

Sociostructural determinants of diabetes self-management: test of a self-efficacy model.

Author:

Rose, Vanessa Karen

Publication Date:

2007

DOI:

<https://doi.org/10.26190/unsworks/17662>

License:

<https://creativecommons.org/licenses/by-nc-nd/3.0/au/>

Link to license to see what you are allowed to do with this resource.

Downloaded from <http://hdl.handle.net/1959.4/31881> in <https://unsworks.unsw.edu.au> on 2024-04-27

Sociostructural determinants of diabetes self-management: test of a self-efficacy model

Vanessa Karen Rose

School of Public Health and Community Medicine
Faculty of Medicine
University of New South Wales

Thesis submitted in fulfilment
of the requirements for the degree of
Doctor of Philosophy

December 2007

ORIGINALITY STATEMENT

I hereby declare that this submission is my own work and to the best of my knowledge it contains no materials previously published or written by another person, or substantial proportions of material which have been accepted for the award of any other degree or diploma at UNSW or any other educational institution, except where due acknowledgement is made in the thesis. Any contribution made to the research by others, with whom I have worked at UNSW or elsewhere, is explicitly acknowledged in the thesis. I also declare that the intellectual content of this thesis is the product of my own work, except to the extent that assistance from others in the project's design and conception or in style, presentation and linguistic expression is acknowledged.

ABSTRACT

Diabetes self-management has clear benefits in reducing diabetes symptoms and complications and improving the health, wellbeing and quality of life of people with diabetes. Successful intervention programs focus on the development of diabetes self-efficacy, which promotes the capacity of people with diabetes to perform diabetes self-management even in the face of difficulty. Diabetes self-management, however, presents considerable challenges for health systems that have been structured to provide acute, rather than chronic care, and health professionals who have been trained to cure illness, rather than manage behaviour. It presents further challenges for people with diabetes who live in socioeconomically disadvantaged circumstances and have limited financial resources for diabetes care and therapies, and poor access to resources for diabetes self-management, such as clean, safe exercise areas and healthy foods at low-cost. These sociostructural determinants of diabetes self-management, defined here as GP care and socioeconomic resources, have the potential to impede the uptake and effective dissemination of diabetes self-management policy and intervention.

This research thesis investigated the impact of sociostructural determinants on diabetes self-management using a model developed from self-efficacy theory. The model was empirically examined using a mixed quantitative and qualitative methodology, where qualitative data were used to illuminate the findings of quantitative data. The quantitative component comprised a random cross-sectional survey of 105 people with diabetes subjected to hierarchical multiple regression with tests for moderator effects. The qualitative component comprised three group interviews of 27 English-speaking, Vietnamese-speaking and Arabic-speaking people with diabetes, analysed using the phenomenological method.

Findings provided partial support for the model. Relationships between sociostructural determinants and diabetes self-management were complex. While good quality GP care facilitated diabetes self-management, it also acted as a barrier to self-monitoring of blood glucose for people with low levels of diabetes self-efficacy. Having limited access to socioeconomic resources did not impede diabetes self-management, even for people with low levels of diabetes self-efficacy, although this may have been masked by access to public health schemes and welfare support. The findings from this small-scale exploratory study suggest that self-efficacy may exert an impact on diabetes self-management, even in the face of sociostructural determinants.

CONTENTS

ACKNOWLEDGEMENTS.....	11
CHAPTER ONE.....	13
General Introduction and Research Rationale.....	13
1.1 Research context.....	13
1.1.1 The burden of diabetes.....	13
1.1.2 Australian chronic disease policy.....	15
1.2 Diabetes self-management.....	18
1.2.1 Definition and overview.....	18
1.2.2 Promoting diabetes self-management.....	22
1.3 Limitations of previous research.....	29
1.4 Research aims and rationale.....	30
CHAPTER TWO.....	33
Self-efficacy theory and sociostructural determinants of.....	33
diabetes self-management.....	33
2.1 Overview.....	33
2.2 Self-efficacy theory.....	34
2.2.1 Defining self-efficacy.....	35
2.2.2 Self-efficacy and diabetes self-management.....	37
2.2.3 Effective promotion of self-efficacy.....	38
2.2.3 Issues in self-efficacy theory.....	43
2.3 Sociostructural determinants of diabetes self-management.....	45
2.4 General practice-based determinants of diabetes self-management.....	48
2.4.1 Diabetes management in general practice.....	49
2.4.2 Diabetes self-management and patient-centred care.....	51
2.5 Socioeconomic determinants of diabetes self-management.....	56
2.5.1 Financial resources and diabetes self-management.....	57
2.5.2 Health literacy and diabetes self-management.....	59
2.5.3 Urban environments and diabetes self-management.....	62
2.6 Towards a test of the.....	62
‘Sociostructural determinants of diabetes self-management’ model.....	62
CHAPTER THREE.....	64
Introduction to Empirical Work.....	64
3.1 Exploratory study.....	64
3.1.1 Overview and methods.....	64
3.1.2 Findings.....	65
3.1.3 Summary and discussion.....	67
3.2 Methodological issues.....	68
3.2.1 Complex policy relevant modelling.....	69
3.2.2 Mixed-methodological research.....	70
3.2.3 Equity in research participation.....	72
3.3 Research aims, questions and objectives.....	73
3.3.1 General research aim and objectives.....	73
3.3.2 Specific research aim and questions.....	73
3.4 Research design.....	74
3.5 Research participation and setting.....	76
3.5.1 Fairfield.....	76
3.5.2 Fairfield Division of General Practice.....	77
3.6 Research approval.....	77
3.6.1 Ethics approval.....	77
3.6.2 Division support and approval.....	77
3.7 Summary.....	78
CHAPTER FOUR.....	79

Quantitative Methods.....	79
4.1 Quantitative study design and hypotheses	79
4.2 Sampling.....	81
4.2.1 Sampling population and frame	81
4.2.2. Power estimates and sample size	81
4.2.3 Sample selection	82
4.2.4 Notes on sampling.....	83
4.3 Survey construction	84
4.3.1 The Summary of Diabetes Self-Care Activities (SDSCA) scale.....	85
4.3.2 The Diabetes Self-Efficacy Scale (DSES)	86
4.3.3 The General Practice Assessment Questionnaire (GPAQ)	87
4.3.4 The Socioeconomic Barriers to Diabetes Self-Care Scale (SBDSC).....	89
4.3.5 Measurement of other variables	93
4.3.6 Pilot testing	93
4.4 Recruitment.....	95
4.4.1 GP consent	95
4.4.2 Participant recruitment.....	95
4.5 Survey administration	95
4.6 Data management and preparation.....	96
4.6.1 Data screening.....	96
4.6.2 Data recoding.....	97
4.7 Data analysis	97
4.7.1 Data independence	97
4.7.2 Preliminary analyses	98
4.7.3 Model testing	99
4.8 Summary.....	102
CHAPTER FIVE	104
Qualitative Methods.....	104
5.1 General overview	104
5.2.1 Phenomenology.....	104
5.2.2 Phenomenology and group interviews	105
5.3 Participants.....	107
5.3.1 Sample size	107
5.3.2 Sample selection	107
5.4 Recruitment.....	108
5.5 Data collection	108
5.5.1 Interview schedules.....	108
5.5.2 Group interviews.....	110
5.5.3 Methods to ensure rigour in data collection	111
5.6 Data analysis	112
5.6.1 Data management.....	112
5.6.2 Analytic method.....	112
5.6.3 Methods to ensure rigour in data analysis.....	114
5.7 Summary	115
CHAPTER SIX.....	117
Quantitative Results: Descriptive data	117
6.1 Survey response rate	117
6.2 Data independence	118
6.3 Sample description.....	119
6.3.1 Demographic characteristics	119
6.3.2 Socioeconomic indicators	120
6.3.3 Health and service data	122
6.3.4 Sociostructural determinants model data	123
6.4 Identifying covariates.....	125
6.4.1 General diet.....	125
6.4.2 Exercise.....	126
6.4.3 Blood glucose testing.....	128
6.5 Summary.....	129

CHAPTER SEVEN	130
Quantitative results: Model testing	130
7.1 Preliminary tests of the model	131
7.1.1 The relation between diabetes self-efficacy and diabetes self-management	131
7.1.2 The relation between GP care and diabetes self-management	132
7.1.3 The relation between socioeconomic barriers and diabetes self-management	133
7.1.4 The relation between predictors and moderators	133
7.2 Tests of moderation.....	134
7.2.1 Regression assumptions and decision-making in tests of moderation	135
7.2.2 Tests for interaction between GP access and diabetes self-efficacy	137
7.2.3 Tests for interaction between GP communication and diabetes self-efficacy.....	141
7.3 Summary.....	153
CHAPTER EIGHT	155
Qualitative Results.....	155
8.1 Sample description.....	155
8.2 Identified themes in diabetes self-management	155
8.2.1 Diabetes self-management beliefs and behaviour.....	158
8.2.2 Self-efficacy and psychological control of diabetes.....	159
8.2.3 Psychosocial barriers to diabetes self-management	161
8.2.4 Financial barriers to diabetes self-management.....	164
8.2.5 GP-based barriers and experiences in diabetes self-management	165
8.3 Sociodemographic influences on diabetes self-management	171
8.3.1 Gender and age	171
8.3.2 Main source of income.....	171
8.3.2 Language and country of birth	172
8.4 Assessing the impact of group context on interview data	172
8.5 Summary.....	178
CHAPTER NINE.....	182
Interpretation of findings	182
9.1 Research limitations.....	182
9.1.1 Limitations in study design	182
9.1.2 Limitations in quantitative methods.....	184
9.1.3 Limitations in qualitative methods.....	189
9.2 Analysis of triangulated quantitative and qualitative data	190
9.2 Diabetes self-efficacy and diabetes self-management.....	192
9.3 Sociostructural determinants of diabetes self-management	195
9.3.1 General practice-based determinants	195
9.3.2 Socioeconomic determinants	197
9.4 Moderation by sociostructural determinants	201
9.4.1 General practice-based moderation.....	201
9.4.2 Socioeconomic moderation.....	208
9.5 Summary.....	210
CHAPTER TEN	213
Implications for research, policy and practice	213
10.1 Implications for research.....	213
10.1.1 Self-efficacy theory and research.....	213
10.1.2 Diabetes self-management for low-income earners	214
10.1.3 Diabetes care in the health system	215
10.1.4 Mixed-method research in diabetes self-management	217
10.2 Implications for policy.....	217
10.2.1 Strengthening patient diabetes self-efficacy.....	217
10.2.2 Strengthening GP support of patient self-efficacy	218
10.2.3 Strengthening GP delivery of diabetes self-management information.....	220
10.2.4 Strengthening practice capacity for diabetes self-management	221
10.3 Implications for practice	223
10.3.1 Provide timely information on diabetes self-management.....	223
10.3.2 Provide opportunities for the development of diabetes self-management skills	223
10.3.3 Provide opportunistic support of patient self-efficacy	224

CONCLUSION.....	226
REFERENCES	228
APPENDIX A.....	249
Patient Information Sheet and Consent Form	249
APPENDIX B.....	250
Survey Instrument.....	250
APPENDIX C.....	251
Normality of Continuous Variables	251
APPENDIX D.....	252
Survey Participation by GP.....	252
APPENDIX E	253
Scatterplots of diabetes self-efficacy and diabetes.....	253
self-management variables.....	253
APPENDIX F	254
Papers published from PhD Research	254

LIST OF TABLES

Table 1.1	24
Table 1.2 Comparison between diabetes self-management and traditional diabetes education	24
Table 1.3 Meta-analyses and systematic reviews of behavioural interventions in diabetes	26
Table 2.1 Sources of self-efficacy in the Diabetes Self-management Program	Error! Bookmark not defined.
Table 2.2	50
Functions of diabetes care within the Chronic Care Model	50
Table 2.3	61
Types of health literacy and diabetes self-management	61
Table 4.1	92
Varimax rotated component loadings for the Socioeconomic Barriers to Diabetes Self-Care Scale	92
Table 4.2	93
Category, level of measurement and instrument source for potential covariates	94
Table 5.1	113
Example of phenomenological data transformation	113
Table 6.1	118
Intra-cluster coefficients (p), design effects (D) and actual sample sizes (n) for SDSCA scales	118
Table 6.2	119
Summary table of Kruskal-Willis testing of SDSCA scales by GP	119
Table 6.3	120
Frequency distributions for respondent demographic data (n=105)	120
Table 6.4	121
Frequency distributions for respondent socioeconomic indicators (n=105)	121
Table 6.5	122
Frequency distributions for respondent general health data (n = 105)	122
Table 6.6	123
Frequency distributions for respondent service related data (n = 105)	123
Table 6.7	123
Mean score, standard deviation, range and maximum scores for SDSCA General Diet, Exercise and Blood Glucose Testing scales (n = 105)	123
Table 6.8	124
Mean, standard deviation, range and maximum score for DSES (n = 105)	124
Table 6.9	124
Mean score, standard deviation, range and maximum score for GPAQ Access and Communication scales (n = 105)	124
Table 6.10	125
Mean score, standard deviation, range and maximum score for SBDSC Place Barriers and Information Barriers scales (n = 105)	125
Table 6.11	127
Summary of descriptive statistics for significant effects of potential confounding variables on SDSCA scales	127
Table 7.1	132
Correlation coefficients between GPAQ Access and Communication scales with SDSCA scales (n = 105)	132
Table 7.2	133
Correlation coefficients between SBDSC Place Barriers and Information Barriers scales with SDSCA scales (n = 105)	133
Table 7.3	134
Correlation coefficients between DSES, GPAQ and SBDSC scales (n = 105)	134
Table 7.4	138
Summary of hierarchical regression for SDSCA General Diet and DSES x GPAQ Access interaction (n = 105)	138
Table 7.5	139
Summary of hierarchical regression for SDSCA Exercise and DSES x GPAQ Access interaction (n = 105)	139
Table 7.6	140

Summary of hierarchical regression for SDSCA Blood Glucose Test and DSES x GPAQ Access interaction (n = 105)	140
Table 7.7	142
Summary of hierarchical regression for SDSCA General Diet and DSES x GPAQ Communication interaction (n = 105)	142
Table 7.8	143
Summary of hierarchical regression for SDSCA Exercise and DSES x GPAQ Communication interaction (n = 105)	143
Table 7.9	144
Summary of hierarchical regression for SDSCA Blood Glucose Test and DSES x GPAQ Communication interaction (n = 105)	144
Table 7.10	147
Summary of hierarchical regression for SDSCA General Diet and DSES x SBDSC Place interaction (n = 105)	147
Table 7.11	148
Summary of hierarchical regression for SDSCA Exercise and DSES x SBDSC Place interaction (n = 105)	148
Table 7.12	149
Summary of hierarchical regression for SDSCA Blood Glucose Test and DSES x SBDSC Place interaction (n = 105)	149
Table 7.13	150
Summary of hierarchical regression for SDSCA General Diet and DSES x SBDSC Information interaction (n = 105)	150
Table 7.14	151
Summary of hierarchical regression for SDSCA Exercise and DSES x SBDSC Information interaction (n = 105)	151
Table 7.15	153
Summary of hierarchical regression for SDSCA Blood Glucose Test and DSES x SBDSC Information interaction (n = 105)	153
Table 8.1	156
Characteristics of interview participants	156
Table 8.2	174
Identified themes presented across interview group	174
Figure 9.1	192
Sociostructural determinants of diabetes self-management model	192
Table 10.1	218
Examples of strategies to strengthen sources of diabetes self-efficacy	218
Table 10.2	220
Level of self-efficacy development and focus of change in diabetes self-management	220

LIST OF FIGURES

Figure 2.1	47
Sociostructural determinants of diabetes self-management model	47
Figure 3.1	75
Visualisation of concurrent triangulation design	75
Figure 4.1	Error! Bookmark not defined.
Statistical interaction model of variables in the Sociostructural determinants of diabetes self-management model	80
Figure 6.1	117
Flow chart showing survey participant response rate	117
Figure 7.1	Error! Bookmark not defined.
Scatterplot of the relation between DSES and SDSCA General Diet scale	Error! Bookmark not defined.
Figure 7.2	Error! Bookmark not defined.
Scatterplot of relation between DSES and SDSCA Exercise scale.....	Error! Bookmark not defined.
Figure 7.3	131
Scatterplot of the relation between DSES and SDSCA Blood Glucose Test scale.....	Error! Bookmark not defined.
Figure 7.4	141
DSES by GPAQ Access interaction in SDSCA Blood Glucose Test scale	141
Figure 7.5	145
DSES by GPAQ Communication interaction in SDSCA Blood Glucose Test scale	145
Figure 7.6	Error! Bookmark not defined.

LIST OF BOXES

Box 3.1	71
Key characteristics of the quantitative and qualitative research paradigms	71
Box 4.1	90
Items generated to reflect socioeconomic barriers to diabetes self-management	90
Table 7.11	148
Summary of hierarchical regression for SDSCA Exercise and DSES x SBDSC Place interaction (n = 105).....	148
Table 10.1	218
Examples of strategies to strengthen sources of diabetes self-efficacy.....	218

ACKNOWLEDGEMENTS

It is a true distortion to believe that any of this thesis could have been created by me alone or, to a lesser degree, that others were simply steering a well and purposeful built ship with a clear destination. I therefore offer my sincere and heartfelt thanks to the following people who provided their indispensable help in just the right way at the right time:

University of NSW PhD supervisors, Mark Harris and Tessa Ho, and my work supervisor and mentor at the Centre for Health Equity Training Research and Evaluation, Liz Harris, for their inspiration, intelligence, dedication, care, practical support, guidance and humour.

University of NSW School of Public Health and Community Medicine staff, particularly Postgraduate Review members, Ilse Blignaut, Sally Nathan and Robyn Richmond and Postgraduate Coordinator, Deborah De Bono, for their valuable advice and encouragement.

Fairfield Division of General Practice staff and board members, particularly Nick Zwar, who supported the research proposal (resulting in financial support for group interviews) and Gladys Hitchen, who was enthusiastic and determined in its implementation.

Sydney South West Area Health Service staff, particularly Jeanette Ward, who as Director of Population Health generously funded part of my time to work on this research, and bilingual health workers, Anh Tran and Heba Day who kindly interpreted the group interviews.

Work and study colleagues, past and present, across the UNSW Research Centre for Primary Health Care and Equity and other institutions who conducted interviews, discussed ideas, and gave critical feedback on thesis drafts: Janette Perz, Lisa Thompson, Elizabeth Comino, Lynn Kemp, Sarah Simpson and Ben Harris-Roxas.

Friends and family, many of whom are work and study colleagues, who made me laugh, gave me continued love and support, and asked ‘how’s the thesis going?’ on a regular basis.

People with diabetes, who generously gave up their valuable time to talk about themselves in the hope that what they say will be heard and contribute to better care and support for self-management and the National Health and Medical Research Council who funded much of this work through a Postgraduate Public Health Scholarship.

CHAPTER ONE

General Introduction and Research Rationale

This chapter provides a general introduction to the burden of diabetes, the central importance of diabetes self-management to public health responses to this burden, and the rationale for an investigation of sociostructural determinants of diabetes self-management. In doing so, it outlines the Australian chronic disease policy context, the behavioural challenge of diabetes self-management and evidence for the effective and efficient promotion of diabetes self-management through different modes of intervention.

1.1 Research context

1.1.1 The burden of diabetes

Diabetes is a major global public health concern for the 21st Century (1, 2). It is currently the fifth leading cause of death globally (3) and is projected to rise substantially, from a world-wide prevalence of 2.4% in 2000 to 4.4% in 2030, representing 366 million people with diabetes (4). The rise of type 2 diabetes has coincided with globalisation and substantial technological and social changes to human work, lifestyles and environments, which have lead to population aging, growth, obesity, unhealthy diets and sedentary lifestyles (1, 2). At the same time, public health initiatives in developed countries have resulted in people living longer than previously and being more susceptible to chronic disease (2). The burden of diabetes is not expected to be distributed evenly across the worlds' populations: the growing prevalence of diabetes will be borne by people in developing countries and, to a lesser extent, socioeconomically disadvantaged people in developed countries (1, 2).

Australia has one of the highest recorded prevalence of diabetes for a developed nation (5). The Australian Diabetes, Obesity and Lifestyle study (AusDiab) of 11 247 Australians from 1999 to 2000 reported a diabetes prevalence of 7.4% (5); 7.2% of

which was attributable to type 2 diabetes (6). The proportion of Australians with diabetes or at-risk for diabetes rose to 23.8% if people with impaired glucose tolerance and impaired glucose fasting were included in these calculations (5). This represents a significant public health challenge for Australia, particularly given that only half the AusDiab sample met individual glycaemic, lipid and blood pressure targets for optimal diabetes control and the reduction of complications (7).

Significant inequalities exist in the mortality of Australians with diabetes. National statistics from 2001 to 2003 show that deaths from diabetes-related causes are more likely to occur in (8):

Aboriginal and Torres Strait Islander people, who are four times more likely to die from diabetes-related causes than other Australians;

People living in remote areas, who are more likely to die from diabetes-related causes than people living in regional areas or major cities;

Certain groups of people born overseas, such as people born in the South Pacific Islands, Southern or South Eastern Europe, Eastern Europe, the Middle East and North Africa, who are more likely to die from diabetes-related causes than people born in Australia; and

People living in the most socioeconomically disadvantaged areas of Australia, who are more likely to die from diabetes-related causes than people born in the most advantaged areas.

Mortality rates for these populations are reflected in statistics for diabetes morbidity, including increased prevalence, presence of complications and health service use (6, 9, 10); and in the case of both socioeconomically disadvantaged and culturally and linguistically diverse groups, have been demonstrated in the US, UK and other European countries (11-17). Socioeconomic factors, in fact, present a diabetes complications risk profile similar to ‘hard’ clinical factors such as hypertension and diabetes duration (18).

The costs of diabetes are substantial. People with diabetes, and particularly those with diabetes complications (i.e. both microvascular and macrovascular disease), report

poorer health, a lower quality of life, higher rates of depression and disability, and significant social and work impairment (6, 19-22). These social, health and welfare costs are not insignificant: US research estimated that diabetes accounted for \$120 billion in lost productivity in the US last century due to early retirement, sick days, disability and premature mortality (23). Australian health system expenditure on diabetes was estimated to be \$784 million in 2000 to 2001; an average cost of \$1469 per known diabetes patient or \$42 per Australian (24). These costs increase substantially with the presence of diabetes complications; in one Australian study the costs of diabetes attributable medications increased five-fold over a four-year period amongst this group (25). The social and economic burden of diabetes and pattern of inequality presents a significant policy challenge for public health in Australia.

1.1.2 Australian chronic disease policy

Type 2 diabetes is both preventable and manageable. Randomised controlled trials, such as the UK Prospective Diabetes Study (UKPDS) showed that the risk of diabetes complications can be reduced by intensive therapy and tight blood glucose and blood pressure control (26-29), resulting in significant cost-savings for health systems in the long-term (30). Efficacy is, however, not the same as effectiveness and even well-designed, highly successful interventions may fail when implemented in real-world environments (31, 32). The strength of clinical trials lies in their high internal validity; a procedure that is necessary to establish causation but also impairs generalization of the findings to different settings and groups (33). In fact, the UKPDS has suffered somewhat from a lack of external validity or generalizability of results; although some benefits remain. By 2002, five years post-trial when participants had returned to usual care, diabetes control (assessed by median haemoglobin A1c or HbA1c values) had converged in the two therapy groups and only one-quarter of former trial participants had achieved the target HbA1c level of < 7.0% (34); a value that is now considered best practice in clinical guidelines for diabetes management (35). This limitation does not render the results of clinical trials worthless because it is clear that they are an essential step in improving population health (32, 33), but it does mean that their findings must be effectively translated to broader public health policy and practice. A first step in this translation is understanding the psychosocial and sociostructural environments in which

this policy will be implemented. This is a key principle of the present research and will be articulated in depth throughout this thesis.

Australian diabetes policy is subsumed within the National Chronic Disease Strategy, which provides an overarching framework of coordinated and nationally agreed action in improving chronic disease prevention and care across Australia (36). Supporting the strategy are five National Service Improvement Frameworks linked to National Health Priority Areas, one of which is diabetes. Both the strategy and frameworks are intended to act as high level guides in informing policy development at the national, state, territory and local levels over the next five to ten years. Key principles underpinning the strategy and frameworks include (36):

- adoption of a population health approach and the reduction of health inequalities;
- prioritisation of health promotion and illness prevention;
- achieving person centred care and optimising self-management;
- providing the most effective care;
- facilitating coordinated and integrated multidisciplinary care across services, settings and sectors;
- achieving significant and sustainable change; and
- monitoring progress.

Self-management is one of four key action areas in the strategy (36) and the diabetes framework clearly articulates a significant role for diabetes self-management across all levels of disease progress; from diagnosis, to early to long-term care, and managing transient declines in health status (37). The framework views diabetes management from the perspective and responsibility of health systems, which are envisaged to support self-management through the structured provision of evidenced-based information on diabetes self-management and the reduction of complications, and later, through shared doctor-patient decision-making. The reliance of the National Chronic Disease Strategy and National Service Improvement Framework for Diabetes on self-management as a key strategy makes sense given that health policy must find a balance

between improving the health and wellbeing of people with a chronic illness and reducing their health care costs (38).

The effective implementation of this strategy will however require significant social and structural change within Australian health systems and the people who provide health care. The Australian health system, like many others around the world, is still primarily oriented toward acute care, reflecting the historical roots of medicine and infectious disease (39-42). Acute care systems are however a poor and inefficient match for chronic disease because (40, 43, 44):

- chronic disease is managed rather than cured;
- chronic disease management is continuous rather than episodic;
- chronic disease management is daily overseen by the patient (i.e. self-management) rather than the doctor; and
- decision-making in chronic disease management is shared rather than determined by doctors and health systems.

1.2 Diabetes self-management

1.2.1 Definition and overview

Guidelines for diabetes management tend to separate self-management activities into those that are performed outside the health care system (i.e. health-promoting behaviours and self-monitoring) and those that are performed within the health care system (i.e. interactions with health care providers). In this way, interactions with health care providers in diabetes decision-making are seen to be the method through which diabetes self-management behaviours, such as diet, exercise and self-monitoring of blood glucose are supported and promoted. Table 1.1 presents the behavioural self-management recommendations for diet, exercise and self-monitoring of blood glucose from the Diabetes Management in General Practice manual (35). Here it is important to note that this thesis has a particular focus on lifestyle behaviours; even though it is recognised that medication use has an important role in self-management and optimal diabetes outcomes. This is because lifestyle behaviours represent the first step in self-management for a person newly diagnosed with type 2 diabetes (35), and are more difficult to adopt and maintain than medication use (51, 59); indicating the need for focussed research and intervention.

Table 1.1
Behavioural recommendations for management of diabetes

Behaviour	Recommendation
Nutrition	<ul style="list-style-type: none"> • balanced healthy eating • carbohydrates rich in fibre with low energy density • reduced fat intake and substitutes for saturated fat
Physical activity	<ul style="list-style-type: none"> • low level aerobic exercise (i.e. brisk walking for half an hour a day) • care of feet during physical activity
Self-monitoring of blood glucose	<ul style="list-style-type: none"> • recommended for all people with type 2 diabetes • frequency of monitoring must be individualised

Adapted from Diabetes Management in General Practice guidelines (35)

Even though there have been considerable advances in diabetes therapy, the vast majority of diabetes management still occurs outside health systems (47, 49-51). In fact, these advances have further increased the need for people with diabetes to participate more fully in self-management and diabetes care decisions (52). Diabetes self-management is the ultimate daily responsibility of people with diabetes, and this responsibility is ‘non-negotiable, inescapable and cannot be shared or assigned’ (44). It is a complex activity comprising the achievement and monitoring of several skilled behaviours including (40, 43, 53):

- performing behaviours that promote health, wellbeing and prevent complications;
- interacting with health care providers in shared decision-making about diabetes care and management;
- monitoring physical and emotional states and making appropriate decisions based on the results of self-monitoring;
- coping with negative emotional states associated with the onset of diabetes such as fear, anger, frustration and sadness; and
- developing and maintaining meaningful social roles in relationships and employment.

Diabetes self-management places considerable psychological and behavioural demands on the individual (51, 54). Individuals must not only perform diabetes self-management activities regularly and accurately, they must also manage the interrelations between activities by self-monitoring physiological states, incorporating this information into decision-making, and adjusting self-management activities, such as diet, exercise or medication use accordingly to maintain a satisfactory quality of life (51, 55-57). It is this seeming relentless cycle of decision-making and behaviour change in response to physiological cues and life needs that prompted Gonder-Frederick, Cox and Ritterband (54) to write:

“From a psychobehavioural perspective, it is difficult to imagine any other illness that places the same level of demand on patients to self-monitor and self-regulate their own health status” (p. 613).

This thesis is primarily concerned with three activities of diabetes self-management: performance of health-promoting behaviours; interaction with health care providers; and self-monitoring of health states, particularly in regard to the activity of blood glucose self-monitoring. These self-management behaviours are the focus of Australian diabetes policy and are supported by guidelines and manuals for diabetes management, such as Diabetes Management in General Practice (35) and Chronic Condition Self-Management Guidelines (58). By tying this research to existing diabetes initiatives, it is hoped that relevant findings from the present study will better inform current Australian diabetes self-management policy and practice, particularly as it relates to general practice.

Behavioural recommendations in diabetes are generally based on evidence demonstrating efficacy in diabetes control through glycaemic management or the reduction of complications. There is sound evidence for the impact of diet and exercise related lifestyle change on diabetes prevention and control (60-62). While self-monitoring of blood glucose is recognised as important in its own regard for diabetes self-management (35, 63), the probable impact of this practice on diabetes control remains controversial. Two recent meta-analyses have investigated the impact of self-monitoring of blood glucose on glycaemic control for people with type 2 diabetes who are not using insulin. One study reported no impact of self-monitoring of blood glucose on glycaemic control (64), while the other reported a moderate impact represented by a clinically relevant 0.39% reduction in HbA1c compared with control groups (65). Both meta-analyses were limited by design heterogeneity and poor methodological quality of the studies included.

The absence of unequivocal evidence for the efficacy of self-monitoring of blood glucose has led some authors to question its value for people with type 2 diabetes, believing it to be a poor use of health dollars and an unnecessarily invasive procedure with no clear benefit (64, 66-68). These authors, however, appear to view self-monitoring of blood glucose incorrectly as an isolated activity. Simply collecting blood glucose information does not determine diabetes control (69). The value and utility of self-monitoring of blood glucose should be viewed in conjunction with the other

behaviours of diabetes self-management, such as diet, exercise and medication use.

Self-monitoring of blood glucose, for example, can play an important role in a structured biofeedback system of diabetes self-management behaviour and decision-making (69, 70). In this regard, a recent randomised controlled trial of a structured program in an outpatient setting linking self-monitoring of blood glucose to meals showed a significant decrease in HbA1c over six-months compared to a control group given lifestyle advice only (71).

Despite impressive trial effects and ambitious targets for diabetes control, the reality is that many people with diabetes experience difficulties with self-management. While oral medication use is considered the easiest and least burdensome of all diabetes self-management activities, both diet and exercise are considered to be the most difficult (54, 56, 59). In a US population study of people given recommendations for diabetes self-management, up to 97% of people with diabetes reported taking regular oral hypoglycaemic or insulin medications, 79% reported regular self-monitoring of blood glucose, 64% reported regular consumption of a diabetes diet, and 47% reported regular exercise (56). These results not only show a relative independence of diabetes self-management behaviours (59), they also suggest the existence of differing underlying psychological constructs, with medication use reflecting notions of habit and adherence (72), and lifestyle change and self-monitoring reflecting notions of, for example, agency and self-efficacy (47, 73, 74). In general, simple compliance models provide poor explanations for complex diabetes self-management behaviours (54).

Diabetes self-management is affected by a myriad of factors. Cross-sectional quantitative studies show that effective diabetes self-management can be impeded by: poor health status and illness comorbidity, such as chronic pain (75, 76) and depression (77-80); psychological factors, such as low self-efficacy (81-86), feelings of stress (87), and perceived burden of treatment (88); demographic factors, such as older age (87, 89) and culturally and linguistically diverse background (89, 90); socioeconomic factors, such as low levels of education (90, 91) and income (90, 92); social factors, such as poor quality of personal and familial relationships (87); health system factors, such as dissatisfaction with care (87), and poor experiences with patient-centred care, including

inadequate shared decision-making and communication (93-97); and diabetes-specific factors such as poor diabetes knowledge (98) and low levels of diabetes health literacy (99).

Qualitative studies have identified similar factors of importance to diabetes self-management, such as diabetes-specific knowledge, psychological control and attitude, social support and collaborative decision-making in diabetes care (100, 101). People who demonstrate good diabetes self-management and control take diabetes seriously (102-104), are rationale problem-solvers (100), are flexible in their self-management routines (102), accept responsibility for diabetes management and outcomes (105), and successfully integrate diabetes self-management into their daily lives (104, 106, 107).

Several qualitative studies have explored diabetes issues in culturally and linguistically diverse populations and Indigenous populations; although these studies tend to focus on meanings of diabetes (108), attributions of diabetes causation (109), and health care and management needs (110), rather than differences in diabetes self-management. A systematic review of health care use and needs among culturally and linguistically diverse groups suggested that effective models of diabetes self-management should include culturally-relevant beliefs, materials and ways of communicating diabetes information (111). While cultural background and beliefs can play a role in diabetes self-management (112), some research suggests that other factors such as, treatment modality (Fitzgerald et al, 2000), financial resources (105), and literacy (113) may play more of a role. This may be especially the case for people from culturally and linguistically diverse backgrounds who are in contact with health systems and have received information or education in diabetes self-management.

1.2.2 Promoting diabetes self-management

Since the findings of the Diabetes Control and Complications Trial (114) and UK Prospective Diabetes Study (115), diabetes patients have had demanding targets set for diabetes control that have not been matched by health system provision of effective self-management programs and ongoing support for behavioural change (116). Traditional methods for diabetes education were didactic and treated people with diabetes as a

passive “receptacle for knowledge or a pot to be filled with information by doctors, nurses, and dieticians” (116). Learning to self-manage diabetes was all about ‘doing the right thing’ and complying with a linear behavioural algorithm for glycaemic control. According to Anderson et al, (44) this model of diabetes education was:

“... based on the assumption that if people performed the ‘right’ number of blood tests, ate the ‘right’ diet, took the ‘right’ amount of insulin and undertook the ‘right’ amount of exercise, that good diabetes control would ensue” (p. 74).

This form of diabetes education has been largely discredited and systematic reviews of didactic interventions show that it has, at best, inconsistent effects on glycaemic control and behavioural change (44, 117). Bodenheimer et al, (53) have identified key differences between diabetes self-management education and traditional patient education: these are adapted to diabetes in Table 1.2. In general, education in diabetes self-management emphasises problem solving and self-efficacy in achieving behavioural change and managing the physical, social and emotional consequences of diabetes, while diabetes education emphasises patient compliance to diabetes-specific knowledge and skills taught by health professionals (53, 55). Diabetes self-management is closer to the ideal of patient empowerment than diabetes education. Rather than enforced compliance to diabetes treatments, patient empowerment attempts to provide individuals with the skills, resources and autonomy they need to take charge of diabetes self-management and make informed decisions about their own care (44, 52, 54).

Despite these philosophical differences in approaches to diabetes management, the terms diabetes education and diabetes-self management education are still used interchangeably, and some researchers appear to make little distinction between didactic education and models of patient empowerment. Ellis et al, (118), for example, included both didactic education and goal-directed self-management education in their meta-analysis of diabetes self-management programs. This has hampered the development of an evidence base for diabetes self-management; a problem that is further complicated by the diversity of models used to both promote and describe diabetes self-management behaviours and diabetes outcomes. Within the health care system, diabetes self-

management models include effective patient-provider communication (93, 94, 97), shared decision-making and goal-setting (95, 96), continuity of care (119), structured diabetes care (120), nurse-led care focusing on personal understandings of diabetes (121) and telephone support for diabetes self-management (122).

Table 1.2
Comparison between diabetes self-management and traditional diabetes education

	Traditional diabetes education	Diabetes self-management education
Underlying theory	Diabetes knowledge produces behaviour change which produces better clinical outcomes	Self-efficacy in performing diabetes self-management behaviours produces better clinical outcomes
Educational approach & content	Education is diabetes specific & teaches information & technical skills related to diabetes	Education is broad & focuses on skills in problem solving
Educational goal	Goal is increased compliance to diabetes care instructions	Goal is increased self-efficacy in diabetes self-care
Conceptualisation of problems	Problems reflect inadequate diabetes control	Problems identified by patients & may or may not be diabetes related

Adapted from Bodenheimer et al (53)

Twelve systematic reviews and meta-analyses of the efficacy of diabetes self-management interventions published since 2001 were identified in the literature review (Table 1.3). The reviews encompass intervention strategies ranging from psychological interventions to group and individual based self-management training conducted in different settings with different population groups. Overall, the systematic reviews and meta-analyses demonstrate a positive impact of diabetes self-management intervention

on glycaemic control, mental wellbeing and quality of life. It is of note that the one review to document inconsistent effects of intervention on glycaemic control (117), reviewed diabetes education rather than diabetes self-management; and that meta-analyses mixing diabetes education and diabetes self-management education showed lower improvements in glycaemic control, particularly over-time (118, 123) than studies focusing exclusively on diabetes self-management education (124-126). The strongest impact of diabetes self-management on glycaemic control was demonstrated through group-based training (124), and this review showed maintenance of these effects over a two-year period.

Effectiveness research in diabetes self-management has been conducted, or published, less frequently than efficacy studies. Eakin et al (135) conducted an effectiveness review of ten diabetes self-management interventions implemented with culturally and linguistically diverse and older age populations using the RE-AIM (Reach, Efficacy, Adoption, Implementation, Maintenance) framework (136). They found that while most of the studies reported efficacy information and some reported maintenance, very few reported information on the proportion of the eligible population participating in the study (i.e. Reach), the proportion and representativeness of healthcare organizations willing to take part in the intervention (i.e. Adoption), and whether the intervention was delivered as intended (i.e. Implementation) (135). This information is essential if

Table 1.3
Meta-analyses and systematic reviews of behavioural interventions in diabetes

Authors	Review type	Intervention strategy	Studies (n)	Findings^a
Deakin et al (124)	Systematic review & meta-analysis	Group based training in diabetes self-management	11 RCTs n = 1532	Improvement in glycaemic control – 1.4% at 6-months, -0.8% at 1-year and -1.0% at 2-years Improvements in fasting blood glucose levels, body weight, diabetes knowledge and systolic blood pressure Intervention had reduced need for medication
Ellis et al (118)	Meta-analysis	Patient education, including didactic, goal-directed interventions	28 RCTs n = 2439	Improvement in glycaemic control -0.29% at 3-months, -0.49 at 6-months, and -0.33 at 1-year Face-to-face delivery, cognitive reframing and exercise content more likely to improve glycaemic control
Gary et al (123)	Meta-analysis	Patient education and behavioural interventions (not including medications)	18 RCTs n = 2720	Improvement in glycaemic control -0.76% at post-test and -0.26% up to 16 weeks or longer
Ismail et al (127)	Systematic review & meta-analysis	Psychological intervention, such as cognitive behavioural therapy (alone or with behaviour modification)	25 RCTs n = 522	Improvement in glycaemic control -0.76% Improvement in psychological distress
Loveman et al (117)	Systematic review	Patient diabetes educational interventions	24 studies	Inconsistent effects of intervention on glycaemic control in type 2 diabetes Cost-effectiveness of patient education unclear

^aGlycaemic control measured by median haemoglobin A1c or HbA1c values

Table 1.3 cont.

Authors	Review Type	Intervention strategy	Studies (n)	Findings ^a
Newman et al (128)	Systematic review	Patient self-management training (group and individual)	21 RCTs	Positive effects of intervention on glycaemic control, diet and exercise
Norris et al (129)	Systematic review	Patient self-management training (group and individual)	72 studies	Positive effects of intervention on diabetes knowledge, frequency and accuracy of blood glucose self-monitoring, self-reported diet and glycaemic control at 6-months Interventions involving patient collaboration more effective than didactic interventions
Norris et al (125)	Meta-analysis	Patient self-management education (group and individual)	31 RCTs n = 4263	Improvement in glycaemic control -0.43%
Norris et al (130)	Systematic review	Patient self-management training in community settings, such as community centres, libraries and faith institutions	30 studies	Positive effects of intervention on glycaemic control in community settings Effect unclear for worksite or camp interventions
Sarkisian et al (131)	Systematic review	Diabetes self-management intervention for older African American and Latino adults	12 studies	Positive effects of intervention on glycaemic control Successful intervention associated with poor glycaemic control at baseline, involvement of families and culturally tailored group program
Steed et al (132)	Systematic review	Diabetes education, self-management and psychological interventions	36 studies	Positive effects of intervention on psychosocial outcomes Self-management interventions improve quality of life & psychological interventions reduce depression
Warsi et al (126)	Systematic review & meta-analysis	Patient self-management education (group and individual)	13 RCTs n = 2036	Improvement in glycaemic control – 0.45% and systolic blood pressure

^a Glycaemic control measured by median haemoglobin A1c or HbA1c value

evidence gleaned from efficacy studies in diabetes self-management is to be effectively transferred to health care systems and diabetes policy.

Despite its importance to political decision-making, even less information is available on the potential cost-effectiveness of diabetes self-management. Only one cost-effectiveness analysis of diabetes self-management intervention has been undertaken; and this was published in 2000 using studies from 1970 to 1991, many of which actually evaluated diabetes education (133). Even so, this study concluded that diabetes self-management training was possibly cost-effective: of the seven out of nine studies in which benefits exceeded costs, the cost benefit ratio ranged from \$0.44 to \$8.76 US dollars for every \$1 spent on self-management education. Both the frequency and accuracy of cost-effectiveness analyses should increase as the methods for measuring the cost-effectiveness of behavioural change over time are developed (134).

The Australian government recently invested \$36.2 million in the Sharing Health Care Initiative, which was designed to test the effectiveness of several different models of chronic disease self-management intervention, including structured coordinated general practice-based care planning, patient education and training, and self-management support through, for example, peer-led support clubs or telephone coaching (45). These interventions were implemented in every state and territory across Australia and included culturally and linguistically diverse, Indigenous, socioeconomically disadvantaged and rural and remote populations. Recommendations from the evaluation of the Sharing Health Care Initiative included (45):

- the capacity of communities to support chronic disease self-management should be promoted;
- chronic disease self-management approaches should be flexible, both in terms of the mode of program delivery and the ability of programs to target and respond to patient need;
- appropriate support should be given to people with chronic diseases so that they do not become dependent on chronic disease programs; and
- health care systems, particularly GPs, should have a pivotal role in facilitating patient self-management of chronic disease.

Even though the Sharing Health Care Initiative was implemented within diverse populations, the diversity of approaches used meant that the effectiveness of interventions for specific population groups could not be determined. Cautionary tales for the implementation and dissemination of self-management interventions are available in the health promotion literature, where authors have speculated on the adverse effects that these programs may have had on health inequalities (141-143). In their review of chronic disease self-management for disadvantaged groups, McDonald et al (144) state that effective chronic disease self-management policy and intervention must take into account the beliefs, knowledge, skills, competing demands, and personal, social, economic and structural resources of both patients and health systems in achieving long-term behavioural change. Diabetes self-management then must be viewed within the psychosocial and sociostructural (i.e. factors or systems that are socially constructed such as the socioeconomic environment and health systems) context of the person with diabetes.

1.3 Limitations of previous research

Specific limitations in diabetes self-management research have been highlighted throughout the preceding discussion. There are two general limitations in the focus and direction of previous research which will be addressed in this study:

1. The lack of focus on how health systems and practitioners influence diabetes self-management

Few studies exploring the influence of health practitioners on diabetes self-management were identified in the literature (93-97); and these studies tend to have been undertaken by investigators from the same research teams, none of whom are Australian (see Section 2.4.2). Given that Australian government policy views the health system, and GPs in particular, as key providers of diabetes care and intervention, a greater focus on this area is warranted.

2. The lack of focus on socioeconomic factors and how they may influence diabetes self-management

A small number of studies exploring the influence of socioeconomic factors, such as income, on diabetes self-management were identified in the literature (90, 92, 203,352-354). These studies show an influence of out-of-pocket costs on access to medications, preventive care and blood glucose testing strips (see Section 2.5.1). All of these studies, were however, undertaken in the United States which, unlike Australia, has limited public health and welfare systems. Given the focus of Australian government policy on promoting self-management in the community, the influence of socioeconomic factors on diabetes self-management needs to be explored.

1.4 Research aims and rationale

The facts of diabetes reviewed in this chapter are clear. They are restated and bullet-pointed below for emphasis.

- Diabetes is a significant global public health concern and a substantial burden on health, social and economic systems (1,2).
- Australia has one of the highest rates of diabetes in the developed world (5), resulting in considerable health system costs (24).
- The burden of diabetes morbidity and mortality is distributed unevenly across the Australian population, with higher prevalence and poorer outcomes in socioeconomically disadvantaged, Aboriginal and Torres Strait Islander, geographically remote, and certain culturally and linguistically diverse groups born overseas (8).
- There is considerable government investment in diabetes intervention and self-management education in Australia evidenced through the National Chronic Disease Strategy (36) and Diabetes Service Framework (37).
- There is converging Level 1 evidence (i.e. systematic reviews and meta-analyses) for the efficacy of diabetes self-management in promoting glycaemic control, mental wellbeing and quality of life (Table 1.3).
- Implementation studies, such as the Australian government's Sharing Health Care Initiative (45), demonstrate the effectiveness of self-management education in

promoting the care and control of diabetes (and other chronic disease) within existing health system structures.

The facts above present both the ‘problem’ of diabetes (i.e. the social and economic costs) and one proposed policy ‘solution’ (i.e. diabetes self-management). This solution however, at least in its current conceptualisation, fails to address the pattern or distribution of diabetes and its costs in Australia. In simple terms, the facts show that the burden of diabetes morbidity and mortality is clustered within particular population groups yet the proposed policy response is based on the assumption that the Australian diabetes population has equal access to diabetes self-management education and the personal, social and structural resources required to implement this education in their daily lives. There are good reasons, however, to suspect that this may not be the case.

People living in disadvantaged communities, for example, have poorer access to health care, fewer financial resources and lower levels of education than their advantaged counterparts (145-147); and are more likely to be isolated and marginalised from social, economic and political structures (148, 149). This suggests that some groups with the highest level of diabetes morbidity and mortality in Australia, such as groups who are disadvantaged, may benefit less from self-management policy than other groups who are better placed to participate in health initiatives and programs. Note that this is not an argument about values or the perceived equity or inequity of the distribution of diabetes within Australia. It is an argument about the logic inherent to the problem of diabetes and its proposed solution, and to get to the crux of the issue, how limited Australian health budgets should best be spent in controlling the growing diabetes ‘epidemic’.

These big picture questions - Will proposed self-management policy reduce diabetes morbidity and mortality in Australia? Which population groups will benefit most from Australian self-management policy? – provide the guiding framework for this thesis, although the scope of work is necessarily smaller. The aim of this research is to examine the sociostructural context in which people daily undertake diabetes self-management. That is, the research examines how people with diabetes negotiate health systems for self-management advice and education and how they perform the daily routines of diet, exercise, self-monitoring of blood glucose and medication use in the

presence, or absence, of adequate socioeconomic resources, such as income to buy healthy foods and safe areas to exercise within their neighbourhood. Access to health systems and socioeconomic resources for diabetes are essential to the success of Australian government self-management policy.

This is not to say that access to health systems and socioeconomic resources are the only influences on diabetes self-management. Diabetes self-management is clearly affected by both sociostructural and volitional factors. Access to health systems and socioeconomic resources in themselves are not sufficient to realise effective diabetes self-management; the person must also possess appropriate psychological resources, such as motivation, perseverance and self-efficacy in behavioural control. Moreover, it is likely that these sociostructural and psychological determinants interact in producing diabetes self-management (a person with strong beliefs in their ability to manage their diabetes through diet control, for example, may be able to use the limited socioeconomic resources available to them more effectively than a person who does not possess this belief). For this reason, this research examines sociostructural determinants of diabetes self-management within a self-efficacy model of health behaviour. This model and argument is advanced in Chapter 2.

CHAPTER TWO

Self-efficacy theory and sociostructural determinants of diabetes self-management

This chapter presents theoretical and empirical evidence supporting the development of a sociostructural determinants model of diabetes self-management based on self-efficacy theory. In doing so, the chapter critically appraises self-efficacy theory including construct development, universality, behavioural causality, and sociostructural determinants of diabetes self-management behaviour. Sociostructural determinants identified for this thesis are access to quality general practice care (e.g. physical access, patient centred care) and socioeconomic resources (e.g. access to appropriate food outlets and exercise environments) for behavioural change. These determinants and their respective components are discussed in detail and their empirical links to diabetes self-management presented with reference to the ‘Sociostructural determinants of diabetes self-management self-efficacy model’.

2.1 Overview

Most health behaviour theories are framed negatively and explain health behaviour as a reaction to risk factors. As a result, these theories greatly over-predict psychopathology and the inability to change difficult behaviours (47, 150). According to Bandura (150):

“We are more heavily invested in intricate theories for failure than in theories for success. Risk factors command our attention. Enablement factors that equip people with the skills and resilient self-beliefs to exert control over their own functioning and taxing environments receive little notice” (p. 215).

Yet many people make substantial changes to their health behaviours without intensive programs or significant service assistance. In the drug and alcohol field, self-initiated change managed by individuals and their families has been referred to as the natural recovery phenomenon or ‘the elephant that no-one sees’ (151). Some people with diabetes receive minimal support from health care providers or systems but are able to

effectively change their behaviours by attention to psychological control processes, family and peer support, and information gleaned from print and media diabetes resources. Ruggerio et al's (56) US population study of diabetes self-management showed that of those with type 2 diabetes who did not receive any self-management recommendations from their health care providers: 69% (no medication) to 80% (insulin or oral medication) had developed their own diet plan; 52% (insulin or oral medication) to 58% (no medication) had developed their own exercise plan; and 7% (no medication), 12% (oral medication), and 31% (insulin medication) had developed their own self-monitoring of blood glucose plan. Self-initiation and maintenance of behavioural change outside health systems is clearly then not a rare or unusual event. This suggests a significant role for self-efficacy.

2.2 Self-efficacy theory

Self-efficacy was selected as the key organising framework for the present study in preference to other theories of health behaviour, including the theory from which it was derived, social cognitive theory, because it offered two distinct advantages. First, self-efficacy avoids many of the criticisms of health behaviour theories such as their problematic causal construction and variable redundancy resulting from overlapping constructs (47, 152). Second, a focus on the self-efficacy construct rather than health behaviour theory reflects current Australian chronic disease policy advocating the flexible design and delivery of diabetes self-management interventions (45). Self-efficacy can be applied to a diverse range of interventions models: it has, in fact, been integrated into the Theory of Planned Behaviour and Health Belief Model (Bandura, 47?). There are even studies investigating its utility in the Transtheoretical Model (47, 153). The predictive utility of these models increases significantly when self-efficacy is included (47).

Self-efficacy is, however, more than just a predictive construct, even though it is often treated this way by researchers. Self-efficacy, in fact, demonstrates many of the hallmarks of theory, including sophisticated conceptualisation, underlying organising principles and assumptions, and testable predictive hypotheses (154-156). It is therefore, referred to as theory in this thesis, as it has been by several other authors (157-160),

including Bandura (73, 161), the major proponent and conceptual developer of the self-efficacy construct.

2.2.1 Defining self-efficacy

Simply put, self-efficacy refers to “people’s beliefs about their capabilities to exercise control over events that affect their lives” (162). In the context of health behaviours, self-efficacy can be defined as a person’s belief in their own capacity to successfully organise, perform and attain valued behavioural outcomes in health across different circumstances and contexts (73, 158, 159, 161-163). Self-efficacy is a psychological construct that governs behavioural change and management through the coordination of three interconnected yet separate cognitive functions: knowledge and skills to perform a behaviour; confidence and capacity to mobilise motivational and other cognitive resources; and belief in the ability to perform a specific behaviour in a given context (158). Here it is important to note that efficacy expectations alone cannot produce behaviour in the absence of behavioural capability (163). Given appropriate skills and supportive environments however, self-efficacy is a major determinant of people’s behaviour (73, 162, 163).

Self-efficacy beliefs have a direct impact on people’s expectations, goals and motivation and are key determinants of how much effort a person will exert and how long they will persevere with a particular behaviour in the face of difficulty (73, 157, 159, 162). The more people believe that they are capable of performing a valued behaviour, the more persistent and resilient they are in performing this behaviour successfully over-time (73, 162). According to Bandura (73), people with high levels of self-efficacy:

“...set themselves challenging goals and maintain strong commitment to them. They invest a high level of effort in what they do and heighten their effort in the face of failures or setbacks. They remain task-focussed and think strategically in the face of difficulties. They attribute failure to insufficient effort, which supports a success orientation. They quickly recover their sense of efficacy after failures or setbacks. They approach potential stressors or threats with the confidence that they can exercise some control over them” (p. 39).

People with low levels of self-efficacy, in contrast, expect to fail in behavioural pursuits, give up quickly at the first sign of difficulty, and are easily convinced that their efforts to enact behavioural change are futile (73, 160). Unless people believe that they can make changes to their lives and achieve desired outcomes they will not persevere with behavioural change in the presence of difficult circumstances. Not surprisingly, people generally choose to engage in behaviours that make them feel efficacious and avoid behaviours that do not, even if these behaviours offer real benefits. By choosing to engage in behaviours that reflect efficacy and avoiding ones that reflect inefficacy, people not only reinforce these efficacy beliefs but they also strengthen and more clearly define their sense of self and self-concept (73). This has important implications for self-efficacy intervention.

Self-efficacy is a domain specific concept rather than a global one; meaning that self-efficacy can only be interpreted and measured in regard to specific behaviour, such as diabetes self-management or diet and exercise behaviours. Within domains, self-efficacy is a multidimensional construct that differs according to level, generality and strength (73, 163, 164):

- Level of self-efficacy refers to people's perceived capabilities across task demands within a specific behavioural domain.
e.g. a person initially shows high self-efficacy in managing their diabetes medications but low self-efficacy as these demands increase.
- Generality of self-efficacy belief refers to people's perceived capabilities across a range of behaviour or within specialised domains of behaviour.
e.g. a person who is unmoved by peer pressure to eat fatty foods is similarly unmoved by peer pressure to divert from physical activity.
- Strength of self-efficacy beliefs refers to the potency of people's perceived capabilities within behavioural domains.
e.g. a person with strong efficacy beliefs persists with self-monitoring of blood glucose despite initial discomfort.

2.2.2 Self-efficacy and diabetes self-management

Self-efficacy is a robust construct with demonstrated predictive utility across diverse areas of behavioural functioning. Meta-analyses, for example, show that self-efficacy contributes significantly to performance in health functioning (165), academic achievement (166), work-related behaviours (167), and athletic achievement (168). Self-efficacy is a significant predictor of diabetes self-management behaviour. People with high self-efficacy in performing diabetes self-management are more likely to eat well, exercise, take their medications and self-monitor their blood glucose levels than people with low-self-efficacy (81-86, 169); irrespective of past self-management behaviour, metabolic control, health beliefs and demographic factors (81, 82). People with high self-efficacy are also more likely to show good glycaemic control (170, 171), mediated by diabetes self-management behaviours (85, 172).

Self-efficacy is similarly a significant predictor of lifestyle behaviours associated with diabetes self-management. People with high dietary self-efficacy eat more fruit and vegetables, eat less fat and buy more healthy foods when shopping than people with low dietary self-efficacy (173-177). People with high exercise self-efficacy perform physical activity more often, more intensely and over a longer period of time than people with low exercise self-efficacy (178-185). One study of physical activity among primary care patients showed a dose-response relationship between self-efficacy and exercise intensity when age and gender were controlled (185).

Self-efficacy is more than just a useful predictor of diabetes self-management. It is a readily manipulable personal construct with real behavioural impact. Intervention studies designed to promote diabetes self-efficacy demonstrate increases in actual diabetes self-management behaviours across a range of intervention approaches (47, 59, 158, 160, 163), including; group diabetes self-management education (186, 187), training in behavioural self-regulation (188), structured peer support in glycaemic control (189), and complex health system interventions involving multiple methods across both urban and rural sites (170, 171, 190). Perhaps the best-known and most successful group-based self-management intervention based on self-efficacy theory is the Chronic Disease Self-management Program developed by Lorig and colleagues at

Stanford University (191). This program has demonstrated efficacy in promoting health status, psychosocial functioning and self-management behaviours and reducing chronic disease related hospitalisations over the long-term, resulting in significant cost savings for health systems (191-193). Importantly, the program has demonstrated efficacy across culturally and linguistically diverse groups, including African American, Bangladeshi, Cambodian, Chinese, Filipino, Korean, Latino/Hispanic, Samoan and Vietnamese populations (45, 194-198).

There is, in fact, good evidence for the cross-cultural validity and universality of the self-efficacy construct. Luszczynska, Gutierrez-Dona and Schwarzer (199), for example, surveyed 8796 people across Costa Rica, Germany, Poland, Turkey and the United States and found similar structural relations between self-efficacy, personality, wellbeing, stress, social support and achievement across countries. Diabetes self-efficacy is associated with diet, exercise and self-monitoring of blood glucose among African-American, Asian, Maori, Latino, Mexican, Pacific Islander and Turkish populations, within both home and western countries (99, 200-203). Self-efficacy is thus likely to be an ‘etic’ or universal construct rather than one that is ‘emic’ or unique in meaning, significance and expression to that culture alone (204, 205). People possess cognitive structures for shared cultural knowledge and cultural structures for specific individually-acquired information, both of which may impact on the expression of behaviour in any given social context (204). At the individual level, culture is but one component of the cognitive information that people use in determining self-efficacy.

2.2.3 Effective promotion of self-efficacy

Interventions to promote self-management behaviours and diabetes outcomes run the risk of failure if mechanisms for patient control and empowerment, such as self-efficacy, are not taken into account. Behavioural intervention through passive methods such as GP advice (206) and consultation handouts (207) show limited impacts on behaviour. Similarly, intensive health system trials that ignore self-efficacy show initial positive impacts on glycaemic control that quickly dissipate when the trial is completed (208, 209). Even some interventions designed to promote self-efficacy show limited success because they fail to act on the sources of self-efficacy. Gerber et al, (2005) for

example, conducted a randomised controlled trial of a diabetes education computer multimedia application designed to improve diabetes outcomes among people with low health literacy. The multimedia application was well-structured, based on theories of learning and involved testimonials from people with diabetes in performing self-management. One year following the trial, there were no significant differences in glycaemic control, weight, blood pressure, knowledge, self-efficacy or self-reported medical care between the intervention group and a usual care control group (210). The failure of this intervention is rooted in the passive presentation of material designed to promote behavioural skills that are best learned through experience; a failing that was exacerbated by a focus on people with low health literacy, a group known to have significant barriers to diabetes control (99, 211).

The sources of self-efficacy information are rarely used in intervention (214) even though their inclusion would strengthen efficacy beliefs and render the impact of intervention longer-lasting. An example of the successful application of self-efficacy theory to intervention is the Diabetes Self-Management Program for Spanish-speaking people (187), based on the Chronic Disease Self-management Program (191), and presented in Table 2.1. Participants learn self-management skills through guided enactive mastery experiences, modelling of self-management behaviour, accurate interpretation of symptoms and informative individualised feedback from instructors. Results from the program show significant improvements in diabetes self-efficacy, diabetes self-management behaviours and self-reported health status (187).

Table 2.1
Sources of self-efficacy in the Diabetes Self-management Program

Source of self-efficacy	Program strategies
Enactive mastery experience	Participants develop diabetes self-management action plan that is performed during the week (e.g. control eating at particular time of day) and report back to participating peers who suggest ways for overcoming difficulties
Vicarious experience	Spanish-speaking peer educators act as course leaders and model appropriate behaviours, particularly focusing on ways of overcoming problems
Verbal persuasion	Participants systematically report on successes and failures in self-management to the group and receive peer instruction and support linked to real behaviours
Physiological information	Participants identify the causes of diabetes symptoms and distinguish among physiological states to put in place effective self-management strategies

Adapted from Lorig and Gonzalez (187)

Bandura (73, 163) identified four sources of self-efficacy information: enactive mastery experiences; vicarious experience; verbal persuasion; and physiological information. Enactive mastery experiences acquired through performance accomplishments are the most influential sources of self-efficacy information because they provide the most tangible evidence of success and failure on a task (73, 159, 163). Repeated success bolsters people's feelings of self-efficacy while repeated failures undermine them, particularly if these failures occur before efficacy beliefs have been established (73, 157). This has important implications for intervention: complex mastery experiences should be hierarchically structured and organised in skill subsets so that people acquire skills progressively (73, 74). People who build mastery slowly over a period of time and experience periodic failures have higher self-efficacy than those who attain skills quickly but then experience a plateau in development. The transfer of enactive mastery experience to self-efficacy is dependent on a person's interpretation of mastery information (73, 163), including:

pre-existing self-knowledge and belief structures (e.g. self-concept) that direct what people pay attention to in their environment, what they remember and how they view personal success or failure; and task difficulty, effort expenditure and contextual factors (e.g. dietary intake managed by family members) that affect personal attributions of performance.

Self-efficacy judgements are also partly influenced by vicarious experience mediated through modelled behaviours and social comparison (73). Observing people who are perceived to be similar to oneself successfully perform a behaviour can help to build self-efficacy, even if the person has never performed this behaviour themselves (73, 74, 157). Vicarious experience is most likely to have positive impacts on efficacy judgements if the modelled behaviour results in clear outcomes for the model (73, 74, 163); for example, if self-monitoring of blood glucose is shown to assist the model in identifying hypoglycaemia and engaging in corrective action to alter blood glucose concentration. Vicarious experience is a less dependable source of self-efficacy information than enactive mastery experience, as social comparison processes influence how a modelled behaviour is perceived (73, 159, 163). That is, a model's failure to successfully perform a given behaviour will have a negative impact on efficacy judgements if the observer perceives a similarity between themselves and the model, yet it will have little impact if the observer believes that they have superior capability to the model (73, 159, 163). The effective transfer of vicarious experience to self-efficacy information is facilitated by a model that has similar attributes and history (e.g. age, cultural background) to the observer, performs behaviour under various (easy and difficult) circumstances, and demonstrates coping strategies in behavioural accomplishment (73).

Verbal persuasion is a method used frequently within health services to convince patients to change behaviours and adopt healthy practices; although it is often used ineffectively as empty praise or straight-forward information provision (73, 159, 163). Verbal persuasion involves leading people through suggestion into believing that they can successfully cope with difficulties associated with behavioural change (73, 163). The effectiveness of this approach in enhancing self-efficacy is reliant on the perceived credibility, capability and expertise of the persuasive source (73, 157). Verbal

persuasion is a weaker source of self-efficacy than either enactive mastery experience or vicarious experience because it is unable to provide an authentic experiential base for efficacy judgements and can be readily extinguished by disconfirming experiences (73, 159, 163). For this reason, it is important to support the person initiating behavioural change with both verbal persuasion and structural aids to facilitate performance.

Bandura (163) cautions:

“to raise by persuasion expectations of personal competence without arranging conditions to facilitate effective performance will most likely lead to failures that discredit the persuaders and further undermine the recipients’ perceived self-efficacy”
(p. 198).

While verbal persuasion may be given as a component of social support, it is not the same as social support. Social support appears to exert positive impacts on diabetes self-management and outcomes in its own right (212), although it is only as good as its ability to enhance the self-efficacy of the individual undergoing change (73). Social support that fosters dependence on others in caring for diabetes actually undermines the ability of the person to perform diabetes self-management and control their own future (213).

The fourth source of self-efficacy information identified by Bandura (73, 163) is physiological information. Physiological states such as stress, fatigue, anxiety, arousal and mood states convey information about a person’s confidence as they contemplate action and prepare to perform a behaviour (159). Because high levels of arousal impede performance, people learn to expect failure when they experience physiological stress and expect success in the absence of aversive arousal (73, 157). Fears of failure can help to ensure inadequate performance by further lowering self-efficacy beliefs and heightening physiological stress (159). The effective transfer of physiological information to self-efficacy information is dependent on the nature of arousal (e.g. level, source and situational circumstances) and degree of attentional focus and interpretative biases in appraising physiological states (73). Here it is important to emphasise that all four sources of self-efficacy information are mediated by cognitive appraisal and processing functions and not directly translated to efficacy judgements (73, 159, 163).

People with diabetes face special difficulties in appraising physiological information for efficacy judgements because both hypoglycaemia and hyperglycaemia can mimic agitated and fatigued states of arousal (160). Similar difficulties in the appraisal of physiological information have been noted previously with coronary artery patients misinterpreting fatigue for cardiac illness (157).

2.2.3 Issues in self-efficacy theory

There are three major issues of debate in self-efficacy theory: these concern the issues of self-efficacy causality, behavioural intention, and behavioural prediction. Some authors have questioned Bandura's (73, 163) contention that self-efficacy is a causal construct. Hawkins (215) and Lee (216), for example, suggest that self-efficacy may actually be an index of performance rather than a cognitive precursor to performance, and as such, be a correlate, but not necessarily a cause, of behaviour. Bandura (73, 217) presents the following argument based on experimental research as evidence of self-efficacy causality:

self-efficacy can be enhanced entirely through observational learning experiences,
meaning that it does not have to rely on prior experience;

self-efficacy can be altered by an introduced factor that has no direct bearing on
behavioural performance, such as bogus feedback unrelated to actual performance; and

self-efficacy can be enhanced by behaviours that actually impair behavioural
functioning.

Dougher (218) believes that the debate on self-efficacy causality may actually reflect differing epistemological and ontological viewpoints. Hawkins (215) and Lee (216), for example, argue their point from a behaviourist framework where cognitions function as representations of the external environment. Bandura (161), in contrast, strongly argues for an agentic explanation of behaviour:

“People are sentient, purposive beings. Faced with prescribed task demands, they act mindfully to make desired things happen rather than simply undergo happenings in

which situational forces activate their subpersonal structures that generate solutions”
(p. 5).

For Bandura (73, 161) people are purposeful and intentional in their actions. They use forethought to imagine future events and select appropriate actions, and are both self-reactive and self-reflective in their execution and examination of these actions in particular environments (161). Some authors have questioned, however, the validity of casting behaviour as the result of a rational actor. In speaking of social cognition theories in health behaviour more generally, Mackian, Bedri and Lovel (219), for example, state:

“The downfall of these models is that most view the individual as a rational decision maker, systematically reviewing available information and forming behaviour intentions from this: ‘I know, therefore I act’. This loses the sense that we are all rooted in social contexts that affect, in a far more complex manner, the way we process and act on information” (p. 139).

Like all cognitive models, the cognitive construct of self-efficacy precedes behaviour, although this does not necessarily mean that the resulting behaviour will be rational or that it cannot be affected by social or environmental influences. According to Bandura (73, 161), human agency is determined by the reciprocal influence of behaviour, personal factors (including cognitions, affective and physiological states), and the external environment (including social systems). This means that a person living in environmentally deprived circumstances, for example, may have their agency limited by a decreased access to socioeconomic resources, which in turn, influences their internal psychological states and behaviour. Social systems, in conjunction with personal systems determine life opportunity. Social systems and milieu determine the nature and distribution of fortuitous life events (i.e. who gets what) and personal systems, including attitudes, beliefs and competencies, govern the ability to capitalise on fortuity (i.e. who capitalises on what). People are both producers and products of social systems however, and agency is manifest at different levels (73, 161):

direct personal agency, manifested as self-efficacy in relation to the performance of specific behaviours;

proxy agency (or efficacy), where others are relied on to secure resources and fulfil needs; and

collective agency (or efficacy), where desired outcomes are achieved through interdependent and socially coordinated group actions.

Even though the majority of published studies support the predictive utility of the self-efficacy construct, some studies have failed to show an effect of self-efficacy on behaviour. Clark and Dodge (220), for example, found inconsistent evidence for a predictive link between self-efficacy and action across different health behaviours, including safety, exercise and smoking. These authors, like Bandura (73), proposed that this inconsistency might in part reflect temporal differences in the measurement of cognitions and behaviour. In other words, the self-efficacy construct may differ according to whether a person's behavioural routine is being initiated or maintained. There is, in fact, some evidence to support this differentiation. In a structural equation model of dietary behaviour, Schwarzer and Renner (221) found that action self-efficacy (i.e. self-efficacy to enact behavioural change) predicted pre-change dietary intentions and coping self-efficacy (i.e. self-efficacy to maintain behavioural change) predicted low-fat and high fibre dietary intake at six-months. Bandura (73) has outlined several sources of discordance between efficacy judgements and action, including: research design errors, relating to faulty measurement, poor theorising involving mismatches between self-efficacy and behaviour, ambiguity of task demands and performance, and statistical overcontrol; cognitive errors, relating to social comparison and inhibition functions, and faulty self-efficacy judgements resulting from, for example, optimistic or pessimistic bias; and disincentives and performance constraints relating to physical, social or structural factors that prevent the expression of a behaviour even when self-efficacy is high.

This last point, that sociostructural factors may constrain or act as disincentives to health behaviour even when self-efficacy is high, forms the focus of this thesis and is discussed further in the following section.

2.3 Sociostructural determinants of diabetes self-management

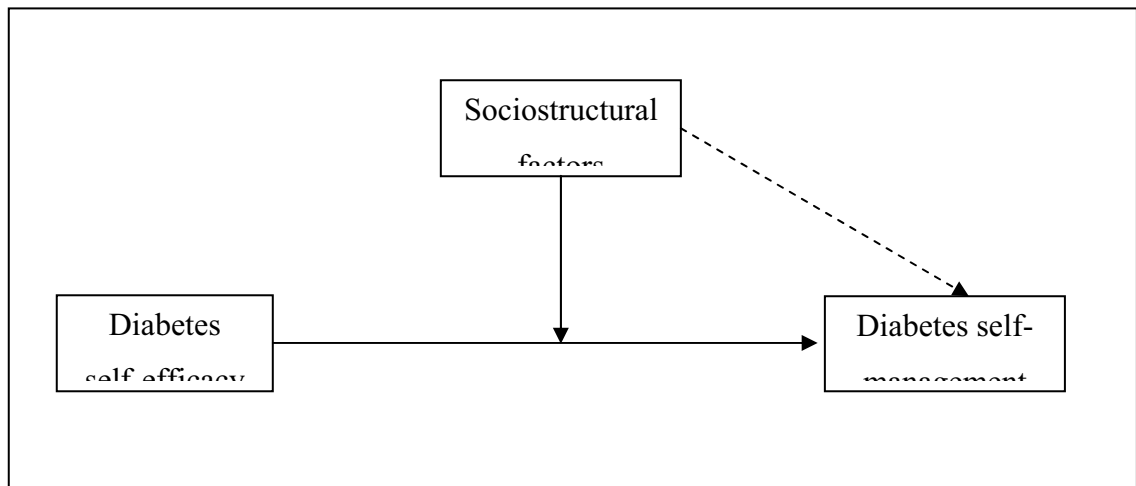
A review of published literature suggests that Bandura's (47, 73, 222) assertion that sociostructural factors can impede the impact of self-efficacy on behaviour has not been formally tested. This is despite the fact that research to this effect has significant implications for chronic disease intervention and policy, which rely in part on self-efficacy initiatives. This study addresses this knowledge gap by investigating the impact of sociostructural factors on diabetes self-management using a self-efficacy model. Sociostructural factors identified by Bandura (47, 222) as being important to health behaviour and intervention and used in this thesis, include:

health systems, where general practice has been selected as an exemplar for study; and socioeconomic structures, focusing on access to both individual-level and community-level resources.

Note: that while the concept of socioeconomic determinants used in this thesis may reflect broader understandings of social disadvantage or similar concepts, the term socioeconomic determinants has been used deliberately to ensure consistency with Bandura's self-efficacy theory and modelling of health behaviour (47, 222).

The structural relations between self-efficacy and sociostructural factors in influencing health behaviour proposed by Bandura (47, 222), are pictorially represented in the 'Sociostructural determinants of diabetes self-management model', which was developed for this thesis and is presented in Figure 2.1. The model has a causal structure so that both self-efficacy and sociostructural factors are hypothesised to influence diabetes self-management singularly and in interaction. Note that the main focus of the current investigation is the interaction between self-efficacy and sociostructural determinants in producing self-management behaviour, and as a result, the direct impact of sociostructural factors on diabetes self-management is identified as an implicit causal relation.

Figure 2.1
Sociostructural determinants of diabetes self-management model



—▶ Explicit hypothesised causal link

----▶ Implicit hypothesised causal link

The Sociostructural determinants of diabetes self-management model addresses a growing criticism of health behaviour interventions in public health: that they fail to take into account socioeconomic inequality and the social determinants of health (223, 224). In the classic Dahlgren and Whitehead (225) social determinants of health model, for example, health behaviour is but one of a sphere of biological and sociostructural health determinants including: age, sex and heredity; social and community interactions; living and working conditions; and the broader overarching socioeconomic and cultural environment. In the Sociostructural determinants of diabetes self-management model, behaviour is seen to be the conduit through which these sociostructural determinants act. In order to strengthen individual-level interventions for diabetes it is necessary to understand how people perceive sociostructural determinants of diabetes self-management and moreover, how these factors affect what people do (or don't do). This approach attempts to view the individual and their behaviour within their social and contextual environment as they see it.

While Bandura (47, 73, 222) conceptualises sociostructural factors as impediments to behaviour only, this model views sociostructural factors as potential barriers and

facilitators to diabetes self-management. That is, while poor general practice care may impede diabetes self-management among people with strong self-efficacy beliefs, through, for example, inhibiting access to self-management information and resources, good quality general practice care may facilitate efficacy beliefs, resulting in improved diabetes self-management, particularly if this care impacts on the sources of self-efficacy. Literature to support the face validity of the sociostructural determinants model, particularly the implicit causal relation between sociostructural factors (i.e. general practice and the socioeconomic environment) and diabetes self-management, is presented in the following sections. Note that the following review is therefore limited to constructs in this model. Broader background literature relating to model constructs, such as the work of Marmot and Wilkinson (46), and Kawachi (48) in the social determinants of health, for example, will not be presented.

2.4 General practice-based determinants of diabetes self-management

The present study focuses on general practice as a determinant of diabetes self-management because:

- patients with type 2 diabetes receive the bulk of their care in general practice, including care for conditions other than diabetes (226, 227);
- patients with type 2 diabetes in general practice display a broad range of disease severity, including a substantial proportion of patients at the less severe end (227), requiring greater dependence on effective self-management;
- general practice is the central focus of Australian federal government diabetes and broader chronic disease policy (36, 37); and
- general practice is, in general, more readily available than specialist diabetes and allied health care (228).

Australian health care is financed separately by state, territory and federal governments: state and territory governments have responsibility for hospital care and the Australian government has responsibility for primary care. This fragmentation of the Australian health system presents considerable financial and clinical barriers to effective chronic disease management (229). Australian general practice patients receive primary care through the national universal public health insurance scheme, Medicare; although not

all GPs use this scheme and an increasing number are introducing co-payments (230).

General practices in Australia are supported by Divisions of General Practice; geographically-defined organizations funded by the Australian government to promote the capacity of general practice to provide quality primary care to communities (231).

Research examining both GP and patient perceptions, attitudes and experiences in general practice care is prolific. The following review is necessarily limited to aspects of care relevant to the present study, including the organisational and policy context of diabetes self-management within Australian general practice and the importance of patient-centred care in promoting behavioural change.

2.4.1 Diabetes management in general practice

Australian chronic disease policy clearly articulates a pivotal role for general practice in promoting chronic disease self-management within the broader functions of chronic disease care (36). These functions are best understood through the Chronic Care Model which views diabetes care in three interrelated and inter-dependent spheres of the broader community, the health care system and the service provider (232, 233). Table 2.2 presents six functions of diabetes care in general practice adapted from the Chronic Care Model (232-235). Evidence from clinical trials and observational studies support the utility of this model in improving diabetes care, patient self-management and blood glucose control (232, 236).

Structured diabetes care (i.e. planned multidisciplinary care supported by clinical information systems) in particular, has been shown to improve the quality of diabetes care in general practice (237-243), including that delivered to disadvantaged patients (244-248); although there appears to be little consistent impact of structured care on diabetes self-management and control (190, 249-253). A Cochrane Collaboration systematic review of 41 studies designed to improve diabetes care in general practice (251) found that complex multifaceted interventions targeting clinician behaviour, practice organization, information systems and patient education and support resulted in the greatest improvements in diabetes care process and outcome: that is, multi-levelled strategies were more successful than single strategies.

The Australian government has implemented several general practice-based policy initiatives to support diabetes care. The National Integrated Diabetes Program (NIDP), for example, contained a package of financial incentives for general practices to improve the prevention, early diagnosis and management of diabetes (254-256):

a one-off practice incentive payment to practices using a diabetes register and recall and reminder system;

a service incentive payment tied to GP provision of minimum annual care standards according to national diabetes guidelines; and

an outcomes incentive paid to practices that achieved diabetes outcome targets.

Table 2.2
Functions of diabetes care within the Chronic Care Model

Function	Example
Access to community resources	General practices have links to community resources and programs for diabetes (e.g. exercise programs, self-help groups) and can effectively mobilise these resources for patients
Organisation of general practice care	General practices operate within an organisational structure and culture (including adequate remuneration and access to system support) that promotes high quality diabetes care
Support of self-management	General practices support diabetes patients to self-manage their diabetes through skill acquisition and empowerment, providing access to tools for self-management (e.g. diets, referral to community resources) and routine assessment and follow-up
Design of delivery system	General practices are structured effectively and efficiently for diabetes care and self-management support through the distribution of tasks across practice staff (including practice nurses and managers), clear discrimination of health roles, and planned diabetes management

Support for clinical decision-making	General practices provide high quality clinical diabetes care through the integration of evidence-based clinical practice guidelines into daily practice (e.g. through computerised reminder systems)
Access to clinical information systems	General practices provide effective and efficient diabetes care through the organization of population and patient data in computerised clinical information systems that serve as reminders for guideline adherence, indicators of performance, and registries for planned care

In addition, Divisions of General Practice were funded to support general practices in establishing and maintaining diabetes registers, promoting GP adherence to standards of diabetes care, and improving diabetes patient access to community resources and multidisciplinary care (254-256). Most recently, the Australian government introduced two chronic disease management item numbers to the Medicare Benefits Schedule: a GP management plan to be conducted in collaboration with diabetes patients, and team care arrangements which enable free but limited access to multidisciplinary care for diabetes patients with complex care needs (257). Despite the availability of policy structures and incentives for diabetes care, many GPs do not in fact access these items or payments (258): in one Australian study, only half the general practices with diabetes registers had claimed a practice or service incentive payment (259). Problems with the uptake of initiatives and incentives reflect problems with the implementation of the chronic care model more widely; many of which stem from attempts to implement ongoing structured chronic care within an encounter-based system oriented towards acute care (42, 234, 260).

2.4.2 Diabetes self-management and patient-centred care

It is clear that diabetes self-management is just one function of diabetes care that GPs perform among many others. Even so, GPs provide support for diabetes self-management less often than they perform laboratory tests, such as HbA1c (261) or prescribe pharmacology (262), make few referrals to health professionals trained in

diabetes self-management, such as diabetes educators (246, 263, 264), report a lack of knowledge and confidence in promoting diabetes patient behaviour change (265-268), and provide diabetes self-management information that is, at best, of variable quality (97, 269, 270). This most likely reflects the almost exclusive policy focus on patient physiological outcomes and health system control of diabetes that characterised diabetes care up until a few years ago.

Guidelines for Chronic Condition Self-Management in general practice have been produced by the Royal Australian College of General Practitioners (58). These guidelines articulate a structured problem solving approach to patient self-management within the framework of patient-centred care. GPs are provided with a structure for patient behaviour change drawn from goal-setting, stages of change and motivational interviewing principles. Self-efficacy is noted as an important determinant of self-management, although its manipulation is not considered. A companion RACGP guide is also available for nurses and allied health professionals (271).

There are, however, two potential problems with the RACGP chronic disease self-management guidelines. First, diabetes care guidelines, like guidelines for many other conditions, are poorly adhered to by GPs (272-274); and it should be expected that guidelines stipulating the performance of behaviours for which GPs are inadequately trained, such as behaviour change (267, 275), will be even more poorly adhered to. Second, the guidelines fail to articulate and delineate roles and responsibilities in self-management across health professionals; the nurse and allied health professionals guidelines, for example, are largely a repeat of the GP guidelines. Put another way, the guidelines do not make clear whether GPs should be the drivers of patient self-management, at least in terms of the health system's role, or a support to patient self-management. New Australian Medicare chronic disease management items seem to suggest a greater role for other health professionals and areas of the health system in the development of self-management skills; albeit only for those deemed to have complex needs.

It is the position of this thesis, that while people with diabetes are the primary drivers of self-management, it is the responsibility of health systems (including government, non-

government and consumer support and advocacy groups) to provide resources for behaviour change and management. Within this role, the intricacies of diabetes self-management and self-efficacy to perform these behaviours are best provided by suitably trained individuals and groups in diabetes self-management; whether that be, for example, a diabetes educator or a lay group educator with diabetes. As the primary providers of ongoing diabetes and other care needs, GPs are best placed to provide diabetes patients with support in the self-management activities they have learned elsewhere: although this is necessarily dependent on the availability of other self-management services, which can be more difficult to access in disadvantaged areas (276). This approach is consistent with calls for regular reinforcement of diabetes self-management skills integrated into standard diabetes care (277). At this point it is worthwhile reflecting that chronic disease self-management is breaking new ground in the organization and delivery of general practice care. Implementation of chronic disease self-management (41):

“does not constitute an incremental change in general practice procedures; rather it constitutes a significant innovation in service delivery requiring a high level change management approach” (p. 76).

One strength of the Australian Chronic Condition Self-Management guidelines is that they emphasise the importance of patient-centred care in promoting self-management. Patient-centred care is best conceptualised as both a philosophical approach to health care and the means through which this is achieved. Definitions of patient-centred care differ, although it can involve (278-283):

considering patients’ needs, wants, beliefs and experiences within the context of the whole person;
providing opportunities for patients to participate in care decision-making and supporting them in doing so;
building strong therapeutic relationships based on effective doctor-patient communication;
encouraging patient control of health through health promotion and disease prevention;
and

organising care and systems and introducing technical innovation to support patients' participation in care and self-management.

There is growing interest in the impact of patient-centred care on diabetes self-management, although studies are still small in number and tend to involve the same research teams. The multinational Diabetes Attitudes, Wishes and Needs (DAWN) study of 5,104 patients across 13 countries in Asia, Australia, Europe and North America found that patient-centred care measured through relationship quality was a significant predictor of patient lifestyle and medical regimen behaviours (94). Patient-provider communication, including agreement on diabetes goals and strategies, promotes diet, exercise, medication, foot care and self-monitoring of blood glucose (93, 95-97). Other aspects of care inherent to a patient-centred approach, such as patient trust and continuity of care, similarly exert a positive impact on diabetes self-management (96, 119).

Both GPs and patients report that they value patient-centred care (279, 284, 285); although GPs tend to value the affective and relational aspects of care more than their patients (286). Patient-centred care that emphasises the affective components of doctor-patient interaction at the expense of diabetes management is, however, ineffective in promoting behavioural change (287). People with diabetes value patient-centred care that facilitates GP communication of accurate and timely information on diabetes self-management (288, 289). Misunderstandings about diabetes and its management are common among diabetes patients (290); and diabetes patients have attributed their own difficulties in self-management to a lack of clarity from GPs and health services (291, 292). Diabetes patients, like other general practice patients, value having sufficient time in the consultation with their GP to discuss management issues and not having to wait too long in the waiting room or to organise an appointment (293-295). General practice patients particularly value those aspects of patient-centred care that enable them to manage their own health more effectively (Little et al, 2001b). Patient-centred care that supports patient self-efficacy, autonomy, empowerment or activation is better able to promote self-management and health outcomes than passive or controlling styles of interaction (281, 296).

Even though GPs believe that patient control of diabetes is paramount for effective self-management (267), they may actually act in ways that subtly impede patient autonomy or usurp control, through for example, demanding patient compliance with management instructions (297, 298). The notion of compliance is, however, incompatible with the approaches of patient-centred care and diabetes self-management, both of which emphasise patient agency rather than obedience (299, 300). Even so, many GPs tend to rely on strategies designed to ensure compliance with their diabetes patients (301). In fact, only a small proportion of GPs report practising patient-centred care (302, 303), particularly that involving participatory decision-making and patient collaboration (304). GPs cite both structural and personal barriers to patient-centred care including a lack of knowledge about patient-centred care, limited consultation time to address patient issues broader than medical management, inadequate remuneration of consultation time, and a professional identity invested in the biomedical model (39, 302, 305).

While not all GPs wish to encourage patient collaboration in care decisions, it is also true that not all patients want to be involved in decision-making (284, 306, 307). People who view the cause of their diabetes as uncontrollable and external to themselves are more likely to believe that diabetes management is the responsibility of GPs and opt for passive roles in the consultation (308). Preferences for a passive role may, however, reflect a developmental process in adaptation to diabetes (309). Patients with chronic conditions, for example, report that they are more likely to passively follow GP advice at the time of diagnosis, and later adapt GP advice to suit their own circumstances as they become more knowledgeable and experienced in self-management (310). Strong effective relationships grounded in the principles of patient-centred care evolve over time and are responsive to the changing needs and understandings of diabetes patients.

Thorne and Paterson (289) explain:

“a complex skill such as self-care management of diabetes will evolve over time and take on differing forms throughout that trajectory. In order for health care professionals to be able to support, rather than interfere with, these processes, learning must be understood in context, and the trajectory of illness experience must be honored” (p. 88).

Not all diabetes patients, however, receive the same experience of patient-centred care in general practice. While there is inconsistent evidence regarding inequalities in diabetes care (16, 311-314), there is converging evidence that socioeconomic disadvantage, ethnicity and language can influence the quality of doctor-patient communication (265, 315-322). GPs, for example, give less positive verbal and nonverbal socioemotional support, are more directive and less participatory in their consultation style, and spend less time in consultation with disadvantaged and culturally and linguistically diverse patients than with advantaged patients from the cultural majority (323-326).

While stereotyping and prejudice may influence patient-centred care in some cases (11, 327-330), much may be attributable to clinical uncertainty arising from cultural differences and language in the shared communication of symptoms and management (327, 330, 331). In fact, in many cases, culturally and linguistically diverse patients prefer to see GPs with whom they share a language and cultural background (295, 316, 323, 332); and there is some evidence to suggest that language and cultural concordance may promote patient-centred care and communication (316, 317, 323, 333).

2.5 Socioeconomic determinants of diabetes self-management

There is considerable evidence that healthy lifestyle behaviours and activities of diabetes self-management differ according to socioeconomic group. For example, socioeconomically disadvantaged groups are less likely to buy, eat or like foods of high nutritional content, such as fruit, vegetables and other foods high in fibre and low in fat, salt and sugar; and are less likely to walk, cycle, swim or jog for physical fitness than groups who are socioeconomically advantaged (177, 334-343). Similarly, socioeconomically disadvantaged groups report poorer diabetes self-management behaviours, including lower rates of dietary adherence, vigorous physical activity and self-monitoring of blood glucose (89-91, 344). Inequalities in diabetes self-management and health behaviours according to socioeconomic resources are found irrespective of the method of measurement: income, education, occupation or geographic area measure.

Causal explanations of inequalities in health and health behaviours have been driven to some extent by measurement of socioeconomic indicators. Geographic area-level socioeconomic indicators, comprising for example, area unemployment rates and household income, have been taken to represent ‘environmental effects’; while individual-level socioeconomic indicators, such as personal income and education-level, have been taken to represent ‘individual effects’. Over the years, these differentiated ‘effects’ have been variously labelled ‘place’ and ‘people’ or ‘context’ and ‘composition’ respectively, and subjected to multilevel modelling to partial out the effects of one over the other (147, 345, 346). This approach has, however, arguably led to more confusion than clarity. While some studies report that place is more important in determining health behaviours (347), others report that health behaviour is largely the result of people (340). What these studies, in fact, show is that neither individual-level nor community-level socioeconomic influences on health behaviours can be ignored. Individual behaviours are necessarily nested within social and physical environments (348). The influence of socioeconomic resources on diabetes self-management cannot be quarantined from the context in which people with diabetes live their lives (349).

The following review presents evidence for three individual-level and community-level socioeconomic factors that have a demonstrated impact on diabetes self-management and related lifestyle behaviours that are important for health, such as diet and exercise: financial resources, health literacy, and urban environments.

2.5.1 Financial resources and diabetes self-management

People with diabetes can incur considerable financial costs in performing self-management, through for example, GP and specialist visits, prescriptions and medications, and the purchase of a glucometer and glucose testing strips for self-monitoring of blood glucose. Several studies show that out-of-pocket costs act as an impediment to diabetes self-management for people on low-incomes, particularly in terms of impeding access to blood glucose testing strips, medications, preventive diabetes care and diabetes education (90, 92, 105, 203, 350-356). These impediments to needed diabetes self-management resources are not inconsequential: financial

impediments to accessing blood glucose testing strips have been linked to poor glycaemic control (357).

Several health and welfare support schemes in Australia provide access to needed diabetes self-management resources at minimal cost:

- diabetes care in general practices and hospitals (including some diabetes education) is subsidised through the universal health insurance scheme, Medicare;
- materials for diabetes self-management, such as glucose testing strips are subsidised through the National Diabetes Services Scheme (NDSS); and
- many medications for diabetes are subsidised through the Pharmaceutical Benefits Scheme (PBS).

People eligible for Australian pension payments (e.g. aged pension, disability pension and unemployment benefits) have medication costs cut further. Safety nets, subsidised medical supplies and welfare payments may ease financial pressures but they do not eradicate them. British researchers showed, for example, that the minimum income for healthy living calculated from minimum prices for a nutritional diet, exercise, clothing, housing and social participation was 132 pounds or 12 pounds higher than the minimum wage (358). Despite cost pressures, many low-income people with diabetes report taking their medications as prescribed (359). People with limited financial resources pay for diabetes medications by borrowing money from family and friends, increasing credit card debt, or going without food and other essential household items (105, 354, 356, 360). This prioritisation of needs is proactive, purposeful and strategic (92, 105, 361). The consequences of relying on family members in gaining needed resources for diabetes self-management, for example, must be weighed carefully. In their qualitative study of health-seeking behaviour among people living in a disadvantaged community in the UK, Pearson et al (362) concluded that:

“these valuable, yet invisible, resources were not employed lightly. Their pursuit and use, which can incur reciprocal obligations, was measured carefully and ‘saved up’ and rationed, called upon in emergencies or on behalf of vulnerable dependents” (p. 50).

Australian health care system subsidies and schemes support health care access, diabetes medication-use and self-monitoring of blood glucose but exclude consumption of a healthy diabetes diet: a key self-management strategy for the prevention of diabetes complications (62). This is a critical omission. Foods high in fat and sugar are cheaper and better able to satisfy immediate hunger than foods required for a healthy diabetes diet, such as fruit and vegetables (363). The costs of a diabetes diet are invisible to the healthcare system but very real for diabetes patients (88). Diabetes patients report difficulties discussing the costs of foods and their inability to perform dietary self-management with their doctors (88); believing that such discussions may jeopardise the doctor-patient relationship (364). For their part, doctors do not bring up the topic of financial limitations either, even when they recognise it as a problem; reporting barriers such as insufficient time and beliefs that they do not have a solution to offer (365).

2.5.2 Health literacy and diabetes self-management

Health literacy is included as a socioeconomic determinant of diabetes self-management in this thesis because of its strong links to education (366, 367), a social determinant of health; although it is recognised that health literacy may also function as an attribute of ethnicity and poor English-language ability (366, 368). Health literacy is a key determinant of health, health care use and health care costs (369-371). Diabetes patients with low levels of health literacy report a poor knowledge of diabetes (372), low adherence to diabetes self-management behaviours (99), poor glycaemic control (211, 367), and high rates of diabetes complications, such as retinopathy (367). One study, however, failed to find an association between health literacy and diabetes self-management (373); although the number of patients with limited health literacy in this sample was under-powered to exclude a type 1 error ($n = 16$).

Definitions of health literacy are contested, although there are generally thought to be three types, originally proposed by Nutbeam (374-376):

- Functional health literacy, or basic skills in reading and writing to function effectively in everyday situations;
- Interactive health literacy, or more advanced literacy and cognitive skills enabling the application of new information to changing situations; and

- Critical health literacy, or more advanced cognitive skills enabling the critical analysis of information and control over life events and situations.

Table 2.3 shows how these types of health literacy can be applied to diabetes self-management. Nutbeam's (374) typology conceptualises health literacy not just as an indicator of literacy and numeracy skills but as a resource for empowerment and control. Even so, health literacy is overwhelmingly assessed at the level of functional health literacy and there remain significant health care problems in the communication and understanding of health-related information (270, 377, 378). People with limited health literacy have substantial difficulty understanding complex medical terminology and treatment regimens in the health care instructions provided by their doctors (377-379); a problem which can be exacerbated when communicating with patients from culturally and linguistically diverse backgrounds (331). Williams et al (378) state: *"Simple instructions such as take medicine orally, on an empty stomach, or three times daily are daunting to many low-literate patients. They commonly do not understand the context, detail or significance of their diagnoses"* (p. 385).

Table 2.3
Types of health literacy and diabetes self-management

Type of health literacy	Implications for self-management
Functional health literacy	<ul style="list-style-type: none"> • Functional understanding of causes, treatment and risks • Understanding of the importance of self-management
Interactive health literacy	<ul style="list-style-type: none"> • Ability to identify the best sources of information on diabetes • Ability to seek information from health professionals specific to personal situation • Application of knowledge on a daily basis to achieve a high level of self-management
Critical health literacy	<ul style="list-style-type: none"> • Ability to critically assess information quality including the reliability of sources • Ability to apply information and understanding in a wide variety of situations

Adapted from Levin-Zamir and Peterburg (375)

Simple techniques to improve understanding of diabetes self-management among people with low health literacy, such as assessing patient recall and comprehension of key concepts, is associated with improved glycaemic control (270). Assessing patient recall of information, however, takes time and it is likely that doctors compensate for misunderstandings and difficulties in the oral communication of management instructions with patient educational materials (377). Written educational materials are, however, just as likely to contain difficult medical terminology and be as incomprehensible to patients as medical information delivered orally (377, 378). One US study, for example, found that only 19% of health educational materials were within the reading comprehension level of most adults (380). Where they do exist, patient health educational materials in languages other than English are similarly pitched toward people with higher levels of education and literacy (381). The comprehension level of patient health materials is of increasing concern as essential resources and

programs for diabetes self-management rely on electronic and internet technology (382, 383).

2.5.3 Urban environments and diabetes self-management

Eating a healthy diet and performing regular exercise are essential components of diabetes self-management; yet many people with diabetes do not live in urban environments or neighbourhoods that are conducive to healthy lifestyles (57, 384). Several studies demonstrate that physical activity is positively related to neighbourhood characteristics commonly lacking in disadvantaged urban environments, such as: pleasing neighbourhood aesthetics, enjoyable scenery and urban design; close proximity to parkland, recreational facilities, playgrounds and sports fields; and clean neighbourhoods with good street lighting and low levels of rubbish and graffiti (57, 385-390). Furthermore, people who believe that their neighbourhood is unsafe and at-risk of crime are less likely to participate in physical activity than those who believe otherwise (267, 390, 391).

Urban environments not only structure opportunities for physical activity, they also structure access to foods important for diabetes self-management. Compared to advantaged neighbourhoods, disadvantaged neighbourhoods have fewer fruit and vegetable shops, bakeries, speciality stores and natural food shops (392); more fast-food restaurants, including McDonalds (393, 394); fewer supermarkets (395); and smaller stores with higher prices and a poorer selection of healthy foods (344, 384, 396, 397), including those recommended for diabetes self-management (398). Access to foods and other resources important to diabetes self-management, such as health care, can further be hindered by the limited availability and reliability of both private and public transport (344, 351, 356).

2.6 Towards a test of the ‘Sociostructural determinants of diabetes self-management’ model

The preceding literature review identified self-efficacy as a major determinant of diabetes self-management and a sophisticated theoretical and practical construct with

clear guidelines for manipulation and health behaviour intervention. Furthermore, the review presented considerable evidence to suggest that sociostructural factors can act as both impediments and facilitators of diabetes self-management. This provides face validity to the assumptions underlying the ‘Sociostructural determinants of diabetes self-management’ model:

- Self-efficacy influences diabetes self-management;
- General practice-based factors, such as access to patient-centred care, influence diabetes self-management; and
- Socioeconomic factors, such as financial resources, health literacy, and urban environments, influence diabetes self-management.

This research investigates the sociostructural context in which people with diabetes perform self-management, and how this context shapes their ability to initiate and maintain appropriate diet, exercise, and self-monitoring of blood glucose routines. Socioeconomic determinants of diabetes self-management, more so than general practice-based determinants, have the appearance of being fixed regulators of health behaviour. This regulation is both structurally explicit (e.g. presence of educational and occupational opportunities) and socially implicit (e.g. societal and class expectations and norms for appropriate employment). Even in disadvantaged circumstances with substantial behavioural constraints, however, people actively interpret their environment and its enablers and impediments to action when planning and performing behaviours (73). People with low self-efficacy are unable to take advantage of the enabling opportunities they are afforded. They are easily discouraged by setbacks and helpless in the face of institutional constraints. People with high self-efficacy, in contrast, are better able to exploit the limited opportunities they are given, even in disadvantaged circumstances. Bandura (73) states:

“Denial that people make any causal contributions to the paths their lives take carries the dispiriting implications that people are powerless to effect any personal changes in their lives. It is a patronizing prescription for apathy and despair” (p.33)

CHAPTER THREE

Introduction to Empirical Work

This chapter introduces the aim and methods used in the study. Following is a description of the research development, including an exploratory study to examine issues in diabetes care, a critical discussion of methodological issues important to policy-relevant research, and an overview of the general research methods, including aims, design, setting and approval. Specific detail on the selection and recruitment of participants for study, methodological approach and intended analyses are presented separately for the quantitative and qualitative data in chapters 4 and 5, respectively.

3.1 Exploratory study

As part of the development of this research a small exploratory study was undertaken of GPs' views on providing care to diabetes patients who are socioeconomically disadvantaged. The exploratory study was designed to expose important issues in diabetes care for people living in disadvantaged communities; particularly those that could be modified by policy or intervention through the conduit of general practice. The research was conducted in conjunction with the Fairfield Division of General Practice and the results have been published in Rose, Harris and Ho (265) under the title '*GPs views on how low socioeconomic position affects diabetes management: an exploratory study*'. This paper is summarised here and reprinted in full in Appendix E. The study proved useful in identifying challenges to diabetes self-management for patients who are disadvantaged and GPs' own cognitions, emotions and behaviour in providing care to this group.

3.1.1 Overview and methods

The aim of the study was to explore GPs' views on diabetes management for patients of low socioeconomic position (low-SEP), including:

- ◆ patient barriers to diabetes management;

- ◆ GP problems in managing diabetes; and
- ◆ suggested improvements in diabetes management.

Nine GPs registered with the Fairfield Division of General Practice diabetes program attended a focus group on issues in providing diabetes care to patients of low-SEP. The focus group was moderated by a supervisor of the doctoral student, who is a GP and experienced facilitator. The focus group was audio-taped and transcribed. Data were analysed using thematic analysis techniques. All three authors read the transcript and agreed upon coding and categories to ensure reliability. GPs were reimbursed for participating in the focus group by Fairfield Division of General Practice.

3.1.2 Findings

1. Low-SEP patient barriers to diabetes management

In the GPs' view, there were four barriers to diabetes management for low-SEP patients: low health literacy; financial constraints; poor mental wellbeing; and negative attitudes towards health. GPs believed that low-SEP patients had low levels of health literacy and this led them to consume a diet inappropriate for diabetes control. Further, low-SEP patients were seen to have a poor understanding of the role of GPs in diabetes management and were unlikely to attend follow-up if they were asymptomatic and did not feel sick.

Other GPs believed that low-SEP patients had adequate levels of health literacy but were unable to manage their diabetes because of the negative socio-structural and psychosocial effects of socioeconomic disadvantage. For example, low-SEP patients were limited in their ability to manage their diabetes because of financial constraints and the costs of healthy foods. Further, poor mental wellbeing and low levels of confidence as a result of disadvantage meant that low-SEP patients were unable to put their understanding of diabetes management into practice. These patients had the knowledge but not the psychosocial resources to change their health behaviours:

“So the knowledge of diet is there for a lot of people it is just that it is hard to actually put that into practice much the same as you know ... people know that smoking is bad

for them but they can't give them up, or they know eating McDonalds is not good for you ... but they just don't know how to make a change".

Some GPs perceived that low-SEP patients had negative attitudes towards diabetes management. These patients were seen to be largely uninterested in their own health and were unlikely to change their health behaviours because "they just couldn't care less".

2. GP problems in managing diabetes amongst low-SEP patients

GPs perceived that there were two problems in managing diabetes amongst low-SEP patients: the availability of allied health services; and difficulty and stress involved in providing diabetes care to this group. GPs' believed that waiting lists for public allied health services affected their management of diabetes amongst low-SEP groups. Delayed contact with allied health workers meant that GPs lost contact with low-SEP patients following diagnosis. Managing diabetes was seen to be difficult once low-SEP patients had become, in the words of one GP, "lost in the system".

There was general consensus amongst GPs that managing diabetes amongst low-SEP patients could sometimes be difficult and stressful. In the GPs' view, low-SEP patients rarely adhered to diabetes management practices or attended routine follow-up consultations. Intensive monitoring to increase attendance at diabetes follow-up was seen to be an intrusive and uncomfortable extension of the doctor-patient relationship:

"We find that when they get the reminders, then you ring the patient or the receptionist rings the patient, you feel like you are on their back all the time. You are actually like some Big Brother, watching them and being too dictatorial".

Some GPs perceived that there was little that they could do to improve diabetes management amongst low-SEP patients and perceived that they were unfairly held responsible for the health of this group.

3. Suggested improvements in diabetes management amongst low-SEP patients

GPs identified two strategies for improving diabetes management amongst low-SEP patients: providing educational materials that matched literacy; and initiating low-SEP

patient financial incentive schemes. GPs perceived that there were a large number of educational resources to assist health professionals and patients with diabetes management: however, these resources were rarely appropriate for people with low-literacy levels. Low-SEP patients from culturally and linguistically diverse backgrounds were seen to be at a particular disadvantage because dietary guides were based upon western meals. GPs believed that diabetes management amongst low-SEP patients could be improved substantially by ensuring that people with diabetes had access to educational materials that matched their literacy levels.

GPs believed that financial incentives could encourage low-SEP patients to participate in diabetes management. In the GPs view, incentives would reward low-SEP patients for attending follow-up visits and enable financial access to a healthier diet. Some GPs perceived that a low-SEP patient financial incentive scheme, based on the model of family benefits payments linked to the National Immunisation Program could also have benefits in reduced practice management costs:

“Because governments allot budgets for doctors to help diabetes, they can put a small portion encouraging people to have two years to fulfil all those criteria like the immunisation program. You fill in the form, tick, tick, tick and submit it and you will find a lot of people will turn up, the rate will go up, you don’t even have to recall anymore, saving costs of recalling. No letters sent, they will turn up by themselves”.

3.1.3 Summary and discussion

GPs believed that low-SEP had an impact upon diabetes management in two ways: low-SEP patients’ capacity to participate in diabetes management; and GPs’ capacity to provide effective diabetes care. GPs believed that the capacity of low-SEP patients to manage diabetes was affected by low health literacy, financial constraints, poor mental wellbeing and negative attitudes towards health. Low levels of health literacy have been linked to low-SEP and diabetes management (399); and there is evidence to support an association between financial constraints and dietary management (400) and psychosocial factors such as self-efficacy and dietary management amongst low-SEP groups (401). There is less evidence however to support an association between low-

SEP and negative attitudes towards health. While people of low-SEP have been shown to hold different values towards health and self-management (e.g. having stronger beliefs in the influence of chance on health) (402, 403); these attitudes are not necessarily negative. There was some suggestion of negative stereotyping of low-SEP patients amongst a small number of GPs in the focus group. Of concern is the potential impact that GPs' negative beliefs may have upon their provision of care and participation in diabetes management with low-SEP patients.

GPs capacity to provide diabetes management to low-SEP patients was affected by difficulties in accessing allied health services and providing effective diabetes care; problems that were associated with feelings of stress and frustration. Chronic disease management can be both difficult and time-consuming for GPs (404). These difficulties may be exacerbated when GPs practise in areas of socio-economic disadvantage and have greater workloads (405) and less time in consultation with patients than GPs who practise in advantaged areas (406). Unlike the United Kingdom, Australia does not have a system for financially supporting general practices located in areas of socioeconomic disadvantage. Additional funding to support general practice within socioeconomically disadvantaged areas may go some way in addressing the limitations of the current health system in supporting diabetes management amongst low-SEP groups. But where should this funding best be spent? According to this group of GPs, funding may best be directed towards initiatives that support low-SEP patients rather than GPs in managing diabetes; such as ensuring access to diabetes education materials that are appropriate for people with low literacy levels and supporting access to continuous diabetes care within general practice through financial incentive payment schemes.

3.2 Methodological issues

Research of poor relevance to policy and practice does not invalidate research findings and conclusions but it does limit the utility of the research as a whole. The following discussion presents three key methodological innovations used in this research to enhance the utility of findings and overcome many of the limitations of previous research identified in the diabetes and health services literature: complex policy relevant modelling; mixed-methodological research; and equity in research participation.

3.2.1 Complex policy relevant modelling

Model building and testing, particularly that derived from theory, is commonly overlooked in diabetes and health services research (128, 407, 408). In some studies, analyses are structured simplistically and overburdened with variables, making it difficult to interpret research results and determine, for example, the significance and relevance of being aged between 18 and 24 over having access to a hospital bed in predicting quality of diabetes care (409). In others, important constructs are left out of analyses entirely, limiting the ability of the research to identify variables in the causal chain for intervention. This was demonstrated in several, otherwise well-designed studies, that excluded measures of diabetes self-management from tests of the efficacy of diabetes self-management interventions (410).

If research in diabetes self-management is to be useful in informing policy and intervention then it must be analytic rather than descriptive and specify models that can be empirically tested. Valid modelling of complex associations in analytic research requires prior theoretical conceptualisation. The use of pre-existing credible theory, such as self-efficacy theory, in examining complex health, behavioural and social phenomena has several advantages including direction in the development of empirical models, the formulation of testable hypotheses and the operationalisation of constructs (155, 407, 408, 411). Complex theory supports complex statistical modelling, such as the use of moderating variables. These variables may be particularly important targets for intervention when major determinants of health and behaviour cannot be readily changed (412, 413).

While the processes that determine the influence of research on policy development are complex (414-416), research that intends to be useful for policymakers should use policy-relevant variables and specify mechanisms for policy delivery. Policy-relevant variables are factors in natural settings that have high utility for practitioners and can be manipulated to bring about change (412, 417, 418). Quality of diabetes care in general practice, for example, is a policy variable because quality can be manipulated by structured computer-based systems of care (239). Psychological factors, including self-efficacy are also policy variables because they too can be manipulated through, for

example, intensive diabetes self-management programs (192). Estimator variables, such as age and gender, in contrast, are factors that cannot be manipulated by policy or practitioners but may be helpful in understanding phenomena or targeting intervention (417).

3.2.2 Mixed-methodological research

Even though sophisticated modelling techniques can increase understanding of the way in which sociostructural determinants impact on diabetes self-management; they can also be limited in explaining how people experience self-management and negotiate health systems in performing self-management behaviours. This is because quantitative modelling is reliant on the information provided by surveys, questionnaires and rating scales. One of the ongoing problems with these methods is that they have a positive response bias; that is, they consistently record high ratings of quality (419, 420), which are not always borne out by other methods of data collection. In one study, for example, patients described negative experiences of care in a health service during an interview even though they reported high levels of satisfaction with the service on a questionnaire (421).

One way of overcoming this limitation is to use mixed quantitative and qualitative methods in examining diabetes self-management. Mixed-method research studies combine different paradigms of knowledge and learning (Box 3.1). This does not necessarily make them incompatible for pragmatic researchers but it does mean that the design of these studies and interpretation of data from them can be complex (419, 422, 423). Some authors (424-426) have proposed a framework for designing mixed-method investigations that simplifies the triangulation of data. This framework is based on complementarity and involves decisions about:

- Priority, where one approach is given priority over the other so that it becomes the main method through which data were collected and the main focus of the investigation;

- Implementation, where data collection is conducted concurrently and brought together in the results and/or discussion or sequenced so that the complementary method informs the development of the priority method; and
- Integration, where the quantitative and qualitative data is logically brought together (i.e. in collection, analysis or discussion) following decisions in priority and implementation.

Mixed methodologies combining quantitative and qualitative methods enable different but complementary aspects of diabetes self-management to be examined within the broader social context. This approach to research design has significant advantages for policy and intervention because mixed methods can (427):

- (1) answer research questions that singular approaches cannot and provide stronger inferences from findings;
- (2) strengthen a study by neutralising and/or overcoming the limitations of singular approaches; and
- (3) assist in understanding complex social phenomena by presenting a diversity of views.

Box 3.1

Key characteristics of the quantitative and qualitative research paradigms

Quantitative paradigm

- Based on positivism, there is an objective reality that can be measured
- The investigator is independent of the research and does not influence it
- Aim is to measure constructs and the relationship between them in a causal scientific framework

Qualitative paradigm

- Based on interpretivism and constructivism, reality is socially constructed and differs according to the person's viewpoint
- The investigator co-constructs the research and findings with the research participant
- Aim is to reveal the process and meanings of people's experience

from Rose (419)

The rationale for using mixed-methods designs in general practice research is the subject of a paper by the doctoral student, published under the title, *Assessing consumers ratings of quality in general practice requires more than just rating scales* (419). The paper is reprinted in full in Appendix E.

3.2.3 Equity in research participation

The vast majority of published research in the diabetes and health services literature, including that determined to reflect ‘evidence’ and ‘best practice’, is undertaken in developed countries and regions across the world, such as Australia, the UK, North America and parts of Europe, particularly the Scandinavian countries. These countries have public or private health infrastructure to support the delivery of diabetes care and administrative and clinical datasets to track diabetes patients and monitor effectiveness. Even so, research participation is largely inequitable within these countries: that is, most studies are conducted using samples comprised of the dominant cultural group, often people who are white, non-disadvantaged and English-speaking (428, 429). In fact, disadvantaged and non-English speaking groups are often excluded from randomised controlled trials because the selection criteria for these studies limit their participation (144, 428), through, for example, requiring access to transport or a home phone, or the ability to read and write English in responding to surveys. These groups are then further excluded from meta-analyses, systematic reviews and clinical practice guidelines, which form the building-blocks of evidence-based practice and policy (430).

This means that evidence informing best practice in diabetes care and self-management is largely derived from samples that do not reflect the socioeconomic and demographic burden of diabetes morbidity and mortality (113, 431). In Australia, the burden of diabetes is disproportionately skewed toward Indigenous, culturally and linguistically diverse, and socioeconomically disadvantaged populations (8). If diabetes self-management research is to be relevant to diabetes policy and practice, it must focus on strengthening the external validity of research findings by actively including those populations that are traditionally excluded from study (136, 429, 431, 432). Research participation can take many forms, and for some culturally and linguistically diverse

populations with a strong distrust in medical research, may best be undertaken using qualitative and innovative mixed-methodologies (429, 432, 433).

3.3 Research aims, questions and objectives

3.3.1 General research aim and objectives

The general research aim and research objectives act as a guiding framework for this study. They are useful in placing the research and findings in context and guiding recommendations for diabetes self-management policy and practice.

General aim:

To examine the sociostructural context in which people with diabetes daily undertake diabetes self-management.

General objectives:

- 1) To test a model of sociostructural determinants of diabetes self-management developed from self-efficacy theory;
- 2) To explore the experiences of culturally and linguistically diverse groups in performing diabetes self-management; and
- 3) To use the findings from both of these investigations to make recommendations for diabetes self-management policy and intervention.

3.3.2 Specific research aim and questions

The specific research aim and research questions relate directly to the sociostructural determinants of diabetes self-management model. Sociostructural determinants refer to factors that are socially structured, and in this thesis are represented by general practice-based determinants and socioeconomic determinants. The specific research aim and research questions are useful in determining the potential utility of the sociostructural

determinants model in explaining diabetes self-management, and examining the findings of this study in the context of other research.

Specific research aim:

To investigate the impact of sociostructural determinants on diabetes self-management using a self-efficacy model.

Major research questions:

RQ 1: How do sociostructural determinants influence diabetes self-management? and

RQ 2: How does diabetes self-efficacy influence the relationship between sociostructural determinants and diabetes self-management?

Specific hypotheses arising from the sociostructural determinants of diabetes self-management model are presented in section 4.1.

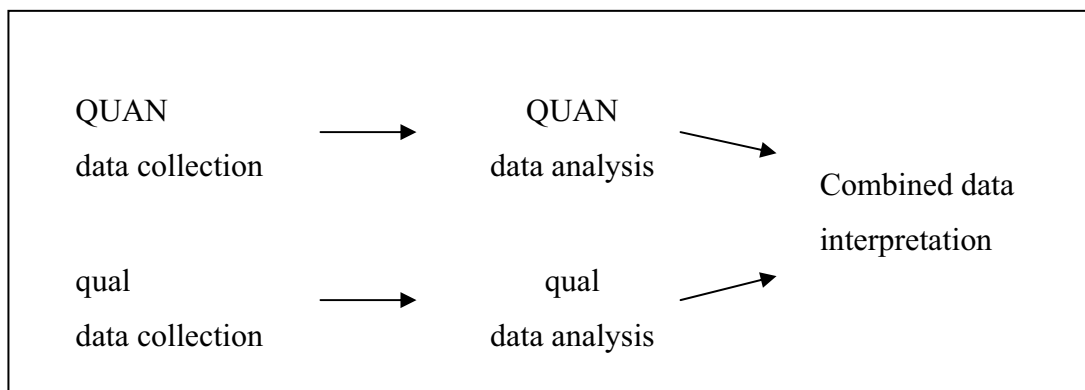
3.4 Research design

This research employed a concurrent triangulation mixed-methods design (425) to gain a complete and more comprehensive understanding of sociostructural determinants of diabetes self-management. Quantitative methods were used to test the utility of a theoretically-based model of sociostructural determinants of diabetes self-management. Qualitative methods were used to explore the experience of diabetes self-management among culturally and linguistically diverse groups of people living in an area of socioeconomic disadvantage. Quantitative and qualitative methods were conducted and analysed independently; and then combined to form meta-inferences of the research results in explaining diabetes self-management. Triangulation (i.e. the mixing of approaches) was performed at the level of the data. The mixed-method data were integrated in the discussion of the results.

The concurrent triangulation mixed-methods design is illustrated in Figure 3.1. Following convention, the terms quantitative and qualitative are shortened to QUAN and qual, with uppercase letters denoting the priority of one method over another (425,

434). Quantitative methods were assigned priority in this research; meaning that the qualitative data were used to support and explain the quantitative data. While the quantitative data were used to answer both research questions, the qualitative data were used primarily to answer the first research question concerning the impact of general practice and socioeconomic determinants on diabetes self-management.

Figure 3.1
Visualisation of concurrent triangulation design



Even though the value of mixed-methods research is increasingly recognised in mainstream scientific communities (424), many of the guidelines or protocols for ensuring rigour in mixing methods remain esoteric and difficult to interpret within the frame of standard research investigations. The following principles for methodological rigour in mixing quantitative and qualitative methods adhered to in this research was adapted from Rice and Ezzy's (435) guidelines for qualitative researchers. These principles articulate four methods for ensuring methodological rigour:

- (1) Theoretical rigour, which is demonstrated through sound argument and the selection of methods appropriate to the research problem;
- (2) Procedural rigour, which is demonstrated through a clear exposition of methodological and analytical decision-making;
- (3) Interpretative rigour, which is demonstrated through triangulation of data, logical inference and 'inter-rater reliability'; and
- (4) Evaluative rigour, which is demonstrated through adherence to ethical codes of research conduct.

3.5 Research participation and setting

Research participants for both the quantitative and qualitative components of this study were recruited through health services located in the Fairfield local government area: that is, Fairfield Division of General Practice and GP members of Fairfield Division. Participants are thus ‘patients’ of health services and are referred to as such in the following chapters, particularly in connection to general practice. Participation in the quantitative component of the study was limited by funding restrictions to English-speaking participants, including those from culturally and linguistically diverse backgrounds. This bias in research participation was counterbalanced with the deliberate selection of non-English-speaking participants in the qualitative component of the study.

3.5.1 Fairfield

Fairfield is an area of high cultural and social diversity situated in the outer south-west region of Sydney. In 2001, the Fairfield local government area (LGA) was the third most populated LGA in Sydney (181, 900 people) and had the highest proportion of overseas born residents of any LGA in Australia (436). At this time, more than 50 percent of Fairfield residents were in the most socioeconomically disadvantaged decile of the Australian population (259). According to indicators for the social determinants of health identified by the World Health Organisation (437), the 2003 Fairfield City Council had:

- a significant proportion of Fairfield residents were at-risk for poverty;
- high rates of stress were experienced by Fairfield residents;
- a significant proportion of children lived in families where both parents were unemployed;
- particular groups of people (e.g. refugees and people with poor English skills) were vulnerable to social exclusion; and
- the unemployment rate for Fairfield was significantly higher than the average for Sydney, NSW and other LGAs in the region.
-

3.5.2 Fairfield Division of General Practice

When this research was initiated in 2002, the Fairfield Division of General Practice had 210 GP members; 60 of who were members of the shared care diabetes program. The diabetes program aimed to improve diabetes management and reduce patient complications through the application of best practice guidelines. This was supported by GP education and access to structures for systematic diabetes care including: a Division held diabetes register (CARDIAB); a Division administered patient recall system; and regular audit and feedback on patient health outcomes and reported diabetes care according to guidelines endorsed by NSW Health (35). The Fairfield Division also assisted GP members in structuring their practices to support computerised patient registers and obtain federal government financial incentives for chronic disease management (e.g. Practice Incentive Program payments). The majority of Fairfield Division GP members reported in 2003 that they used diabetes registers; this group did not statistically differ from other GP members in terms of the number of diabetes patients, the size of the practice and number of practice staff (259).

3.6 Research approval

3.6.1 Ethics approval

The University of New South Wales Human Research Ethics Committee granted ethics approval for this study (HREC No: 01231). The patient ethics information sheet and consent form used in both the quantitative and qualitative components of this study are reproduced in Appendix A.

3.6.2 Division support and approval

The Fairfield Division of General Practice Diabetes Shared Care Committee granted approval for this research. This approval was important in gaining access to GPs and their patients, the CARDIAB database and Division resources to support study implementation. Fairfield Division provided assistance with the identification of GP

samples for patient recruitment and resources for the implementation of the group interviews including venues and catering.

3.7 Summary

This study uses a concurrent triangulation mixed-methods research design to gain a rich and complex understanding of how sociostructural determinants influence diabetes self-management. Complexity is the rule, rather than the exception, of diabetes self-management. This is underscored by the exploratory study which identified overlapping determinants of behaviour among socioeconomically disadvantaged patients and concomitant interactions with GPs' provision of diabetes care. It is also the case that complex research designs and understandings of diabetes self-management are more likely to be policy relevant than simplistic models. This is, in part, because the structure of mixed-methodologies promote the inclusion of groups who are marginalised from research, such as people who are disadvantaged or have poor English-language skills. At the same time, inferences from mixed-methods studies may have greater validity than any one method has alone because they draw on different research paradigms with methods specific to each approach. The following chapters present the detailed methodology for both the quantitative (Chapter 4) and qualitative (Chapter 5) components of this mixed-methods study, including the respective research designs, sample selection, and methods of data collection and analysis.

CHAPTER FOUR

Quantitative Methods

This chapter presents the quantitative methods used in this research to empirically test the sociostructural determinants model of diabetes self-management. It presents the study design and hypotheses; sampling and power estimates; survey construction, including development of the Socioeconomic Barriers to Diabetes Self-Care Scale scale; procedures for recruitment and survey administration; data management, systems and preparation; and data analysis techniques including methods for testing hypothesised interactions between the predictor and moderating diabetes self-management variables.

The use of quantitative methods relates directly to the following research questions:

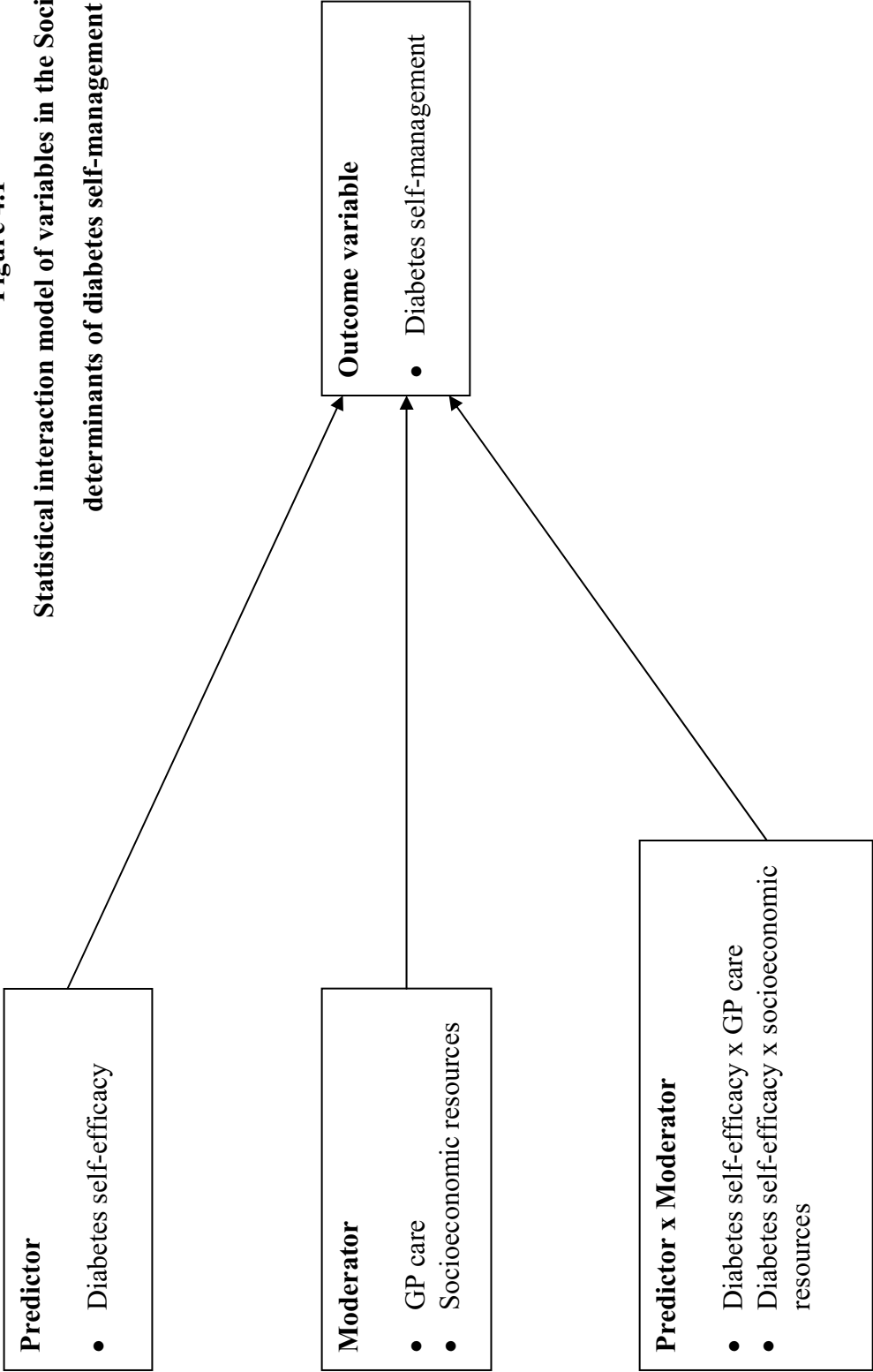
RQ 1: How do sociostructural determinants influence diabetes self-management? and

RQ 2: How does diabetes self-efficacy influence the relationship between sociostructural determinants and diabetes self-management?

4.1 Quantitative study design and hypotheses

The quantitative component of this research used a cross-sectional survey design in examining sociostructural determinants of diabetes self-management. A cross-sectional design is appropriate given that the research is focussed on the interaction of variables rather than their temporal sequence. The outcome variable or criterion was diabetes self-management, the predictor was self-efficacy in diabetes self-management, and the moderator variables were general practice-based determinants (referred to as GP care) and socioeconomic determinants (referred to as socioeconomic resources) of diabetes self-management. Following the convention of Baron and Kenny (413) the statistical interaction model is represented by the diagram in Figure 4.1:

Figure 4.1
Statistical interaction model of variables in the Sociostructural determinants of diabetes self-management model



This model was used to test the following five hypotheses (the first three of which satisfy preliminary tests of the model):

- 1) There is a positive relation between diabetes self-efficacy and diabetes self-management, so that self-efficacy increases with self-management;
- 2) There is a positive relation between GP care and diabetes self-management, so that GP care increases with self-management;
- 3) There is a positive relation between socioeconomic resources and diabetes self-management, so that socioeconomic resources increase with self-management;
- 4) GP care moderates the relation between diabetes self-efficacy and diabetes self-management, so that the relation is strengthened for high quality GP care and weakened for low quality GP care; and
- 5) Socioeconomic resources moderate the relation between diabetes self-efficacy and diabetes self-management, so that the relation is strengthened for high levels of socioeconomic resources and weakened for low levels of socioeconomic resources.

4.2 Sampling

4.2.1 Sampling population and frame

To test the model it was necessary to define a diabetes population that had: a high proportion of people with limited access to socioeconomic resources; and contact with a GP for diabetes care. This was achieved by identifying a geographical population with a low SEIFA (Socioeconomic Indicators for Areas) disadvantage score (i.e. Fairfield) and a resident Division of General Practice with an active diabetes program (i.e. Fairfield Division). The sampling frame for this research was diabetes patients registered with the Fairfield Division of General Practice Diabetes Program.

4.2.2. Power estimates and sample size

General guidelines for determining sample size for regression analyses are based on the number of predictors in the model. Assuming a medium sized relation between predictors and outcome (i.e. alpha for significance testing = .05, population multiple $R = .20$), Green (438) recommends $N > 50 + 8m$, for testing the full model and $N > 104 + m$ for testing individual predictors; where m is the number of predictors. Calculation of

sample size for hierarchical regression analyses with interaction terms requires further consideration. Jaccard, Turrisi and Wan (439) outline four conditions necessary for determining sample size in testing interactions:

- 1) The level of power desired, taking into account Type II error;
- 2) The alpha (Type 1 error) level;
- 3) Estimate for the population squared multiple correlation for the main-effects model; and
- 4) Estimate for the population squared multiple correlation for the full model with interaction term.

In this research, power (i.e. the sensitivity of a test in determining an effect) was set as .80 following the recommendation of Cohen (440) and the alpha level for significance testing was set at .05. Estimates for the population multiple R in the main effects and full model are more difficult to determine and rely on an assessment of regression effects in previous literature. This task is made more difficult by the inclusion of a new variable - socioeconomic barriers to diabetes self-management - in the proposed model. Estimates therefore relied on the demonstrated effect of the predictor, diabetes self-efficacy, on the outcome variable, diabetes self-management. This approach gave a conservative estimate for the model, assuming that the inclusion of the moderating variables increases the population multiple R . The estimate for the population multiple R in the main-effects model was set at .20 and .25 for the full interaction model. Jaccard, Turrisi and Wan (439) provide a table of approximate sample sizes necessary for achieving power of .80, with an alpha of .05 and one interaction term (Table 3.1, p.37). Applying the previous estimates to this table, the recommended sample size for this research was 119.

4.2.3 Sample selection

Patients with diabetes registered with the Fairfield Division Diabetes Program were listed on the CARDIAB database and access to this database for study sampling was contingent on GP approval (see section 4.4.1 for GP recruitment and approval procedures). Ten GPs approved patient participation in the study, representing a potential study sample of 431 patients with diabetes. Some registrants were ineligible

for selection because they needed an interpreter (21%); leaving a total of 340 patients for sample selection. A random sample of 250 diabetes patients was selected using a standard table of random numbers generated by the Million Men Study. Oversampling was conducted to account for a potential loss of sample resulting from age-related diseases (e.g. dementia), illness associated with diabetes complications and/or comorbidities, poor English-language ability and database errors.

4.2.4 Notes on sampling

It should be noted that there are limitations to the use of the CARDIAB database in sample selection and the subsequent generalisability of results in the quantitative component of this study. Not all diabetes patients are registered with CARDIAB and not all GPs use CARDIAB or are members of Divisions of General Practice, who administer the CARDIAB database. This suggests that diabetes patients registered with CARDIAB may not be representative of the broader diabetes population. Patients receiving guideline-based care from Australian GPs, for example, have been demonstrated to receive higher quality diabetes care than other patients (238). This may mean that the diabetes sample in this study have better quality GP care experiences than diabetes patients not registered with CARDIAB. Other methods of sample selection, however, have similar limitations:

- samples derived from hospital-based diabetes centres tend to have more complex needs and complications (532,533);
- samples derived from diabetes education groups tend to be white, well educated, financially secure and report better diabetes care and control (484-486); and
- samples derived directly through general practices tend to be invasive and have low response rates (534).

Despite the potential methodological limitations, the CARDIAB database was used in the quantitative component of this research for the following reasons:

1. Use of the CARDIAB database as a method of sample selection was preferred by the Fairfield Division of General Practice and the results of this study were to be used to inform diabetes program and policy development at the Division; and

2. At the time of sample selection in 2002, Fairfield Division of General Practice had the highest number of diabetes registrants on CARDIAB of any Division in Australia (535) and data from its program had been considered robust enough to publish in a peer-reviewed journal (246, 259).

The potential bias presented by the CARDIAB database in this research was balanced to some extent by use of the mixed-methods research design. Diabetes patients in the qualitative component of this study were sampled from English-speaking, Arabic-speaking and Vietnamese-speaking diabetes education groups (see 5.3.2 *Sample Selection* in *Chapter 5 Qualitative Methods*), enabling representation in the research from people not registered with CARDIAB.

An unintended consequence of the sampling strategy was that diabetes patients were clustered to GP. While it was not the intention of this study to examine patient care in relation to individual GPs, it was possible that GPs could affect patient diabetes self-management in ways that had not been pre-determined or controlled. As a result, post-hoc analyses were undertaken to investigate the independence of the data including statistical assessments of clustering and design effects (see section 4.7.1).

4.3 Survey construction

Standardised scales were used wherever possible to operationalise constructs in the sociostructural determinants model because standardised scales enable greater generalisability of results across studies. Scales were selected on the basis of adequate psychometric properties and acceptance in the diabetes, health services and broader public health fields. No appropriate scales to measure socioeconomic resources for diabetes self-management were identified in the literature. To fill this gap, the Socioeconomic Barriers to Diabetes Self-Care Scale (SBDSC) was developed using factor analysis for this research. Survey questions assessing demographic and/or socioeconomic data were adapted from the 2001 Australian Census instrument (ABS) and the General Practice Assessment Questionnaire (GPAQ). The full survey is presented in Appendix B.

4.3.1 The Summary of Diabetes Self-Care Activities (SDSCA) scale

Diabetes self-management is a multidimensional construct and should be measured accordingly. A good measure of diabetes self-management should therefore assess behaviour across a number of self-management domains: diet, exercise and self-monitoring of blood glucose. At the same time, behavioural performance in one domain can be a poor predictor of performance in others, suggesting that appropriate measures of self-management should measure each domain separately. As diabetes self-management is a behavioural function, its measurement should reflect actual behaviour rather than perception as much as possible. While self-reports will always be affected to some extent by respondents' perceptions, this impact can be minimised by quantifying the occurrence of self-management behaviours (e.g. how many times did you test your blood sugar?). Further inaccuracies relating to recall can be minimised by asking respondents to report recent behaviour, such as on the day of testing or in the last week.

The Summary of Diabetes Self-Care Activities scale (SDSCA) (441, 442) is a widely used measure of diabetes self-management. The SDSCA has five scales: General Diet, Specific Diet, Exercise, Blood Glucose Testing and Foot Care. Psychometric properties of the SDSCA are adequate. Internal reliability is reported as moderate to high for the General Diet ($\alpha = .67$ to $.71$), Exercise ($\alpha = .47$ to $.80$) and Blood Glucose Testing ($\alpha = .69$ to $.75$) scales and low for the Foot Care subscale ($\alpha = .24$ to $.30$). Specific Diet has been found to be consistently unreliable with Cronbach's alphas ranging from $.07$ to $.20$. Test-retest reliability over three to four months is reported as moderate: General Diet ($r = .25$ to $.60$); Specific Diet ($r = .42$ to $.45$); Exercise ($r = .42$ to $.61$); Blood Glucose Testing ($r = .30$ to $.71$); and Foot Care ($r = .47$ to $.59$). Convergent validity was assessed for the General Diet, Specific Diet and Exercise scales and shows significant weak to moderate correlations with food and exercise records and general questionnaires (442).

Following a review of the performance of this measure across seven studies ($n = 1988$) several items were reworded (442). This study used the revised SDSCA with the three scales shown to demonstrate good internal reliability; because hypothesis testing is reliant on a reliable, valid and robust dependent variable. The SDSCA General Diet,

Exercise and Blood Glucose scales measure the frequency with which each self-management activity was performed over the last seven days. There are two items in each scale. Scoring the SDSCA scales involves calculating the mean number of days in the last week that the self-management activity was performed. Scale scores range from 0 to 7.

4.3.2 The Diabetes Self-Efficacy Scale (DSES)

Self-efficacy is a domain specific concept. This means that generalist measures that assess self-efficacy unrelated to specific situations or behaviour should be avoided because they will inevitably have low specificity and are poor predictors of behaviour. Domain specificity means that high levels of self-efficacy in one domain of behaviour do not necessarily translate to self-efficacy across other domains. Following this, the best predictor of diabetes self-management is self-efficacy in performing diabetes self-management behaviours. Or even better, the best predictor of exercise in self-management for example, is self-efficacy in performing exercise.

Measurement specificity and reliability may further be enhanced by the use of broad response scales. Bandura (73, 138), for example, recommends that self-efficacy be measured with a 0 – 100 response scale presented in ten unit intervals. There is some evidence to support his assertion, with one study showing that a self-efficacy measure with a 0 – 100 response format was psychometrically stronger than a traditional likert scale format (443).

Domain specificity and response format sensitivity represent the ideal in self-efficacy measurement, although actual instruments and practical examples of their application are harder to come by. A review of the survey literature was unable to identify an appropriate self-efficacy instrument with domain specificity to diabetes self-management (i.e. diet, exercise, self-monitoring of blood glucose). Furthermore, while a scale with strong psychometric properties was identified for exercise, such as Bandura's Self-Efficacy Exercise Scale (138), comparative scales were not identified for diabetes diet or self-monitoring of blood glucose. As self-efficacy is concerned specifically with confidence in overcoming barriers to performing behaviours it is important that measures of diabetes self-efficacy comprise barriers that reflect diabetes-specific issues.

Rather than construct a scale for this research, it was decided to sacrifice some discrimination in the prediction of diabetes self-management and use an existing generalized measure with strong psychometric properties and demonstrated relevance to, or testing with, the Australian population. The psychometric quality of instruments used in this research was a prime concern given that a scale had to be developed to represent the concept of socioeconomic barriers to diabetes self-management.

The Diabetes Self-Efficacy Scale (DSES) is an 18-item measure of self-efficacy in performing diabetes self-management activities, developed in the Australian context (444). The DSES was adapted from the Insulin Management Diabetes Self-efficacy Scale (IMDSES) and is appropriate for both insulin-using and non-insulin-using people with diabetes. The DSES is reported to have adequate psychometric properties. In a test of the instrument with 226 participants, internal reliability was reported as moderate ($\alpha = .82$). Construct validity was demonstrated with item-total correlations ranging from $r = .33$ to $r = .74$. Diabetes self-efficacy beliefs were further shown to be stable over time (444). The DSES is measured on a 6-point likert scale from strongly agree to strongly disagree. Scoring involves the simple addition of items: 5 items are reverse coded. Scores range from 18 to 108 with higher scores representing lower levels of self-efficacy in diabetes self-management.

4.3.3 The General Practice Assessment Questionnaire (GPAQ)

People with diabetes visit their GP for more than just diabetes care; meaning that they base their assessments of care on more than just contact for a specific disease. Instrument selection should therefore reflect patients' general perceptions of GP care rather than just their perceptions of the diabetes care that GPs provide. Measurement of GP care should also reflect the multidimensional nature of this construct. Preference in instrument selection was given to measures that assessed aspects of GP care known to influence diabetes self-management and/or diabetes outcomes, such as access to GP care and patient-centred care.

GPs' delivery of self-management information to diabetes patients was not measured in this research. This was because the majority of participants were diagnosed up to 10

years earlier and it is likely that this was the occasion when they received information from their GP on diabetes self-management. Assessments of GP delivery of self-management information are therefore subject to retrospective recall bias. Further, it was recognised that information on diabetes self-management can come from a wide range of sources including GPs, diabetes educators, specialists, books, the internet, the media and friends; and this may have further biased recall by reducing participant sensitivity to GP-delivered information.

The General Practice Assessment Questionnaire (GPAQ) (445) was developed by UK Primary Care Trusts to assess consumer satisfaction with general practice-based services as part of the GP funding contract. The GPAQ was constructed by adapting the US Primary Care Assessment Survey (PCAS) for use in the UK. It is widely used in Australia due to similarities in primary health care systems. The GPAQ is a 28-item self-report measure with 6 assessable scales: Access (8-items); Receptionists (1-item); Continuity of Care (1-item); Communication (6-items); Practice Nursing (2-items); and Overall Satisfaction (1-item).

GPAQ is used here in preference to the General Practice Assessment Survey or GPAS (the earlier version of GPAQ) on recommendation of the authors (445); even though the collation of psychometric data for GPAQ is continuing. Psychometric information for GPAS suggests that GPAQ will have strong psychometric properties. The GPAS was reported to have acceptable levels of reliability and validity when tested on a sample of 7247 patients (446). Internal reliability for GPAS scales also represented in GPAQ was reported to be moderate to high: Access ($\alpha = .86$); Communication ($\alpha = .90$) and Nursing Care ($\alpha = .95$). Test-retest reliability was similarly high with correlations ranging from .81 to .92 across scales: Access ($r = .81$); Communication ($r = .85$) and Nursing Care ($r = .92$). Construct validity of the GPAS, measured by internal consistency, inter-item correlations and score discrimination between satisfied and dissatisfied patients, was reported to be satisfactory (446). The GPAS was also sensitive to differences in ratings of GP care according to age and ethnicity (447).

Two GPAQ scales, Access and Communication, were considered appropriate for measuring access to GP care in this research because both reflect aspects of quality care

important to diabetes outcomes and have good psychometric properties. Furthermore, items on the Communication scale strongly reflect the concept of patient-centredness (448). Scoring of the GPAQ is facilitated by a SPSS syntax program publicly available on the GPAQ website (www.gpaq.uk). Scale scores range from 0 –100; with high scores representing high levels of satisfaction with GP care.

4.3.4 The Socioeconomic Barriers to Diabetes Self-Care Scale (SBDSC)

No appropriate instruments for measuring socioeconomic barriers to diabetes self-management, or a similar socioeconomic resources construct, could be identified in the literature. The Socioeconomic Barriers to Diabetes Self-Care Scale (SBDSC) scale was developed specifically for this research and was constructed using the responses of 105 participants. Sample characteristics are presented in Chapter 6. Further discussion of the development of the measure is published in Rose (449) under the title, *Socioeconomic barriers to diabetes self-care: development of a factor analytic scale*. The paper is presented in full in Appendix E.

Item generation

A literature review was undertaken of socioeconomic factors associated with specific diabetes self-management behaviours, such as blood glucose testing and general health and lifestyle behaviours, such as diet and exercise. Six factors were identified in this review: cost of care and materials, transport to care, safe areas for exercise, area cleanliness, food security and health literacy. Ten items were generated to reflect these issues (Box 4.1). A mix of positively worded and negatively worded items was included to discourage acquiescence. Items were piloted with a convenience sample of 8 diabetes patients to assess face validity (section 4.3.6).

Box 4.1

Items generated to reflect socioeconomic barriers to diabetes self-management

1. I sometimes go without my diabetes treatment and supplies because I can't afford to buy them
2. I understand everything that my doctor tells me about my diabetes*
3. I always see my doctor regularly, even when money is tight*
4. It is difficult to find a safe place to exercise where I live
5. My local supermarket or shop has all the foods I need to eat a healthy diet*
6. I find it difficult to get transport to see my doctor or specialist
7. I can afford to pay for private diabetes specialists*
8. I sometimes go without the foods I need because I can't afford to buy them
9. I don't always understand the written information or handouts my doctor gives me
10. The places in my local area where I can exercise are clean and tidy*

*These items were reverse coded

Measurement of items

Socioeconomic barriers were measured on a 5-point likert scale ranging from strongly disagree to strongly agree; giving a score range of 1 – 5. High item scores represented high socioeconomic barriers. Five items were reverse coded (Box 4.1). Items were administered orally to participants.

Factor analysis

The sample size of 105 was adequate to perform factor analysis (Bryman, 2001; Kline 1994); this was confirmed by a Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy of .636 and a significant chi-square statistic for Bartlett's test of sphericity ($p = .000$). A principal components analysis with varimax rotation was performed on the 10 socioeconomic barriers items. Missing data were replaced with the estimation maximisation method. There were no outliers. Evaluation of assumptions for factor analysis was satisfactory, although all items showed negative skewness (i.e. towards high socioeconomic resources). Factors were extracted according to the Root Curve criterion as determined by the Cattell scree test (Cattell, 1966). This approach was favoured over an inspection of eigenvalues because eigenvalues can result in an overly liberal definition of factors; particularly when the aim of factor analysis is to produce a meaningful reduction of data (Kline, 1994). Analysis was performed using SPSS Version 11.3.

Results of factor analysis

Four components with eigenvalues greater than 1 were extracted, encompassing all 10 items. This was reduced to 2 components following the scree test. These 2 components accounted for 46.15% of the variance. The component loadings, communalities (h^2) and percentages of variance explained after varimax rotation are shown in Table 4.1. Component loadings less than .30 were suppressed to aid interpretation.

Interpretation of the factors for the Socioeconomic Barriers to Diabetes Self-Care Scale was relatively straightforward. Variables loading on component 1 seemed to be concerned with barriers to self-management that were associated with where a person lives. Variables loading on component 2 seemed to be concerned with barriers to self-management that were associated with information that a person receives from their

doctor. The 2 components were therefore labelled *Place Barriers* and *Information Barriers* respectively (Table 4.1).

Table 4.1
Varimax rotated component loadings for the Socioeconomic Barriers to Diabetes Self-Care Scale

Item	Factors		h^2
	1	2	
Unkept area for exercise	.74		.64
Unsafe place to exercise	.73		.55
Unhealthy foods at local shop	.71		.70
Unable to afford foods	.67		.59
Unable to understand oral information		.79	.66
Unable to understand written information		.78	.77
% of variance	21.26	14.89	36.15
Label	Place Barriers	Information Barriers	

The Socioeconomic Barriers to Diabetes Self-Care Scale

The Socioeconomic Barriers to Diabetes Self-Care Scale (SBDSC) consists of two scales: Place Barriers and Information Barriers. The Place Barriers scale consists of four items and measures patients' perceptions of environmental safety and aesthetics and access to foods (from Box 4.1):

- 10. The places in my local area where I can exercise are clean and tidy
- 4. It is difficult to find a safe place to exercise where I live
- 5. My local supermarket or shop has all the foods I need to eat a healthy diet
- 8. I sometimes go without the foods I need because I can't afford to buy them

The Information Barriers scale consists of two items and measures patients' perceived understanding of diabetes information presented by their doctors (from Box 4.1):

2. I understand everything that my doctor tells me about my diabetes
9. I don't always understand the written information or handouts my doctor gives me

Scale scores were calculated by determining the mean score for each scale. Both scales therefore have a score range of 1 to 5; with higher scores indicating higher socioeconomic barriers to diabetes self-management.

4.3.5 Measurement of other variables

Other variables were measured as potential covariates of the relation between diabetes self-efficacy and diabetes self-management. These variables form 3 categories: demographic variables, socioeconomic variables and health and service related variables. Table 4.2 displays these potential covariates, categories, level of measurement and instrument source.

4.3.6 Pilot testing

The presentation of measures in the survey was deliberately ordered to: move the respondent from concrete to perceptual assessments of behaviour; and move from less personal to more personal information once rapport had been established. Text to orient the respondent to the requirements and scoring keys of each measure were based on the instructions of specific scales or standard survey instrument formatting. The instrument was piloted with a convenience sample of 8 people attending the Fairfield Hospital Diabetes Support Group; who also participated in the English-speaking focus group. Most pilot participants were female ($n = 5$), aged between 65 – 74 years ($n = 5$) and were reliant on a pension as their main source of income ($n = 6$). Four pilot participants were born overseas and 3 spoke a language other than English in the home.

Pilot participants completed the survey over the telephone. The survey took between 15 to 35 minutes to complete depending on English language ability. Responses were recorded and any difficulties in completing questions were noted. At the completion of the survey respondents were asked the following questions:

Did you understand every question?

Are there any questions that you had difficulty answering?

- Did the survey cover issues about diabetes self-management that are important to you?
- Is there anything we left out?

Results from the pilot test suggested that the survey was acceptable (i.e. there was no missing data) and had satisfactory face validity.

Table 4.2
Category, level of measurement and instrument source for potential covariates

Variable	Category	Level of measurement	Source
Age	Demographic	Interval	GPAQ
Gender	Demographic	Categorical	GPAQ
Marital status	Demographic	Categorical	GPAQ
Language spoken in Country of Birth	Demographic	Categorical	ABS
Level of education	Socioeconomic	Categorical	ABS
Employment status	Socioeconomic	Categorical	GPAQ
Weekly household income	Socioeconomic	Categorical	ABS
Accommodation	Socioeconomic	Categorical	GPAQ
General health	Health & service	Categorical	GPAQ, SF-36
Other illness or disability	Health & service	Categorical	GPAQ
Diabetes education	Health & service	Categorical	Constructed for research
Health Care Card status	Health & service	Categorical	Constructed for research
Method of paying GP	Health & service	Categorical	Constructed for research

4.4 Recruitment

4.4.1 GP consent

GPs who were registered with the Fairfield Division Diabetes Program and had at least 13 patients listed on the CARDIAB database were selected for contact. More than 13 patients was chosen as the inclusion criteria because it represented a natural split in the distribution of patients registered; that is, the distribution of patients according to GP were broadly clumped in two distinct groups around 13 patients. Thirty-three GPs were contacted by letter with the assistance of Division staff. This letter outlined the aims of the study, support for the research by the Division and requested GP expressions of interest in patient participation. The doctoral student met interested GPs face-to-face to clarify understanding of the research and discuss in detail patient ethics and consent procedures. Ten GPs gave their consent for the research team to access patient records for sampling.

4.4.2 Participant recruitment

Patients selected through random sampling were mailed an information package outlining the research aims, procedures and expectations for patient involvement. This package comprised: a letter stating that their GP had consented to this contact; a study information sheet; ethics and consent forms; and a return self-addressed envelope for return of the consent form. Patients were notified in the letter that they would be contacted by telephone within two-weeks to clarify understandings of the research and their participation. This procedure was considered necessary for maximising participation among a sample that may be disadvantaged and/or have poor English language abilities.

4.5 Survey administration

Surveys were administered by telephone. This approach is less biased than a waiting room or diabetes clinic survey and has the potential for a higher response rate than a postal survey (450, 451). Participant response rates derived from similar study

populations in disadvantaged areas suggest that response rates of 40% to 60% using this method are common (139). The doctoral student conducted 70% of the surveys. Three research assistants experienced in telephone interviewing conducted the remaining surveys after being trained in survey administration by the doctoral student. Standardised text for introducing the research and answering common questions was produced to ensure reliability across interviewers.

4.6 Data management and preparation

All participant survey data were de-identified and then entered and analysed using the Statistical Package for the Social Sciences (SPSS) Version 11.3. Participant contact details were kept in an excel file separate from the survey data.

4.6.1 Data screening

Two procedures were undertaken to ensure the accuracy of the data file: a 15% data accuracy check of randomly selected cases in the data file; and an inspection of variable frequencies for data entry errors. Less than 5% of the data file was missing and there were no patterns detected, suggesting a random response. The expectation maximization method was used to input missing data because it avoids overfitting and produces realistic variances (452).

Data were screened for the presence of potential univariate outliers for preliminary analyses. Procedures for detecting univariate outliers included inspection of boxplots and standardised scores (i.e. potential outliers >3.29) for continuous variables and 90-10 category splits for dichotomous variables. No univariate outliers were detected among continuous variables. The sociodemographic dichotomous variable ‘Method of Paying GP’ showed a 99-1 split and was retained for descriptive purposes only. Multivariate outliers were assessed using mahalanobis distance in later hierarchical regression analyses, as described by Tabachnik and Fidell (452).

Normality of continuous variables was assessed using histograms and SPSS statistical tests of normality, skewness and kurtosis. These tests showed non-normality and skew

of all sociostructural determinants model variables except diabetes self-management (see Appendix C). This skew appeared to be systematic towards high functioning; that is, high diabetes self-efficacy, high GP care and low socioeconomic barriers. Variables that violated the assumption of normality were not transformed at this point. Normality was inspected further during assumption testing of residuals in later multiple regression analyses.

4.6.2 Data recoding

Categorical variables with small cell sizes were collapsed and recoded to enable analysis. Recoding was conducted according to both natural splits within the data and conceptual fit within categories. Level of education, for example, was recoded into a dichotomous variable with categories: less than Year 10 and more than Year 10. This distinction was thought to be sensitive to the attainment of school qualifications for an older age-group and people educated in non-Australian educational systems. As a general rule, variables were kept continuous rather than dichotomised because categorising continuous variables results in both a loss of predictive power and an increase in Type I and Type II errors (452).

4.7 Data analysis

4.7.1 Data independence

A series of calculations and statistical tests were performed to gain an indication of the degree of clustering in the data, present as a result of the sampling method. The Intraclass Correlation Coefficient (ICC) for each outcome variable was calculated using variance data from one-way ANOVA. Following is the formula used for calculating ICC (ρ):

$$\rho = \frac{s_b^2 - s_w^2}{s_b^2 + (m-1)s_w^2}$$

where s_b^2 = the variance between clusters, s_w^2 = the variance within clusters and m = the average number of participants from each practice.

ICCs range from 0 to 1 with small ICCs representing less clustering in the data (453). Further calculations were performed to determine the Effective Sample Size (ESS) for each outcome variable. Calculation of the ESS requires estimation of a correction factor called the Design Effect (DE). The formula used for calculating DE was:

$$DE = 1 + \rho(m-1)$$

and ESS was calculated using this formula:

$$ESS = \frac{mk}{DE}$$

where k = the number of clusters

4.7.2 Preliminary analyses

Preliminary analyses were conducted to determine the characteristics of the sample, and through this, identify potential variables for inclusion in moderational models as model covariates.

Sample description

Continuous variables were summarised using means and standard deviations. Categorical variables were summarised using frequencies and proportions. Descriptions of both variable types were presented with 95% confidence intervals.

Identifying covariates

Potential covariates were identified by testing the relation or effect of demographic, socioeconomic and health and service variables on diabetes self-management variables. Continuous variable covariates were identified through tests of the significance of Pearson's correlation coefficient. Categorical variable covariates were identified

through the significance of the F test in one-way ANOVA; and where the assumptions of one-way ANOVA were violated (through for example, heterogeneity of variance), the significance of the χ^2 statistic in Kruskal-Willis testing. Alpha for statistical testing was set at .05 for all analyses. Following the advice of Perneger (454), Bonferroni adjustments were not made to the alpha statistical significance level of .05 because of the exploratory nature of these analyses and the inflated risk of Type II error.

4.7.3 Model testing

The relation between predictor and outcome

A series of scatterplots between the predictor (i.e. self-efficacy) and the 3 diabetes self-management outcome variables (i.e. general diet, exercise and blood glucose testing) were produced to examine the nature of variable relation. Plots were inspected to determine whether there was a linear, curvilinear or quadratic relation between the 2 variables. This procedure was essential in determining the most appropriate regression method for testing the hypothesised model.

Regression assumptions

Analysis of residuals was performed using scatterplots to examine the relation between predicted outcome scores and errors of prediction. The following assumptions were inspected for each model (452):

1. Normality: residuals were normally distributed around predicted outcome scores;
2. Linearity: residuals had a straight-line relation with predicted outcome scores; and
3. Homoscedasticity: the variance of residuals about predicted outcome scores was the same for all predicted scores.

Screening for outliers was performed using casewise diagnostics (univariate outliers) and Mahalanobis distance (multivariate outliers). Residuals scatterplots were further inspected to determine the leverage, discrepancy and influence of outliers.

Structuring the interaction

The predictor and moderator variables were standardised to reduce multicollinearity among variables in the regression equation while the outcome variable was left

unchanged (455). Standardising variables has benefits over centering in interpretability of the predictor and moderator and ease of plotting interactions (456). Problems only arise in this method when causality is a concern (439). This research is concerned with associative effects and as a result is tested using a cross-sectional design.

The product or interaction term was created by multiplying together the standardised predictor and moderator variables (413, 439, 455, 456). The structure of a standard regression equation for a predictor and moderator interaction is represented by:

$$Y = b_1X + b_2Z + b_3XZ + b_0$$

where Y = the outcome variable, b_1X = the predictor, b_2Z = the moderator, b_3XZ = the interaction term, and b_0 = the error term.

Hierarchical multiple regression was used to test for moderator effects (439, 455, 456). The predictor and moderator variables were entered in the first block or step and the interaction term entered in the second step. Failure to test the model hierarchically confounds the interaction effect with the variables from which the term was created (456, 457). This modelling means that interpretation of the predictor and moderator is dependent on the interaction. In other words, the effects of the predictor and moderator must be interpreted as conditional effects and not as main effects (456); so that “the first-order effect of one variable represents the effect of that variable at the average level of the other variable(s)” (p. 121).

Testing the significance of interactions

The statistical significance of the moderator effect was determined by inspecting the single degree of freedom F test; which showed the stepwise increase in variance accounted for by the addition of the interaction term (439, 455, 456). The effect size for the interaction was determined by inspecting the change in R^2 after the interaction term had been added to the model (456). A small effect size is defined as .02, a moderate effect size as .13 and a large effect size is defined as .26 and above (455). Interpretation of regression coefficients was restricted to unstandardised B regression coefficients

because coefficients in regression equations with interaction terms are not adequately standardised and are therefore uninterpretable (455, 456). Step-down procedures were not used in model testing following the advice of Aiken & West (455) who recommend keeping non-significant interactions terms in the model when there are strong theoretical reasons for doing so.

Interpreting interactions

Significant moderation effects were plotted using procedures identified by Aiken and West (455). Here, the standard interaction regression equation is restructured to show the regression of Y (i.e. the outcome variable) on X (i.e. the predictor) at levels of Z (i.e. the moderator):

$$Y = (b_1 + b_3Z)X + (b_2Z + b_0)$$

Unstandardised B regression coefficients were substituted into the model at three values of Z : one standard deviation below the mean, at the mean and one standard deviation above the mean (455). Following convention, these three values were designated as Z_L (Low), Z_M (Mean) and Z_H (High). This procedure resulted in three regression lines, which were plotted to show the effect of the predictor on the outcome variable at the three specified values of the moderator (456).

Post hoc testing of interactions involved: testing whether the regression lines differed from each other by inspecting the t -test for the significance of the interaction term coefficient in the full model; and testing whether the regression lines differed from 0 (455). This latter test required the creation of 2 new variables representing the simple slope for the regression of Y on X at Z_L and Z_H . This was performed using procedures reported by Aiken and West (455) on page 18:

- 1) Create a new variable Z_{CV} , which is the original variable Z minus the conditional variable of interest, i.e. $Z_{CV} = Z - CV_Z$, where $CV_Z = Z_L$ or Z_H
- 2) Multiply the predictor with the new variable Z_{CV} , i.e. $(X)(Z_{CV})$
- 3) Regress the outcome variable Y on X , Z_{CV} and $(X)(Z_{CV})$

This test of the simple slopes shows the significance of the relation between the predictor and outcome at different levels of the moderator (456). The t -test associated with the regression coefficient b_1 (i.e. the simple slope of Y on X at the conditional value CV_Z of Z) was inspected to determine whether the regression lines differed from 0.

Including covariates in moderator models

Covariates or confounding variables were entered in the first step of the hierarchical regression followed by the predictor, moderator and then interaction term (456). Frazier,

Tix and Barron (456) recommend testing whether covariates function consistently across levels of the other variables by adding interactions between covariates and other model variables in the final step of the hierarchical regression. While ideal, this step was not taken because it was thought that the sample size would be insufficient for detecting these additional interaction effects.

4.8 Summary

The quantitative component of this mixed-methods research is concerned with statistical testing of the Sociostructural determinants of diabetes self-management model. Five hypotheses are derived from the model; two of which address interaction effects between diabetes self-efficacy and sociostructural determinants in explaining diabetes self-management behaviours. A cross-sectional quantitative research design is employed because causal relations among variables are not essential to determining the validity of the model. Standardised scales with adequate psychometric properties were selected for inclusion in the telephone survey. An exception to this was the Socioeconomic Barriers to Diabetes Self-care scale, which was developed using factor analysis because no appropriate scales could be identified.

The hypothesised interaction between diabetes self-efficacy and sociostructural determinants was analysed using hierarchical multiple regression with tests for moderator effects. The required sample size to ensure power for the detection of interaction effects is calculated to be 119. Note that while this is not a large sample and will have obvious implications for generalisability of the quantitative results, the primary purpose of this mixed-methods research is to explore the potential validity and

utility of an innovative, and previously untested, sociostructural determinants of diabetes self-management model. Even so, strategies to conserve statistical power were employed wherever possible, such as testing interactions separately, and calculating, but not including, intra-cluster coefficients in hierarchical multiple regression models. Results from the quantitative component of this mixed-methods study are presented in Chapters 6 (Descriptive data) and 7 (Model testing).

CHAPTER FIVE

Qualitative Methods

This chapter presents the qualitative methods used in this study to explore the experiences of people in self-managing their diabetes; with particular emphasis on psychosocial and socioeconomic factors and interaction with GPs. It includes: discussion of the theoretical approach to research, phenomenology; sample selection and recruitment; methods of data collection; and data analysis techniques. Strategies for ensuring rigour in the collection and interpretation of results are noted throughout.

The use of qualitative methods relates directly to the following research question:
RQ 1: How do sociostructural determinants influence diabetes self-management?

5.1 General overview

Qualitative methods were used in this study to illuminate the findings of the quantitative methods: that is, quantitative testing of the sociostructural determinants of diabetes self-management model. Even so, qualitative methodology was not restricted to the parameters of this model for two reasons:

1. Participants' experiences of diabetes self-management are complex and multi-layered and cannot be easily or validly isolated from the broader context of diabetes; and
2. The findings of the qualitative research were to be used in informing diabetes program development at the Fairfield Division of General Practice, which had contributed financial and other resources to the qualitative component of this study.

5.2 Theoretical approach

5.2.1 Phenomenology

This qualitative research was informed by the philosophical and empirical approach of phenomenology. Essentially, phenomenology involves studying the world from the individual's own point of view. Two key concepts underlie this approach to research:

the life-world and intentionality. The life-world represents an individual's subjective construction of the world around them including taken-for-granted daily events. Individuals' articulation of their life-world, or 'lived experience', is the raw data necessary for accurately understanding phenomena from the perspectives of those involved (458).

The concept of intentionality comes from the philosophy of Husserl who believed that consciousness (including preconscious and unconscious processes) was intentional; being always directed towards the world (459). In other words, consciousness is an active rather than a passive process, meaning that if we are to accurately understand why individuals behave in certain ways we need to understand the meanings they give to their actions (435). The concepts of the life-world and intentionality highlight the psychological subjectivity of phenomenology: essentially all individuals' experiences are different even when the observed event is the same. In phenomenological research this subjectivity is both acknowledged and addressed (458). The phenomenological reduction states that individual's perceptions and experiences of events are taken as they present to be even though they may not accurately reflect how these events actually are (459). The process of bracketing enables researchers to account for their own subjectivity in data analysis by being aware of personal pre-existing biases or knowledge of a phenomenon (459).

5.2.2 Phenomenology and group interviews

This research used key informant group interviews to explore individuals' experiences of diabetes self-management. Group interviews are a data collection strategy aimed at maximising resources in gaining access to individual's experiences, understandings and everyday explanations of a particular phenomenon. The use of group interviews in this research reflects a pragmatic compromise between the approach of phenomenology and the resources required to access the experiences of people in diabetes self-management who are commonly excluded from research; that is, people who do not speak English. Data collection in groups has several advantages (435, 460, 461):

- scientific scrutiny, in that several others can observe the group interview and comment on the rigour of data collection;

- social anonymity, in that participant responses are seen to be the responsibility of others and not the individual enabling participants to speak freely;
- accessibility, in that group interviews can support and encourage disadvantaged or marginalised groups to participate in research; and
- time and cost effectiveness, in that the experiences of several participants can be explored at the same time.

While some authors consider in-depth interviews to be the exemplary method of data collection (462), group interviews can be consistent with phenomenology. Group interviews, like individual interviews, are solely concerned with exploring individuals' meanings and understandings of phenomena. They can be distinguished from focus groups which are dependent on the facilitation of group interaction in data collection and view the group as the unit of analysis (463-465). Group interviews use traditional didactic interview methods and the unit of analysis remains the individual. They can be distinguished from individual interviews only in the method of data collection.

Having said that, group interviews inevitably yield different data than individual interviews. This data differs both in content and in structure. Individuals, for example, tend to report more socially sensitive information than people in groups (466). This does not however invalidate the data analysis or findings from group interviews; it is simply a function of the context of data collection (464). Some authors, such as Webb and Kevern (467), view this context negatively, believing that the group environment 'contaminates' the individual's experience. While the experiences of others in the group may impact on what an individual reveals about their own experience, this does not invalidate what the individual chooses to reveal. In fact, the phenomenological reduction implies that this information must be accepted as given. Hearing others share their experiences may actually encourage individuals into a deeper reflection and understanding of their own beliefs and behaviours; a key goal of the phenomenological method.

The structure of phenomenological data, or the way in which an individual conveys their experience, is inevitably affected by the group context. The structure of group interviews facilitates individual expression of attitudes, opinion, knowledge and beliefs

about phenomena rather than in-depth personal narratives of experience (463). It is simply not possible for an individual to reveal their in-depth conceptualisation of an experience within a limited time-frame where other people are waiting to speak. This does not, however, prevent the use of material accessed through group interview in phenomenological analysis. Attitudes and beliefs are simply subsets of the more detailed phenomenological information that can arise in biographical narrative and are keys to how an individual understands phenomena (468).

5.3 Participants

5.3.1 Sample size

Phenomenological research tends to have smaller sample sizes than other forms of qualitative research because of the nature of inquiry and level of exploration into participants' experiences (458, 469). In this case, sample size calculation was related to the method of data collection. Twohig and Putnam (470) suggest that the appropriate number of participants in a group interview is between four and 12 and the number of group interviews required to achieve saturation on a topic is between three and 12; depending on the purpose of the study, participants, and the availability of resources. Taking into account the needs of this study, including the mixed-methods research design and resource availability, a decision was made to conduct three group interviews, allowing for up to 12 participants in each group.

5.3.2 Sample selection

Purposive sampling methods were used to select groups reflecting cultural diversity in Fairfield. The Fairfield Division of General Practice patient diabetes register (CARDIAB) was used to identify the three most frequently occurring language groups of people with diabetes in the Fairfield CARDIAB population. Convenience sampling was then used to identify pre-existing diabetes groups reflecting the CARDIAB selection. The sample consisted of English-speaking, Vietnamese-speaking and Arabic-speaking people attending group diabetes education in the Fairfield area.

5.4 Recruitment

People attending one of three group diabetes education sessions in English, Vietnamese or Arabic languages were invited to participate in the study. The recruitment procedure differed for the English-speaking and non-English-speaking groups. For the English-speaking group, the doctoral student attended the Diabetes Support Group at the Fairfield Hospital Diabetes outpatients clinic and invited attendees to participate in the study. The Vietnamese-speaking and Arabic-speaking diabetes education groups were initiatives of the Fairfield Division of General Practice diabetes program manager; who invited people to participate in the study under instruction from the doctoral student. All potential participants were given essential details of the study including: aims of the research, affiliations of the research team, contact telephone numbers, ethics approval, venue, date and time, and travel and catering arrangements. Taxis were arranged as transport to venues to ensure access to the study for disadvantaged participants. Light refreshments were supplied at all group interviews.

5.5 Data collection

5.5.1 Interview schedules

A semi-structured interview schedule format was considered most appropriate for this research because it is widely used in phenomenology, enables essential topics to be covered, and promotes flexibility; including prompting of responses and exploration of participant-initiated concerns (462). Box 5.1 shows the interview schedule for the group interviews. Questions were clustered around two central themes: a) experiences in performing diabetes self-management behaviours, including structural impediments; and b) experiences of interaction with GPs and access to primary care. The questions were structured to elicit:

- self-management experiences that could inform understanding of the components of the sociostructural determinants of diabetes self-management model;
- self-management experiences that were not related to the model; and
- issues in access to diabetes care in general practice (including access to resources) that could inform program development at Fairfield Division.

Being diagnosed with diabetes by a GP was used to orient participants to a discussion of general practice experiences because it was expected that this example would be highly salient for people with diabetes. The question schedule was developed by the doctoral student and then discussed and refined in consultation with supervisors, a diabetes patient, other researchers and members of the Fairfield Division of General Practice Diabetes Program Committee.

Box 5.1

Interview schedule for participant experiences in diabetes self-management

A. Experiences in performing diabetes self-management behaviours

1. What do you do to look after your diabetes?

2. What kinds of things make it difficult for you to look after your diabetes?

prompt: socioeconomic factors (money, safety etc)

prompt: what makes it easy?

B. Experiences of GPs and access to primary care

3. Think about the time when you were first diagnosed with diabetes. What did your doctor (i.e GP) do?

prompt: were there things that you wish your doctor had done but didn't do?

4. Some doctors like to see people with diabetes regularly. Do you think it makes sense to go to the doctor even if you don't feel ill?

5. What can doctors do to help people with diabetes?

5.5.2 Group interviews

English-speaking participants completed a brief anonymous survey of demographic and socioeconomic characteristics prior to interview. The diabetes educator at Fairfield Division provided this information for Vietnamese-speaking and Arabic-speaking participants. The general procedure for all group interviews included: introductions; an overview of the study; expectations of the interview; rules in participation; interviewer role; time limit; informed consent; assurances of anonymity; and data usage. Participants were informed that the group interview would be audiotaped and given specific instructions to talk loudly and clearly. The group interview began with each participant taking it in turns to relate his or her experiences in performing diabetes self-management behaviours in response to the first question (sometimes called a round robin technique). After this point, participants were free to contribute when they liked; although the interviewer asked direct questions of less verbal participants to ensure that their individual experiences were expressed.

Interviewers

The group interview with English-speaking participants was conducted by the doctoral student. Group interviews with both Vietnamese-speaking and Arabic-speaking participants were conducted by the doctoral student and a bilingual health worker employed by the then South Western Sydney Area Health Service (SWSAHS). The bilingual health worker interpreted the questions to participants and interpreted participants' responses back to the doctoral student. The doctoral student met with the bilingual health workers prior to interview to discuss the aims of the study and group interview process. Following the advice of Temple and Edwards (471), the bilingual health workers were encouraged to take an active role in the interviewing process by following up questions to participants to clarify responses or obtain detail on related issues they considered important: thus distinguishing their role solely from interpreters. The doctoral student provided the bilingual health workers with the interview questions up to a week before the session to enable sufficient time for question interpretation and clarification of any difficulties in this process.

Both bilingual health workers had a broad knowledge of health issues, including diabetes, which was relevant to their respective Vietnamese-speaking and Arabic-speaking communities. The Vietnamese-speaking group interview was conducted by the doctoral student and a Vietnamese-speaking health worker from Cabramatta Community Health Centre (SWSAHS). The Arabic-speaking group interview was conducted by the doctoral student and an Arabic-speaking health worker from Liverpool Hospital (SWSAHS). The bilingual health workers were recruited to the study by the Fairfield Division diabetes program manager. The diabetes program manager had previously worked in collaboration with the Vietnamese-speaking health worker in administering group diabetes education to Vietnamese-speaking participants. The program manager had also worked in collaboration with the Arabic-speaking health worker; although this had not been in diabetes education. Both bilingual health workers undertook the group interview in addition to their normal SWSAHS roles.

Venues

The English-speaking group interview was held at the Fairfield Hospital Diabetes Support Group venue, Prairiewood Community Health Centre. The Arabic-speaking group interview was held at the Fairfield Division of General Practice; a venue that participants had attended for diabetes education. The Vietnamese-speaking group interview was held at a venue familiar to participants but not used in diabetes education, the Vietnamese Community Association at Canley Vale.

5.5.3 Methods to ensure rigour in data collection

Two methods to ensure rigour in data collection were used in this research: participant feedback on the acceptability of the interview schedule; and the use of scribes in scientific scrutiny.

- 1) The acceptability of the interview schedule for participants was continually assessed during data collection. Feedback on question wording and appropriateness was actively sought from participants and members of the research team at the end of each group interview. Questions were refined in light of these comments where appropriate.

- 2) Scribes (i.e. note-takers) took notes of individual's experiences raised in the group interview even though the interviews were audiotaped. This enabled scribe data to be used in interpreting hard-to-hear statements as a result of problems in recording. Scribes were also useful in ensuring the integrity of the group interview. At the end of each group interview, the interviewers, scribe and any other group observers met to discuss their impressions of the interview, including major issues raised, reflections on the interview process, and any operational processes that needed to be refined for the next group. The English-speaking group interview was scribed by a public health research colleague from the Centre for Health Equity Training Research and Evaluation. The Vietnamese-speaking and Arabic-speaking group interviews were scribed by the Fairfield Division diabetes program manager, who is a qualified diabetes educator.

5.6 Data analysis

5.6.1 Data management

All group interviews were audiotaped and transcribed verbatim by the doctoral student using transcription equipment. Transcripts were supplemented with the information provided by scribe observer notes where necessary. Participant names or other identifying information were removed from the transcript to ensure anonymity. Participants were assigned a participant number based on observational information from the group interview and voice discrimination from the audiotapes. This information was matched to participant demographic and socioeconomic data to enable description of the participant sample.

5.6.2 Analytic method

The four-step method of phenomenological analysis suggested by Giorgi and Giorgi (459) was used to analyse the transcripts. The term 'meanings' is used to denote participants' descriptions and interpretations of experiences.

Step 1: Read the entire transcript while being mindful of the phenomenological reduction (i.e. experiences are taken to be as they present to be rather than what they actually are) and alert to the meanings that participants attribute to their experiences.

Step 2: Identify ‘meaning units’, that is, sections of text relating to a particular meaning or experience.

Step 3: Transform meaning units for data synthesis through (a) revealing meanings that are lived but not fully articulated or in full awareness and (b) generalising meanings so that analyses are not situation specific. Table 5.1 shows an example of data transformation illustrated using a meaning unit from a participant in the exploratory study of GPs’ views on providing care to diabetes patients who are disadvantaged (265). In this example, the participant was describing her experience in performing follow-up activities for diabetes patients who are disadvantaged.

Table 5.1
Example of phenomenological data transformation

Meaning unit	Transformations
<p>“We find that when they get the reminders, then you ring the patient or the receptionist rings the patient, you feel like you are on their back all the time. You are actually like some Big Brother, watching them and being too dictatorial”. (GP 4, Female)</p>	<p>Ensuring adherence to diabetes care amongst patients who are disadvantaged requires intensive monitoring (generalised meaning)</p> <p>Intensive monitoring is an uncomfortable extension of the doctor-patient relationship (revealed meaning)</p>

from Rose, Harris and Ho (265)

Step 4: Develop the structure of the analysed data by identifying themes that are essential to explaining the experiences reported by participants. This is achieved through identifying patterns in the transformation of meaning units across the data.

5.6.3 Methods to ensure rigour in data analysis

Three methods to ensure rigour in data analysis were used in this research: bracketing, respondent validation and inter-rater reliability. Methods to validate research results through agreement on major themes with others involved in the research, such as participants (i.e. member checking) or other researchers (i.e. inter-rater reliability), are not associated with the phenomenological method. In fact, in phenomenology it is unimportant that different researchers may identify different meaning units because the interpretation of meaning is necessarily subjective (459). Further, it should not be unexpected that research participants fail to recognise major themes identified by the researcher if these themes were latent (i.e. unexpressed or unacknowledged) rather than manifest (i.e. expressed) in participants' description of experience (459). It is worth noting that these issues in phenomenology reflect a wider debate in qualitative research about the utility of respondent validation. While some researchers see it as integral to ensuring rigour (469), others see it as a threat to research validity (472).

Despite this, methods to ensure rigour in data analysis were used in this research because the research results were intended to inform diabetes policy and program development at Fairfield Division of General Practice and more widely. In accordance with the assumptions of phenomenology, respondent validation and inter-rater reliability was only performed on manifest themes; that is, issues identified by participants, such as the expressed need for better information on diabetes self-management from GPs following diagnosis. Latent themes were identified by the doctoral student and were not subject to respondent validation or inter-rater reliability.

Bracketing

Bracketing is a term specific to phenomenology that involves a process where the researcher is able to take account of the impact of their own subjective biases on the research results. Following the suggestion of Groenwald (458), bracketing was performed by the doctoral student writing down her knowledge and beliefs about diabetes self-management and sociostructural factors prior to data analysis. By making the implicit explicit, the researcher gains control over the influence of this information on the phenomenon being studied (459).

Respondent validation

Respondent validation involves gaining agreement from interview participants that the identified themes accurately reflect their views and experiences (469, 473). Respondent validation was performed with the English-speaking participants by providing them with a summary of the results and following this up with a telephone call. All participants verified the accuracy of the analysis. Respondent validation was not performed with Vietnamese-speaking or Arabic-speaking participants because of a lack of resources for translation of feedback material.

Inter-rater reliability

Inter-rater reliability (sometimes called multiple coding) is a term borrowed from quantitative methods to describe the level of agreement among researchers who have independently analysed the same qualitative data (435, 474). The doctoral student, supervisor and co-supervisor independently analysed each group interview transcript and identified manifest themes of participant experiences in diabetes self-management; before meeting to discuss their findings and resolve any discrepancies in interpretation.

A small number of discrepancies in the constituents of themes were identified and resolved through discussion.

5.7 Summary

The qualitative component of this mixed-methods research is concerned with gaining a rich understanding of the impact of sociostructural determinants on diabetes self-management. Phenomenology was selected as the guiding approach because it illuminates the subjective ‘lived experience’ of people as they perform behaviours and experience events. English-speaking, Vietnamese-speaking, and Arabic-speaking people attending diabetes education were selected for group interview because they represent the three largest language-groupings of people with diabetes registered with the Fairfield Division. Procedures for the administration and reporting of group interviews were standard. Non-English speaking group interviews were interpreted ‘live’ to the interviewer.

The analysis of phenomenological data is complex. The analytic method used in this qualitative research focuses on the identification, and then transformation, of meanings or themes which best explain the experiences reported by interview participants. Methods to ensure rigour in data analysis are not associated with the phenomenological method. Even so, respondent validation and inter-rater reliability were performed on selective parts of the data to ensure the broader applicability of results. Respondent validation was not performed in the non-English-speaking groups because of resource limitations. Results from the qualitative component of this mixed-methods study are presented in Chapter 8.

CHAPTER SIX

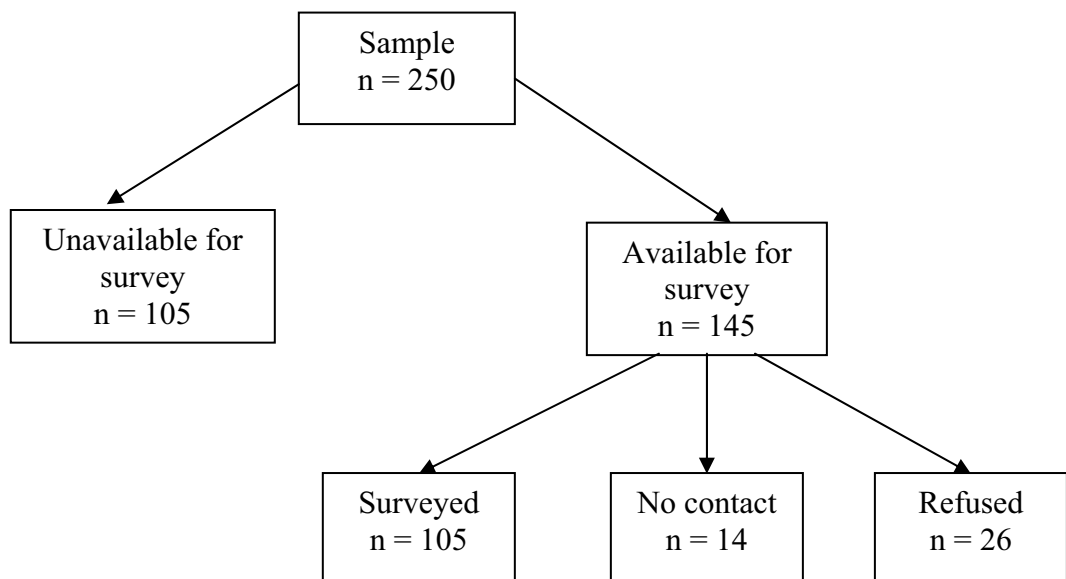
Quantitative Results: Descriptive data

This chapter presents the characteristics of the survey sample for the quantitative component of the mixed-methods study. While not directly related to the research questions or quantitative hypotheses, the presentation of descriptive data is important for generalisability and the interpretation of results. Results are reported for the survey response rate, data independence, sample description, and potential covariates of the sociostructural determinants of diabetes self-management model.

6.1 Survey response rate

Figure 6.1 shows a flow-chart of the survey response rate. From the random sample of 250 diabetes patients registered with the Fairfield Division's CARDIAB database 105 were not available for survey because: their contact details were incorrect ($n = 36$); they were dead or had a medical condition that prevented survey participation (e.g. dementia) ($n = 27$); they were not able to speak English ($n = 20$); or they had moved practice, were overseas, or were removed from the list by GPs ($n = 22$).

Figure 6.1
Flow chart showing survey participant response rate



One-hundred and forty-five CARDIAB registrants were available for survey. Of this number, 105 were surveyed, 14 could not be contacted and 26 refused participation. The survey response rate, for those CARDIAB registrants available for survey, was 72.4%.

Table 6.1 (Appendix D) shows the pattern of patient participation in the survey according to GP.

6.2 Data independence

Selection of diabetes patients for the survey was contingent on patient registration in the CARDIAB database. However, ethics procedures requiring consent from GPs meant that the patient sampling population was necessarily associated with the GPs who granted access to CARDIAB records. Table 6.1 shows the intra-cluster coefficients (ICC), design effects and actual sample sizes for the Summary of Diabetes Self-Care Activities (SDSCA) scales. Analyses were based on variance derived from one-way ANOVAs of GP on SDSCA scales; even though the variable GP violated the assumptions of one-way ANOVA because of small cell sizes. As a result these estimates should be interpreted with caution and are presented only as a guide to interpreting power in subsequent analyses.

Both the General Diet and Exercise scales showed large ICCs and design effects resulting in sample sizes of 50 and 55 respectively. The Blood Glucose Test scale showed a moderate ICC and design effect. This effect was equivalent to a sample size of 78 if the data was not clustered.

Table 6.1
Intra-cluster coefficients (p), design effects (D) and actual sample sizes (n)
for SDSCA scales

SDSCA scale	p	D	n
General Diet scale	.114	2.083	50.410
Exercise scale	.097	1.921	54.659
Blood Glucose Test scale	.039	.135	77.778

Further analyses were undertaken to determine whether scores on SDSCA scales differed according to patients' GP, as the ICCs above suggested. Table 6.2 presents a summary of Kruskal-Willis testing of SDSCA scales by GP. Scores on the General Diet and Exercise scales differed significantly according to patients' GP (all $< .05$). There was no difference in Blood Glucose Testing according to the GP with which patients were registered.

Table 6.2
Summary table of Kruskal-Willis testing of SDSCA scales by GP

SDSCA scale	<i>n</i>	<i>df</i>	χ^2	<i>p</i>
General diet scale	104	9	17.709	.039
Exercise scale	105	9	18.335	.031
Blood glucose test scale	105	9	5.664	.773

6.3 Sample description

6.3.1 Demographic characteristics

Analysis of sample data ($n = 105$) showed that respondents were aged on average 65.1 years ($SD = 13.6$) with a 95% confidence interval of 62.4 to 67.8 years. Table 6.3 presents the frequency distributions for respondent demographic data. The majority of respondents were male (62.9%) and married (66.7%).

The sample contained a high proportion of people born in a non-English speaking country (50.5%) reflecting the cultural diversity of the sampling area. Almost a quarter of this subgroup (23.8%) reported that they continue to speak Arabic or Assyrian languages within the home ($n = 25$). There were no Vietnamese-speaking respondents in the sample despite the high proportion of this group in the Fairfield area. Respondents born in overseas countries - irrespective of language background - had been living in Australia for an average of 27.2 years ($SD = 16.7$) with a 95% confidence interval from 22.8 years to 31.6 years.

Table 6.3
Frequency distributions for respondent demographic data (n=105)

Demographic category	n	%	95% CI
Gender			
Male	66	62.9	53.4 – 72.4
Female	39	37.1	28.1 - 46.1
Marital status			
Married or cohabitating	70	66.7	51.6 – 81.8
Not married ¹	17	16.3	1.2 – 31.4
Widowed	18	17.1	2.0 – 32.2
Language spoken in country of birth			
English language	53	50.5	40.7 – 60.3
Non-English language	52	49.5	40.0 – 59.0

¹ including divorced, separated and single

6.3.2 Socioeconomic indicators

Table 6.4 shows the frequency distributions for respondent socioeconomic indicators.

The majority of respondents left school before Year 12 or the equivalent level of education in their country of birth (65.8%). Most were retired from paid work (66.7%) and living in their own homes (68.6%) on a household income of less than \$400 week (54.3%); an amount corresponding to the aged pension for single and married respondents.

Table 6.4
Frequency distributions for respondent socioeconomic indicators (n=105)

Socioeconomic category	n	%	95% CI
Level of education			
Less than Year 10	47	44.8	27.5 – 62.1
Year 10-11	22	21.0	3.7 – 38.3
Year 12	36	34.3	17.0 – 51.6
Employment			
Retired from work	70	66.7	52.1 – 81.3
Other out of the workforce ¹	16	15.2	.6 – 29.8
Full-time work or study	19	18.1	3.5 – 32.7
Weekly household income			
Less than \$300	30	28.6	1.1 – 56.1
\$300 - \$400	27	25.7	0 – 53.2
\$400 - \$600	19	18.1	0 - 45.6
\$600 - \$1000	13	12.4	0 – 39.9
More than \$1000	16	15.2	0 – 42.7
Accommodation			
Owner-occupied or mortgaged	72	68.6	54.0 – 83.2
Rented from Department of Housing	17	16.2	1.6 – 30.8
Other accommodation ²	16	15.3	.7 – 29.9

¹ including unable to work because of long-term health problem or disability and home duties

² including rented from a private landlord and other arrangements

6.3.3 Health and service data

General health

Table 6.5 shows the frequency distributions for respondent general health data. More than half of the sample (58.6%) rated their general health as good, very good or excellent. Most respondents (55.2%) reported that they had another illness or disability besides diabetes.

Table 6.5
Frequency distributions for respondent general health data (n = 105)

General health category	n	%	95% CI
<i>General health¹</i>			
Poor	11	10.6	0 – 21.4
Fair	32	30.8	2.0 – 41.6
Good	41	39.4	28.6 – 50.2
Very good or excellent	20	19.2	8.4 – 30.0
Other illness or disability			
Yes	58	55.2	45.5 – 64.9
No	47	44.8	35.1 – 54.5

¹ 1 missing value, n = 104

Service related data

Table 6.6 shows the frequency distributions for respondent service related data. Two-thirds of respondents reported that they had attended formal individual or group diabetes education (66.3%). A similar proportion reported that they had health care cards for subsidised medications (68.6%). All but one respondent (99.0%) did not pay for general practice consultations because their GP relied on Medicare bulk-billing.

Table 6.6
Frequency distributions for respondent service related data (n = 105)

Service related	n	%	95% CI
<i>Diabetes education</i>			
Attended	69	66.3	57.0 – 75.6
Not attended	35	33.7	24.4 – 43.0
Health Care Card			
Yes	72	68.6	59.5 – 77.7
No	33	31.4	22.4 – 40.5
Method of paying GP			
Medicare bulk-billed	104	99.0	97.1 – 100
Gap payment	1	1.0	0 – 2.9

6.3.4 Sociostructural determinants model data

Diabetes self-management

Table 6.7 shows the means, standard deviations and score ranges for SDSCA scales General Diet, Exercise and Blood Glucose Testing. Scores indicate that in the past 7 days respondents had eaten a healthy diet on an average of 5.67 days, exercised on an average of 3.54 days and tested their blood sugar levels on an average of 4.31 days.

Table 6.7
Mean score, standard deviation, range and maximum scores for SDSCA General Diet, Exercise and Blood Glucose Testing scales (n = 105)

SDSCA scales	X	SD	Range	Max. score
General Diet	5.67	1.57	1- 7	7
Exercise	3.54	2.22	0 – 7	7
Blood Glucose Test	4.31	2.51	0 – 7	7

Diabetes self-efficacy

Table 6.8 shows the mean, standard deviation, score range and maximum score for the Diabetes Self-efficacy Scale. Higher scores represent lower levels of self-efficacy. The mean score of 36.90 indicates that the sample had on average relatively high levels of diabetes self-efficacy.

Table 6.8
Mean, standard deviation, range and maximum score for DSES (n = 105)

Scale	X	SD	Range	Max. score
Diabetes Self-efficacy	36.90	10.59	20 – 66	108

GP care

Table 6.9 shows the means, standard deviations, score ranges and maximum scores for GPAQ scales Access and Communication. GP access displays the greatest range in scores across the sample. Both scales show high respondent ratings of GP care.

Table 6.9
Mean score, standard deviation, range and maximum score for GPAQ Access and Communication scales (n = 105)

GPAQ scales	X	SD	Range	Max. score
Access	75.14	14.98	33 – 100	100
Communication	80.43	13.61	50 – 100	100

Socioeconomic resources

Table 6.10 shows the means, standard deviations, score ranges and maximum scores for Socioeconomic Barriers to Diabetes Self-Care Scale (SBDSC): Place Barriers and Information Barriers. Both scales show low levels of socioeconomic barriers to diabetes self-management among survey respondents.

Table 6.10
Mean score, standard deviation, range and maximum score for SBDSC Place Barriers and Information Barriers scales (n = 105)

<i>SBDS scales</i>	X	SD	Range	Max. score
Place Barriers	4.57	2.27	3 - 15	20
Information Barriers	3.48	1.76	2 - 9	10

6.4 Identifying covariates

In this section results are organised by SDSCA scale. Test results and values are presented in the text. Table 6.11 presents a summary of significant results showing differences in diabetes self-management variables according to demographic, socioeconomic, health and service categories. Variables that violated the assumptions of one-way ANOVA (through for example, large unequal groups or small cell sizes) were tested using Kruskal-Willis. Medians and range values are presented in Table 6.11 following convention for the display of non-parametric test data. Note that one-way ANOVA, and its non-parametric alternative, Kruskal-Willis, was used for all covariate testing to ensure consistency in approach and simplicity in the interpretation of results.

6.4.1 General diet

Demographic data

There was a weak but significant correlation between age and general diet ($r = .216$, $p < .05$) indicating that general diet increased with age. One-way ANOVA showed no

significant difference in general diet according to language spoken in country of birth ($F(1, 102) = .539, p = .465$). Gender violated the one-way ANOVA assumption of homogeneity of variance; Kruskal-Willis testing showed no significant differences in general diet according to gender ($\chi^2 = .196, df = 1, p = .658$) or marital status ($\chi^2 = .711, df = 2, p = .701$).

Socioeconomic indicators

One-way ANOVA showed no significant difference in general diet according to level of education ($F(2, 101) = .907, p = .407$). Kruskal-Willis testing showed no significant differences in general diet according to employment ($\chi^2 = 4.407, df = 2, p = .110$), household weekly income ($\chi^2 = 3.641, df = 4, p = .457$), or accommodation ($\chi^2 = 2.094, df = 2, p = .351$).

Health and service data

Significance testing showed that both general health as a continuous variable ($r = .129, p = .129$) and time diagnosed with diabetes ($r = -.175, p = .103$) were unrelated to general diet. One-way ANOVA showed no significant difference in general diet according to attendance at diabetes education ($F(1, 101) = .077, p = .782$). Other illness or disability violated the one-way ANOVA assumption of homogeneity of variance; Kruskal-Willis testing showed no significant differences in general diet according to other illness or disability besides diabetes ($\chi^2 = 1.817, df = 1, p = .178$), general health as a categorical variable ($\chi^2 = 3.837, df = 3, p = .336$) or health care card status ($\chi^2 = .024, df = 1, p = .877$).

6.4.2 Exercise

Demographic data

Significance testing showed that age was unrelated to exercise ($r = -.045, p = .645$). One-way ANOVA showed a significant difference in exercise according to language spoken in country of birth ($F(1, 103) = 7.681, p = .007$). Respondents born in a non-English-speaking country exercised more in the last 7 days than respondents born in an English speaking country (Table 6.11). There was no significant difference in exercise according to gender ($F(1, 103) = .745, p = .390$) using one-way ANOVA. Similarly,

Kruskal-Willis testing showed no significant difference in exercise according to marital status ($\chi^2 = .499$, $df = 2$, $p = .779$).

Socioeconomic indicators

Level of education violated the one-way ANOVA assumption of homogeneity of variance; Kruskal-Willis testing showed no significant differences in exercise according to level of education ($\chi^2 = .291$, $df = 2$, $p = .965$), employment ($\chi^2 = .108$, $df = 2$, $p = .948$), household weekly income ($\chi^2 = 3.288$, $df = 4$, $p = .511$) and accommodation ($\chi^2 = 4.913$, $df = 1$, $p = .086$).

Table 6.11

Summary of descriptive statistics for significant effects of potential confounding variables on SDSCA scales

	<i>n</i>	<i>X</i>	<i>Mdn</i>	<i>SD</i>	<i>Range</i>
Exercise scale					
Language spoken in COB¹					
English language	53	2.96	2.50	2.23	7.00
Non-English language	51	4.14	4.00	2.08	7.00
Blood Glucose Test scale					
Language spoken in COB²					
English language	53	4.93	5.50	2.32	7.00
Non-English language	51	3.67	3.50	2.58	7.00

¹ $F(1, 103) = 7.681$, $p = .007$

² $F(1, 103) = 7.044$, $p = .009$

Health and service data

Significance testing showed that both general health as a continuous variable ($r = .144$, $p = .144$) and time diagnosed with diabetes ($r = -.046$, $p = .660$) were unrelated to exercise. One-way ANOVA showed no significant differences in exercise according to

other illness or disability besides diabetes ($F(1, 103) = .057, p = .812$) and attendance at diabetes education ($F = 2.149, df = 1, 102, p = .146$). Kruskal-Willis testing showed no significant differences in exercise according to general health as a categorical variable ($\chi^2 = 3.073, df = 3, p = .381$) and health care card status ($\chi^2 = .557, df = 1, p = .456$).

6.4.3 Blood glucose testing

Demographic data

Significance testing showed that age was unrelated to blood glucose testing ($r = .137, p = .162$). One-way ANOVA showed a significant difference in blood glucose testing according to language spoken in country of birth ($F(1, 103) = 7.044, p = .009$). Respondents born in an English-speaking country tested their blood glucose more in the last 7 days than respondents born in a non-English speaking country (Table 6.11). There was no significant difference in blood glucose testing according to gender ($F(1, 103) = .520, p = .472$) using one-way ANOVA. Similarly, Kruskal-Willis testing showed no significant difference in blood glucose testing according to marital status ($\chi^2 = .414, df = 2, p = .813$).

Socioeconomic indicators

Level of education violated the one-way ANOVA assumption of homogeneity of variance; Kruskal-Willis testing showed no significant differences in blood glucose testing according to level of education ($\chi^2 = .291, df = 2, p = .965$), employment ($\chi^2 = 1.450, df = 2, p = .484$), household weekly income ($\chi^2 = 2.832, df = 4, p = .586$) or accommodation ($\chi^2 = 2.426, df = 2, p = .297$).

Health and service data

Significance testing showed that both general health as a continuous variable ($r = .062, p = .535$) and time diagnosed with diabetes ($r = .158, p = .140$) were unrelated to blood glucose testing. One-way ANOVA showed no significant difference in blood glucose testing according to other illness or disability besides diabetes ($F(1, 103) = 2.615, p = .109$) or attendance at diabetes education ($F(1, 102) = .001, p = .981$). Kruskal-Willis testing showed no significant difference in blood glucose testing according to general

health as a categorical variable ($\chi^2 = 2.580$, $df = 3$, $p = .461$) and health care card status ($\chi^2 = 2.736$, $df = 1$, $p = .098$).

6.5 Summary

The response rate for the survey was 74.2%, representing 105 participants. There was evidence of significant clustering in the data meaning that the scores on all SDSCA scales were clustered to some extent according to the participants GP. SDSCA Blood Glucose Test was less affected by clustering and more robust than the other 2 diabetes self-management scales.

Respondents in the sample were aged on average 65 years and half were born in a non-English-speaking country. Most respondents were male (63%), married (67%), had left school before Year 12 (66%), were retired from paid work (67%) and living in their own homes (69%). Just over half had a household income of less than \$400 week. Almost 60% of the sample reported that they were in good health or better and approximately half had another illness or disability besides diabetes. The majority of respondents had attended formal individual or group diabetes education (66%), had access to health care cards for subsidised medications (69%) and were bulk-billed by their GP (99.0%).

Respondents reported moderate to high levels of diabetes self-management activities. Diet was attended to most frequently followed by blood glucose testing and then exercise. Respondents reported high levels of diabetes self-efficacy, high levels of access to GP care and GP communication and low levels of socioeconomic barriers to diabetes self-management. Two covariates for the sociostructural determinants model of diabetes self-management were identified. Age was weakly positively correlated with SDSCA General Diet scale and Language spoken in Country of Birth was associated with both SDSCA Exercise and Blood Glucose Test scales. Respondents born in a non-English-speaking country were more likely to exercise than respondents born in an English-speaking country. This was reversed for blood glucose testing, where respondents born in an English-speaking country were more likely to test their blood glucose than respondents born elsewhere.

CHAPTER SEVEN

Quantitative results: Model testing

This chapter presents the results from quantitative tests of the sociostructural determinants model of diabetes self-management. Included are reports of the preliminary tests of the model including determination of the nature of the relation between diabetes self-efficacy and diabetes self-management, intercorrelations between model variables, and tests of moderation presented separately for GP care and socioeconomic barriers.

Results from quantitative model testing relate directly to the following research questions:

- RQ 1: How do sociostructural determinants influence diabetes self-management? and
RQ 2: How does diabetes self-efficacy influence the relationship between sociostructural determinants and diabetes self-management?

Results are organised according to model hypotheses (the first three of which satisfy preliminary tests of the model):

- H1: There is a positive relation between diabetes self-efficacy and diabetes self-management.
H2: There is a positive relation between GP care and diabetes self-management.
H3: There is a positive relation between socioeconomic resources and diabetes self-management.
H4: GP care moderates the relation between diabetes self-efficacy and diabetes self-management.
H4a: GP access moderates the relation between diabetes self-efficacy and diabetes self-management.
H4b: GP communication moderates the relation between diabetes self-efficacy and diabetes self-management.
H5: Socioeconomic resources moderate the relation between diabetes self-efficacy and diabetes self-management.

H5a: Place barriers moderate the relation between diabetes self-efficacy and diabetes self-management.

H5b: Information barriers moderate the relation between diabetes self-efficacy and diabetes self-management.

7.1 Preliminary tests of the model

7.1.1 *The relation between diabetes self-efficacy and diabetes self-management*

H1: There is a positive relation between diabetes self-efficacy and diabetes self-management

Scatterplots between the DSES and individual SDSCA scales are presented in Appendix E because inspection of the nature of association informs the selection of regression procedure. Figure E.1 shows a significant moderate negative correlation between DSES and SDSCA General Diet scale ($n = 105$, $r = -.521$, $p = < .01$) indicating that general diet increases with diabetes self-efficacy. The plot shows some degree of heteroscedasticity between the two variables but the association appears to be linear.

Figure E.2 shows a significant weak negative correlation between the DSES and SDSCA Exercise scale ($n = 105$, $r = -.220$, $p = < .05$) indicating that exercise increases with diabetes self-efficacy. The plot shows a slight linear association between the DSES and Exercise scales.

Figure E.3 shows a significant weak negative correlation between the DSES and SDSCA Blood Glucose Test scale ($n = 105$, $r = -.197$, $p = < .05$) indicating that blood glucose testing increases with diabetes self-efficacy. The plot shows a minimal association - presumed to be linear – between the two variables.

This hypothesis appears to be supported. There was a positive relation between:

- diabetes self-efficacy and general diet;
- diabetes self-efficacy and exercise; and
- diabetes self-efficacy and blood glucose test.

7.1.2 The relation between GP care and diabetes self-management

H2: There is a positive relation between GP care and diabetes self-management

Table 7.1 shows the Pearsons correlation coefficients for the association between the GPAQ Access and Communication scales with SDSCA scales. Significant positive but weak correlations between SDSCA and GPAQ scales indicated that general diet increased as access to GP care and communication between GPs and patients increased.

Blood glucose testing increased with access to GP care. There was no association between SDSCA Exercise and either GPAQ scale.

Table 7.1
Correlation coefficients between GPAQ Access and Communication scales
with SDSCA scales (n = 105)

SDSCA scales	GPAQ scales	
	Access	Communication
General Diet	.193*	.238*
Exercise	.029	.005
Blood Glucose Test	.204*	.145

* $p < .05$

This hypothesis appears to be partially supported. There was a positive relation between:

- GP access and general diet;
- GP communication and general diet; and
- GP access and blood glucose testing.

There was no relation between:

- GP access or GP communication with exercise; and
- GP communication and blood glucose testing.

7.1.3 The relation between socioeconomic barriers and diabetes self-management

H3: There is a positive relation between socioeconomic resources and diabetes self-management

Table 7.2 shows the Pearsons correlation coefficients for the association between SBDSC Place Barriers and Information Barriers scales with SDSCA scales. The correlation coefficients show no association between these variables. This hypothesis therefore, appears not to be supported.

Table 7.2
Correlation coefficients between SBDSC Place Barriers and Information Barriers scales with SDSCA scales (n = 105)

SDSCA scales	SBDSC scales	
	Place Barriers	Information Barriers
General Diet	-.049	-.015
Exercise	-.044	-.006
Blood Glucose Testing	-.062	-.020

* $p < .05$

7.1.4 The relation between predictors and moderators

Table 7.3 shows the pearsons correlation coefficients for the association between DSES, GPAQ, and SBDSC scales. DSES was significantly but weakly negatively correlated with both GPAQ scales indicating that diabetes self-efficacy increases with GP care. DSES was weakly but significantly positively correlated with the SBDSC Place Barriers scale indicating that diabetes self-efficacy decreases with socioeconomic barriers to

diabetes self-management. Correlation coefficients between GPAQ and SBDSC scales showed no association between these variables. Intercorrelations among subscales showed a strong relation between GPAQ Access and Communication scales and no relation between SBDSC Place and Information scales.

Table 7.3
Correlation coefficients between DSES, GPAQ and SBDSC scales (n = 105)

	DSES	GPAQ		SBDSC
		Access	Comm.	Place B.
DSES				
GPAQ Access scale	-.227*			
GPAQ Communication scale	-.241*	.639**		
SBDSC Place Barriers	.198*	-.043	-.094	
SBDSC Information Barriers	.125	-.085	-.093	.000

* $p < .05$ ** $p < .01$

7.2 Tests of moderation

Tests of moderation in the sociostructural determinants model were conducted separately for GP care and socioeconomic resources because of sample size and the risk of error. Hierarchical multiple regression was performed in all analyses between SDSCA scales as the outcome variable, and covariate, predictor and moderator, and predictor by moderator interaction entered in steps following the order of the hypothesised model. Covariates were age for SDSCA General Diet scale and Born in an English-Speaking Country (BESC; the dummy variable of language spoken in country of birth) for both SDSCA Exercise and SDSCA Blood Glucose Testing scales.

Final models are presented in tabular form. Non-significant interactions between the predictor and moderator remained in the model in accordance with theory. Graphs of interactions and tests that the regression lines differ from 0 are presented only for significant interactions. Effects for the predictor and moderator are interpreted as conditional effects rather than main effects because these effects are conditional on the

interaction. Covariate effects are interpreted as main effects. Alpha for statistical testing was set at .05 and was not adjusted to account for the number of tests conducted. As a result, there is a possibility that the results may be affected by inflated Type 1 error.

7.2.1 Regression assumptions and decision-making in tests of moderation

Several violations of the regression assumption of normality were noted in the testing of the hypothesised moderation regression models:

- the smaller than anticipated sample size of 105 and problems with data clustering meant that regression models would be inevitably underpowered in detecting interaction effects;
- the scatterplots of residuals showed non-normality and heteroscedasticity;
- there was substantial skew toward high functioning across all model variables and these were not sensitive to logarithmic transformations; and
- a large number of multivariate outliers were present (up to 10% of all cases) in models containing SBDSC variables.

Simple non-parametric testing of multivariate outliers showed that these cases did not differ from the larger sample on any variables. This suggested that there was some idiosyncrasy in the data, particularly in the way that survey participants responded to the SBDSC items in relation to their performance on other measures. This called into question what the SBDSC scale was actually measuring. Rather than excluding this scale from testing it was decided to conduct the planned analyses while being mindful of its limitations. This approach was used in a further two decisions similarly designed to conserve sample size and prevent overfitting of the data to the model:

- regression analyses were undertaken on all 105 cases; univariate and/or multivariate outliers were noted but not deleted or altered and violation of the assumption of normality for residuals was tolerated.
- key model variables were not subjected to minimum tolerance tests for regression, even though it was likely that some variables (e.g. SBDSC) may fail this test.

These decisions inevitably had ramifications for the interpretation of research findings. The following tests of the sociostructural determinants of diabetes self-management

model should be viewed as exploratory. Caution is urged in interpreting results and generalising findings to wider research.

7.2.2 Tests for interaction between GP access and diabetes self-efficacy

H4a: GP access moderates the relation between diabetes self-efficacy and diabetes self-management

SDSCA General Diet

A hierarchical multiple regression was performed between SDSCA General Diet scale and Age (Step 1), DSES and GPAQ Access (Step 2) and DSES by GPAQ Access interaction (Step 3). There was one univariate outlier with a standardised residual of > 3 and no multivariate outliers. Residuals showed heteroscedasticity toward errors of prediction being greater at smaller predicted values. Table 7.4 shows the unstandardised regression coefficients (B), standard errors ($SE B$), 95% confidence intervals (95% CI), standardised regression coefficients (β) and R^2 change for the covariate, predictor, moderator and predictor x moderator interaction at their step of entry. After step 3 with all variables in the equation, $R = .494$, $R^2 = .244$, $F(4, 100) = 8.058$, $p < .001$. The R^2 change for the DSES x GPAQ Access interaction term was not significant. There was a conditional effect of DSES on SDSCA Diet; the unstandardised regression coefficient in the final model ($B = -.640$, $p < .001$) indicating that diabetes self-efficacy increased with general diet.

Table 7.4
Summary of hierarchical regression for SDSCA General Diet and DSES x GPAQ
Access interaction (n = 105)

Step and variable	<i>B</i>	<i>SE B</i>	95% <i>CI</i>	β	<i>R</i> ² <i>change</i>
Step 1					
Age (z-score)	.315	.141	.174, .456	.215*	.046*
Step 2					
Age (z-score)	.173	.131	.042, .304	.118	
DSES (z-score)	-.612	.134	-.746, -.478	-.417***	
GPAQ Access (z-score)	.136	.131	.006, .267	.093	.191***
Step 3					
Age (z-score)	.182	.131	.051, .313	.124	
DSES (z-score)	-.640	.138	-.778, -.502	-.437***	
GPAQ Access (z-score)	.129	.131	-.002, .26	-.083	
DSES*GPAQ Access	-.139	.150	-.289, .011	-.083	.007

* $p < .05$ *** $p < .001$

SDSCA Exercise

A hierarchical multiple regression was performed between SDSCA Exercise scale and Born in an English-speaking country (BESC) (Step 1), DSES and GPAQ Access (Step 2) and DSES by GPAQ Access interaction (Step 3). There were no outliers. The scatterplot of errors in residuals showed only a slight departure from normality. Table 7.5 shows the unstandardised regression coefficients (*B*), standard errors (*SE B*), 95% confidence intervals (95% *CI*), standardised regression coefficients (β) and *R*² change for the covariate, predictor, moderator and predictor x moderator interaction at their step of entry. After step 3 with all variables in the equation, $R = .361$, $R^2 = .130$, $F(4, 100) = 3.735$, $p < .01$. The *R*² change for the DSES x GPAQ Access interaction term was not significant. There was a conditional effect of DSES on SDSCA Exercise in the final model; the unstandardised regression coefficient ($B = -.542$, $p < .05$) indicating that diabetes self-efficacy increased with exercise. There was a main effect of the model covariate BESC on SDSCA Exercise; the unstandardised regression coefficient

($B = -1.194$, $p < .01$) showing a negative relation between those born in an English-speaking country and exercise score.

Table 7.5
Summary of hierarchical regression for SDSCA Exercise and DSES x GPAQ
Access interaction (n = 105)

Step and variable	<i>B</i>	<i>SE B</i>	95% <i>CI</i>	β	R^2 change
Step 1					
BESC	-1.163	.420	-1.583, -.743	-.263**	.069**
Step 2					
BESC	-1.198	.417	-1.615, -.781	-.217**	
DSES (z-score)	-.487	.213	-.07, -.274	-.220*	
GPAQ Access (z-score)	.051	.215	-.164, .266	.023	.051
Step 3					
BESC	-1.194	.417	-1.611, -.777	-.271**	
DSES (z-score)	-.542	.219	-.761, -.323	-.245*	
GPAQ Access (z-score)	.039	.215	-.176, .254	.018	
DSES*GPAQ Access	-.254	.241	-.495, -.013	-.101	.010

* $p < .05$ ** $p < .01$

SDSCA Blood Glucose Test

A hierarchical multiple regression was performed between SDSCA Blood Glucose Test scale and Born in an English-speaking country (BESC) (Step 1), DSES and GPAQ Access (Step 2) and DSES by GPAQ Access interaction (Step 3). There were no outliers. The scatterplot of residuals showed slight heteroscedasticity toward errors of prediction being greater at smaller predicted values. Table 7.6 shows the unstandardised regression coefficients (*B*), standard errors (*SE B*), 95% confidence intervals (95% *CI*), standardised regression coefficients (β) and R^2 change for the covariate, predictor, moderator and predictor x moderator interaction at their step of entry. After step 3 with all variables in the equation, $R = .444$, $R^2 = .197$, $F(4, 100) = 6.122$, $p < .01$. The R^2 change for the DSES x GPAQ Access interaction term was significant ($p < .01$); although the effect size was small.

Table 7.6
Summary of hierarchical regression for SDSCA Blood Glucose Test and DSES x GPAQ Access interaction (n = 105)

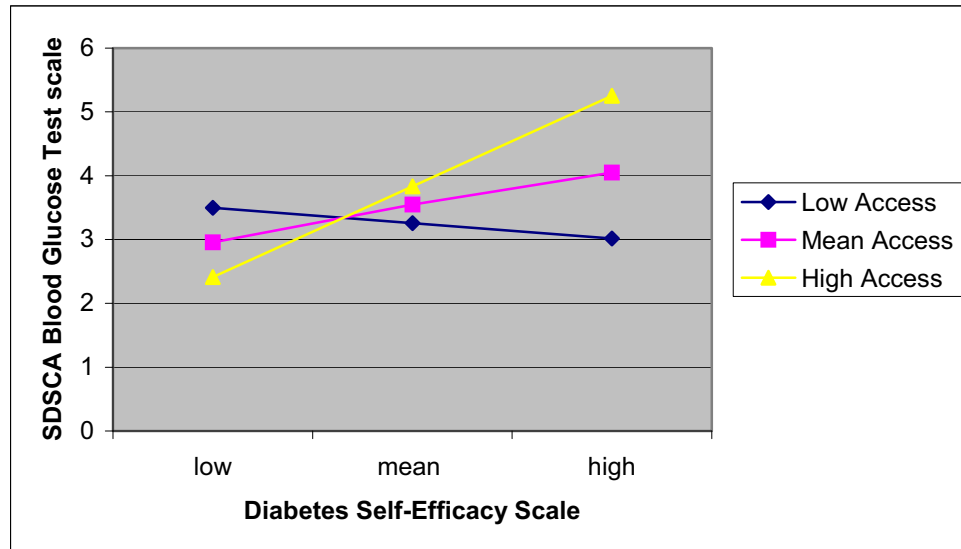
Step and variable	<i>B</i>	<i>SE B</i>	95% <i>CI</i>	β	<i>R</i> ² <i>change</i>
Step 1					
BESC	1.264	.476	.788, 1.74	.253**	.064**
Step 2					
BESC	1.144	.473	.671, 1.617	.229*	
DSES (z-score)	-.410	.241	-.651, -.169	-.163*	
GPAQ Access (z-score)	.327	.244	.083, .571	.130	.053
Step 3					
BESC	1.154	.454	.7, 1.608	.231*	
DSES (z-score)	-.590	.238	-.828, -.352	-.235*	
GPAQ Access (z-score)	.288	.234	.054, .522	.115	
DSES*GPAQ Access	-.831	.264	-1.095, -.567	-.291**	.080**

* $p < .05$ ** $p < .01$

Figure 7.4 shows the relation between diabetes self-efficacy and blood glucose testing at different levels of GP access. High levels of diabetes self-efficacy have a positive effect on blood glucose testing when access to GP care is high. This effect is diminished when ratings of access to GP care are low. The slopes of these regression lines significantly differ from each other ($B = -.291, p < .01$).

Post-hoc tests were undertaken to determine whether the regression lines differed from 0. The regression line showing the relation between DSES and SDSCA Blood Glucose at high levels of GPAQ Access was significantly different from 0 ($B = -1.413, p < .01$). However, the regression line with low levels of GP access was not ($B = .235, p > .05$). There was a conditional effect of DSES on SDSCA Blood Glucose Test in the final model with diabetes self-efficacy increasing with blood glucose testing ($B = -.590, p < .05$). There was a main effect of BESC on SDSCA Blood Glucose Test ($B = 1.154, p < .05$); indicating that those born in an English-speaking country had higher blood glucose testing scores than those born elsewhere.

Figure 7.4
DSES by GPAQ Access interaction in SDSCA Blood Glucose Test scale



This hypothesis appears to be partially supported:

- GP access moderated the relation between diabetes self-efficacy and blood glucose testing.

However, GP access did not moderate the relation between diabetes self-efficacy and general diet, or diabetes self-efficacy and exercise.

7.2.3 Tests for interaction between GP communication and diabetes self-efficacy

H4b: GP communication moderates the relation between diabetes self-efficacy and diabetes self-management

SDSCA General Diet

A hierarchical multiple regression was performed between SDSCA General Diet scale and Age (Step 1), DSES and GPAQ Communication (Step 2) and DSES by GPAQ Communication interaction (Step 3). There were 2 univariate outliers with a standardised residual of > 3 and 2 multivariate outliers with extreme mahalanobis scores ($p < .001$). Residuals showed heteroscedasticity toward errors of prediction being greater at smaller predicted values. Table 7.7 shows the unstandardised regression coefficients (B), standard errors ($SE B$), 95% confidence intervals (95% CI),

standardised regression coefficients (β) and R^2 change for the covariate, predictor, moderator and predictor x moderator interaction at their step of entry. After step 3 with all variables in the equation, $R = .503$, $R^2 = .253$, $F(4, 100) = 8.479$, $p < .001$. The R^2 change for the DSES x GPAQ Communication interaction term was not significant. There was a conditional effect of DSES on SDSCA General Diet in the final model; the unstandardised regression coefficient ($B = -.604$, $p < .001$) indicating that diabetes self-efficacy increased with general diet in the sample.

Table 7.7
Summary of hierarchical regression for SDSCA General Diet and DSES x GPAQ
Communication interaction (n = 105)

Step and variable	<i>B</i>	<i>SE B</i>	95% <i>CI</i>	β	R^2 change
Step 1					
Age (z-score)	.315	.141	.174, .456	.215*	.046*
Step 2					
Age (z-score)	.209	.131	.078, .34	.142	
DSES (z-score)	-.581	.135	-.716, -.446	-.396***	
GPAQ Comm (z-score)	.224	.132	.092, .356	.153	.204***
Step 3					
Age (z-score)	.205	.132	.073, .337	.140	
DSES (z-score)	-.604	.140	-.744, -.464	-.412***	
GPAQ Comm (z-score)	.241	.135	.106, .376	.165	
DSES*GPAQ Comm	-.075	.122	-.197, .047	-.057	.003

* $p < .05$ *** $p < .001$

SDSCA Exercise

A hierarchical multiple regression was performed between SDSCA Exercise scale and Born in an English-speaking country (BESC) (Step 1), DSES and GPAQ Communication (Step 2) and DSES by GPAQ Communication interaction (Step 3). There were 4 multivariate outliers with extreme mahalanobis scores ($p < .001$). The scatterplot of errors in residuals showed only a slight departure from normality. Table 7.8 shows the unstandardised regression coefficients (B), standard errors ($SE B$), 95%

confidence intervals (95% *CI*), standardised regression coefficients (β) and R^2 change for the covariate, predictor, moderator and predictor x moderator interaction at their step of entry. After step 3 with all variables in the equation, $R = .368$, $R^2 = .135$, $F(4, 100) = 3.908$, $p < .01$. The R^2 change for the DSES x GPAQ Communication interaction term was not significant. There was a conditional effect of DSES on SDSCA Exercise in the final model; the unstandardised regression coefficient ($B = -.597$, $p < .05$) indicating that diabetes self-efficacy increased with exercise. There was a main effect of BESC on SDSCA Exercise with the unstandardised regression coefficient ($B = -1.210$, $p < .01$) showing a negative relation between those born in an English-speaking country and exercise scores.

Table 7.8
Summary of hierarchical regression for SDSCA Exercise and DSES x GPAQ
Communication interaction (n = 105)

Step and variable	<i>B</i>	<i>SE B</i>	95% <i>CI</i>	β	R^2 change
Step 1					
BESC	-1.163	.420	-1.583, -.743	-.263**	.069**
Step 2					
BESC	-1.177	.412	-1.589, -.765	-.267**	
DSES (z-score)	-.522	.213	-.735, -.309	-.235*	
GPAQ Comm (z-score)	-.097	.213	-.31, .116	-.044	.052
Step 3					
BESC	-1.210	.412	-1.622, -.798	-.274**	
DSES (z-score)	-.597	.221	-.818, -.376	-.269*	
GPAQ Comm (z-score)	-.037	.218	-.255, .181	.017	
DSES*GPAQ Comm	-.248	.199	-.447, -.049	-.125	.013

* $p < .05$ ** $p < .01$

SDSCA Blood Glucose Test

A hierarchical multiple regression was performed between SDSCA Blood Glucose Test scale and Born in an English-speaking country (BESC) (Step 1), DSES and GPAQ Communication (Step 2) and DSES by GPAQ Communication interaction (Step 3).

There were 3 multivariate outliers with extreme mahalanobis scores ($p < .001$). The scatterplot of residuals showed slight heteroscedasticity toward errors of prediction being greater at smaller predicted values. Table 7.9 shows the unstandardised regression coefficients (B), standard errors ($SE B$), 95% confidence intervals (95% CI), standardised regression coefficients (β) and R^2 change for the covariate, predictor, moderator and predictor x moderator interaction at their step of entry. After step 3 with all variables in the equation, $R = .450$, $R^2 = .202$, $F(4, 100) = 6.122$, $p < .01$. The R^2 change for the DSES x GPAQ Communication interaction term was significant ($p < .01$); although the effect size was small.

Table 7.9
Summary of hierarchical regression for SDSCA Blood Glucose Test and DSES x GPAQ Communication interaction (n = 105)

Step and variable	<i>B</i>	<i>SE B</i>	95% <i>CI</i>	β	<i>R² change</i>
Step 1					
BESC	1.264	.476	.788, 1.74	.253**	.064**
Step 2					
BESC	1.232	.469	.763, 1.701	.247*	
DSES (z-score)	-.425	.243	-.668, -.182	-.169	
GPAQ Access (z-score)	.243	.243	0, .486	.097	.046
Step 3					
BESC	1.132	.447	.685, 1.579	.227*	
DSES (z-score)	-.646	.240	-.886, -.406	-.257**	
GPAQ Access (z-score)	.421	.237	.184, .658	.168	
DSES*GPAQ Access	-.737	.217	-.954, -.52	-.329**	.092**

* $p < .05$ ** $p < .01$

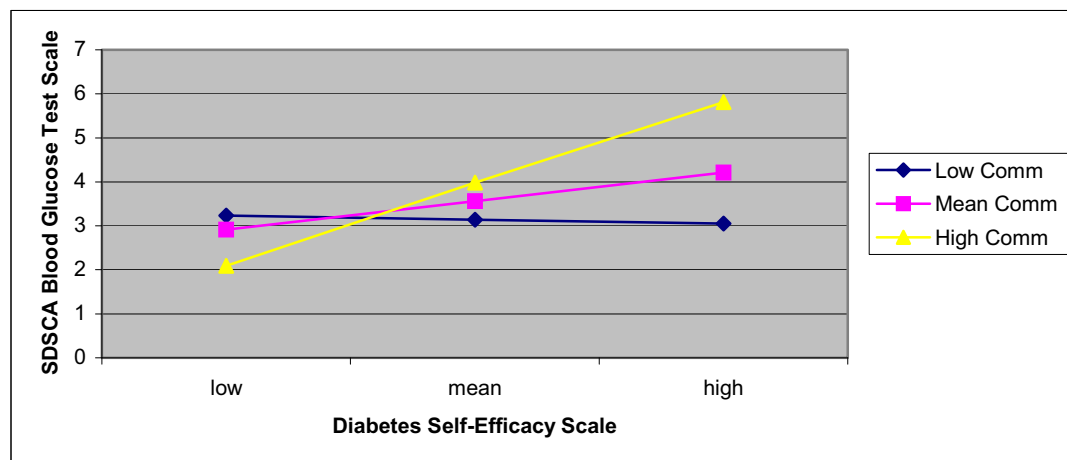
Figure 7.5 shows the relation between diabetes self-efficacy and blood glucose testing at different levels of GP communication. High levels of diabetes self-efficacy have a positive effect on blood glucose testing when GP communication is high. However, high GP communication impedes the impact of diabetes self-efficacy on blood glucose testing when self-efficacy is low. There appears to be little differential effect of self-

efficacy on blood glucose testing when ratings of GP communication are low. The slopes of these regression lines clearly differ from each other ($B = -.737, p < .01$).

Post-hoc tests were undertaken to determine whether the regression lines differed from 0. The regression line showing the relation between DSES and SDSCA Blood Glucose at high levels of GPAQ Communication was significantly different from 0 ($B = -.773, p < .01$). However, the regression line with low levels of GP Communication was not ($B = .235, p > .05$). There was a conditional effect of DSES on SDSCA Blood Glucose Test in the final model, with diabetes self-efficacy increasing in relation to blood glucose testing ($B = -.646, p < .01$). There was a main effect of BESC on SDSCA Blood Glucose Test ($B = 1.132, p < .05$); indicating that those born in an English-speaking country had higher blood glucose testing scores than those born elsewhere.

Figure 7.5

DSES by GPAQ Communication interaction in SDSCA Blood Glucose Test scale



This hypothesis appears to be partially supported:

- GP communication moderated the relation between diabetes self-efficacy and blood glucose testing.

However, GP communication did not moderate the relation between diabetes self-efficacy and general diet, or diabetes self-efficacy and exercise.

7.2.4 Tests for interaction between Place Barriers and diabetes self-efficacy

H5a: Place barriers moderate the relation between diabetes self-efficacy and diabetes self-management

SDSCA General Diet

A hierarchical multiple regression was performed between SDSCA General Diet scale and Age (Step 1), DSES and SBDSC Place (Step 2) and DSES by SBDSC Place interaction (Step 3). There were 2 univariate outliers with a standardised residual of > 3 and 6 multivariate outliers with extreme mahalanobis scores ($p < .001$). Residuals showed heteroscedasticity toward better prediction at larger predicted values. Outliers were present at lower predicted values. Table 7.10 shows the unstandardised regression coefficients (B), standard errors ($SE\ B$), 95% confidence intervals (95% CI), standardised regression coefficients (β) and R^2 change for the covariate, predictor, moderator and predictor x moderator interaction at their step of entry. After step 3 with all variables in the equation, $R = .481$, $R^2 = .232$, $F(4, 100) = 7.538$, $p < .001$. The R^2 change for the DSES x SBDSC Place interaction term was not significant. There was a conditional effect of DSES on SDSCA General Diet in the final model ($B = -.661$, $p < .001$); indicating that diabetes self-efficacy increased with general diet in the sample.

Table 7.10
Summary of hierarchical regression for SDSCA General Diet and DSES x SBDSC
Place interaction (n = 105)

Step and variable	<i>B</i>	<i>SE B</i>	95% <i>CI</i>	β	R^2 change
Step 1					
Age (z-score)	.315	.141	.174, .456	.215*	.046*
Step 2					
Age (z-score)	.166	.131	.035, .297	.114	
DSES (z-score)	-.658	.134	-.792, -.524	-.449***	
SBDSC Place (z-score)	.074	.130	-.056, .204	.051	.185***
Step 3					
Age (z-score)	.166	.132	.034, .298	.113	
DSES (z-score)	-.661	.140	-.801, -.521	-.451***	
SBDSC Place (z-score)	.072	.134	-.062, .206	.049	
DSES* SBDSC Place	.009	.099	-.09, .108	.008	.000

* $p < .05$ *** $p < .001$

SDSCA Exercise

A hierarchical multiple regression was performed between SDSCA Exercise scale and Born in an English-speaking country (BESC) (Step 1), DSES and SBDSC Place (Step 2) and DSES by SBDSC Place interaction (Step 3). There were 8 multivariate outliers with extreme mahalanobis scores ($p < .001$). Despite this, the scatterplot of predicted versus observed residuals does not show a large departure from normality. Table 7.11 shows the unstandardised regression coefficients (*B*), standard errors (*SE B*), 95% confidence intervals (95% *CI*), standardised regression coefficients (β) and R^2 change for the covariate, predictor, moderator and predictor x moderator interaction at their step of entry. After step 3 with all variables in the equation, $R = .361$, $R^2 = .130$, $F(4, 100) = 3.735$, $p < .01$. The R^2 change for the DSES x SBDSC Place interaction term was not significant. There was a main effect of the covariate BESC on SDSCA Exercise in the final model; the unstandardised regression coefficient ($B = -1.136$, $p < .01$) showing a negative relation between those born in an English-speaking country and exercise.

Table 7.11
Summary of hierarchical regression for SDSCA Exercise and DSES x SBDSC
Place interaction (n = 105)

Step and variable	<i>B</i>	<i>SE B</i>	<i>95% CI</i>	β	<i>R² change</i>
Step 1					
BESC	-1.163	.420	-1.583, -.743	-.263**	.069**
Step 2					
BESC	-1.185	.412	-1.597, -.773	-.269**	
DSES (z-score)	-.491	.210	-.701, -.281	-.222*	
SBDSC Place (z-score)	-.042	.211	-.253, .169	-.019	.051
Step 3					
BESC	-1.136	.415	-1.551, -.721	-.257**	
DSES (z-score)	-.426	.220	-.646, -.206	-.192	
SBDSC Place (z-score)	.01	.217	-.207, .227	.005	
DSES* SBDSC Place	-.163	.161	-.324, -.002	-.103	.009

* $p < .05$ ** $p < .01$

SDSCA Blood Glucose Test

A hierarchical multiple regression was performed between SDSCA Blood Glucose Test scale and Born in an English-speaking country (BESC) (Step 1), DSES and SBDSC Place (Step 2) and DSES by SBDSC Place interaction (Step 3). There were 9 multivariate outliers with extreme mahalanobis scores ($p < .001$). Residuals showed heteroscedasticity toward better prediction at larger predicted values. Outliers were present at lower predicted values. Table 7.12 shows the unstandardised regression coefficients (*B*), standard errors (*SE B*), 95% confidence intervals (*95% CI*), standardised regression coefficients (β) and *R² change* for the covariate, predictor, moderator and predictor x moderator interaction at their step of entry. After step 3 with all variables in the equation, $R = .331$, $R^2 = .109$, $F(4, 100) = 3.069$, $p < .05$. The *R² change* for the DSES x SBDSC Place interaction term was not significant.

There was a conditional effect of DSES on SDSCA Blood Glucose Test in the final model; the unstandardised regression coefficient ($B = -.526$, $p < .05$) indicating that

diabetes self-efficacy increased with blood glucose testing scores. There was a main effect of BESC on SDSCA Blood Glucose Test ($B = 1.189, p < .05$), showing a positive relation between those born in an English-speaking country and blood glucose testing.

Table 7.12
Summary of hierarchical regression for SDSCA Blood Glucose Test and
DSES x SBDSC Place interaction (n = 105)

Step and variable	<i>B</i>	<i>SE B</i>	95% <i>CI</i>	β	<i>R</i> ² <i>change</i>
Step 1					
BESC	1.264	.476	.788, 1.74	-.253**	.064**
Step 2					
BESC	1.236	.471	.765, 1.707	-.247*	
DSES (z-score)	-.463	.240	-.703, -.223	-.185	
SBDSC Place (z-score)	-.112	.241	-.353, .129	-.045	.039
Step 3					
BESC	1.189	.475	.714, 1.664	-.238*	
DSES (z-score)	-.526	.252	-.778, -.274	-.210*	
SBDSC Place (z-score)	-.162	.248	-.41, .086	-.065	
DSES* SBDSC Place	.156	.184	-.028, .34	.087	.006

* $p < .05$ ** $p < .01$

This hypothesis did not appear to be supported. Place barriers did not moderate the relation between diabetes self-efficacy and diabetes self-management.

7.2.5 Tests for interaction between Information Barriers and diabetes self-efficacy

H5b: Information barriers moderate the relation between diabetes self-efficacy and diabetes self-management

SDSCA General Diet

A hierarchical multiple regression was performed between SDSCA General Diet scale and Age (Step 1), DSES and SBDSC Information (Step 2) and DSES by SBDSC Information interaction (Step 3). There were 2 univariate outliers with a standardised residual of > 3 and 8 multivariate outliers with extreme mahalanobis scores ($p < .001$). Residuals showed heteroscedasticity toward better prediction at larger predicted values. Outliers were present at lower predicted values. Table 7.13 shows the unstandardised regression coefficients (B), standard errors ($SE B$), 95% confidence intervals (95% CI), standardised regression coefficients (β) and R^2 change for the covariate, predictor, moderator and predictor x moderator interaction at their step of entry. After step 3 with all variables in the equation, $R = .408$, $R^2 = .230$, $F(4, 100) = 7.464$, $p < .001$. The R^2 change for the DSES x SBDSC Place interaction term was not significant. There was a conditional effect of DSES on SDSCA General Diet in the final model ($B = -.644$, $p < .001$) indicating that diabetes self-efficacy increased with general diet scores.

Table 7.13

Summary of hierarchical regression for SDSCA General Diet and DSES x SBDSC Information interaction (n = 105)

Step and variable	<i>B</i>	<i>SE B</i>	<i>95% CI</i>	β	<i>R² change</i>
Step 1					
Age (z-score)	.315	.141	.174, .456	.215*	.046*
Step 2					
Age (z-score)	.165	.135	.003, .303	.113	
DSES (z-score)	-.648	.135	-.783, -.513	-.442***	
SBDSC Info (z-score)	.023	.134	-.111, .157	.016	.183***
Step 3					
Age (z-score)	.166	.136	.031, .302	.113	
DSES (z-score)	-.644	.136	-.78, -.508	-.439***	
SBDSC Info (z-score)	.034	.140	-.106, .174	.023	
DSES* SBDSC Info	-.029	.107	-.136, .078	-.026	.001

* $p < .05$ *** $p < .001$

SDSCA Exercise

A hierarchical multiple regression was performed between SDSCA Exercise scale and Born in an English-speaking country (BESC) (Step 1), DSES and SBDSC Information (Step 2) and DSES by SBDSC Information interaction (Step 3). There were 10 multivariate outliers with extreme mahalanobis scores ($p < .001$). The scatterplot of predicted versus observed residuals shows outliers at low predicted values; although heteroscedasticity is not present to a large degree. Table 7.14 shows the unstandardised regression coefficients (B), standard errors ($SE B$), 95% confidence intervals (95% CI), standardised regression coefficients (β) and R^2 change for the covariate, predictor, moderator and predictor x moderator interaction at their step of entry. After step 3 with all variables in the equation, $R = .349$, $R^2 = .122$, $F(4, 100) = 3.460$, $p < .05$. The R^2 change for the DSES x SBDSC Information interaction term was not significant. There was a conditional effect of DSES on SDSCA Exercise in the final model with diabetes self-efficacy increasing in relation to exercise ($B = -.507$, $p < .05$). There was a main effect of BESC SDSCA Exercise; the unstandardised regression coefficient ($B = -1.164$, $p < .01$) showing a negative relation between those born in an English-speaking country and exercise.

Table 7.14
Summary of hierarchical regression for SDSCA Exercise and
DSES x SBDSC Information interaction (n = 105)

Step and variable	B	$SE B$	95% CI	β	R^2 change
Step 1					
BESC	-1.163	.420	-1.583, -.743	-.263**	.069**
Step 2					
BESC	-1.178	.412	-1.59, -.766	-.267**	
DSES (z-score)	-.512	.210	-.722, -.302	-.231*	
SBDSC Info (z-score)	.08	.210	-.13, .29	.036	.052
Step 3					
BESC	-1.164	.420	-1.584, -.744	-.264**	
DSES (z-score)	-.507	.212	-.719, -.295	-.229*	

SBDSC Info (z-score)	.093	.222	-.129, .315	.042	
DSES* SBDSC Info	-.034	.175	-.208, .141	-.020	.000

* $p < .05$ ** $p < .01$

SDSCA Blood Glucose Test

A hierarchical multiple regression was performed between SDSCA Blood Glucose Test scale and Born in an English-speaking country (BESC) (Step 1), DSES and SBDSC Information (Step 2) and DSES by SBDSC Information interaction (Step 3). There were 9 multivariate outliers with extreme mahalanobis scores ($p < .001$). Residuals showed heteroscedasticity toward better prediction at larger predicted values. Outliers were present at lower predicted values. Table 7.15 shows the unstandardised regression coefficients (B), standard errors ($SE\ B$), 95% confidence intervals (95% CI), standardised regression coefficients (β) and R^2 change for the covariate, predictor, moderator and predictor x moderator interaction at their step of entry. After step 3 with all variables in the equation, $R = .343$, $R^2 = .118$, $F(4, 100) = 3.337$, $p < .05$. The R^2 change for the DSES x SBDSC Information interaction term was not significant.

There was a conditional effect of DSES on SDSCA Blood Glucose Test in the final model; the unstandardised regression coefficient for DSES ($B = -.500$, $p < .05$) indicating that diabetes self-efficacy increased with blood glucose testing in the sample. There was a main effect of BESC on SDSCA Blood Glucose Test; the unstandardised regression coefficient of 1.133 ($p < .05$) indicating a positive relation between those born in an English-speaking country and blood glucose testing.

This hypothesis did not appear to be supported. Information barriers did not moderate the relation between diabetes self-efficacy and diabetes self-management.

Table 7.15
Summary of hierarchical regression for SDSCA Blood Glucose Test and
DSES x SBDSC Information interaction (n = 105)

Step and variable	<i>B</i>	<i>SE B</i>	<i>95% CI</i>	β	<i>R² change</i>
Step 1					
BESC	1.264	.476	.788, 1.74	-.253**	.064**
Step 2					
BESC	1.239	.471	.768, 1.71	-.248*	
DSES (z-score)	-.464	.240	-.704, -.224	-.185	
SBDSC Info (z-score)	-.118	.240	-.356, .122	-.047	.039
Step 3					
BESC	1.133	.477	.656, 1.61	-.227*	
DSES (z-score)	-.500	.240	-.74, -.26	-.199*	
SBDSC Info (z-score)	-.218	.251	-.469, .033	-.087	
DSES* SBDSC Info	.254	.198	.056, .452	.130	.015

* $p < .05$ ** $p < .01$

7.3 Summary

There was a significant but weak linear correlation between DSES and all 3 SDSCA scales indicating that diabetes self-efficacy increased with general diet, exercise and blood glucose testing scores. GPAQ Access was weakly correlated with SDSCA General Diet and Blood Glucose Test and GPAQ Communication was weakly correlated with SDSCA General Diet. All of these correlations were positive indicating that diabetes self-management increased with ratings of GP care. SBDSC scales were not related to SDSCA scales. Intercorrelations among model variables showed weak correlations between DSES and both GPAQ scales indicating that diabetes self-efficacy increased with access to GP care and GP communication. There was a weak correlation between DSES and SBDSC Place barriers showing that diabetes self-efficacy decreased with increasing barriers to diabetes self-management associated with place.

GPAQ Access and Communication scales were significant moderators of the DSES and SDSCA Blood Glucose Test relationship; when the covariate born in an English-speaking country was controlled. In both cases, high levels of diabetes self-efficacy had a positive effect on blood glucose testing when GP access or communication was high. Effect sizes for both models were small. There was a conditional effect of DSES on SDSCA scales in all but one model with diabetes self-efficacy increasing with diabetes self-management. There was a main effect of language spoken in country of birth in all models with SDSCA Exercise and Blood Glucose Test as the outcome variables. In all cases, exercise was related to being born in a non-English-speaking country and blood glucose testing was related to being born in an English-speaking country.

The results of hypothesis testing in the quantitative component of this study suggest that the following interpretation of the Sociostructural determinants of diabetes self-management model is the best fit to the data (Figure 7.6).

CHAPTER EIGHT

Qualitative Results

This chapter presents the results from the qualitative component of the mixed-methods research. It provides a description of the characteristics of the group interview participants and an analysis of the themes that arose in response to questions about diabetes self-management, barriers to self-management and experiences with GPs in receiving diabetes care. Analysis is also provided of the influence of sociodemographic characteristics and group context on the expression of individual experience.

Results from qualitative analyses relate directly to the following research question:

RQ 1: How do sociostructural determinants influence diabetes self-management?

8.1 Sample description

Twenty-eight people with diabetes participated in the group interviews. All participants had Type 2 diabetes and were attending or had been attending group diabetes education sessions. Table 8.1 presents a description of the demographic characteristics of each participant identified only by ID code. Nine participants attended the English-speaking group interview, eight participants attended the Vietnamese-speaking group interview and 11 participants attended the Arabic-speaking group interview. Most participants were female ($n = 17$), aged between 65 to 74 years ($n = 13$), born overseas ($n = 25$), spoke a language other than English at home ($n = 25$), and were reliant on a pension as their main source of income ($n = 23$).

8.2 Identified themes in diabetes self-management

Participants' experiences in diabetes self-management clustered around five superordinate themes: diabetes self-management beliefs and behaviour; self-efficacy and psychological control of diabetes; psychosocial barriers to diabetes self-management; financial barriers to diabetes self-management; and GP-based barriers and experiences in diabetes self-management (see Table 8.2 for an overview of themes).

Table 8.1
Characteristics of interview participants

ID	Interview group	Gender	Age group	Country of birth	Language spoken at home	Main source of income
P1	English-speaking	Male	55-64	England	English	Employment
P2	English-speaking	Male	65-74	Germany	German	Pension
P3	English-speaking	Female	65-74	Italy	Italian	Pension
P4	English-speaking	Female	65-74	Australia	English	Pension
P5	English-speaking	Female	55-64	Croatia	Croatian	Pension
P6	English-speaking	Male	65-74	Lebanon	Arabic	Pension
P7	English-speaking	Female	65-74	Australia	English	Pension
P8	English-speaking	Female	65-74	Australia	English	Pension
P9	English-speaking	Male	45-54	Lebanon	Arabic	Pension
P10	Vietnamese-speaking	Female	45-54	Vietnam	Vietnamese	Pension
P11	Vietnamese-speaking	Female	25-34	Vietnam	Vietnamese	Employment
P12	Vietnamese-speaking	Female	25-34	Vietnam	Vietnamese	Employment
P13	Vietnamese-speaking	Female	55-64	Vietnam	Vietnamese	Pension
P14	Vietnamese-speaking	Female	55-64	Vietnam	Vietnamese	Pension

Table 8.1 cont.

ID	Interview group	Gender	Age group	Country of birth	Language spoken at home	Main source of income
P15	Vietnamese-speaking	Female	65-74	Vietnam	Vietnamese	Pension
P16	Vietnamese-speaking	Male	65-74	Vietnam	Vietnamese	Pension
P17	Vietnamese-speaking	Female	45-54	Vietnam	Vietnamese	Pension
P18	Arabic-speaking	Male	65-74	Lebanon	Arabic	Pension
P19	Arabic-speaking	Male	55-64	Lebanon	Arabic	Pension
P20	Arabic-speaking	Female	35-44	Lebanon	Arabic	Pension
P21	Arabic-speaking	Male	45-54	Lebanon	Arabic	Employment
P22	Arabic-speaking	Female	65-74	Lebanon	Arabic	Pension
P23	Arabic-speaking	Male	55-64	Iran	Assyrian	Pension
P24	Arabic-speaking	Female	45-54	Lebanon	Arabic	Pension
P25	Arabic-speaking	Female	65-74	Lebanon	Arabic	Pension
P26	Arabic-speaking	Male	55-64	Lebanon	Arabic	Employment
P27	Arabic-speaking	Male	65-74	Afghanistan	Arabic	Pension
P28	Arabic-speaking	Female	65-74	Lebanon	Arabic	Pension

8.2.1 Diabetes self-management beliefs and behaviour

In general, participants demonstrated a good knowledge of diabetes and the activities of diabetes self-management for type 2 diabetes; most likely as a result from their experiences in diabetes education and peer interaction and learning. Participants described activities related to: diet, such as regulating the intake of sugary and fatty foods; exercise, such as regular walking; blood glucose testing, including testing before and/or after meals; and oral medication use. While the causal interaction between dietary intake, exercise and blood glucose levels was accurately referenced by all groups - so that, for example intake of foods high in sugar was linked to increases in blood glucose levels and exercise was linked to reductions in blood glucose levels - not all participants had direct or immediate experience of these causal effects through personal blood glucose testing. Participants who performed blood glucose testing had the advantage, in terms of building self-efficacy, of linking behaviour directly and tangibly to their physiology. P8, for example, revealed her surprise at the causal link between exercise and blood glucose levels in relating her experiences in undertaking a cardiac rehabilitation program as a result of a ‘heart scare’:

“... it’s quite unbelievable what three-quarters of an hour of exercise [does]...my sugar would be 9.7 and three-quarters of an hour later after doing four lots of different exercises the sugar would be down to 6.4”.

Participants demonstrated some pride in relating that they were able to manage their diabetes on diet and exercise only. Even those taking oral medication emphasised the lifestyle changes they made in controlling their diabetes, most likely because this reflected aspects of self-management within their control. Participants appeared to define themselves through these behaviours, as if the behaviours in themselves demonstrated their success in diabetes self-management. P8, for example, introduced herself with “I’m type 2 diet control and medication”. In fact, there was a latent theme among participants concerning the role of self-management behaviour in identity formation, and as a projection of this, attributions of success and failure in diabetes control. Success was demonstrated through changes to lifestyle, and for those taking medication, lifestyle and medication. Failure in diabetes self-management was

demonstrated through either a failure of these previously successful behaviours to promote adequate control (see for example P11 in section 8.2.2) or a change in behaviours that signified progression of the disease, such as the use of insulin injection, an invasive procedure that P25 stated she would rather die than do.

There was evidence of some misinformation in diabetes self-management despite participant's attendance in diabetes education. P2, P4 and P5, for example, believed that generically labelled medications were not as effective in controlling diabetes as brand-labelled medications. This meant that they actively avoided generic-labels even though they were well priced in comparison to brands. Other 'lay beliefs' not affected by diabetes education focussed on the causes of diabetes. P19 and P20, for example, believed that diabetes resulted from the ingestion of foods that had been chemically altered, such as the addition of chemical growth hormones to chicken. P8 and P27 traced the onset of diabetes to stressful life events, including the sudden incapacity of a previously capable family member and the trauma of fleeing a home country at war to seek asylum.

8.2.2 Self-efficacy and psychological control of diabetes

Participants related the activities of diabetes self-management to psychological notions of self-efficacy and control, even though this had not been asked of them. They used words and phrases such as "willingness", "control", "self-control", "determined" and "very strong mind" to describe the psychological resources necessary to both begin and maintain dietary changes and physical activity regimens. Self-efficacy and its relationship to diabetes self-management behaviours was exemplified by P18 and P15 who described their experiences in overcoming barriers to exercising and diet control. When P18 was first diagnosed with diabetes he was 110kg and could not walk more than five minutes without becoming breathless. Despite initial discomfort, P18 persisted with a daily walking routine because he believed that this would help him keep his blood glucose levels within a healthy range. P18 was now walking daily without problem and had lost over 20kg in weight. P15 demonstrated self-efficacy in dietary control during the course of the group interview. Knowing that the interview time coincided with the time that she normally ate a mid-morning snack, P15 had pre-

prepared a meal and brought it along to the interview with her; even though she was aware that other food would be available. P15 ate her meal at the correct time during the interview, without embarrassment.

P18 and P15s' experiences highlight the importance of belief in human agency; that people have the ability to change the circumstances of their lives. This belief requires an understanding that personal control lies within the individual rather than in the environment or with others. Participants believed that an internal locus of control was necessary for effective diabetes self-management, although they did not use this term. Instead they spoke of accepting diabetes and accepting responsibility for diabetes. Accepting diabetes meant accepting that this was a chronic condition with which they would need to live for the rest of their lives. Diabetes was 'my problem because I have to live with it'. Accepting diabetes was seen to be key to taking control. It was, however, a process which involved a period of grieving for the non-diabetes life. P3 related the useful advice that she received from a family member with diabetes when she had just been diagnosed:

"....they told me, 'are you alright?' and I say I cry... well if you upset that you got it you're one step ahead. If you say no I don't want to know it, well then you're in trouble".

Accepting responsibility for diabetes meant taking responsibility for health states and diabetes self-management behaviours. Responsibility represents a progression from acceptance that 'diabetes is my problem' to 'only I can manage my diabetes'; an internal progressive shift in the logic of psychological control. Performance of diabetes self-management behaviours was seen to be dependent on the person with diabetes. As P23 asserts, no amount of assistance from others, including GPs, can make a person look after their diabetes if they do not want to. The importance of internal control beliefs in self-management is explored further in negotiating control of diabetes with GPs.

Most participants indicated that they were in control of their diabetes or were gaining control in specific domains of self-management. This was not the experience of P11.

P11 was first diagnosed with gestational diabetes during her pregnancy and she believed that the condition would disappear once she had given birth. Instead P11 was diagnosed with type 2 diabetes about five years ago. She believes that her diabetes is getting worse each year despite her attempts to control it with diet, exercise and oral medication. While P11's diabetes may in fact be progressing and the symptoms worsening, she also revealed several behavioural insights and cognitions that suggest a low level of psychological control. P11 spoke of being always tired and stressed and not having enough time to plan meals and eat the right foods. She feels let down by doctors and by her own body for failing to behave in the ways she believed it should. While the cause and effect of P11's feelings of being out of control cannot be known, it is clear that diabetes symptoms and psychological control interact in a complex way in producing diabetes self-management behaviours.

8.2.3 Psychosocial barriers to diabetes self-management

Stress

Stress was recognised as a major challenge to diabetes self-management by participants. Stress lowers psychological control over self-management behaviours, so that P20, for example, turns to comfort in high-fat food after having a fight with her husband about smoking in front of the children. P14 finds that worry about her high blood glucose readings prevent her from going out to exercise; the very thing that she acknowledges may be of benefit. Stress was seen to be largely uncontrollable and participants were unable to provide suggestions for modifying the actual cause of their stress, even when prompted. Yet three participants noted that stress was not an inevitable consequence of difficult or upsetting circumstances. It was the way in which the individual thought about this circumstance that determined whether they experienced stress. For P2 perceptions about circumstances need not reflect reality. In the following example of a discussion with friends P2 directly links personal beliefs to stress, irrespective of the accuracy of his beliefs:

“They could be right, I could be wrong. You know but... my way of thinking I see it's wrong and that will make me upset”.

Participants in general seemed much more knowledgeable and better equipped to deal with the effects of stress than the actual stressor. Feelings of stress were seen to affect blood glucose levels by causing them to rise steeply. This prompted action in various domains of self-management to lower blood glucose levels, including altering medication intake, eating less and going for a walk. P4 had a different approach to coping with the physiological effects of stress. On the days when she visits her husband with dementia in a nursing home, an event that she recognises as stressful, P4 deliberately avoids attending the doctor for blood glucose testing because she knows it will be elevated. While P4 had not found a way to manage the cause of her stress, or even the effects of it on her diabetes symptoms, she uses this knowledge of the relationship between stress and blood glucose levels to avoid inaccurate test results of her diabetes control.

Friends and family

Friends and family were often seen to be barriers to diabetes self-management, particularly when the person had just been diagnosed and was struggling to come to terms with a life-long disease. This negative social support was commonly expressed in a minimisation of diabetes and its impact on the individual. That is, family and friends did not stick to meal plans or times, encouraged participants to eat high-fat foods and even, in the experience of P2, questioned the validity of his diagnosis because “you don’t look like there’s anything wrong with you”. Participants attributed this negative social support to family and friends’ poor knowledge of diabetes and its consequences. They perceived that it was their role to educate those close to them about the importance of receiving support in self-management activities. Turning negative social support into positive social support requires a high level of psychological control. Participants had to be authoritative, persistent and beyond embarrassment, particularly in situations where receiving food was a cultural expectation. They had to have a high level of confidence or self-efficacy in regulating their behaviour and communicate this consistently to others. P9 likened this slow but consistent process of educating friends and family to training a horse. Friends and family expressed hurt when P9 first refused their food but after consistently communicating what he will and won’t eat over time they have accepted his new lifestyle and are now supportive of his dietary needs.

Consistent messages to family and friends were seen to be most effective when they focussed on the potential negative life-altering or life-threatening consequences of not performing diabetes self-management activities. These messages were intended to scare. P4, for example, found that telling her daughter that she could pass out if she did not eat at a specific time was a useful turning point in gaining her support:

“I found a very good thing was my daughter says ‘oh we don’t need to eat now’ and I said, well, it’s like this; if we don’t eat you’ll be picking me up off the floor. ‘What do you mean, mum?’ I said I’ve got the shakes and I have to go eat. A few times like that and... I found, Debbie says, oh yes it’s about time mum ate, you know and that’s it, sort of thing, and they’ll go and get something for me”.

While challenging, these efforts in educating friends and family in diabetes and the importance of self-management activities were well worthwhile. Educated friends and family often proved to be a great support; making sure that participants ate at certain times and even limiting household food to match the diet requirements of diabetes self-management.

Work

While only five out of the 28 interview participants were in employment – the remainder receiving a pension as their main source of income – the impact of work on diabetes self-management emerged as a significant impediment to diabetes control for this group. The nature of work and the workplace, including deadlines, overtime and pressures to work through breaks to complete tasks had an impact on when and how employed participants performed diabetes self-management. For example, P1 could only find time to exercise on the days when he was not working and P12 skipped meals and/or ate take-away foods that were quick and easy to consume but had high fat and carbohydrate content. Work interfered particularly with dietary management through its impact on irregular mealtimes; a situation that participants felt they had little control over.

Dietary control of diabetes was perceived by participants, regardless of employment status, to be an intensive, demanding activity requiring forethought and planning. This

was because dietary control required a strict daily routine that had to be adhered to if blood sugar levels were to be appropriately balanced. This, in turn, required determination, self-efficacy and time to prepare nutritious meals and snacks, including those that could be consumed quickly at work. P12 believed that the time required to perform dietary self-management meant that strict dietary control was more difficult for people who were working or caring for children than for those who were older and retired:

“You have to follow strictly the diet full-stop. Which means that you have to have a routine from say breakfast, snack at morning tea, lunch and then dinner and so on. So you have to have a lot of time to contribute into your diet ... So with her she’s old and her husband’s retired so therefore she has time to look after the diet properly....but the majority of people who have children or are younger and also work have a problem”.

8.2.4 Financial barriers to diabetes self-management

Most participants did not have a lot of money to purchase resources for diabetes self-management, such as medications and healthy foods. Participants receiving a pension were assisted in purchasing medications by the public Pharmaceutical Benefits Scheme (PBS) which subsidises medications to pensioner card-holders. For most interviewed, the cost of diabetes medication would have been a major burden without the PBS. Problems could arise, however, when pensioners exceeded the safety net allowance. This was the experience of P7 who regularly exceeds the safety net because of her multiple co-morbid conditions requiring different medications. This means that P7 has to pay full-price for medications for more than six-months of the year; a situation that she described as extremely difficult. Paying full-price for medications was a significant burden, even for participants who were working. P12, for example, is employed but she does not earn enough money in her job to buy medications at full-cost without having to miss out on buying another needed resource. This dilemma was succinctly expressed by P16:

“The problem is that...if they have to buy medication for diabetes it means they have to stop spending something else to afford the diabetes medication”.

Participants were frequently faced with this decision to trade-off other needed resources against the requirements of diabetes self-management. Sometimes these trade-offs occurred across diabetes self-management activities so that the purchase of medications took priority over the purchase of expensive healthy foods. Trade-offs were seen to be necessary because the real cost of uncontrolled diabetes was disability or death. While participants prioritised resources for diabetes self-management to avoid these dire consequences, they perceived the act of performing trade-offs differently. Some participants, like P12, felt that they did not have any control over the distribution of financial resources and were forced to prioritise diabetes self-management. Other participants like P7, integrated trade-offs into their control beliefs so that the prioritisation of resources to support diabetes self-management was in itself an act of psychological control and their own volition. Literally, making a trade-off between needed resources is ‘my choice’ in diabetes self-management.

8.2.5 GP-based barriers and experiences in diabetes self-management

Lack of appropriate informational resources

Participants believed that GPs did not give them appropriate informational resources to support diabetes self-management. That is, GPs failed to provide handouts or information sheets on diabetes self-management that were useful in the actual performance of self-management activities. This was a particular problem for Vietnamese-speaking and Arabic-speaking participants who reported a paucity of culturally tailored diabetes information such as diet plans and eating guides; even for those participants attending GPs from a similar cultural background. P16, for example, explained that because rice forms the base of all meals in his Vietnamese diet it can be very easy to consume two or three bowls of rice with meat and vegetables in one sitting, leading to an over-consumption of carbohydrate. P16, like other non-English speaking participants, expressed a clear need for culturally specific dietary information that supports diabetes self-management within the broader boundaries of traditional diet and lifestyle.

This problem with informational resources was however not limited to non-English speaking participants. Participants in general wanted clear but detailed take-home information on the intricacies of diet and carbohydrate counting and exercise rather than general health brochures on how to live healthy lifestyles. P8, for example, revealed that while her GP had been very generous and encouraging in providing her with diabetes brochures, the information provided had been completely inadequate for her needs:

“They do hand you pamphlets and my doctor’s given me a terrible lot of pamphlets over the period of time. But sometimes they just don’t seem to have the information that you really want, you know”.

This lack of appropriate information to support diabetes self-management was a major impediment to diabetes control. Even so, some participants demonstrated self-efficacy in diabetes self-management by actively seeking information that they were unable to obtain through GPs from other sources. P4, for example, had joined Diabetes Australia and participated in shopping tours to support dietary management. P20 had borrowed books on diabetes in Arabic from her local library and P27 had tuned in to a talk on diabetes given by a doctor on an Arabic-language local radio station.

Poor communication of diabetes self-management information

Participants’ experiences revealed that it was not only material resources that were lacking in GPs support of diabetes self-management but GPs’ actual oral communication of diabetes self-management information. In general, GPs failed to give participants enough information about diabetes and diabetes self-management activities. In some cases, GPs failed to explain exactly what diabetes was and how it should be managed. Participants were particularly vulnerable at the time of diagnosis and believed that poor communication of essential information at this early stage prevented them from developing good self-management behaviours and encouraged them to continue poor self-management practices. P8, for example, kept eating sweets after her GP diagnosed her with diabetes because she believed that her GP did not help her to understand the seriousness or chronicity of diabetes. P8 changed her behaviour only after her eyesight became affected and she began to feel ‘giddy’.

P14 believes that her GP misled her about her diagnosis and the requirements of diabetes self-management. When P14 was diagnosed with diabetes her GP told her that she had a ‘high level of sugar in her body’, but he did not use the word ‘diabetes’. This misinformation continued for three consecutive GP visits and it was only when her daughter guessed that ‘high sugar’ might mean diabetes that P14 had any idea of her diagnosis. P14’s negative experience of diagnosis is unusual compared to the experiences of others interviewed but her description of her GP’s communication of self-management information reflects the experiences of most participants. P14’s GP told her to eat well, exercise and take her medication but he did not tell her how or why she should perform these activities:

“He didn’t tell me what sort of thing that I should eat. And he didn’t mention anything, he just tell me exercise. And why do I have to do exercise? Why do I have to eat sensibly? And why do I have to take medication?”.

Participants drew a clear distinction between information and understanding. It was not enough for GPs to simply state the behavioural changes required or to give handouts on diabetes self-management. Participants needed to understand why and how diet, exercise, glucose monitoring and medication would improve their health and prevent diabetes complications. GPs needed to be clear about diabetes being a chronic condition. P16, for example, initially believed that diabetes could be cured like a cold. The consequences of poor information transfer and a lack of understanding about diabetes self-management are long-standing. P1 believes that his diabetes would not have progressed to the stage it is now if he had known how to modify his behaviour when he was first diagnosed.

Limited time in the consultation

The limited amount of time given by GPs to diabetes patients in consultation was a common theme among participants. This was important because participants believed that lengthier consultation times presented more opportunity for the transfer of information in diabetes self-management. In a latent theme, consultation time was used to define the integrity of GPs and the quality of care they provide. GPs of little integrity spent less time in consultation than participants needed. Five participants, four of who

were Vietnamese-speaking, openly expressed anger at GPs for failing to spend enough time with them in the consultation; and indication to these participants that their GPs did not respect them. P17, for example, related how her GP controlled time in the consultation by standing up when he wanted her to leave, irrespective of whether she felt that she had completed the consultation or had more health issues she wanted to discuss.

GPs of high integrity, in contrast, spend as much time in consultation as participants require and are relaxed rather than impatient. This belief was exemplified by P9, who has ample time with his GP and never feels rushed (see quote in section 8.2.5.5), and P4 who spoke admiringly of doctors who gave their time to participate in diabetes education sessions, even though they were very busy. Consultation time was, however, not always an accurate indication of GP integrity or quality of care. Some participants felt let down by their GPs in terms of consultation length but also reported good relationships with their GPs. This point is discussed further in the next section.

The gap between high trust and poor care

There was a very definite gap between participants' experiences of GP-based barriers to diabetes self-management and participants' expressions of trust and even affection for GPs. With the exception of five participants noted above, participants in general related positive trusting relationships with their GPs. GPs were, in fact, very well liked and respected by participants and this had an impact on the way in which they explained poor care experiences. Even though these participants were able to make criticisms of GP care, they appeared uncomfortable in doing so and qualified statements with expressions such as "I guess", "sort of" and "maybe". This discomfort likely reflects a cognitive dissonance or discrepancy between feelings of trust in GPs and the actual care that participants received. Experiences of poor care call into question the participants' decision to invest trust in their GP and continue to attend this GP over others. Essentially, 'why do I trust this GP if they give poor care?'. This cognitive situation was untenable and participants were keen to account for their negative statements to relieve dissonant feelings and maintain their personal integrity. P7, for example, believed that GPs had a poor knowledge of diabetes and diabetes self-management activities. She

later explained these limitations within structural barriers to GP care such as workload and professional role:

“Well a GP’s got to handle every disease, hasn’t he? If you go to a specialist, that’s different, he’s only handling disease A. When you go to the GP, I mean, the person after me could be going in with asthma and the one after that could be going in with heart problems, so I mean, they must have a never ending job of studying up the latest”.

Participants’ acceptance of poor GP care may, however, not be as straightforward as presented in these interviews. There was some evidence of an undercurrent of dissatisfaction among participants in P19’s and P26’s comments that GP’s scheduling of regular patient consultations was motivated by financial greed: comments that brought prolonged group laughter from Vietnamese-speaking and Arabic-speaking participants. As before, some participants were keen to ameliorate this negative GP image, in this case by counter-balancing negative reports of GP behaviour with positive reports. P21, for example, counter-balanced the report of GP greed with reports of GP altruism in providing care for refugees without public health benefits and dispensing free medications.

Negotiating control of diabetes with GPs

Participants believe that GPs are essential to diabetes care and recognise that they are reliant on them for needed prescription medications. This places GPs in a powerful position. People with diabetes need to negotiate control over their diabetes and self-management activities within these power structures. Some participants did this by integrating GP care into their own belief systems and notions of psychological control. P10 demonstrated this when explaining why she would visit her GP for a diabetes check-up even if she did not feel that she needed to:

“In my case, if my doctor ask me to visit again, I think I’m obliged to do so because I would feel that maybe that she give some more information or maybe a new information that I didn’t know. I think it’s good for me”.

P10 visits her GP not because her GP asks her to, but because she believes it is useful for her to do so. P10 is in control of this situation, not her GP. An internal locus of control in managing diabetes was demonstrated through participants' belief in their own agency and their minimisation of the role of GPs. GPs were useful for diagnosis and prescriptions but they had little role in actually determining diabetes self-management because this could be only controlled by the person with diabetes. P23 summed this thought up well:

“I want to say just one thing, not doctor help you, nobody help you except yourself. If you want you can help you yourself, if not no-one can help you. It's just advice for what you do. If you don't want to do it, who can help you?”.

There is a fine balance, however, between having a belief that health is self-determined and valuing the role and expertise of others in diabetes care. P19, for example, sees GPs as peripheral to diabetes self-management. He believes that he is fully responsible for his diabetes and that GPs are a necessity only when he is ill. P19 further asserts this belief by attributing GP motivations for regular check-ups to financial greed. While P19's beliefs demonstrate an internal locus of control in diabetes self-management, his rationalisations also hint at a fear of being able to maintain control over diabetes in the presence of a powerful other. In fact, losing control of diabetes to GPs was a latent theme among interview participants. This is seen in participant experiences within the consultation.

Most participants described traditional doctor-patient relationships where GP and patient roles are clearly delineated. That is, GPs are the holders of medical knowledge and treatments and patients are the passive recipients of these medical resources. Participants seemed acutely aware of these roles and many behaved in ways to maintain them. P4, for example, believed that her GP wanted to be acknowledged as the expert in diabetes. As a result, P4 took a passive role in the consultation even though she believed that she knew more about diabetes self-management than her GP. But P4 did not assume this role solely for the sake of her GP. Being passive in the consultation enabled P4 to withhold knowledge about what she really knows about diabetes self-

management. In this way, she is able to maintain control over her diabetes and avoid any potential threat to control that may result from sharing care with her GP.

It is likely that participant methods of control of diabetes fit the consultation style, although it is not clear whether this is led by the GP, the participant or both. P4's experiences in negotiating control of diabetes in the consultation can be contrasted with P9. P9's GP has a patient-centred style of consultation and encourages P9 to ask questions about diabetes self-management. Sharing knowledge in this way does not place P9 at risk for losing control of his diabetes. Rather, it enables him to use his GP as an expert resource in supporting his own decision-making about diabetes self-management:

"I can go to my doctor and if I want to discuss something or tell him that this says so or so, what do you think? You know, he can take it easy, sit and relax with me and just relax and not worry about the people outside. He talks and discusses and gives me the right advice all the time".

8.3 Sociodemographic influences on diabetes self-management

8.3.1 Gender and age

There was no apparent influence of either gender or age on the expression of individual experience in diabetes self-management. While younger participants tended to relate difficulties in dietary self-management and the costs of medication this was related more to employment status than to age.

8.3.2 Main source of income

There appeared to be some clustering of themes in diabetes self-management according to the main source of income or employment status. Participants in employment tended to report higher financial costs associated with medication use and difficulties in diabetes self-management related to time-constraints and workplace pressures. Diabetes medications were largely made affordable for pension-holders through access to the Pharmaceutical Benefits Scheme. There was a general perception that a lack of work

commitments made diabetes self-management, and dietary control in particular, easier for people who are out of the workforce and receiving a pension as their main source of income.

8.3.2 Language and country of birth

The potential influence of language spoken at home or country of birth on experiences in diabetes self-management was difficult to assess given the clustering of this attribute to interview group. Participants born in Vietnam, for example, all of who spoke Vietnamese at home, were more likely to express anger and frustration in reporting negative experiences with GPs than participants born in other countries. It is not possible to determine however whether these Vietnamese participants actually experienced poorer care with GPs or whether they simply felt more comfortable sharing these experiences in the presence of an interpreter who had also been instrumental in their diabetes education.

It is useful to investigate the potential influence of language and country of birth on experiences of diabetes self-management among participants in the English-speaking group interview because five of these participants were from non-English speaking backgrounds and spoke other languages within the home. The participants in this group interview did not appear to show any variation in the reporting of experiences in diabetes self-management according to country of birth. Again, this may reflect something about the group interview context, the cohesiveness of individuals in group diabetes education or the cultural commonality of themes in diabetes self-management. The potential impact of the group context on the qualitative data is explored in the next section.

8.4 Assessing the impact of group context on interview data

The potential impact of the group context on the diabetes self-management experiences related by participants is discussed in the qualitative results section so as to explicitly draw out this context in the data. The group context is thus seen not as a limitation of this method but as an important contextual point for analysis. Even though there were

28 people interviewed for this study, there was a relative paucity of raw data for analysis. This was because attitudes and beliefs regarding self-management practices were more easily accessed through the group interview method than in-depth narrative. Most participants provided snap-shots of beliefs and experiences rather than the ‘full-story’ of their experience. This meant that it was not possible to piece together a continuous narrative for individuals. Exceptions to this were participants who drew vivid accounts of their experiences, such as P11, who shared her experiences of diabetes control and P4, who described, in detail, her methods of convincing her daughter that diabetes really was a serious condition.

That some participants may tell their stories better than others is not an unusual finding in itself because interview participants naturally differ according to their verbosity, their insight into their own beliefs and behaviour, and the extent to which they are willing to share their personal experience with an interviewer. However, in a group context, it is difficult to untangle what may be attributable to the individual and what may be attributable to:

structural influences on the expression of individual experiences, such as the impact of group interview time-limits, including time-limits that participants may have imposed on themselves in responding to questions; and

social influences on the expression of individual experiences, such as the impact of hearing others’ experiences on the selection and reporting of experience or the impact of the presence of others on the self-censoring of individual experience.

Table 8.2 shows a break-down of superordinate themes, themes, and sub-themes identified in the qualitative data by interview group. In general, themes were distributed evenly across all interview groups, suggesting a commonality of participant experience in diabetes self-management, at least at the broader thematic level. This also suggests that the group context may have exerted little influence on the subject of participants’ experiences, because experience was not overtly clustered to group.

Table 8.2
Identified themes presented across interview group

Superordinate theme	Theme	Sub-theme	Language spoken in group		
			English	Vietnamese	Arabic
Diabetes self-management beliefs and behaviour	Activities in diabetes self-management	Diet control	X	X	X
		Exercise	X	X	X
		Blood glucose testing	X	X	X
	Causal determinants of blood glucose levels	Diet and blood glucose dynamics	X	X	X
		Exercise and blood glucose dynamics	X		X
		Testing and control	X	X	X
	Self-management as identity	Self-efficacy in testing	X		
		Pride in lifestyle control	X		X
		Insulin as failure	X	X	X
	'Lay beliefs' in cause and care of diabetes	Diabetes caused by chemicals in food			X
		Diabetes caused by stress	X		
		Generic brands are ineffective	X		

Table 8.2 cont.

Superordinate theme	Theme	Sub-theme	Language spoken in group		
			English	Vietnamese	Arabic
Self-efficacy and psychological control	Self-efficacy	Overcoming barriers to diet	X	X	X
		Overcoming barriers to exercise	X		X
	Owning diabetes	Accepting diabetes	X		
		Control lies with me	X	X	X
	Self-control	Being determined	X	X	X
Out of control		X	X	X	
Psychosocial barriers to diabetes self-management	Stress	Effect on psychological control	X	X	X
	Friends and family	Stress is uncontrollable	X	X	X
		Stress is in the mind	X		X
	Coping by modifying behaviour		X	X	X
		Negative social support	X	X	X
	Self-efficacy		X	X	X
		Training friends and family	X		X
	Positive social support		X		X
		Time and structure	X	X	

Table 8.2 cont.

Superordinate theme	Theme	Sub-theme	Language spoken in group		
			English	Vietnamese	Arabic
Financial barriers	Cost of resources	PBS and medication	X	X	
		Work and medication		X	X
	Prioritising resources	Food			X
		Trade-offs	X	X	X
GP-based barriers	Lack of information	Psychological control	X	X	
		Culturally-relevant material		X	X
		Poor detail and utility	X	X	X
		Self-efficacy	X		X
	Poor communication	Diagnosis	X	X	
		Consequences	X	X	X
	Limited consultation time	Understanding/rationale for self-management	X	X	
		Information transfer		X	X
		GP integrity	X	X	X
		Lack of respect (anger)	X	X	

Table 8.2 cont.

Superordinate theme	Theme	Sub-theme	Language spoken in group		
			English	Vietnamese	Arabic
Negotiating control with GPs	Gap between trust and care	Trust in GP	X	X	X
		Discomfort and integrity	X		X
		Explaining poor care	X		X
		Dissatisfaction (humour)		X	X
	Maintaining control	GPs are needed resource	X	X	X
Losing control (fear)		Clearly defined roles	X	X	X
		GP role is minimal	X	X	X
		GP is peripheral			X
		Hiding knowledge	X		
Roles in consultation		Doctor-patient	X	X	X
		Collaborators	X		X

What this data does not show, however, is that during interview administration, some participants used others' comments and experiences as a springboard for their own comments and stories. While this is a clear indication of social influence on expression of individual experience in diabetes self-management, it is, however, unclear whether participants would also raise these issues in one-on-one interviews.

8.5 Summary

Participants demonstrated a sound understanding of the activities of diabetes self-management and the reciprocal dynamics of diet, exercise and blood glucose levels, although not all participants were able to view this effect through blood glucose testing. Managing diabetes through lifestyle intervention (with or without oral medication) was the preferred method of diabetes self-management and a cause of pride for participants. In fact, participants expressed their identity through diabetes management and perceived success and failure in diabetes control through their ability to regulate their diet, perform exercise and avoid insulin. Some misinformation in the causes and management of diabetes was evident among participants even though they had attended diabetes education.

Participants saw self-efficacy and psychological control as being central to diabetes self-management. Eating a healthy diet, exercising, testing blood glucose levels and taking medications were all dependent on having a belief in one's own ability to be able to succeed in performing these behaviours, even when circumstances were difficult.

Participants linked this notion of psychological control to an attitude of acceptance.

People with diabetes must first accept that they have diabetes and then accept responsibility for managing this chronic condition if they are to be successful in diabetes self-management. The experiences reported by participants suggest that they were achieving psychological control in diabetes self-management, although some were struggling to come to terms with the responsibility of self-management in the broader context of their lives.

Participants described experiences in diabetes self-management that demonstrated self-efficacy in performing these behaviours. While they were able to identify barriers to diabetes self-management, such as stress, family and friends and financial limitations, these were generally seen as challenges to be dealt with and overcome. Participants were unable to deal with the causes of stress but they were able to identify triggers and plan ahead and take action in self-management to reduce the impact of stress on blood glucose levels. They developed shock tactics and drew on their psychological resources of self-belief, persistence and determination to turn negative social support from their family and friends into positive social support. Work presented somewhat more of a problem for those who were in employment, mainly through its impact on time and diet planning.

Participants who were receiving a pension and had access to extra subsidies through the Pharmaceutical Benefits Scheme found the costs of medication more affordable than those who were in employment. Limited disposable income, however, meant that participants prioritised financial resources towards those that benefited diabetes self-management, such as oral medications. Even with a seemingly intractable problem such as limited financial resources, some participants were able to demonstrate a high level of self-efficacy by viewing the prioritisation of money to medications and food for diabetes self-management as an act of personal agency and control.

Participants believed that GPs failed to provide them with adequate information to guide them in diabetes self-management. Resources were not tailored to traditional cultural eating habits and did not provide the type of information useful for behavioural change. Participants also identified failures in the way GPs explained diabetes and communicated information about diabetes self-management, particularly during diagnosis. Participants wanted complex information on diabetes. They did not want GPs to simply tell them what to do, they wanted GPs to explain the link between diabetes control and behaviour and provide a rationale for diabetes self-management. The failure of GPs to do this was seen by some participants to account for their poor self-management practices and a worsening of their diabetes.

Participants believed that GPs spent too little time in consultation with them to discuss diabetes self-management in detail. Consultation length acted as a proxy for GP integrity with GPs of high integrity giving freely of their time and GPs of low integrity rushing participants out the door. While some participants were angry at GPs for letting them down in this way, most participants were forgiving of their GPs. These participants found that experiences of poor care sat uncomfortably with the trust they invested in GPs. This exposed a gap between the positive feelings that participants held for their GPs in general and the actual care that they had experienced. In response, participants rationalised their support for their GP, and their own decision-making, by explaining poor care within the structural limitations of GP workload or counterbalancing instances of poor GP care with instances of good GP care. Explosions of laughter concerning comments of GP greed may however suggest an undercurrent of dissatisfaction among participants.

Participants feared losing control of their diabetes care to GPs. Some participants coped with this fear by integrating GP instructions for care and diabetes monitoring into their self-efficacy and control beliefs. Other participants made sure that GPs could not gain control by failing to attend follow-up consultations. Negotiating control of diabetes with GPs involved achieving a balance between self-sufficiency and the need to access GP resources. Once in the consultation, strategies to maintain control of diabetes differed according to consultation style. Participants describing traditional doctor-patient relationships with their GPs were able to maintain control by remaining passive in the consultation. In this way, they did not need to volunteer or discuss any information that they knew about diabetes self-management and risk losing control of their condition. Participants describing patient-centred styles of consultation were able to maintain control by viewing their GP as an expert resource to support them in diabetes self-management.

Sociodemographic influences on participant responses were seen in regard to participants' main source of income or employment status. Participants in employment had less time for dietary control and greater difficulty paying for medications than participants in receipt of a pension with access to the Pharmaceutical Benefits Scheme. It is unclear whether language and country of birth influenced participant responses

because language was largely bounded by group. Even in the English-speaking group interview, where half the participants were born in non-English speaking countries, the lack of identified cultural difference in participant responses may have more to do with group context and social influences than actual cultural beliefs.

The impact of group on participant responses was clearly seen in the amount and depth of raw interview material collected. Group structural and social influences were more conducive to individual expression of attitudes, beliefs and short narratives of experience rather than the expression of in-depth experiences in diabetes self-management. Whether the group context had an impact on the meanings or experiences reported by participants is more difficult to assess. There was a high degree of convergence across groups in the experiences expressed suggesting that the identified themes in diabetes self-management were common; which may not be unusual given their common experience in diabetes education. At the same time, it was clear that social facilitation did play a role in participant responses, particularly in the content or subject matter of their reported experiences; although, again, whether participants may have raised these same issues in individual interview is unknown. There is a strong suggestion of the impact of group context on the expression of individual experience in diabetes self-management although pinpointing exactly where this impact took place in the data is more difficult.

CHAPTER NINE

Interpretation of findings

This chapter presents the findings of the quantitative and qualitative components of the mixed-methods study as they relate to the specific research aim (i.e. aim specific to the sociostructural determinants of diabetes self-management model) and major research questions.

Specific research aim:

To investigate the impact of sociostructural determinants on diabetes self-management using a self-efficacy model.

Major research questions:

RQ 1: How do sociostructural determinants influence diabetes self-management? and
RQ 2: How does diabetes self-efficacy influence the relationship between sociostructural determinants and diabetes self-management?

These findings are set first within the methodological limitations of the research to enable the results to be appropriately interpreted. The procedure and methods for triangulating the quantitative and qualitative findings is then explained, before the actual findings and interpretations are presented.

9.1 Research limitations

This research has a number of limitations, which should be considered when interpreting the findings and comparing these results to other populations and samples. Research limitations are discussed in relation to study design and conceptualisation, and then separately for the quantitative and qualitative study components.

9.1.1 Limitations in study design

There were two main limitations in the design and conceptualisation of this study that may have had an impact on the findings. These were related to the issue of causality and

representativeness of the study sample. The sociostructural determinants of diabetes self-management model is conceptualised within a causal framework and will need to be tested using a longitudinal study design where the temporal effects of one variable on another can be determined. However, because of uncertainties regarding the direction of effects and interactions between model components, it was decided to conduct an exploratory analysis using a cross-sectional design. Even though the statistical terms, predictor, moderator and outcome variable, are used for convenience, causality cannot reliably or validly be inferred from a procedure based on correlation. This means, for example, that it is not possible to unequivocally state from the regression of diabetes self-efficacy on general diet that self-efficacy determines dietary behaviour. Even so, the cross-sectional design was able to provide an adequate test of the sociostructural determinants of diabetes self-management model and predictions regarding moderation.

Strong evidence from intervention studies suggests that self-efficacy does precede diabetes self-management behaviour (171, 186, 188, 190). Furthermore, while the causal link between sociostructural determinants and diabetes self-management is not proven, it is unlikely that diabetes self-management is a major determinant of GP care and the socioeconomic environment, rather than the other way around. There may, of course, be some degree of reverse causation, or as Bandura (73, 161) describes it, reciprocal determinism among model components, particularly when the operationalisations of these constructs are derived from perceptions rather than externally validated phenomena. For example, people who feel discouraged about their diabetes self-management and life in general, may perceive sociostructural determinants to have more of an impact on their behaviour than they actually do. This will be especially the case for people who are depressed and have diabetes; a problem that has been linked to poor self-management (77-79) and glycaemic control (79, 475).

The second main limitation to study design related to the representativeness of this study sample and the potential generalisability of the findings to the broader diabetes population. This study was undertaken in the Fairfield local government area in south western Sydney, an area characterised by high socioeconomic disadvantage and cultural diversity (436). The high proportion of participants in both the quantitative and qualitative components of this study reporting low incomes and overseas birth suggests

that the sample may be representative of the local population; and as a result, the findings are potentially useful for informing health services and diabetes programs in this region. Fairfield is, however, relatively well serviced by diabetes services - Fairfield Hospital, for example, has a diabetes clinic offering free consultations and group diabetes education – and this should be kept in mind when generalising the results and recommendations from this study to other disadvantaged areas. Rural areas in particular, have very poor availability of general practice, diabetes, specialist and allied health services (476): all of which may exert an impact on diabetes self-management and control. Other problems related to the accessibility of healthy and affordable foods for diabetes self-management in rural and remote areas (477) suggests that these results have limited generalisability for non-urban areas.

The study also shows limited generalisability to some population groups known to have a high prevalence of type 2 diabetes, such as Indigenous Australians (6), who were not identified in this research. The relative paucity of information on the diabetes self-management beliefs, behaviours and GP service use of non-English speaking Australians however, with the notable exceptions of those produced by Diabetes Australia (478) and South East Sydney Area Health Service (479, 480), suggests that there may be a case for the cautious application of the qualitative results to the broader population of Arabic-speaking and Vietnamese-speaking people with diabetes living in Australian urban areas and attending diabetes education.

9.1.2 Limitations in quantitative methods

Three main methodological limitations in the quantitative component of this research were identified. These relate to: sample selection; the measurement of constructs; and sample size, power and clustering. There was a clear bias in sample selection, resulting from the initial non-random selection of GPs who gave their consent for their diabetes patients to be included in the study. Despite the large number of Vietnamese GPs working in the Fairfield area, none self-selected to participate in the study, and this meant that Vietnamese patients were significantly under-represented in the sample (in fact, none participated in the survey). This led to a lack of synergy between participants in the quantitative component of the study and the qualitative component in terms of ethnic background. However, this problem could not be rectified at the time because the

Vietnamese-speaking group interview had been conducted prior to quantitative sample selection. The inclusion of a Vietnamese sample in the survey may have altered the results of the quantitative study; given the differences in reporting of attitudes to poor GP care of Vietnamese participants identified in the qualitative study.

Further sample bias related to the subsequent selection of diabetes patients registered with the Fairfield Division of General Practice CARDIAB program and database. Even though diabetes patients were randomly selected from CARDIAB, it is probable that this sampling frame was in itself biased. For example, it is possible that GPs who participate in CARDIAB and volunteer to participate in diabetes research programs, or volunteer their patients to participate, have high levels of interest in diabetes care. It is also possible that diabetes patients who are registered with CARDIAB are ‘good patients’, in that they tend to adhere to diabetes care instructions, attend follow-up and show appropriate outcomes. Australian evidence suggests that general practitioners that participate in structured register and recall systems, such as CARDIAB, are more likely to adhere to diabetes care guidelines than practices that do not (238). This suggests that the survey sample may be skewed toward patients with better diabetes self-management practices and management outcomes than the ‘average’ diabetes patient: particularly when the large proportion of the sample unavailable for survey is also taken into account (see Chapter 6). In fact, this bias is reflected in the quantitative data with all variables showing a positive skew toward higher functioning. This sampling bias necessarily limits the generalisability of results from the qualitative study to broader populations of people with diabetes.

The second quantitative methodological limitation related to measurement error in the measurement of model constructs and the subsequent impact of this on model prediction. Some of this error may be accounted for by the method of data collection. Even though telephone surveys were thought to generate a higher response rate among this sample than other methods, including self-report surveys, telephone surveys raise the possibility of a social desirability bias in participant responding. That is, participants may have responded to questions in a way that they believed were socially desirable or appropriate (139). A social desirability bias may in fact indicate why participants in this

sample, and in other samples for that matter, consistently report high levels of satisfaction with GP care.

Prediction is facilitated by both the reliability of measures and the use of variables that assess similar domains of functioning (73, 412). In this research, both predictor and moderators were a poor fit to the discrete diabetes self-management measures of general diet, exercise and blood glucose testing. A good fit, for example, would be a diabetes moderation model assessing whether the impact of dietary self-efficacy on dietary self-management varied across levels of GP provision of diet plans. Limitations with the use of the global diabetes self-efficacy instrument, rather than a domain-specific measure recommended by Bandura (73), were discussed in the Quantitative Methods chapter. It is likely that this lack of measurement specificity led to smaller correlations between variables and interaction effect sizes than would be achieved using appropriate measures (452). These problems were potentially compounded for the Socioeconomic Barriers to Diabetes Self-Care Scale (449), which was constructed specifically for this research and was not subject to rigorous assessment of its psychometric properties and validity.

The Socioeconomic Barriers to Diabetes Self-Care Scale was constructed using a limited item pool which, while appropriate for factor analysis and the size of this sample (481, 482), limited the accurate assessment of these constructs (412). It could be, for example, that the ten items selected were a poor measure of people's actual experience in performing diabetes self-management in socioeconomically difficult situations; particularly given that item generation was reliant in large part on evidence derived from the United Kingdom. The small item pool also meant that factors consisted of few items and had limited interpretability; although the case for considering small numbers of items as a factor is stronger if the items appear to represent a theoretical construct (481). This was the case with the two-item Information Barriers scale that appeared to assess issues of diabetes information, understanding and comprehension related to the broader concept of diabetes health literacy.

Given the predominance of issues of economic concern in the qualitative data, it is unclear why items that were designed to measure socioeconomic barriers related to cost

failed to load on one factor or load across two factors in ways that made theoretical sense in the factor analysis. It may be that questions of cost relating to GP service use and medication access were confounded by the availability of public health care in Australia through Medicare and Pharmaceutical Benefits Schemes. Alternatively, it may have had something to do with social desirability functions. Questions concerning similar socioeconomic constructs such as income, for example, are renowned for being poorly reported by respondents (483); although this problem was not noted in this research. Issues of item integrity are fundamental to scale construction and factor analytic solutions are only as good as the raw data provided. On this note, normality of individual items greatly enhances factor analysis (452, 482), and all socioeconomic barriers items in this analysis were negatively skewed toward few barriers. While the sample size of 105 was adequate (481, 482) it is likely that it was not of a sufficient size to be robust enough to ride out the difficulties inherent to a skewed distribution. The Socioeconomic Barriers to Diabetes Self-Care Scale should therefore be interpreted cautiously and subject to further development including generation of a larger item pool for data reduction, and assessment of the psychometric properties of reliability and validity.

The third quantitative methodological limitation related to the interrelated concepts of sample size, power and clustering. The quantitative study was underpowered. The achieved sample size of 105 was less than the 119 required to detect significant effects in hierarchical regression analyses with interaction terms, using estimates for sample size based on Jaccard, Turrisi and Wan (439). This again was an effect of the sampling method and use of Fairfield Division's CARDIAB database as the sampling frame.

Even though the initial random sample of 250 CARDIAB registrants was more than sufficient for the required testing, including that needed for control of clustering effects, necessary exclusions due to database inaccuracy and to a lesser extent, patient incapacity, meant that only 145 CARDIAB registrants were actually potentially available for survey. As many of these exclusions could not be performed until actual contact had been made with the diabetes patient or family member, there was no opportunity to resample CARDIAB registrants. Replacement procedures were not considered because the random sample selected (i.e. 250 CARDIAB registrants) was much larger than the sample required for model testing (i.e. 119 respondents). Small

sample sizes can increase errors of statistical inference, particularly type II error or the likelihood of accepting the null hypothesis when in fact, it should be rejected (412). This is of particular concern when constructs are untested or unlikely to be a feature of a large proportion of the population; such as people experiencing socioeconomic barriers to diabetes self-management.

While the achieved sample size was 105, the effective sample size was potentially much lower because of clustering. Clustering of diabetes patients to GP was an unintended side-effect of the sampling method. It potentially meant that any observed differences in patients' ratings of GP care could be attributed to particular GPs rather than interactions between patients and GPs across practices. This has important implications for policy dissemination, such as whether a policy for improving GP-patient communication, for example, should be universally distributed or targeted. Intra-cluster correlation coefficient (ICC) calculations performed on the three outcome variables, general diet, exercise and blood glucose testing showed significant cluster effects; particularly for general diet and exercise. These effects were attributed to the heterogeneity of variance in the full sample, resulting from small and unequal group sizes in the GP variable. Subsequent univariate non-parametric tests showed an impact of GP on general diet and exercise, but not blood glucose testing, commensurate to ICC calculations. ICCs, design effects and associated sample sizes were presented as a guide for interpreting power in statistical analyses but were not added to statistical models.

Study power was further limited by the non-normality of the diabetes self-efficacy and sociostructural determinants variables, all of which were skewed toward higher functioning: the socioeconomic barriers to diabetes self-management variables, in particular, showed significant skew and both univariate and multivariate outliers. Non-normality of predictor and moderator variables substantially decreases the reliability of the interaction term and power of the regression (413, 439, 455); and when all variables are similarly skewed, there is the added risk that statistical sensitivity may be further limited through ceiling effects (452). Taken together, these limitations suggest that the quantitative component of this study was significantly underpowered; making it difficult to determine whether an absence of an effect of socioeconomic resources on

the diabetes self-efficacy and diabetes self-management relation was due to a failure of theory, poor measurement or inadequate power (456).

The impact of power must also be considered in relation to the increased risk of type 1 error in these results. That is, the decision to conserve study power by not applying Bonferroni corrections to alpha levels in multiple comparisons in model testing may have increased the likelihood of rejecting the null hypothesis when in fact it should be accepted (412). This raises the possibility that statistically significant findings were the result of type 1 error and not the results of the study. This interpretation, however, remains speculative and the reader is again urged caution when interpreting these results.

9.1.3 Limitations in qualitative methods

Two main methodological limitations in the qualitative component of this research were identified, relating to: sample selection; and rigour in the non-English speaking group interviews. Participants in the group interviews were identified through convenience sampling, a method that can result in bias (435), and all were currently participating in, or had participated in, diabetes education. Available evidence, including that derived from the Western Australian Fremantle Diabetes Study, suggests that people who are older, have poor English-language skills, have low-incomes, limited education and are from an Indigenous or non-white background are less likely to attend diabetes education (484, 485); and are also more likely to report poorer diabetes self-management skills, diabetes care, and diabetes outcomes than people with diabetes who do attend (484-486). It is likely then, that people who participate in diabetes education have a high level of knowledge, self-efficacy and practical experience of diabetes self-management:

and this appeared to be borne out by the qualitative data. While this limitation necessarily restricts the populations to which these results can be applied, the use of a biased sample proved to be a strength of the study because training in diabetes self-management and exposure to other health professionals placed participants in a unique position to evaluate GP care and reflect on their own self-management practices.

Convenience sampling also led to the use of pre-existing groups for interview. Not all researchers recommend using participants who are known to each other in group

interviews because these groups have shared norms and understandings for interaction, which can affect data collection (461, 487, 488). However, it is also the case that familiarity amongst group members can promote the disclosure of personal experiences and the quality of information provided (489). This study purposively selected diabetes patients for inclusion in the qualitative component based on the representation of language groups in the Fairfield Division CARDIAB database. This decision was seen to be a way of facilitating access to the study for those groups traditionally marginalised in research; that is, people with poor English-language skills. While not a limitation in itself, it is important to note that language groupings do not necessarily reflect cultural identification and care has been taken in this thesis not to confuse these issues.

The second qualitative methodological limitation related to the lower level of rigour performed in the non-English speaking group interviews, in comparison to the English-speaking group interview, which may have had an impact on the accuracy of data collection and verification. Funding limitations meant that it was not possible to conduct the Vietnamese and Arabic-speaking group interviews solely in the language of participants and then translate the transcripts of these interviews into English. This approach would have enabled use of the translation/back-translation method, where materials are translated from one language to another, and then back again, to ensure accuracy and rigour (490). As this was not performed, it is possible that bilingual health workers' interpretation of the group interviews contain some inaccuracies and/or mislabelling of participant experiences (113, 491). It is unlikely that the interpretation process in itself may have affected participants' expression of their diabetes self-management experiences, because aspects of the process that it can affect, such as group interaction, are unimportant in group interviews (435). Resource limitations also meant that member checking was not performed in the non-English-speaking group interviews. Even though all participants in the English-speaking group interview validated the manifest themes of diabetes self-management identified by the research team, it is acknowledged that this may not have been the case in the non-English-speaking group interviews.

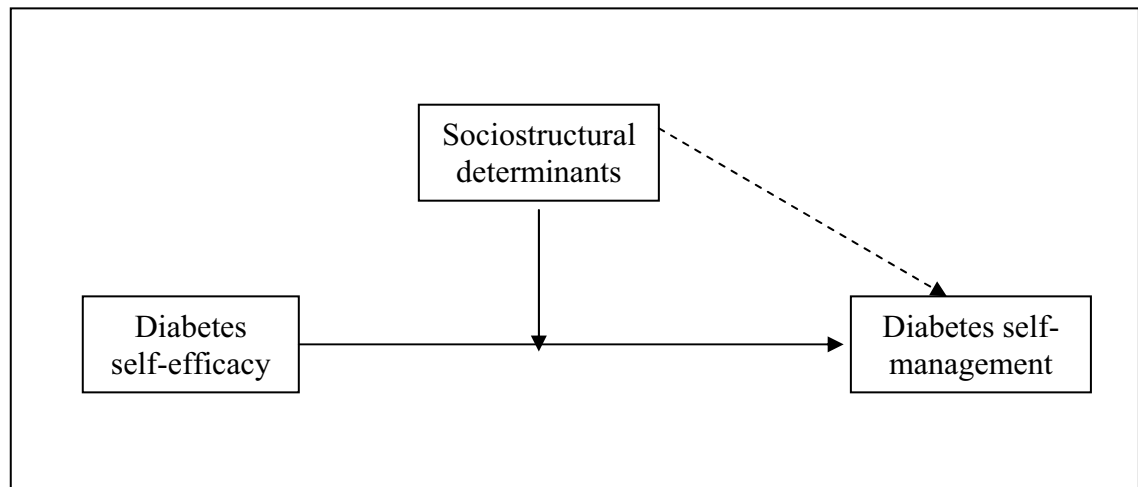
9.2 Analysis of triangulated quantitative and qualitative data

The triangulation of quantitative and qualitative data in this study occurred at the level of the data. Literally, triangulation took place when two different data sources were used to answer overarching empirical questions on sociostructural determinants of diabetes self-management. While there is much attention to research design and data collection in mixed-methods studies (427) there is a relative paucity of practical material on how to rigorously present this triangulated material in discussion. To overcome this limitation, this thesis articulates a structured approach to the presentation and discussion of triangulated data based on model theory and research design priority.

First, findings are organised and discussed in regard to hypotheses arising from the sociostructural determinants of diabetes self-management model. A pictorial representation of this predictive model is reprinted below in Figure 9.1 to assist interpretation. Please note that while this model was conceptualised as a causal model this was not tested in this thesis. Figure 9.1 shows three causal links, expressed and tested as associative links only. These links correspond to the following five hypotheses (the first three of which satisfy preliminary tests of the model):

- 1) There is a positive relation between diabetes self-efficacy and diabetes self-management, so that self-efficacy increases with self-management;
 - 2) There is a positive relation between GP care and diabetes self-management, so that GP care increases with self-management;
 - 3) There is a positive relation between socioeconomic resources and diabetes self-management, so that socioeconomic resources increase with self-management;
 - 4) GP care moderates the relation between diabetes self-efficacy and diabetes self-management, so that the relation is strengthened for high quality GP care and weakened for low quality GP care; and
 - 5) Socioeconomic resources moderate the relation between diabetes self-efficacy and diabetes self-management, so that the relation is strengthened for high levels of socioeconomic resources and weakened for low levels of socioeconomic resources.
-

Figure 9.1
Sociostructural determinants of diabetes self-management model



—→ Explicit hypothesised associative link

----→ Implicit hypothesised associative link

Second, findings are presented within model predictions according to design priority. Quantitative methods were assigned priority in this research and are therefore presented first for conceptual analysis (see Chapter 3). The following four guides were adhered to in structuring the interpretation of findings:

- quantitative findings were used as the primary data source in assessing and interpreting model predictions;
- qualitative findings were used to illuminate, or give greater understanding to, quantitative findings;
- quantitative findings were not dependent on qualitative findings for interpretation; and
- qualitative findings that informed model design and utility were presented even when they were in conflict with quantitative findings.

9.2 Diabetes self-efficacy and diabetes self-management

Hypothesis 1: There is a positive relation between diabetes self-efficacy and diabetes self-management, so that self-efficacy increases with self-management

The quantitative data appeared to support this hypothesis: higher levels of diabetes self-efficacy were related to higher performance of diabetes self-management activities. People who reported higher levels of diabetes self-efficacy also reported higher levels of general diet, exercise and self-monitoring of blood glucose over a weekly period. This finding adds to the growing body of existing research demonstrating the link between diabetes self-efficacy and diabetes self-management (81-86, 169). The somewhat skewed distribution of the self-efficacy variable toward higher functioning suggests that this linear relation holds even among a group of people with relatively 'robust' levels of diabetes self-efficacy. General diet showed the strongest relation to diabetes self-efficacy while exercise and self-monitoring of blood glucose showed minimal relations. This finding may reflect the greater specificity and attention given to diet-related questions in the diabetes self-efficacy measure overall. For example, while the Diabetes Self-Efficacy Scale (444) contains five questions specific to diet, there are only two questions specific to exercise and one specific to self-monitoring of blood glucose (Appendix B). The demonstration of strong relations between self-efficacy and behaviour is dependent on accurate measurement of constructs representing similar questions or domains of functioning (73, 159). The low correlations between diabetes self-efficacy and exercise and self-monitoring of blood glucose should be seen in part as a reflection of the low specificity of the global self-efficacy scale in predicting these domain-specific behaviours.

The qualitative data showed that people in diabetes education viewed self-efficacy and psychological control as being central to diabetes self-management. This strong theme emerged from the data even though there were no specific questions or prompts related to psychological control. Participants did not use the term self-efficacy but alluded to this construct through their experiences and beliefs in the importance of a 'very strong mind' in overcoming barriers to diet control and exercise. This was demonstrated in particular through participants' experiences in 'training' family members and friends in methods to provide them with positive social support in performing diabetes self-management. Compatible with self-efficacy theory, participants' stories showed that highly efficacious people are persistent, motivated and resilient in maintaining behaviours. They are not easily discouraged by failures and are adept at using different strategies and resources to achieve their aims. Putting substantial effort into training

family and friends to support diabetes self-management has significant additional benefits, many of which likely function to reinforce self-efficacy. In a meta-analysis of 122 studies from 1948 to 2001, DiMatteo (492) showed moderate significant relations between adherence to medical treatment (i.e. medication adherence and adherence to medical instructions) and practical and emotional social support, family cohesiveness and low levels of family conflict. Practical social support in particular, that is, the quality of relationships rather than just the presence of others, was strongly related to adherence to medical treatment (492).

Despite the importance of self-efficacy in producing behaviour, lay understandings of this construct in diabetes self-management have not been an explicit focus of previous research. Most qualitative research has conceptualised psychological control as a method of coping with diabetes or a way of categorising people according to their success in glucose control (102, 103, 107). The relative neglect of self-efficacy in qualitative data is likely related to the specificity of the self-efficacy construct and the difficulty in untangling this concept from other more global psychological constructs in narrative data. In their qualitative study of 44 individuals with diabetes, Savoca, Miller and Quandt (107), for example, were unable to find discrete references to self-efficacy among participants' experiences of diabetes self-management but they did find reference to what they believed was a global concept of efficacy or perseverance that determines diabetes control.

People do not tend to describe their experiences within specific domains of functioning unless they are directed to do so. Identifying the construct of self-efficacy in qualitative data requires examining the narrative for exemplars of experience where people highlight strategies used to overcome barriers to diabetes self-management behaviours. In this way, the data is examined not just to describe the attributes of individuals (e.g. copers, perseverance) but also to identify demonstrations of these attributes, and the strategies used to attain them. This approach potentially increases the utility of qualitative research in informing the components of diabetes self-management intervention.

9.3 Sociostructural determinants of diabetes self-management

9.3.1 General practice-based determinants

Hypothesis 2: There is a positive relation between GP care and diabetes self-management, so that GP care increases with self-management

The quantitative data appeared to support this hypothesis. There was a relation between quality of GP care and performance of diabetes self-management activities; although this relation differed according to the domain of diabetes self-management and GP care.

People with poor access to GP care also reported poor general diet and poor self-monitoring of blood glucose behaviours. People who reported poor communication with their GP also reported poor adherence to a general diabetes diet over a weekly period.

These results suggested that poor access to GP care and GP communication may have acted as a barrier to general diet and self-monitoring of blood glucose, but not exercise, which was unrelated to either quality of GP care domain. This finding is consistent with

a growing body of research documenting the impact of GP care on diabetes self-management behaviour (93-97, 119). One recent path analytic study of 752 patients with type 2 diabetes, for example, demonstrated a relation between both general and diabetes specific patient-provider communication and diabetes self-management behaviours, including diet, exercise, medication and self-monitoring of blood glucose (97). Furthermore, these relations between GP care and diabetes self-management activities were demonstrated when age, gender, marital status, income, ethnicity, medication regimen, and number of comorbid conditions were controlled.

The study finding that GP care was related to diet and self-monitoring of blood glucose but not exercise runs contrary to previous research. Exercise for diabetes patients has however, until recently, been relatively unsupported in Australian general practice and the broader health system. This reflects an international trend where principles for diabetes self-management have historically emphasised diet at the expense of other self-management behaviours (119). A key function of general practice is managing referral to other health services. While Australian GPs have been able to refer diabetes patients to endocrinologists, dieticians and diabetes educators, for example, to receive

instruction in diabetes self-management, they have been unable to refer patients to publicly funded or subsidised health professionals dedicated to promoting physical activity, such as exercise physiologists, until changes made to Medicare in January 2006 (257).

Awareness of the role of exercise physiologists and access to their services has increased only recently as a result of the general practice SNAP (Smoking, Nutrition, Alcohol and Physical Activity) program (493). This interpretation of the data, therefore, suggests that the observed relations between GP care and diabetes self-management may be, in part, a function of GPs' referral practice, and the ability of the broader health system to support the discrete diabetes self-management practices of diet, exercise, and self-monitoring of blood glucose. Effective diabetes care results from a dynamic interplay between patient, GP and systemic health system factors (267). The influence of the broader health system on diabetes self-management is a hidden but potentially significant factor in this study.

As with the measurement of self-efficacy, measurement of quality of GP care showed a skew toward higher ratings within a constricted score range. 'Poor' GP access or GP communication should then, in this case, be seen as a rating of satisfactory, but not exceptional care. Even among people who are satisfied with their access to GP care and level of GP communication, there exists a gradient in care that functions with a gradient in dietary self-management and self-monitoring of blood glucose. High levels of satisfaction with GP care identified using the General Practice Assessment Survey have been demonstrated previously (494). Rating scales tend to be poor discriminators of health care quality and can mask instances of suboptimal care (419, 420). Even so, Collins and O'Cathain's (495) study of the qualitative difference between individual ratings of 'satisfied' and 'very satisfied' in health care suggests that even at this high end, seemingly similar ratings represent meaningful gradations of care.

The qualitative data suggested how poor GP care might function as a barrier to diabetes self-management. Both access to GP care and GP communication appeared to have an impact on diabetes self-management through the availability of good quality diabetes self-management information. Poor access to GP care in the form of brief consultation

times functioned as a barrier to diabetes self-management by providing people with less opportunity to ask questions and receive detailed information on the performance of self-management activities. Shorter consultation times have been shown to limit the transfer of health promoting information and constrain dialogue initiated by patients relevant to their illness (496-499). Furthermore, brief consultations are more common for Australian patients attending practices located within disadvantaged areas (324, 499). While some group interview participants were able to attribute poor access to GP workload, as has been demonstrated in other qualitative studies (500), others perceived brief consultation times as a mark of disrespect. Given that a lack of trust in health institutions impedes use of health services (501), this belief potentially made use of GP care a greater impediment in the future.

Poor communication of recommendations for diabetes self-management has been noted in US research, with the quality of communication varying enormously across physicians (97, 269, 270). Poor GP communication in this research appeared to function as an impediment to diabetes self-management through the provision of poor quality oral and written information. Poor quality information lacked both sufficient prescriptive detail (e.g. culturally-appropriate dietary guides) and a clear rationale (e.g. how diet affects blood glucose levels) for behavioural change, leading people to continue poor self-management practices and underestimate the seriousness of diabetes. Perceptions of diabetes as being a non-serious condition have been identified as a barrier to good diabetes outcomes previously (102-104); although it has not been clear how these problems manifest. Poor GP communication is thought to interfere with patients' ability to understand their illness and make informed decisions about future care (502). The data from this study suggests that the mechanism underlying these beliefs about the seriousness of diabetes may be related to poor information provision from GPs, and most probably, the health system more widely. While GPs have identified patients' inability to perceive the seriousness of diabetes as an impediment to diabetes care and outcomes (102, 267), they are less clear about their role in the development of patient beliefs (265).

9.3.2 Socioeconomic determinants

Hypothesis 3: There is a positive relation between socioeconomic resources and diabetes self-management, so that socioeconomic resources increase with self-management
--

This hypothesis did not appear to be supported by the quantitative data. There was no relation between socioeconomic resources and the three reported self-management behaviours, diet, exercise and self-monitoring of blood glucose. In fact, the minimal correlations between the socioeconomic barriers scales, Place Barriers and Information Barriers, and the three diabetes self-management outcome measures suggest an independence of these variables and constructs. This suggests that even if a person did report a high level of place barriers to diabetes self-management, such as unsafe exercise environments and poor access to affordable foods, this did not in any way impact on their reported activities of diet, exercise or self-monitoring of blood glucose. This finding appears counterintuitive, particularly when compared to research demonstrating clear links between neighbourhood deprivation and both low levels of physical activity (334, 335, 342), and unhealthy food purchasing behaviours (177, 336, 337, 339). It may be that this study failed to find an effect of socioeconomic resources on diabetes self-management because the test of the model was underpowered. This problem was potentially exacerbated by the lack of score variability on both the Place Barriers and Information Barriers measures. Like the other variables, the two socioeconomic barriers scales showed a negative skew toward 'higher functioning' and lower levels of place and information barriers.

The limitations in psychometric construction and development of the Socioeconomic Barriers to Diabetes Self-Care Scale were discussed above. A problem specific to the Information Barriers scale was the specificity of questions developed to assess the broader concept of health literacy and the transfer of information from doctor to patient in health systems. This scale measured individual's self-reported assessment of their understanding of diabetes information provided by their doctor. While this assessment has important implications for quality of care and the effectiveness of GP-delivered interventions, it may not necessarily impact on diabetes self-management if people are able to obtain information to direct and support their self-management behaviours elsewhere. That is, people who do not understand the written or oral information on diabetes provided by their doctors can gain this information from friends and family, the media, the internet, library books written in different languages, diabetes associations and groups, and diabetes education provided by diabetes educators, nurses, and ethnic

health workers. Participants in the qualitative group interviews reported use of all of these information sources in supporting their diabetes self-management.

It may be that the Place Barriers scale failed to predict diabetes self-management because it was measured differently to other research. Place Barriers measured individuals' perceptions of the extent to which variables assumed to impact on diet and exercise behaviour, actually impeded these activities. Most research demonstrating a link between place and lifestyle behaviours in general populations however, use population level statistics to predict food purchasing behaviour and physical activity with area-level socioeconomic indices, whilst controlling for myriad individual influences (334, 338-340). These studies not only have significantly greater power than this research, but to avoid the ecological fallacy, they should really only apply to research conducted at the ecological and not individual level. Studies conducted at the individual and ecological level on the same issue, such as the relation between socioeconomic position and health for example, have been shown repeatedly to derive different findings (503).

Unlike the quantitative data, the qualitative data clearly showed an impact of socio-economic resources on diabetes self-management through access to limited financial resources; a result that has been demonstrated previously in both quantitative and qualitative research (90, 92, 105, 350-352, 354-356). Chronic illness presents a considerable financial burden for individuals and families (360). Workers on low-incomes without access to extra 'pensioner-only' subsidies through the Pharmaceutical Benefits Scheme (PBS) in the qualitative study, had limited finances with which to buy expensive diabetes medications, as did those participants who were receiving a pension but had exceeded the PBS safety net because of co-morbid conditions requiring medication. Even for people with access to benefits and welfare support, the high cost of healthy foods, in particular vegetables, made adherence to an appropriate diabetes diet difficult.

One major reason for this discrepancy between the quantitative and qualitative data was that each approach used different methods and therefore accessed different information. While medication use and financial limitations appeared to be salient issues in diabetes

self-management for people in the group interviews, these issues were not explored in the diabetes survey. As previously noted, the factor analysis failed to derive a meaningful scale concerned with financial limitations, including cost of medications. Rather than being a limitation of the research however, this finding illustrates the very function of mixed-methodologies and the strength and utility of this approach (419, 425, 426). That is, essential data that would normally be ignored or excluded by one approach is captured by the other for analysis, leading to a richer understanding of the complexities of diabetes self-management.

The qualitative data suggested that the impact of limited socioeconomic resources on diabetes self-management was buffered to some extent by access to government welfare support (e.g. age or disability pension, housing assistance) and free and/or subsidised access to needed diabetes health and self-management resources (e.g. PBS, Health Care Card, Medicare, National Diabetes Services Scheme). The importance of safety nets in protecting health have been noted previously (504, 505). This raises the possibility that a person with access to government health benefits and welfare support has the potential to perform the fundamentals of diabetes self-management, even if they only have meagre socioeconomic resources as disposable income. This may be especially the case for aspects of diabetes self-management that can only be accessed through health institutions and structures, such as insulin and glucose testing strips. It may also only be appropriate to those people with diabetes who are financially secure, and own their own homes for example, even though they rely on a pension as their main source of income.

Many people receiving government welfare benefits in Australia struggle to afford basic items for living such as food and clothing (360, 506). Disposable income can be so limited for people receiving pensions that seemingly inconsequential rises in service charges can impede access to needed health resources. For example, a \$6.50 charge for pension holders attending physiotherapy and podiatry in Victorian community health centres resulted in many pensioners going without needed services (506). The impact of increased user charges on accessibility is currently of great concern in Australia, and rural areas in particular, where Medicare bulk-billing for GP consultations is being increasingly replaced with patient co-payments and out-of-pocket costs (230). A similar

concern exists with potential increases in co-payments for PBS medications, which could result in poorer outcomes for low-income earners (504).

Increased expenses for needed services can have a pervasive impact on the lives of people with low-incomes. Several studies of pensioners and low-income earners have shown that people may pay for needed services by going without so-called ‘discretionary items’, such as food (105, 354, 359). Similarly, participants in the qualitative component of this study revealed that they make trade-offs between needed resources in order to perform diabetes self-management. They shift financial resources towards diabetes medications and healthy foods, and away from other items they require, including treatments for other conditions. This strategy to support diabetes self-management at the expense of other needs may have substantial implications for a person’s overall health. It may also hide the potential impact of socioeconomic barriers on diabetes self-management. This interpretation of the data suggests that the full impact of limited socioeconomic resources on diabetes self-management may be masked for people who have access to government subsidised diabetes resources and have the strategic decision-making ability to prioritise and distribute their limited financial resources towards diabetes self-management. This hypothesis derived from the qualitative component of this exploratory study deserves further attention and may prove to be more fruitful in understanding socioeconomic barriers to diabetes self-management than a focus on place and information barriers; even given their acknowledged limitations in this research.

9.4 Moderation by sociostructural determinants

9.4.1 General practice-based moderation

Hypothesis 4: GP care moderates the relation between diabetes self-efficacy and diabetes self-management, so that the relation is strengthened for high quality GP care and weakened for low quality GP care

The quantitative data appeared to lend partial support to this hypothesis: GP care moderated the relation between diabetes self-efficacy and self-monitoring of blood glucose, but not diet or exercise. High quality GP care (access and communication) acted as a synergistic moderator of self-efficacy and self-monitoring of blood glucose:

that is, it exacerbated the effect of the predictor on the outcome (507). That there was a relatively low level of clustering to GP for this outcome variable and no impact of GP on self-monitoring of blood glucose in univariate analyses suggests that these results may have occurred across GPs, and as a result, may not be related to the consulting styles or practices of particular GPs over others; although this interpretation remains speculative. The relatively robust effective sample size and model power for self-monitoring of blood glucose does, however, potentially explain why a moderation effect was demonstrated for this diabetes self-management behaviour but not diet or exercise behaviours. It may also be the case (taking the finding as valid) that diabetes self-efficacy functions relatively independently of GP care in producing diet and exercise behaviours or, alternatively, that diabetes self-efficacy exerts a stronger influence on these lifestyle behaviours than GP care.

The quantitative data suggested that people with high self-efficacy and high access to GP care also reported high levels of self-monitoring of blood glucose. This same pattern of results was demonstrated for moderation by GP communication. This observed synergistic moderation by high quality GP care suggests that high GP care reinforces existing high levels of diabetes self-efficacy in producing self-monitoring of blood glucose. This likely occurs in two ways:

- 1) GPs directly impact on the sources of patient diabetes self-efficacy through verbal persuasion and encouragement in performing behaviours, and providing patients with physiological feedback for judging the effectiveness of their self-monitoring of blood glucose, such as HbA1c - both of which contribute to feelings of success and efficacy; and/or
- 2) People with high diabetes self-efficacy are able to elicit pertinent information from trusted GPs to self-reinforce their own efficacious beliefs and mastery of self-monitoring of blood glucose.

Given that this study was unable to test causality, it is also likely that while high self-efficacy and high GP care may produce high levels of self-monitoring of blood glucose, the performance of successful self-management behaviours may also produce stronger

feelings of self-efficacy and better quality GP care, or attributions of GP care. This seems particularly likely in an 'established system' of diabetes self-management where people have been diagnosed for some time and are working to maintain appropriate behaviours rather than embark on lifestyle change.

The facilitation of already existing high levels of diabetes self-efficacy by high GP care is likely to occur through a patient-centred approach to consultation. Patient-centred care emphasises the communication of relevant health information and patient-GP partnerships in decision-making for diabetes management (281-283). It thus requires both appropriate methods of communication and accessibility, including flexibility in consultation times and length. Patient-centred care functions best when GPs or other health workers have the ability to both elicit patient beliefs about diabetes self-management and enable patients to effectively and reliably perform these behaviours (281). This patient-centred model of care was perhaps best illustrated in the qualitative data by the experience of P9, who perceived his GP as an expert resource in diabetes self-management who was there to support him in making the right decisions. P9 felt that he could discuss any issue in diabetes self-management with his GP that he liked, including new research and treatments for diabetes that he had heard about in the media. In return, P9 perceived that his GP did not make him feel rushed and consistently gave him considered and thoughtful advice in making care decisions.

It is probable that GPs respond to their highly efficacious patients with enthusiasm, encouragement and resources to promote even greater patient autonomy in diabetes self-management. GPs believe that patients should take greater responsibility for their health and management of diabetes (265). Self-efficacy theory shows that people seek out experiences that confirm and strengthen their efficacy beliefs and avoid experiences that do not (73). GPs may therefore preferentially allocate resources such as consultation time and patient centred communication to patients who show high self-efficacy in diabetes self-management because they have the greatest capacity to benefit from these resources and in turn, are best able to reinforce GPs' own feelings of efficacy and success. Such an approach may actually be encouraged by methods that are currently popular in GP education for behaviour change, such as training in motivational

interviewing using the “Stages of Change” technique where patients who are “not ready” are given brief information only.

GPs may be more likely to act on the sources of patient self-efficacy in diabetes self-management by, for example, using HbA1c results and other physiological measures as a learning tool and spur for patient encouragement: an approach that has demonstrated positive impacts on glycaemic control (508). Here it is interesting to speculate on how self-efficacy or the sources of self-efficacy may relate to the primary care construct of patient enablement, or patient perceptions that they are better able to manage their condition following consultation. Patient enablement has been associated with GP provision of health promotion, a positive approach to consultation and GP interest in the effect of illness on a patient’s life (280). It may be that the patient enablement construct acts as a mediator between GP care and patient self-efficacy in producing behavioural outcomes.

While GPs may influence patient self-efficacy, it is also probable that people who are highly efficacious are increasingly capable of asking more detailed questions and accessing more sophisticated information on diabetes self-management from their GPs.

While self-efficacy theory does not support the notion of a global self-efficacy construct, it does support the generalisation of efficacy beliefs through mastery experiences (73). As Bandura (73) points out:

“the development and exercise of capabilities would be severely constricted if there was absolutely no transfer of efficacy beliefs across activities or settings” (p.50).

If this were the case, people would need to develop new efficacy beliefs for each new activity or situation they encountered. Bandura (73) identifies six processes through which mastery experiences can produce generalisation of efficacy beliefs:

Similar subskills are required across mastery experiences;

Skills are codeveloped across different domains;

Higher order cognitive self-regulatory skills are generalised across activities;

Coping skills that enable people to exercise control over threats to skill development are generalised across people, activities and situations;

Diverse activities are cognitively structured to identify commonalities; and
Powerful mastery experiences produce a pervasive transformational restructuring of efficacy beliefs.

It may be then that people who have demonstrated mastery in self-monitoring of blood glucose, for example, generalise these efficacy beliefs to eliciting information on this self-management behaviour from GPs. That people who are highly efficacious in diabetes self-management may have the capability to elicit information from their GPs and act as partners in diabetes care, does not, however, necessarily mean that they will do so. P4 in the qualitative study, for example, was unwilling to share any information about diabetes self-management with her GP for fear of losing control of diabetes management. This example highlights the importance of the GP role in supporting patients in diabetes self-management. It is likely that optimal diabetes self-management behaviours are produced by a 'fit' between high patient self-efficacy and high quality of GP patient-centred care. Note that this 'fit' does not necessarily require GP-patient concordance in treatment outcomes or decision-making, although this may in fact occur. Fit refers more to a reciprocal interaction between efficacious patients and enthusiastic GPs who reinforce each other in promoting appropriate behaviours and producing favourable diabetes outcomes.

While good quality GP care was shown to increase self-monitoring of blood glucose in the presence of high diabetes self-efficacy, the quantitative data also suggested that it had a minimal or even detrimental impact when self-efficacy was low. That is, people with low self-efficacy and high access to GP care also reported low levels of self-monitoring of blood glucose. As before, the same pattern of results was demonstrated for moderation by GP communication. This observed synergistic moderation suggested that high GP care in this case reinforced existing low levels of diabetes self-efficacy in producing self-monitoring of blood glucose. This was an unexpected finding that has not been produced in previous literature. There are two possible interpretations of this finding:

People with low diabetes self-efficacy abdicate responsibility for self-monitoring of blood glucose to their GPs, who they trust will act as 'proxy agents' in managing their blood glucose testing on their behalf; and/or

GPs maintain rapport with their diabetes patients who demonstrate low diabetes self-efficacy by either, not actively encouraging self-monitoring of blood glucose or conducting blood glucose testing for them.

People seek to exercise control over behavioural domains in which they expect to have some impact. If they expect little impact, people may turn to others within their broad social network to act as 'agents' on their own behalf (73). Proxy agency is a method for accessing needed resources and outcomes through other people. Like other methods of social networking and support, proxy agency may have both positive and negative consequences. Proxy agency can have positive consequences by enabling the person to gain needed resources and behavioural outcomes whilst freeing up their own time and personal resources to focus on changing what they can control themselves (73). This conceptualisation of proxy agency is analogous to the community-level notion of linking social capital, where people link to more powerful others in meeting needs and obtaining resources that they would not be able to obtain in other ways (509).

Proxy agency may have negative consequences, however, if a person abdicates responsibility for behavioural domains over which they do objectively have control and becomes dependent on others for needed resources and outcomes. It appears likely that people who have low levels of diabetes self-efficacy also believe that they have little control over self-monitoring of blood glucose, and as a result, abdicate responsibility for this diabetes self-management activity to their GPs who they trust and hold in high regard. This interpretation of the data then suggests that people with low diabetes self-efficacy use their GPs as proxy agents in acquiring tests of their blood glucose levels. Trust in GPs however may not necessarily translate into good care. The qualitative data showed a very clear gap between participants' feelings of trust and respect for their GPs and instances of poor GP care, particularly in regard to GPs' failure to provide appropriate informational resources to support diabetes self-management activities. This gap between trust and poor care, and patients' reluctance to relate these negative care experiences has been demonstrated previously (421, 510, 511).

There is some evidence to suggest that, as in this study, people who report poor diabetes self-management practices also report more favourable ratings of health care providers. O'Connor et al (104), for example, conducted a qualitative study of 34 people with type 2 diabetes who participated in a four-day diabetes education program in the United States. They found that participants who responded poorly to the program (i.e. they showed less than 20% improvement in blood glucose levels following training) also showed both poorer diabetes self-management practices and more positive views of their health care providers. While this study did not assess self-efficacy in diabetes self-management, there was evidence that the group labelled “negative responders” were less strategic and flexible in their diabetes self-management regimen than so-called “positive responders”.

This study (104) raises the issue of causality and whether people with low self-efficacy first experience failure in diabetes self-management and then look to GPs or other health care providers for diabetes control, or whether they look to GPs for control and then experience failure in diabetes self-management. Using qualitative methods, Parry et al (308) interviewed 40 people newly diagnosed with diabetes on three different occasions over a yearly period to examine beliefs regarding disease causation and management. They found that people who located the main cause of their diabetes outside of themselves were also more likely to look to health professionals as the primary source of their diabetes management and control. This study places control beliefs prior to diabetes self-management behaviour and a reliance on GPs for diabetes management. This has implications for the development of self-efficacy because beliefs about the controllability of health states can impair the processing of efficacy information (73).

It is likely that GPs respond to high levels of patient trust and patronage in ways that facilitate trust and continue to foster these relationships. GPs may respond to a patient who does not wish to test their blood glucose levels by, for example, testing it regularly for them or focussing on other aspects of diabetes self-management that the patient can achieve (or the GP cannot achieve themselves, such as diet and exercise): a practice that is sometimes referred to as ‘miscarried helping’ (512). This suggests that GPs may

sometimes base their care decisions on aspects of the consultation or patient that have little to do with medical knowledge. There is, in fact, some empirical precedent for this interpretation. GPs have been shown to prescribe medications, make referrals and even forgo evidenced-based medicine to protect and foster doctor-patient relationships (513-516). Some care decisions appear to be based solely on GPs' perceptions of patient expectations for care rather than actual consultation behaviour (515, 516). GPs place great importance on patient responsibility in diabetes self-management and feel that they have been unfairly laden with this responsibility for patient behaviour (265). The methods GPs use to promote patient trust may conversely act to promote patient dependence upon the health care system among people with low levels of diabetes self-efficacy.

When GPs withhold information on self-monitoring of blood glucose from diabetes patients or do not actively encourage this behaviour, they effectively prevent patients from developing self-efficacy in this domain of self-management. This 'clinical inertia' (517) may potentially decrease patient autonomy in diabetes self-management and increase patient reliance on health systems. There are times, however, when GPs may deliberately not encourage self-monitoring of blood glucose for legitimate reasons. Self-monitoring of blood glucose can be a somewhat demanding and invasive activity. The diabetes patient may, for example, have a co-morbid condition, such as depression, that will make self-monitoring of blood glucose both difficult and unreliable. Or the diabetes patient may be experiencing stressful and unstable social and economic conditions, such as people who are seeking asylum in Australia, and the GP may not wish to add to their burden. In these situations, a practical approach that emphasises best practice where patients are likely to undertake the behaviour may be warranted (518). This decision, however, has to be weighed carefully and should be reconsidered regularly. Self-monitoring of blood glucose likely strengthens and reinforces self-efficacy in other domains of self-management by giving diabetes patients the opportunity to see the daily impact of diet and exercise on diabetes control.

9.4.2 Socioeconomic moderation

Hypothesis 5: Socioeconomic resources moderate the relation between diabetes self-efficacy and diabetes self-management, so that the relation is strengthened for high levels of socioeconomic resources and weakened for low levels of socioeconomic resources

This hypothesis did not appear to be supported: the quantitative data suggested that socioeconomic resources did not moderate the relation between diabetes self-efficacy and diabetes self-management. A low level of socioeconomic resources did not impede diabetes self-management even when self-efficacy was high. This is not surprising given that socioeconomic barriers themselves had no impact on diabetes self-management, and that a general condition of moderation is that the moderator should be associated with the outcome variable (456). This finding suggests that people with high levels of diabetes self-efficacy are able to perform diabetes self-management irrespective of socioeconomic barriers, presumably because they are able to draw upon both universal (i.e. Medicare or the National Diabetes Services Scheme) and targeted (i.e. PBS and Health Care Cards) Australian public health schemes, and strategically prioritise their limited resources toward diabetes self-management activities. The qualitative data suggested that people with high levels of diabetes self-efficacy may actually use these strategies to reinforce their feelings of efficacy. For some group interview participants, the very act of prioritising scarce socioeconomic resources in diabetes self-management was attributed to their own efficacy and agency, while for others, resource prioritisation was perceived to be out of their control; a belief that would function to lower self-efficacy further.

Interestingly, while socioeconomic barriers had no impact on diabetes self-management, they did exert an impact on diabetes self-efficacy. Place barriers, that is perceptions of neighbourhood safety and local access to healthy foods, were associated with lower levels of diabetes self-efficacy. Bandura (73, 222) has speculated that socioeconomic conditions may shape agency through their impact on efficacy expectations conveyed by social norms that are enforced by others, maintained by structures and internalised by the person. Health systems and other institutions, for example, as representatives of broader society, function to encourage and reward the behaviour of some people at the exclusion of others (47, 73, 222). McLeod and Kessler (519) hypothesised similar routes to agency in their examination of socioeconomic vulnerability to undesirable life events. They proposed that stressful life events resulting from difficult socioeconomic conditions may exert a socialising influence on people “through the lessons they teach about the potential for mastery and personal control” (p 170).

In fact, there is some evidence that efficacy expectations and agency result from the effects of early socioeconomic conditions. One study found that young people of low socioeconomic position do not aspire to medical school because this role is not expected of them (520). Another study demonstrated that young people of low socioeconomic position are less comfortable with making decisions based on free choice because this is not something that they are regularly afforded (521). These findings suggest that socioeconomic conditions do not just structure access to social, economic and educational resources that create opportunities for a better life, they also promote positive self-perceptions and cognitive flexibility that enable people to take advantage of these opportunities (222, 519). It may be that socioeconomic resources are best investigated as potential causes of self-efficacy, mediated through agency beliefs and expectations. In this way, socioeconomic barriers may be expected to initially impede the acquisition of efficacy beliefs through lowered perceptions of agency, until success in some behavioural domains can be demonstrated.

9.5 Summary

This study explored the application of self-efficacy theory to understanding sociostructural determinants of diabetes self-management in a disadvantaged region of Sydney. Generalisability of these results to other populations of people with diabetes is limited for a number of reasons. Specific methodological limitations relating to sample bias and low power for model testing render the findings of this study exploratory.

Findings that replicate known evidence, such as the positive quantitative relation between diabetes self-efficacy and diabetes self-management, can be stated with some certainty. Other more controversial findings, such as the moderating impact of high quality GP care on low self-efficacy and infrequent self-monitoring of blood glucose, will require further theoretical and empirical investigation.

The quantitative finding that diet, exercise and self-monitoring of blood glucose increased with diabetes self-efficacy replicates other research. The central importance of psychological control and self-efficacy skills in maintaining effective diabetes self-management behaviours was illuminated in the qualitative data. In particular, group

interview participants articulated how they overcame barriers to diabetes self-management by actively training loved ones in how best to support them in managing their own illness. The identification of the self-efficacy construct in narrative data is novel to the method of qualitative inquiry.

The quantitative finding that quality of GP care could improve, or, impede diabetes self-management adds to a growing empirical literature in this area. This study suggested that people with low quality of access to GP care had difficulty keeping to a diabetes diet and self-monitoring their blood glucose levels regularly; while people reporting low quality of GP communication had difficulty keeping to a diabetes diet. The qualitative findings illuminated likely pathways and mechanisms through which poor GP care may impede diet and self-monitoring of blood glucose. Group interview participants revealed that GPs provide poor quality oral and written information on diabetes self-management, and that this problem is made worse by inadequate consultation length.

The quantitative finding that socioeconomic barriers were unrelated to diabetes self-management activities was somewhat surprising given the strength of previous research. This finding was attributed in part to difficulties with model power and the conceptualisation and construction of the Socioeconomic Barriers to Diabetes Self-Care Scale. Qualitative findings in this case suggested a complementary, rather than supportive, interpretation of the quantitative data. Group interview participants revealed that financial limitations impeded access to healthy foods and diabetes medications, although this appeared to be attenuated somewhat by access to Australian government health and welfare support schemes and the individual prioritisation of scarce resources. The quantitative finding that socioeconomic resources did not impede diabetes self-management when self-efficacy was high (or low) was unsurprising given preliminary model findings. The unexpected relation between place barriers and diabetes self-efficacy deserves further investigation.

The quantitative finding that high quality GP care (i.e. access and communication) could act as a synergistic moderator of diabetes self-efficacy and self-monitoring of blood glucose is unique in the diabetes literature. This finding should be considered preliminary, given the methodological limitations. The significant moderation suggested

that high quality GP care may reinforce high levels of diabetes self-efficacy in producing self-monitoring of blood glucose. Two potential mechanisms were proposed for this finding: GPs are able to impact directly on patient sources of self-efficacy, such as verbal persuasion and physiological feedback, through a patient centred-approach to care enabling both sufficient time for consultation and open communication of diabetes management; and people with high diabetes self-efficacy are able to elicit essential information on diabetes self-management from their GPs in self-reinforcing their own efficacy in self-monitoring of blood glucose. The significant moderation also suggested that high quality GP care may reinforce low levels of diabetes self-efficacy in producing self-monitoring of blood glucose. This finding was attributed to proxy agency and the possibility that people with low diabetes self-efficacy abdicate responsibility for their self-monitoring of blood glucose to their trusted and highly valued GPs. It was further speculated that GPs may actually encourage this dependent behaviour in the interests of maintaining rapport.

CHAPTER TEN

Implications for research, policy and practice

The general aim of this study was to examine the sociostructural context in which people with diabetes daily undertake diabetes self-management. This chapter presents the broader implications of study findings for research, policy and practice. These implications must be tempered by the limitations of the present study and should therefore be understood as suggested areas of focus only. Proposed areas of focus build on existing evidence and health system structures in order to strengthen study findings. For this reason, implications for policy are unique to the Australian health care context.

10.1 Implications for research

10.1.1 Self-efficacy theory and research

The sociostructural determinants to diabetes self-management model developed from self-efficacy theory (47, 73, 222) has clear value for investigating health behaviours in difficult socioeconomic circumstances and where people face barriers to accessing the health system. However, the model requires further theoretical conceptualisation and empirical testing if it is to be useful in informing policy and intervention in diabetes self-management or other chronic conditions. In particular, clear conceptualisation of the self-efficacy and health behaviour factors related to socioeconomic and health system conditions will better guide the operationalisation of constructs and performance of predictive models. Are socioeconomic determinants, for example, best measured by ‘place’, such as access to healthy foods and safe exercise areas or ‘people’, such as limited financial resources?

The findings from this study leant only partial support to the structural impediments to diabetes self-management model. There was some support for the importance of self-efficacy in promoting diabetes self-management behaviour, irrespective of cultural background or language spoken. Diabetes self-efficacy appeared to drive behaviour even in the presence of high quality GP care, although this result requires replication. Further research should also investigate the proposed interpretation of this finding: that

constructs of both personal and proxy agency in relation to health care produce diabetes self-management behaviours. Popay et al (522) have used qualitative methods to explore experiences of personal agency and attributions of control among people living in disadvantaged communities. This work may serve as a model in investigating efficacy expectations in diabetes self-management. Furthermore, recent research on the socialisation of health inequalities (523) suggests value in an investigation of cognitive mediators of diabetes self-management and other health-promoting behaviours among people living in difficult and deprived circumstances.

Suggestions for future research in self-efficacy theory arising from this study include:

- Investigating the interaction between high quality GP care and high and low levels of diabetes self-efficacy in producing diabetes self-management behaviours, including the effects of consultation time on both self efficacy and self management behaviours;
- Exploring constructs of both personal and proxy agency of people living in disadvantaged communities in performing diabetes self-management; and
- Exploring self-efficacy as a mediator of socioeconomic circumstances and health behaviours including diabetes self-management.

Given the limitations of this study, further research in self-efficacy theory may best be explored through a randomised controlled trial of self-efficacy-enhancing interventions in diabetes self-management amongst people living in socioeconomically disadvantaged communities.

10.1.2 Diabetes self-management for low-income earners

There was a suggestion in this study that access to Australian public health insurance, subsidies and safety nets (e.g. PBS pensioner subsidies, Medicare and other social welfare support) may buffer the negative impacts of limited financial resources on diabetes self-management. With increasing costs to subsidised medications (504) and co-payments for GP services (230) it is imperative that this ‘hidden pensioner economy’ be explored and its limits documented. Given that this research accessed only those people already in receipt of GP care, and in the case of the qualitative study, diabetes

education, there is a real need to study barriers to diabetes self-management among vulnerable and marginalised populations.

Suggestions for future research in diabetes self-management for low-income earners arising from this study include:

Examining the role of Australian government subsidised public health and welfare schemes in promoting diabetes self-management and other chronic disease self-management practices among low-income earners; and

Investigating the hidden cost of diabetes self-management for low-income earners, including the financial costs of healthy foods and the potential social and health costs of the prioritisation of limited resources for diabetes self-management.

10.1.3 Diabetes care in the health system

There are many studies and published papers investigating access to general practice, GP-patient interaction in the consultation, GP management of diabetes and general-practice based interventions in diabetes care. This research suggests further investigative forays into the impact of poor GP care, particularly in regard to information provision, on patient self-efficacy and diabetes self-management behaviour.

However, there is an urgent need to organise the existing evidence in ways that are useful in directing future research and informing policy in diabetes self-management.

As a first step, researchers need to set GP management of diabetes care within the broader diabetes health care system as a whole (i.e. including allied, specialist and community care) in determining barriers and facilitators to diabetes self-management. These system models should include both government and non-government diabetes support and will inevitably differ across locations (e.g. country or urban versus rural location) and populations (e.g. Indigenous versus non-Indigenous). Foster and Tilse (524) provide a model for this in their system-wide study of access to Australian rehabilitation services for people with traumatic brain injury.

The suggested focus for future research in diabetes care in the health system arising from this study involves:

Examining diabetes care within the broader health care system, including points of patient entry and exit, and opportunities for supporting diabetes self-management at each point.

10.1.4 Mixed-method research in diabetes self-management

It is clear that mixed-methods research has utility for understanding diabetes self-management and investigating complex patient – health care provider interactions in promoting appropriate diabetes behaviours and lifestyle change. However, the application of mixed-methodologies to diabetes self-management research is currently limited by an almost exclusive focus on defining mixed-methods designs and terminology at the expense of the development of practical methods in the synthesis of quantitative and qualitative findings. The suggested focus for future mixed-methods research in diabetes care arising from this study involves:

- Developing practical frameworks for the synthesis and presentation of findings from mixed-method investigations.

10.2 Implications for policy

This thesis posits that behavioural outcomes in diabetes self-management result from high patient self-efficacy and wider health system support including GP reinforcement of patient efficacy expectations and appropriate behaviours. Health systems, therefore, have an important role in facilitating, but not determining, diabetes patient behaviour. It is clear that any diabetes self-management initiative will need to be part of a broader chronic disease self-management policy. Evaluation of the Australian government funded ‘Sharing Health Care Initiative’ suggested that appropriate chronic disease outcomes could be achieved using different intervention and practice models that were flexible and adapted to context (45). Many of these models emphasised patient self-management of chronic conditions; an important consideration given poor integration and coordination for chronic disease programs across the Australian health system (45, 525).

10.2.1 Strengthening patient diabetes self-efficacy

Evidence suggests that self-efficacy in diabetes self-management can be successfully promoted using very different models of intervention (45). However, many of these interventions show an attenuation of the self-efficacy effect over time (158), raising

questions concerning program fidelity. It appears to be a recurrent problem in program design that self-efficacy is viewed as an outcome variable rather than as an agent of behavioural change. If interventions are to promote sustained behavioural change in diabetes, they must explicitly target the four sources of self-efficacy: enactive mastery, vicarious experience, verbal persuasion, and physiological information. Examples of strategies in strengthening the sources of diabetes self-efficacy are presented in Table 10.1.

Table 10.1
Examples of strategies to strengthen sources of diabetes self-efficacy

Source of self-efficacy	Example strategy
Enactive mastery	Structured gradation of skill difficulty to promote skill acquisition and enable frequent experience of success in diabetes self-management
Vicarious experience	Credible peer role models with diabetes model self-management behaviours in face of difficulties
Verbal persuasion	Credible experts in diabetes provide verbal reinforcement of patient behaviours in order to increase diabetes self-management behaviour
Physiological information	Physiological cues and levels of arousal are examined to monitor diabetes states and determine corrective action in diabetes self-management

The suggested focus for policy in strengthening diabetes patient self-efficacy is:

- Programs to promote self-efficacy and sustained behavioural change, irrespective of mode of intervention, should act on the sources of self-efficacy.

10.2.2 Strengthening GP support of patient self-efficacy

Sustainable models of patient behaviour change in diabetes self-management should strengthen GP support and facilitation of patient self-efficacy. Even though GPs are not the main agents of change, they will still need adequate training to effectively support

diabetes patients at different levels of self-efficacy and behavioural skill. The provision of effective support in behaviour change should not be an assumed skill, particularly as there is a risk that GPs without this knowledge may overwhelm diabetes patients and unwittingly reduce self-efficacy in performing diabetes self-management. Training in evidence-based models of health behaviour change, including self-efficacy theory, should be integrated into medical curriculum and Royal Australian College of General Practitioners Continuing Professional Development (RACGP CPD) programs administered through Division of General Practices. This training should be general rather than diabetes specific to encourage the broad uptake, utility and dissemination of skills.

Current Australian general practice guidelines for promoting chronic disease self-management, such as those produced by the RACGP (58) propose patient behaviour change using the Transtheoretical Model (526). This model is structured, easy to follow and can incorporate methods to promote self-efficacy. However, recent evidence, including a systematic review of the effectiveness of the model in behaviour change and stage progression has questioned the validity of this model (527, 528). Bandura (47) has developed a 3-stage self-efficacy model with directions for behaviour change at each level (Table 10.2). This approach may prove to be more fruitful in promoting diabetes self-management and other health behaviours because it acts directly on the mechanism of change, that is, level of self-efficacy, rather than on a descriptive stage presumed to represent readiness for change.

Suggestions for policy in strengthening GP support of patient self-efficacy include:

- GPs and medical students receive training in evidenced-based methods for supporting patient behaviour change using self-efficacy theory; and
 - RACGP guidelines for chronic disease self-management in general practice incorporate methods and strategies for supporting patient self-efficacy.
-

Table 10.2
Level of self-efficacy development and focus of change in diabetes
self-management

Level of self-efficacy	Description and focus of change
First	<ul style="list-style-type: none"> • High self-efficacy and positive outcome expectations • Require minimal guidance and support to accomplish changes
Second	<ul style="list-style-type: none"> • Self-doubts about personal efficacy and likely benefits of actions - give up quickly in the face of difficulty • Require interactive support and guidance through, for example, telephone support
Third	<ul style="list-style-type: none"> • Low self-efficacy and belief that health behaviour is outside personal control • Require significant personal guidance administered through a structured mastery program with graded task difficulty

Adapted from Bandura (2004)

10.2.3 Strengthening GP delivery of diabetes self-management information

It is important that GPs be skilled in the delivery of accurate, relevant and appropriate diabetes self-management information. Qualitative evidence, including that obtained in this study, shows that patients attribute poor diabetes self-management practices and outcomes to GPs' communication of this information at diagnosis (288, 308). The main problem here appears to relate to both the quality of information that GPs provide and the frequency with which they provide it. There is a need for the provision of diabetes self-management information to be integrated into general practice guidelines for routine diabetes management. In fact, the most recent edition of the Australian *Diabetes Management in General Practice 2005/2006* publication (35) has gone some way to achieving this with guidelines for patient nutrition, physical activity and blood glucose self-monitoring. This important step must however be supplemented by accurate patient information on diabetes self-management if these guides are to be useful.

Despite the volume of diabetes patient educational material produced, diabetes patients still report that this material does not meet their needs in diabetes self-management (288, 529). At least part of this problem is related to the fact that people with diabetes differ according to their level of self-efficacy, literacy and cultural background and no one publication can satisfy the needs of all people. It is clear that people with diabetes require access to a suite of diabetes self-management materials that supports their diverse needs in diet, exercise and self-monitoring of blood glucose. These materials should range from basic to sophisticated across different levels of literacy and should reflect, where possible, the dietary and social mores of different cultures. Importantly, they should be structured in ways to encourage, motivate and support the initiation and maintenance of diabetes self-management skills rather than just being a static source of information (47). This suggests that patient information on diabetes self-management may be best accessed through an interactive website which GPs can navigate with their diabetes patients in selecting information unique to each patients' situation. This website may best be hosted and maintained by Diabetes Australia. A possible model for this interactive website exists with the Australian National Breast Cancer Centre website which enables patient information to be tailored to meet individual need (www.breasthealth.com.au).

The suggestion for policy in strengthening GP delivery of diabetes self-management is:

- Diabetes Australia or similar body host an interactive website of diabetes self-management materials that enable GPs to tailor information according to patient self-efficacy, literacy and cultural background.

10.2.4 Strengthening practice capacity for diabetes self-management

Systematic reviews, including those endorsed by the Cochrane Collaboration, show that successful interventions to improve diabetes outcomes in primary care focus on clinician behaviour, practice organization, information systems, and patient education and self-management support (530). Importantly, these interventions are successful only when all initiatives are combined (227), highlighting the fact that programs to support diabetes self-management must be integrated into broader general practice organization for effective chronic disease care. The Chronic Care Model (227, 233) integrates

support for patient self-management and behavioural change within comprehensive chronic disease management including: systems for information management, evidence-based clinical management, practice teamwork and delegation of responsibilities, and population based care including links with community services. These last two are of particular importance for the direct support of diabetes self-management within general practice.

While GPs will need to reinforce patient self-efficacy in diabetes self-management during regular follow-up consultations for evidence-based diabetes care, they may be able to delegate some of this role to practice nurses. Practice nurses should support GPs in providing more focussed, ongoing, long-term self-efficacy support in assisting patients in overcoming barriers to behavioural change. Practice nurses should not, however, replace health professionals with existing responsibilities for diabetes self-management education, such as Diabetes Educators, but should work with these health professionals in supporting patient behavioural change. This highlights the important role that practice nurses, and other practice staff, such as practice managers, have in linking the practice with the broader health and community care system. While structures exist to support linkages between GPs and other health professionals in diabetes care, such as the Medicare Chronic Disease Management items facilitating multidisciplinary team care (257), there are no structures or systems to support linkages with community-based services, even though these services may provide essential support to diabetes patients through, for example, diabetes self-management support groups and exercise classes. There is an urgent need for practices to have access to up-to-date local directories of existing community health services and resources that can support diabetes self-management. The identification of these community-based resources would be best supported by Divisions of General Practice.

The suggestion for policy in strengthening practice capacity for diabetes self-management is:

- Divisions of General Practice support the development and dissemination of continuously updated local directories of community-based health resources for diabetes self-management.
-

10.3 Implications for practice

Implications of the findings of this study for practice refer explicitly to GP care and as a result, draw upon current Australian policy and structures for chronic disease care within general practice. As a general suggestion however, it seems clear that GPs should practise patient centred care if they wish to meet the needs of their patients in diabetes self-management. This is because patient-centred care is concerned with diabetes self-management as viewed by the patient and is supportive of patient autonomy and agency in behavioural change and regulation. Aside from adopting this more facilitative way of working in the consultation, there are some very practical strategies that Australian GPs can implement now to support their patients in diabetes self-management.

10.3.1 Provide timely information on diabetes self-management

Evidence from qualitative studies, including the reports of participants in this study, have shown that people with diabetes want to receive information on diabetes self-management at diagnosis (292, 308). Furthermore, patients have attributed poor diabetes self-management practices during the initial stages of their condition to a failure to receive this information when needed (288, 308). Suggestions for GP practice in providing timely information on diabetes self-management include:

- Provide patients with diabetes self-management information during the consultation in which the patient is diagnosed with diabetes (or as soon as possible after); and
- Establish a procedure where the practice receptionist books a longer consultation to optimise the transfer of diabetes self-management information.

10.3.2 Provide opportunities for the development of diabetes self-management skills

Available evidence indicates that the vast majority of people with diabetes do not receive diabetes education or training in self-management skills (486). Furthermore, evidence from Australian diabetes registers suggests that GPs rarely refer their patients to diabetes educators or dieticians (246). Referral of patients to services that promote diabetes self-management is now supported by Medicare Chronic Disease Management Allied Health items where eligible patients can access five service visits with, for

example, diabetes educators, dieticians and/or exercise physiologists (257). The involvement of health professionals with responsibility for diabetes self-management education in multidisciplinary diabetes care is facilitated through Medicare Team Care Arrangements which provides GPs with rebates for the coordination of chronic care.

Suggestions for GP practice in providing opportunities for the development of diabetes self-management skills include:

- Refer diabetes patients to public hospital group or individual diabetes self-management education soon after diagnosis;
- Refer eligible diabetes patients to allied health services under the Medicare Allied Health scheme; and
- Involve an accredited diabetes educator in the multidisciplinary care of diabetes patients using the Medicare Team Care Arrangements scheme.

10.3.3 Provide opportunistic support of patient self-efficacy

The sources of patient diabetes self-efficacy upon which GPs can readily impact appear to be verbal persuasion and physiological information. Regular three to six monthly follow-up visits recommended in clinical care guidelines for best practice in diabetes care (35) provide an excellent opportunity for GPs to discuss diabetes self-management behaviours, provide verbal encouragement, clear up any misunderstandings and reinforce the rationale for diet, exercise and blood glucose testing. As self-efficacy is domain specific, GPs should make verbal statements designed to reinforce diabetes patient self-management specific to individual behaviours. GPs may wish to use physiological information to support verbal persuasion, but should only do so if they can use this information skilfully, because negative information may actually disempower diabetes patients (68).

The suggestion for GP practice in providing opportunistic support of patient self-efficacy is:

- Use three-monthly clinical care follow-up visits to discuss diabetes self-management, provide verbal encouragement of specific behaviours and, if appropriate, use physiological results to reinforce behavioural achievements.
-

CONCLUSION

At the time of writing, the results of the 2004-05 AusDiab study undertaken by the International Diabetes Institute in Melbourne were published in The Australian newspaper under the headline “275 Australians a day told they have diabetes” (Adam Cresswell, 15 May 2006). The story reported that the “diabetes epidemic” costs Australia \$3 billion a year and up to one-quarter of hospital beds are taken up by people with diabetes. Around this time (12 May 2006), the Australian Minister for Health and Ageing, Tony Abbott, issued a press release announcing new Medicare items for group intervention services delivered by dietitians, diabetes educators and exercise physiologists for people with type 2 diabetes, as part of a \$5 million a year expansion of the Medicare Allied Health and Dental Care Initiative. These examples highlight both the immediacy of the Australian ‘diabetes epidemic’ and the Australian government’s increasing propensity toward policy responses that support diabetes self-management.

Diabetes self-management is seen to be a key strategy for improving diabetes outcomes and reducing health care costs. This strategy is, however, only as effective as its ability to promote the capacity of people with diabetes to effectively manage their illness within the broader context of their lives. Diabetes self-management is not performed in isolation: it is negotiated daily within socioeconomic constraints and structures, including those presented by health care systems and professionals. This thesis sought to illuminate these sociostructural determinants and investigate how they may impact on a person’s ability to undertake diabetes self-management using a model developed from self-efficacy theory.

Findings from this small exploratory study suggest complex relationships between sociostructural determinants and diabetes self-management. In general, people with diabetes perform better self-management when they have the support of good quality GP care. The exception to this rule is people with low levels of diabetes self-efficacy, who do not benefit from good quality GP care in self-monitoring of blood glucose. This is a reminder that diabetes self-management presents a considerable challenge for health care systems that have been structured to provide episodic care for acute, rather than chronic, illness; and for GPs and their diabetes patients who must now renegotiate long-

held relationships in care to work towards supporting people with diabetes in managing their own illness and enhancing self efficacy.

Complex relationships were further identified between socioeconomic resources and diabetes self-management. This exploratory research suggested that people with diabetes performed self-management even in the presence of socioeconomic barriers; although this finding belied the challenges inherent to negotiating diabetes self-management with limited financial resources. While some costs for diabetes self-management could be offset through access to Health Care Cards and the Pharmaceutical Benefits Scheme, other costs could not; meaning that so-called discretionary items had to be comprised. These findings are exploratory and should be investigated further.

Less controversial is the suggestion that considerable investment in diabetes self-management should be made in the promotion of diabetes self-efficacy; although this perhaps does not go far enough. The goal of health policy in chronic disease should not be to save health care costs or develop discrete behavioural skills in affected individuals but to promote human functioning and agency for meaningful participation in the social and economic life of the community: the real meaning of self-management for people with diabetes.

REFERENCES

1. McKinlay J, Marceau L. US public health and the 21st century: diabetes mellitus. *Lancet* 2000;356:757-61.
2. Zimmet P, Alberti G, Shaw J. Global and societal implications of the diabetes epidemic. *Nature* 2001;414:782-7.
3. Roglic G, Unwin N, Mathers C, Tuomilehto J, Nag S, Connolly V, et al. The burden of mortality attributable to diabetes: realistic estimates for the year 2000. *Diabetes Care* 2005;28:2130-5.
4. Wild S, Roglic G, Green A, Sicree R, King H. Global prevalence of diabetes: estimates for the year 2000 and projections for 2030. *Diabetes Care* 2004;27:1047-53.
5. Dunstan D, Zimmet P, Welborn T, de Courten M, Cameron A, Sicree R, et al. The rising prevalence of diabetes and impaired glucose tolerance. The Australian Diabetes, Obesity and Lifestyle Study. *Diabetes Care* 2002;25:829-34.
6. Australian Institute of Health and Welfare. Diabetes: Australian Facts 2002. Canberra: AIHW; 2002. AIHW Cat. No. CVD 20.
7. Kemp T, Barr E, Zimmet P, Cameron A, Welborn T, Colagiuri S, et al. Glucose, lipid, and blood pressure control in Australian adults with Type 2 diabetes. *Diabetes Care* 2005;28:1490-2.
8. Dixon T, Webbie K. Diabetes-related deaths 2001-2003. Canberra: Australian Institute of Health and Welfare; 2005. AIHW Cat. No. AUS 69.
9. Glover J, Hetzel D, Tennant S. The socioeconomic gradient and chronic illness and associated risk factors in Australia. *Aust New Zealand Health Policy* 2004;1:8. Published online 12 December 2004. doi:10.1186/1743-8462-1-8.
10. Thow A, Waters A. Diabetes in culturally and linguistically diverse Australians: identification of communities at high risk. Canberra: Australian Institute of Health and Welfare; 2005. AIHW Cat. No. CVD 30.
11. Bachmann M, Eachus J, Hopper C, Davey Smith G, Proppert C, Pearson N, et al. Socio-economic inequalities in diabetes complications, control, attitudes and health service use: a cross-sectional study. *Diabet Med* 2003;20:921-9.
12. Bihan H, Laurent S, Sass C, Nguyen G, Huot C, Moulin J, et al. Association among individual deprivation, glycemic control, and diabetes complications. *Diabetes Care* 2005;28:2680-5.
13. Bhopal R, Hayes L, White M, Unwin N, Harland J, Ayis S, et al. Ethnic and socio-economic inequalities in coronary heart disease, diabetes and risk factors in Europeans and South Africans. *J Public Health Med* 2002;24:95-105.
14. Chaturvedi N, Jarrett J, Shipley M, Fuller J. Socioeconomic gradient in morbidity and mortality in people with diabetes: cohort study findings from the Whitehall study and the WHO multinational study of vascular disease in diabetes. *BMJ* 1998;316:100-5.
15. Connolly V, Unwin N, Sherriff P, Bilous R, Kelly W. Diabetes prevalence and socioeconomic status: a population based study showing increased prevalence of type 2 diabetes mellitus in deprived areas. *J Epidemiol Community Health* 2000;54:173-7.
16. Lanting L, Joung I, Mackenbach J, Lamberts S, Bootsma A. Ethnic differences in mortality, end-stage complications, and quality of care among diabetic patients: a review. *Diabetes Care* 2005;28:2280-8.
17. Koster A, Bosma H, Kempen G, van Lenthe F, van Eijk J, Mackenbach J. Socioeconomic inequalities in mobility decline in chronic disease groups (asthma/COPD, heart disease, diabetes mellitus, low back pain): only a minor role for disease severity and comorbidity. *J Epidemiol Community Health* 2004;58:862-9.
18. Nicolucci A, Carinci F, Ciampi A, on behalf of the SID-AMD Italian Study Group for the Implementation of the St. Vincent Declaration. Stratifying patients at risk of diabetic complications: an integrated look at clinical, socioeconomic, and care-related factors. *Diabetes Care* 1998;21:1439-44.
19. Anderson R, Freedland K, Clouse R, Lustman P. The prevalence of comorbid depression in adults with diabetes: a meta-analysis. *Diabetes Care* 2001;24:1069-78.
20. Bruce D, Davis W, Davis T. Longitudinal predictors of reduced mobility and physical disability in patients with type 2 diabetes. *Diabetes Care* 2005;28:2441-7.
21. Rubin R, Peyrot M. Quality of life and diabetes. *Diabetes Metab Res Rev* 1999;15:205-18.
22. Von Korff M, Katon W, Lin E, Simon G, Ciechanowski P, Ludman E, et al. Work disability among individuals with diabetes. *Diabetes Care* 2005;28:1326-32.

-
23. Vijan S, Hayward R, Langa K. The impact of diabetes on workforce participation: results from a national household survey. *Health Serv Res* 2004;39:1653-70.
 24. Dixon T. Costs of diabetes in Australia 2000-01. Canberra: Australian Institute of Health and Welfare; 2005. AIHW Cat. No. AUS 59.
 25. Davis W, Hendrie D, Knuiman M, Davis T. Determinants of diabetes-attributable non-blood glucose-lowering medication costs in Type 2 diabetes: the Fremantle Diabetes Study. *Diabetes Care* 2005;28:329-36.
 26. Stratton I, Adler A, Neil H, Matthews D, Manley S, Cull C, et al. Association of glycaemia with macrovascular and microvascular complications of type 2 diabetes (UKPDS 35): prospective observational study. *BMJ* 2000;321:405-12.
 27. UK Prospective Diabetes Study Group. Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in type 2 diabetes (UKPDS 33). *Lancet* 1998;352:837-53.
 28. UK Prospective Diabetes Study Group. Effect of intensive blood-glucose control with metformin on complications in overweight patients with type 2 diabetes (UKPDS 34). *Lancet* 1998;352:854-65.
 29. UK Prospective Diabetes Study Group. Tight blood pressure control and risk of macrovascular and microvascular complications in type 2 diabetes. *BMJ* 1998;317:703-13.
 30. Gray A, Raikou M, McGuire A, Fenn P, Stevens R, Cull C et al. Cost-effectiveness of an intensive blood glucose control policy in patients with type 2 diabetes: economic analysis alongside randomized controlled trial (UKPDS 41). *BMJ* 2000;320:1373-8.
 31. Rose V, Harris E. From efficacy to effectiveness: case studies in unemployment research. *J Public Health* 2004;26:297-302.
 32. Stephenson J, Imrie J. Why do we need randomised controlled trials to assess behavioural interventions? *BMJ* 1998;316:611-3.
 33. Centers for Disease Control and Primary Prevention Working Group. Primary prevention of type 2 diabetes mellitus by lifestyle intervention: implications for health policy. *Ann Intern Med* 2004;140:951-7.
 34. Davis T, Colagiuri S. The continuing legacy of the United Kingdom Prospective Diabetes Study. *Med J Aust* 2004;180:104-5.
 35. Diabetes Australia and RACGP. Diabetes management in general practice. 11th ed. Gorokan, NSW: Diabetes Australia; 2005.
 36. National Health Priority Action Council (NHPAC). National chronic disease strategy. Canberra: Australian Government Department of Health and Ageing; 2006.
 37. National Health Priority Action Council (NHPAC). National service framework for diabetes. Canberra: Australian Government Department of Health and Ageing; 2006.
 38. Aroni R, Swerissen H. Chronic illness: policies and paradoxes. *Australian Journal of Primary Health* 2004;9:7-8.
 39. Fuller J, Harvey P, Misan G. Is client-centred care planning for chronic disease sustainable? Experience from rural South Australia. *Health Soc Care Community* 2004;12:318-26.
 40. Holman H, Lorig K. Patient self-management: a key to effectiveness and efficiency in care of chronic disease. *Public Health Rep* 2004;119:239-43.
 41. Lambert S. Chronic condition self-management: a primary health care change management problem. *Australian Journal of Primary Health* 2005;11:70-7.
 42. Weeks A, McAvoy B, Peterson C, Furler J, Walker C, Swerissen H, et al. Negotiating ownership of chronic illness: an appropriate role for health professionals in chronic illness self-management programs. *Australian Journal of Primary Health* 2003;9:25-33.
 43. Von Korff M, Gruman J, Schaefer J, Curry S, Wagner E. Collaborative management of chronic illness. *Ann Intern Med* 1997;127:1097-102.
 44. Anderson R, Funnell M, Carlson A, Saleh-Statn N, Craddock S, Chas Skinner C. Facilitating self-care through empowerment. In: Snoek F, Chas Skinner T, editors. *Psychology in diabetes care*: John Wiley and Sons Ltd; 2000.
 45. Australian Department of Health and Ageing. National evaluation of the sharing health care demonstration projects. Canberra: Australian Department of Health and Ageing; 2005.
 46. Marmot M, Wilkinson R. Social determinants of health. Second ed. Oxford: Oxford University Press; 2003.
 47. Bandura A. Health promotion by social cognitive means. *Health Educ Behav* 2004;31:143-64.
 48. Kawachi I, Kennedy B. Socioeconomic determinants of health: Health and social cohesion: why care about income inequality? *BMJ* 1997;314:1037-41.
-

-
49. Walker C, Swerissen H, Belfrage J. Self-management: its place in the management of chronic illness. *Aust Health Rev* 2003;26:34-42.
 50. Glasgow R, Hiss R, Anderson R, Friedman N, Hayward R, Marrero D, et al. Report of the health care delivery work group. Behavioral research related to the establishment of a chronic disease model for diabetes care. *Diabetes Care* 2001;24:124-30.
 51. Clarke J, Crawford A, Nash D. Evaluation of a comprehensive diabetes disease management program: progress in the struggle for sustained behavior change. *Disease Management* 2002;5:77-86.
 52. Funnell M, Anderson A. Patient empowerment: a look back, a look ahead. *Diabetes Educ* 2003;29:454-64.
 53. Bodenheimer T, Lorig K, Holman H, Grumbach K. Patient self-management of chronic disease in primary care. *JAMA* 2002;288:2469-25.
 54. Gonder-Frederick L, Cox D, Ritterband L. Diabetes and behavioral medicine: the second decade. *J Cons Clin Psychol* 2002;70:611-25.
 55. Barlow J, Wright C, Sheasby J, Turner A, Hainsworth J. Self-management approaches for people with chronic conditions. *Patient Educ Couns* 2002;48:177-87.
 56. Ruggiero L, Glasgow R, Dryfoos J, Rossi J, Prochaska J, Orleans C, et al. Diabetes self-management: self-reported recommendations and patterns in a large population. *Diabetes Care* 1997;20:568-76.
 57. Wing R, Goldstein M, Acton K, Birch L, Jakicic J, Sallis J, et al. Behavioral science research in diabetes. Lifestyle changes related to obesity, eating behavior, and physical activity. *Diabetes Care* 2001;24:117-23.
 58. RACGP. Chronic condition self-management guidelines. Summary for general practitioners: The Royal Australian College of General Practitioners; 2002. Retrieved 23 March 2004 from <https://www.racgp.org.au/Content/NavigationMenu/ClinicalResources/RACGPGuidelines/SharingHealthCare/20020703gp.pdf>
 59. Glasgow R, Fisher E, Anderson B, La Greca A, Marrero D, Johnson S, et al. Behavioral science in diabetes. Contributions and opportunities. *Diabetes Care* 1999;22:832-43.
 60. Boule N, Haddad E, Kenny G, Wells G, Sigal R. Effects of exercise on glycemic control and body mass in type 2 diabetes mellitus: a meta-analysis of controlled clinical trials. *JAMA* 2001;286:1218-27.
 61. Diabetes Prevention Program Research Group. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *New Eng J Med* 2002;346:393-403.
 62. Franz M, Horton E, Bantle J, Beebe C, Brunzell J, Cousten A, et al. Nutrition principles for the management of diabetes and related complications (Technical review). *Diabetes Care* 1994;17:490-518.
 63. American Diabetes Association. Self-monitoring of blood glucose. *Diabetes Care* 1994;17:81-6.
 64. Coster S, Gulliford M, Seed P, Powrie J, Swaminathan R. Self-monitoring in type 2 diabetes mellitus: a meta-analysis. *Diabet Med* 2000;17:755-61.
 65. Welschen L, Bloemendal E, Nijpels G, Dekker J, Heine R, Stalman W, et al. Self-monitoring of blood glucose in patients with type 2 diabetes who are not using insulin. *Diabetes Care* 2005;28:1510-7.
 66. Davidson M. Self-monitoring of blood glucose in type 2 diabetic patients not receiving insulin. A waste of money. *Diabetes Care* 2005;28:1531-3.
 67. Franciosi M, Pellegrini F, De Baradis G, Belfiglio M, Di Nardo B, Greenfield S, et al. Self-monitoring of blood glucose in non-insulin-treated diabetic patients: a longitudinal evaluation of its impact on metabolic control. *Diabet Med* 2005;22:900 - 6.
 68. Peel E, Parry O, Douglas M, Lawton J. Blood glucose self-monitoring in non-insulin-treated type 2 diabetes: a qualitative study of patients' perspectives. *Br J Gen Pract* 2004;54:183-8.
 69. Ipp E, Lucas Aquino R, Christenson P. Self-monitoring of blood glucose in type 2 diabetic patients not receiving insulin. The sanguine approach. *Diabetes Care* 2005;28:1528-30.
 70. Frankum S, Ogden J. Estimation of blood glucose levels by people with diabetes: a cross-sectional study. *Br J Gen Pract* 2005;55:944-8.
 71. Schwedes U, Siebolds M, Mertes G, for the SMBG Study Group. Meal-related structured self-monitoring of blood glucose. *Diabetes Care* 2002;25:1928-32.
 72. Reach G. Role of habit in adherence to medical treatment. *Diabet Med* 2004;22:415-20.
 73. Bandura A. Self-efficacy: the exercise of control. New York: Freeman; 1997.
 74. Baranowski T, Perry C, Parcel G. How individuals, environments and health behaviour interact: Social Cognitive Theory. In: Glanz K, Rimer B, Lewis F, editors. *Health behaviour and health education: Theory, research and practice*. Third ed. San Francisco: John Wiley and Sons; 2002.
-

-
75. Dutton G, Johnson J, Whitehead D, Bodenlos J, Brantley P. Barriers to physical activity among predominately low-income African-American patients with type 2 diabetes. *Diabetes Care* 2005;28:1209-10.
 76. Krein S, Heisler M, Piette J, Makki F, Kerr E. The effect of chronic pain on diabetes patients' self-management. *Diabetes Care* 2005;28:65-70.
 77. Ciechanowski P, Katon W, Russo J. Depression and diabetes: Impact of depressive symptoms on adherence, function, and costs. *Arch Intern Med* 2000;160:3278-85.
 78. Lin E, Katon W, Von Korff M, Rutter C, Simon G, Oliver M, et al. Relationship of depression and diabetes self-care, medication adherence, and preventive care. *Diabetes Care* 2004;27:2154-61.
 79. McKeller J, Humphreys K, Piette J. Depression increases diabetes symptoms by complicating patients' self-care adherence. *Diabetes Educ* 2004;30:485-92.
 80. Park H, Hong Y, Lee H, Ha E, Sung Y. Individuals with type 2 diabetes and depressive symptoms exhibited lower adherence with self-care. *J Clin Epidemiol* 2004;57:978-84.
 81. Aljaseem L, Peyrot M, Wissow L, Rubin R. The impact of barriers and self-efficacy on self-care behaviors in type 2 diabetes. *Diabetes Educ* 2001;27:393-404.
 82. Kavanagh D, Gooley S, Wilson P. Prediction of adherence and control in diabetes. *J Behav Med* 1993;16:509-22.
 83. Senecal C, Nouwen A, White D. Motivation and dietary self-care in adults with diabetes: are self-efficacy and autonomous self-regulation complementary or competing constructs? *Health Psychol* 2000;19:452-7.
 84. Siebolds M, Gaedeke O, Schwedes U, on behalf of the SMBG Study Group. Self-monitoring of blood glucose: psychological aspects relevant to changes in HbA(1c) in type 2 diabetic patients treated with diet or diet plus oral antidiabetic medication. *Patient Educ Couns* 2006;62:104-10.
 85. Sousa V, Zauszniewski J, Musil C, Price Lea P, Davis S. Relationship among self-care agency, self-efficacy, self-care and glycemic control. *Research and Theory in Nursing Practice* 2005;19:217-30.
 86. Williams K, Bond M. The roles of self-efficacy, outcome expectancies and social support in the self-care behaviours of diabetics. *Psychol Health Med* 2002;7:127-41.
 87. Albright T, Parchman M, Burge S. Predictors of self-care behavior in adults with type 2 diabetes: an RRNeST study. *Fam Med* 2001;33:354-60.
 88. Vijan S, Hayward R, Ronis D, Hofer T. The burden of diabetes therapy. *J Gen Intern Med* 2005;20:479-82.
 89. Adams A, Mah C, Soumerai S, Zhang F, Barton M, Ross-Degnan D. Barriers to self-monitoring of blood glucose among adults with diabetes in an HMO: a cross-sectional study. *BMC Health Services Research* 2003;3:6. Published online 19 March 2003. doi:10.1186/1472-6963-3-6.
 90. Karter A, Ferrara A, Darbinian J, Ackerson L, Selby J. Self-monitoring of blood glucose: Language and financial barriers in a managed care population with diabetes mellitus. *Diabetes Care* 2000;23:477-83.
 91. Goldman D, Smith J. Can patient self-management help explain the SES health gradient? *Proc Natl Acad Sci U S A* 2002;99:10929-34.
 92. Piette J, Heisler M, Wagner T. Problems paying out-of-pocket costs among older adults with diabetes. *Diabetes Care* 2004;27:384-91.
 93. Piette J, Schillinger D, Potter M, Heisler M. Dimensions of patient-provider communication and diabetes self-care in an ethnically diverse population. *J Gen Intern Med* 2003;18:624-33.
 94. Rubin R, Peyrot M, Siminerio L. Health care and patient-reported outcomes. Results of the cross-national Diabetes Attitudes, Wishes and Needs (DAWN) study. *Diabetes Care* 2006;29:1249-55.
 95. Heisler M, Bouknight R, Hayward R, et al. The relative importance of physician communication, participatory decision making, and patient understanding in diabetes self-management. *J Gen Intern Med* 2002;17:243-52.
 96. Heisler M, Vijan S, Anderson R, Ubel P, Bernstein S, Hofer T. When do patients and their physicians agree on diabetes treatment goals and strategies, and what difference does it make? *J Gen Intern Med* 2003;18:893-902.
 97. Aikens J, Bingham R, Piette J. Patient-provider communication and self-care behavior among type 2 diabetes patients. *Diabetes Educ* 2005;31:681-90.
 98. Persell S, Keating N, Landrum M, Landon B, Ayanian J, Borbas C, et al. Relationship of diabetes-specific knowledge to self-management activities, ambulatory preventive care, and metabolic outcomes. *Prev Med* 2004;39:746-52.
 99. Sarkar U, Fisher L, Schillinger D. Is self-efficacy associated with diabetes self-management across race/ethnicity and health literacy? *Diabetes Care* 2006;29:823-9.
-

-
100. Hill-Briggs F, Cooper D, Loman K, Brancati F, Cooper L. A qualitative study of problem solving and diabetes control in type 2 diabetes self-management. *Diabetes Educ* 2003;29:1018-28.
 101. Nagelkerk J, Reick K, Meengs L. Perceived barriers and effective strategies to diabetes self-management. *J Adv Nurs* 2006;54:151-8.
 102. Campbell R, Pound P, Pope C, Britten N, Pill R, Morgan M, et al. Evaluating meta-ethnography: a synthesis of qualitative research on lay experiences of diabetes and diabetes care. *Soc Sci Med* 2003;56:671-84.
 103. Murphy E, Kinmonth A. No symptoms, no problem? Patients' understandings of non-insulin-dependent diabetes. *Fam Pract* 1995;12:184-92.
 104. O'Connor P, Crabtree B, Yanoshik M. Differences between diabetic patients who do and do not respond to a diabetes care intervention: a qualitative analysis. *Fam Med* 1997;29:424-8.
 105. Hunt L, Pugh J, Valenzuela M. How patients adapt diabetes self-care recommendations in everyday life. *J Fam Pract* 1998;46:207-215.
 106. Peterson T, Lee P, Hollis S, Young B, Newton P, Dornan T. Well-being and treatment satisfaction in older people with diabetes. *Diabetes Care* 1998;21:93-5.
 107. Savoca M, Miller C, Quandt S. Profiles of people with type 2 diabetes mellitus: the extremes of glycemic control. *Soc Sci Med* 2004;58:2655-66.
 108. Thompson S, Gifford S. Trying to keep a balance: the meaning of health and diabetes in an urban Aboriginal community. *Soc Sci Med* 2000;51:1457-72.
 109. Garro L. Individual or societal responsibility? Explanations of diabetes in an Anishinaabe (Ojibway) community. *Soc Sci Med* 1995;40:37-46.
 110. Karantzas E, Kirwan A. Ethnic community stakeholders as partners in primary and secondary diabetes prevention. *Australian Journal of Primary Health* 2004;10:61-6.
 111. Von Hofe B, Thomas M, Colagiuri R. A systematic review of issues impacting on health care for culturally diverse groups using diabetes as a model. Sydney: Australian Centre for Diabetes Strategies and Multicultural Health Unit; 2002.
 112. Lawton J, Ahmad N, Hallowell N, Hanna L, Douglas M. Perceptions and experiences of taking oral hypoglycaemic agents among people of Pakistani and Indian origin: qualitative study. *BMJ* 2005; doi:10.1136/bmj.38460.642780.EO (published 9 May 2005).
 113. Walker C, Weeks A, McAvoy B, Demetrious E. Exploring the role of self-management programmes in caring for people from culturally and linguistically diverse backgrounds in Melbourne, Australia. *Health Expectations* 2005;8:315-23.
 114. Diabetes Control and Complications Trial Research Group. The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. *New Eng J Med* 1993;329:977-86.
 115. UK Prospective Diabetes Study Group. UK Prospective Diabetes Study 16. Overview of 6 years' therapy of type II diabetes: a progressive disease. *Diabetes* 1995;44:1249-58.
 116. Fox C, Kilvert A. Intensive education for lifestyle change in diabetes. Ongoing input is required to effect and maintain change in behaviour. *BMJ* 2003;327:1121-2.
 117. Loveman E, Cave C, Green C, Royle P, Dunn N, Waugh N. The clinical and cost-effectiveness of patient education models for diabetes: a systematic review and economic evaluation. *Health Technology Assessment* 2003;7:1-190.
 118. Ellis S, Speroff T, Dittus T, Brown A, Pichert J, Elasy T. Diabetes patient education: a meta-analysis and meta-regression. *Patient Educ Couns* 2003;52:97-105.
 119. Parchman M, Pugh J, Noel P, Larme A. Continuity of care, self-management behaviors, and glucose control in patients with type 2 diabetes. *Med Care* 2002;40:137-44.
 120. Polonsky W, Earles J, Smith S, Pease D, MacMillan M, Christensen R, et al. Integrating medical management with diabetes self-management training. *Diabetes Care* 2003;26:3048-53.
 121. Hornsten A, Lundman B, Stenlund H, Sandstrom H. Metabolic improvement after intervention focusing on personal understanding in type 2 diabetes. *Diabetes Res Clin Pract* 2005;68:65-74.
 122. Kim H, Oh J. Adherence to diabetes control recommendations: impact of nurse telephone calls. *J Adv Nurs* 2003;44:256-61.
 123. Gary T, Genkinger J, Guallar E, Peyrot M, Brancati F. Meta-analysis of randomized educational and behavioral interventions in type 2 diabetes. *Diabetes Educ* 2003;29:488-501.
 124. Deakin T, McShane C, Cade J, Williams R. Group based training for self-management strategies in people with type 2 diabetes mellitus. *Cochrane Database of Systematic Reviews* 2005;2:CD003417.
 125. Norris S, Lau J, Jay Smith S, Schmid C, Engelgau M. Self-management education for adults with type 2 diabetes. *Diabetes Care* 2002;25:1159-71.
-

-
126. Warsi A, Wang P, LaValley M, Avorn J, Solomon D. Self-management education programs in chronic disease. *Arch Intern Med* 2004;164:1641-9.
 127. Ismaeil K, Winkley K, Rabe-Hesketh S. Systematic review and meta-analysis of randomised controlled trials of psychological interventions to improve glycaemic control in patients with type 2 diabetes. *Lancet* 2004;363:1589-97.
 128. Newman S, Steed L, Mulligan K. Self-management interventions for chronic illness. *Lancet* 2004;364:1523-37.
 129. Norris S, Engelgau M, Narayan K. Effectiveness of self-management training in type 2 diabetes: a systematic review from randomised controlled trials. *Diabetes Care* 2001;24:561-88.
 130. Norris S, Nichols P, Casperson C, Glasgow R, Engelgau M, Jack L, et al. Increasing diabetes self-management education in community setting. *Am J Prev Med* 2002;22:39-66.
 131. Sarkisian C, Brown A, Norris K, Wintz R, Mangione C. A systematic review of diabetes self-care interventions for older African American or Latino adults. *Diabetes Educ* 2003;29:467-79.
 132. Steed L, Cooke D, Newman S. A systematic review of psychosocial outcomes following education, self-management and psychological interventions in diabetes mellitus. *Patient Educ Couns* 2003;51:5-15.
 133. Klonoff D, Schwartz D. An economic analysis of interventions for diabetes. *Diabetes Care* 2000;23:390-404.
 134. Wagner T, Goldstein M. Behavioral interventions and cost-effectiveness analysis. *Prev Med* 2004;39:1208-14.
 135. Eakin E, Bull S, Glasgow R, Mason M. Reaching those most in need: a review of diabetes self-management interventions in disadvantaged populations. *Diabetes Metab Res Rev* 2002;18:26-35.
 136. Glasgow R, Klesges L, Dzewaltowski D, Bull S, Estabrooks P. The future of health behavior change research: what is needed to improve translation of research into health promotion practice? *Ann Behav Med* 2004;27:3-12.
 137. Paterson B, Thorne S, Dewis M. Adapting to and managing diabetes. *J Nurs Scholarship* 1998;30:57-62.
 138. Bandura A. Guide for creating self-efficacy scales. In: Pajares F, Urdan T, editors. *Self-efficacy beliefs of adolescents*. Greenwich, CT: Information Age Publishing; 2006.
 139. De Vaus D. *Surveys in social research*. Melbourne: Allen & Unwin; 2002.
 140. Anderson J. Empowering patients: issues and strategies. *Soc Sci Med* 1996;43:697-705.
 141. Galbally R. Health promoting environments: who will miss out? *Aust N Z J Public Health* 1997;27:429-30.
 142. Whitelaw S, Baxendale A, Bryce C, Machardy L, Young I, Witney E. 'Settings' based health promotion: a review. *Health Prom Int* 2001;16:339-53.
 143. Boyce W. Disadvantaged persons' participation in health promotion programs: some structural dimensions. *Soc Sci Med* 2001;52:1551-64.
 144. McDonald J, Harris E, Kurti L, Furler J, Appollini L, Tudball J. *Action on health inequalities: early intervention and chronic condition self-management*. Sydney: Health Inequalities Research Collaboration, Primary Health Care Network; 2004.
 145. Kirby J, Toshiko K. Neighbourhood socioeconomic disadvantage and access to health care. *J Health Soc Behav* 2005;46:15-31.
 146. Macintyre S, Ellaway A. Ecological approaches: rediscovering the role of the physical and social environment. In: Berkman L, Kawachi I, editors. *Social Epidemiology*. New York: Oxford University Press; 2000.
 147. Macintyre S, Maciver S, Sooman A. Area, class and health: should we be focussing on places or people? *J Soc Policy* 1993;22:213-34.
 148. Wallerstein N. Empowerment to reduce health disparities. *Scand J Public Health* 2002;59:S72-7.
 149. Wallace R, Wallace D. Socioeconomic determinants of health: Community marginalisation and the diffusion of disease and disorder in the United States. *BMJ* 1997;314:1341-6.
 150. Bandura A. A sociocognitive analysis of substance abuse: an agentic perspective. *Psychol Sci* 1999;10:214-7.
 151. Granfield R, Cloud W. The elephant that no-one sees: natural recovery among middle-class addicts. *J Drug Issues* 1996;26:45-61.
 152. Ogden J. Some problems with social cognition models: a pragmatic and conceptual analysis. *Health Psychol* 2003;22:424-8.
 153. Boudreaux E, Carmack C, Scarinci I, Brantley P. Predicting smoking stage of change among a sample of low socioeconomic status, primary care outpatients: replication and extension using decisional balance and self-efficacy theories. *Int J Behav Med* 1998;148-65.
-

-
154. Nigg C, Jordan P. It's a difference of opinion that makes a horserace... *Health Educ Res* 2005;20:291-3.
 155. Nutbeam D, Harris E. Theory in a nutshell. A practical guide to health promotion theories. Hong Kong: McGraw-Hill Australia; 2004.
 156. Noar S, Zimmerman R. Health behavior theory and cumulative knowledge regarding health behaviours: are we moving in the right direction? *Health Educ Res* 2005;20:275-90.
 157. Holloway A, Watson H. Role of self-efficacy and behaviour change. *Int J Nurs Pract* 2002;8:106-115.
 158. Marks R, Allegrante J, Lorig K. A review and synthesis of research evidence for self-efficacy-enhancing interventions for reducing chronic disability: implications for health education practice. *Health Prom Pract* 2005;6:37-43.
 159. Pajares F. Current directions in self-efficacy research. In: Maehr M, Pintrich P, editors. *Advances in motivation and achievement*. Greenwich, CT: JAI Press; 1997.
 160. Rapley P, Fruin D. Self-efficacy in chronic illness: the juxtaposition of general and regimen-specific efficacy. *International Journal of Nursing Practice* 1999;5:209-15.
 161. Bandura A. Social Cognitive Theory: an agentic perspective. *Annu Rev Psychol* 2001;52:1-26.
 162. Bandura A. Human agency in social cognitive theory. *Am Psychol* 1989;44:1175-84.
 163. Bandura A. Self-efficacy: toward a unifying theory of behavioral change. *Psychol Rev* 1977;84:191-215.
 164. Schwarzer R. Self-efficacy in the adoption and maintenance of health behaviours: theoretical approaches and a new model. In: Schwarzer R, editor. *Self-efficacy: thought control of action*. Washington, DC: Hemisphere; 1992.
 165. Holden G. The relationship of self-efficacy appraisals to subsequent health related outcomes: a meta-analysis. *Social Work in Health Care* 1991;16:53-93.
 166. Multon K, Brown S, Lent R. Relation of self-efficacy beliefs to academic outcomes: a meta-analytic investigation. *J Couns Psychol* 1991;38:30-8.
 167. Stajkovic A, Luthans F. Self-efficacy and work-related performance: a meta-analysis. *Psychol Bull* 1998;124:240-61.
 168. Moritz S, Feltz D, Fahrbach K, Mack D. The relation of self-efficacy measures to sport performance: a meta-analytic review. *Research Quarterly for Exercise and Sport* 2000;71:280-94.
 169. Plotnikoff R, Brez S, Hotz S. Exercise behavior in a community sample with diabetes: understanding the determinants of exercise behavioral change. *Diabetes Educ* 2000;26:450-9.
 170. Howorka K, Pumprla J, Wagner-Nosiska D, Grillmayr H, Schlusche C, Schabmann A. Empowering diabetes out-patients with structured education: short-term and long-term effects of functional insulin treatment on perceived control over diabetes. *J Psychosom Res* 2000;48:37-44.
 171. Sturt J, Whitlock S, Hearnshaw H. Complex intervention development for diabetes self-management. *J Adv Nurs* 2006;54:293-303.
 172. Sigurdardottir A. Self-care in diabetes: model of factors affecting self-care. *J Clin Nurs* 2005;14:301-14.
 173. Steptoe A, Doherty S, Kerry S, Rink E, Hilton S. Sociodemographic and psychological predictors of changes in dietary fat consumption in adults with high blood cholesterol following counseling in primary care. *Health Psychol* 2000;19:411-9.
 174. Steptoe A, Perkins-Porras L, McKay C, Rink E, Hilton S, Cappuccio F. Psychological factors associated with fruit and vegetable intake with biomarkers in adults from a low-income neighbourhood. *Health Psychol* 2003;22:148-55.
 175. Savoca M, Miller C. Food selection and eating patterns: themes found among people with type 2 diabetes mellitus. *J Nutrition Educ* 2001;33:224-33.
 176. Wilson D, Friend R, Teasley N, Green S, Reaves I, Sica D. Motivational versus social cognitive interventions for promoting fruit and vegetable intake and physical activity in African American adolescents. *Ann Behav Med* 2002;24:310-9.
 177. Anderson E, Winett R, Wojcik J. Social-cognitive determinants of nutrition behavior among supermarket food shoppers: a structural equation analysis. *Health Psychol* 2000;19:479-86.
 178. Bock B, Marcus B, Pinto B, Forsyth L. Maintenance of physical activity following an individualized motivationally tailored intervention. *Ann Behav Med* 2001;23:79-87.
 179. Calfas K, Sallis J, Oldenburg B, French M. Mediators of change in physical activity following an intervention in primary care: PACE. *Prev Med* 1997;26:297-304.
 180. Clark D, Nothwehr F. Exercise self-efficacy and its correlates among socioeconomically disadvantaged older adults. *Health Educ Behav* 1999;26:535-46.
-

-
181. Dallow C, Anderson J. Using self-efficacy and a transtheoretical model to develop a physical activity intervention for obese women. *Am J Health Prom* 2003;17:373-81.
 182. Dishman R, Motl R, Sallis J, Dunn A, Birnbaum A, Welk G, et al. Self-management strategies mediate self-efficacy and physical activity. *Am J Prev Med* 2005;29:10-18.
 183. McAuley E, Blissmer B, Katula J, Duncan T, Mihalko S. Physical activity, self-esteem, and self-efficacy relationships in older adults: a randomized controlled trial. *Ann Behav Med* 2000;22:131-9.
 184. Rovniak L, Anderson E, Winett R, Stephens R. Social cognitive determinants of physical activity in young adults: a prospective structural equation analysis. *Ann Behav Med* 2002;24:149-56.
 185. Simons-Morton D, Hogan P, Dunn A, Pruitt L, King A, Levine B, et al. Characteristics of inactive primary care patients: baseline data from the activity counseling trial. *Prev Med* 2000;31:513-21.
 186. Barlow J, Wright C, Turner A, Bancroft G. A 12-month follow-up study of self-management training for people with chronic disease: are changes maintained over time? *Br J Health Psychol* 2005;10:589-99.
 187. Lorig K, Gonzalez M. Community-based diabetes self-management education: definition and case study. *Diabetes Spect* 2000;13:234-40.
 188. Gleeson-Kreig J. Self-monitoring of physical activity: effects on self-efficacy and behavior in people with type 2 diabetes. *Diabetes Educ* 2006;32:69-78.
 189. Heisler M, Piette J. "I help you, and you help me": facilitated telephone peer support among patients with diabetes. *Diabetes Educ* 2005;31:869-79.
 190. Maddigan S, Majumdar S, Guirguis L, Lewanczuk R, Lee T, Toth E, et al. Improvements in patient-reported outcomes associated with an intervention to enhance quality of care for rural patients with type 2 diabetes. *Diabetes Care* 2004;27:1306-12.
 191. Holman C, Lorig K. Perceived self-efficacy in self-management of chronic disease. In: Schwarzer R, editor. *Self-efficacy: thought control of action*. Washington, DC: Hemisphere; 1992.
 192. Lorig K, Ritter P, Stewart A, Sobel D, Brown B, Bandura A, et al. Chronic Disease Self-Management Program: 2-Year health status and health care utilization outcomes. *Med Care* 2001;39:1217-23.
 193. Lorig K, Sobel D, Stewart A, Brown B, Bandura A, Ritter P, et al. Evidence suggesting that a chronic disease self-management program can improve health status while reducing hospitalization: a randomized trial. *Med Care* 1999;37:5-14.
 194. Fu D, Fu H, McGowan P, Shen Y, Zhu L, Yang H, et al. Implementation and quantitative evaluation of chronic disease self-management programme in Shanghai, China: randomized controlled trial. *Bull WHO* 2003;81:174-82.
 195. Garvin C, Cheadle A, Chrisman N, Chen R, Brunson E. A community-based approach to diabetes control in multiple cultural groups. *Ethn Disease* 2004;14:S83-92.
 196. Griffiths C, Motlib J, Azad A, Ramsay J, Eldridge S, Feder G, et al. Randomised controlled trial of a lay-led self-management programme for Bangladeshi patients with chronic disease. *Br J Gen Pract* 2005;55:831-7.
 197. Lorig K, Ritter P, Jacquez A. Outcomes of border health Spanish/English chronic disease self-management programs. *Diabetes Educ* 2005;31:401-9.
 198. Lorig K, Ritter P, Gonzalez V. Hispanic chronic disease self-management: a randomized community-based outcome trial. *Nurs Res* 2003;52:361-9.
 199. Luszczynska A, Gutierrez-Dona B, Schwarzer R. General self-efficacy in various domains of human functioning: evidence from five countries. *International Journal of Psychology* 2005;40:80-9.
 200. Kara M, van der Bijl J, Shortridge-Baggett L, Asti T, Erguney S. Cross-cultural adaptation of the diabetes management self-efficacy scale for patients with type 2 diabetes mellitus. *International Journal of Nursing Studies* 2005;doi: 10.1016/j.ijnurstu.2005.07.008.
 201. Skelly A, Marshall J, Haughey B, Davis P, Dunford R. Self-efficacy and confidence in outcomes as determinants of self-care practices in inner-city, African-American women with non-insulin-dependent diabetes. *Diabetes Educ* 1995;21:38-46.
 202. Wen L, Shepherd M, Parchman M. Family support, diet, and exercise among older Mexican Americans with type 2 diabetes. *Diabetes Educ* 2004;30:980-93.
 203. Zgibor J, Simmons D. Barriers to blood glucose monitoring in a multiethnic community. *Diabetes Care* 2002;25:1772-7.
 204. Earley P, Randel A. Cognitive causal mechanisms in human agency: etic and emic considerations. *J Behav Ther Exper Psych* 1995;26:221-7.
 205. Bandura A. Social cognitive theory in cultural context. *J Applied Psychol* 2002;51:269-90.
-

-
206. Marshall A, Booth M, Bauman A. Promoting physical activity in Australian general practices: a randomised trial of health promotion advice versus hypertension management. *Patient Educ Couns* 2005;56:283-90.
207. Wetzels R, Wensing M, van Weel C, Grol R. A consultation leaflet to improve an older patient's involvement in general practice care: a randomized trial. *Health Expectations* 2005;8:286-94.
208. Menard J, Payette H, Baillargeon J, Maheux P, Lepage S, Tessier D, et al. Efficacy of intensive mutlithrapy for patients with type 2 diabetes mellitus: a randomized controlled trial. *Can Med Assoc J* 2005;173:DOI:10.1503/cmaj.050054.
209. Sarkadi A, Rosenqvist U. Experience-based group education in Type 2 diabetes. A randomised controlled trial. *Patient Educ Couns* 2004;53:291-8.
210. Gerber B, Brodsky I, Lawless K, Smolin L, Arozullah A, Smith E, et al. Implementation and evaluation of a low-literacy diabetes education computer multimedia application. *Diabetes Care* 2005;28:1574-80.
211. Rothman R, DeWalt D, Malone R, Bryant B, Shintani A, Crigler B, et al. Influence of patient literacy on the effectiveness of a primary care-based diabetes disease management program. *JAMA* 2004;292:1711-6.
212. van Dam H, van der Horst F, Knoops L, Ryckman R, Crebolder H, van den Borne B. Social support in diabetes: a systematic review of controlled intervention studies. *Patient Educ Couns* 2005;59:1-12.
213. Hagedoom M, Keers J, Links T, Bouma J, Ter Maaten J, Sanderman R. Improving self-management in insulin-treated adults participating in diabetes education. The role of overprotection by the partner. *Diabet Med* 2006;23:271-7.
214. Koopman-van den Berg D, van der Bijl J. The use of self-efficacy enhancing methods in diabetes education in the Netherlands. *Scholarly Inquiry for Nursing Practice* 2001;15:249-57.
215. Hawkins R. Self-efficacy: a cause of debate. *Journal of Behavior Therapy and Experimental Psychiatry* 1995;26:235-40.
216. Lee C. On cognitive theories and causation in human behaviour. *Journal of Behavior Therapy and Experiemental Psychiatry* 1992;23:257-68.
217. Bandura A. Ontological and epistemological terrains revisited. *Journal of Behavior Therapy and Experiemental Psychiatry* 1996;27:323-45.
218. Dougher M. A bigger picture: cause and cognition in relation to differing scientific frameworks. *J Behav Ther Exper Psych* 1995;26:215-9.
219. Mackian S, Bedri N, Lovel H. Up the garden path and over the edge: where might health-seeking behaviour take us? *Health Policy Planning* 2004;19:137-46.
220. Clark N, Dodge J. Exploring self-efficacy as a predictor of disease management. *Health Educ Behav* 1999;26:72-89.
221. Schwarzer R, Renner B. Social cognitive predictors of health behavior: action self-efficacy and coping self-efficacy. *Health Psychol* 2000;19:487-95.
222. Bandura A. Health promotion from the perspective of social cognitive theory. *Psychol Health* 1998;13:623-49.
223. Schulz A, Zenk S, Odoms-Young A, Hollis-Neely T, Nwankwo R, Lockett M, et al. Healthy eating and exercising to reduce diabetes: exploring the potential of social determinants of health frameworks within the context of community-based participatory diabetes prevention. *Am J Public Health* 2005;95:645-51.
224. Sorenson G, Emmons K, Hunt M, Barbeau E, Goldman R, Peterson K, et al. Model for incorporating social context in health behavior interventions: application for cancer prevention for working class, multiethnic populations. *Prev Med* 2003;37:188-97.
225. Dahlgren G, Whitehead M. Policies and strategies to promote social equity in health. Stockholm: Institute for Future Studies; 1991.
226. Kenny C. Diabetes and the quality and outcomes framework: successful UK initiative highlights inequity of investments between sectors. *BMJ* 2005;331:1097-8.
227. Rothman A, Wagner E. Chronic illness management: what is the role of primary care? *Ann Intern Med* 2003;138:256-61.
228. Gulliford M, Mahabir D. Utilisation of private care by public primary care clinic attenders with diabetes: relationship to health status and social factors. *Soc Sci Med* 2001;53:1045-56.
229. Battersby W, and the SA HealthPlus Team. Health reform through coordinated care: SA HealthPlus. *BMJ* 2005;330:662-5.
230. Hopkins S, Speed N. The decline in 'free' general practitioner care in Australia: reasons and repercussions. *Health Policy* 2005;73:316-29.
-

-
231. Hutton C. Divisions of general practice, capacity building and health reform. *Australian Family Physician* 2005;34:64-6.
 232. Bodenheimer T, Wagner E, Grumbach K. Improving primary care for patients with chronic illness. *JAMA* 2002;288:1775-9.
 233. Wagner E. Chronic disease management: what will it take to improve care for chronic illness? *Effective Clin Pract* 1998;1:2-4.
 234. Lewis R, Dixon J. Rethinking management of chronic diseases. *BMJ* 2004;328:220-2.
 235. Brooks P. The impact of chronic illness: partnerships with other healthcare professionals. *Med J Aust* 2003;179:260-2.
 236. Piatt G, Orchard T, Emerson C, Simmons D, Songer T, Brooks M et al. Translating the chronic care model into the community: results from a randomized controlled trial of a multifaceted diabetes care intervention. *Diabetes Care* 2006;29:811-7.
 237. Dorr D, Wilcox A, Donnelly S, Burns L, Clayton P. Impact of generalist care managers on patients with diabetes. *Health Serv Res* 2005;40:1400-21.
 238. Harris M, Pridden D, Ruscoe W, Infante F, O'Toole B. Quality of care provided by general practitioners using or not using Division-based diabetes registers. *Med J Aust* 2002;177:250-2.
 239. Jackson C, Bolen S, Brancati F, Batts-Turner M, Gary T. A systematic review of interactive computer-assisted technology in diabetes care. *J Gen Intern Med* 2006;21:105-10.
 240. Montori V, Dineen S, Gorman C, Zimmerman B, Rizza R, Bjornsen S et al. The impact of planned care and a diabetes electronic management system on community-based diabetes care. *Diabetes Care* 2002;25:1952-7.
 241. Pringle M, Stewart-Evans C, Coupland C, Williams I, Allison S, Sterland J. Influences on control in diabetes mellitus: patient, doctor, practice or delivery of care? *BMJ* 1993;306:630-4.
 242. Smith S, Bury G, O'Leary M, Shannon W, Tynan A, Staines A et al. The North Dublin randomized controlled trial of structured diabetes shared care. *Fam Pract* 2004;21:39-45.
 243. Sonnaville J, Bouma M, Colly L, Deville W, Wijkkel D, Heine R. Sustained good glycaemic control in NIDDM patients by implementation of structured care in general practice: 2-year follow-up study. *Diabetologia* 1997;40:1334-40.
 244. Bailie R, Robinson G, Togni S, D'Abbs P. A multifaceted health-service intervention in remote Aboriginal communities: 3-year follow-up of the impact on diabetes care. *Med J Aust* 2004;181:195-200.
 245. Georgiou A, Burns J, Harris M. GP claims for completing diabetes 'cycle of care'. *Australian Family Physician* 2004;33:755-7.
 246. Georgiou A, Burns J, McKenzie S, Penn D, Flack J, Harris M. Monitoring change in diabetes care using diabetes registers: experience from divisions of general practice. *Australian Family Physician* 2006;35:77-80.
 247. Phillips L, Ziemer D, Doyle J, et al. An endocrinologist-supported intervention aimed at providers improves diabetes management in a primary care site. *Diabetes Care* 2005;28:2352-60.
 248. The California Medi-Cal Type 2 Diabetes Study Group. Closing the Gap: effect of diabetes case management on glycemic control among low-income ethnic minority populations. *Diabetes Care* 2004;27:95-103.
 249. Vyas A, Haidery A, Wiles P, Gill S, Roberts C, Cruickshank J. A pilot randomized trial in primary care to investigate and improve knowledge, awareness and self-management among South Asians with diabetes in Manchester. *Diabet Med* 2003;20:1022-6.
 250. Valk G, Renders C, Kriegsman D, Newton K, Twisk J, van Eijk J et al. Quality of care for patients with type 2 diabetes mellitus in the Netherlands and the United States: a comparison of two quality improvement programs. *Health Serv Res* 2004;39:709-25.
 251. Renders C, Valk G, Franse L, Schellevis F, van Eijk J, van der Wal G. Long-term effectiveness of a quality improvement program for patients with type 2 diabetes in general practice. *Diabetes Care* 2001;24:1365-70.
 252. O'Connor P, Crain A, Rush W, Sperl-Millen J, Gutenkauf J, Duncan J. Impact of an electronic medical record on diabetes quality of care. *Ann Fam Med* 2005;3:300-6.
 253. Gabbay R, Lendel I, Saleem T, Shaeffer G, Adelman A, Mauger T et al. Nurse case management improves blood pressure, emotional distress and diabetes complication screening. *Diabetes Res Clin Pract* 2006;71:28-35.
 254. Burns J, Powell Davies G, Harris E, Harris M. The evolving role of general practice in diabetes care. In: Walker C, Peterson C, Millen N, Martin C, editors. *Chronic illness. New perspectives and new directions*. Bayswater, Victoria: Tertiary Press; 2003.
 255. Parsons J. Diabetes: can systems change improve outcomes? *Australian Family Physician* 2001;30:1116-7.
-

-
256. Veale B. Meeting the challenge of chronic illness in general practice. *Med J Aust* 2003;179:247-9.
257. Newland J, Zwar N. General practice and the management of chronic conditions. Where to now? *Australian Family Physician* 2006;35:16-19.
258. Blakeman T, Harris M, Comino E, Zwar N. Implementation of the enhanced primary care items requires ongoing education and evaluation. *Australian Family Physician* 2001;30:75-7.
259. Ariyaratne C, Harris M. The use of diabetes registers in an urban division of general practice. *Australian Family Physician* 2004;33:287-8.
260. Oldroyd J, Proudfoot J, Infante F, Powell Davies G, Bubner T, Holton C, et al. Providing healthcare for people with chronic illness: the views of Australian GPs. *Med J Aust* 2003;179:30-3.
261. Glasgow R, Strycker L. Preventive care practices for diabetes management in two primary care samples. *Am J Prev Med* 2000;19:9-14.
262. Phillips P, Wilson D, Beilby J, Taylor A, Rosenfeld E, Hill W, et al. Diabetes complications and risk factors in an Australian population. How well are they managed? *Int J Epidemiol* 1998;27:853-9.
263. Australian Diabetes Educators Association. The rationale for commonwealth government funding of diabetes self-management education: Australian Diabetes Educators Association; 2004.
264. Charles J, Ng A, Miller G. Management of type 2 diabetes in Australian general practice. *Australian Family Physician* 2006;35:378-9.
265. Rose V, Harris M, Ho M. GPs' views on how low socioeconomic position affects diabetes management: an exploratory study. *Australian Journal of Primary Health* 2004;10:120-3.
266. Olivarius N, Beck-Nielsen H, Andreason A, Horder M, Pedersen P. Randomised controlled trial of structured personal care of type 2 diabetes mellitus. *BMJ* 2001;323:970-5.
267. Brown J, Harris S, Webster-Bogaert S, Wetmore S, Faulds C, Stewart M. The role of patient, physician and systemic factors in the management of type 2 diabetes mellitus. *Fam Pract* 2002;19:344-9.
268. Agarwal G, Pierce M, Ridout D. The GP perspective: problems experienced in providing diabetes care in UK general practice. *Diabet Med* 2002;19:S13-20.
269. Glasgow R, Hampson S, Strycker L, Ruggiero L. Personal-model beliefs and social-environmental barriers related to diabetes self-management. *Diabetes Care* 1997;20:556-61.
270. Schillinger D, Piette J, Grumbach K, et al. Closing the loop. Physician communication with diabetic patients who have low health literacy. *Arch Intern Med* 2003;163:83-90.
271. RACGP. Chronic condition self-management guidelines. Summary for nurses and allied health professionals: The Royal Australian College of General Practitioners; 2002. Retrieved 23 March 2004 from <https://www.racgp.org.au/Content/NavigationMenu/ClinicalResources/RACGPGuidelines/SharingHealthCare/20020703ahp.pdf>
272. Bell R, Camacho F, Goonan K, Duren-Winfield V, Anderson R, Konen J, et al. Quality of diabetes care among low-income patients in North Carolina. *Am J Prev Med* 2001;21:124-31.
273. Faruqi N, Frith J, Colagiuri S, Harris M. The use and perceived value of diabetes clinical management guidelines in general practice. *Australian Family Physician* 2000;29:173-6.
274. Larne A, Pugh J. Evidence-based guidelines meet the real world. The case of diabetes care. *Diabetes Care* 2001;24:1728-33.
275. van den Arend I, Stolk R, Rutten G, Schrijvers G. Education integrated into structured general practice care for type 2 diabetic patients: results in sustained improvement of disease knowledge and self-care. *Diabet Med* 2000;17:190-7.
276. Khunti K, Ganguli S, Lowy A. Inequalities in provision of systemic care for patients with diabetes. *Fam Pract* 2001;18:27-32.
277. Goudswaard A, Stolk R, Zuithoff N, de Valk H, Rutten G. Long-term effects of self-management education for patients with Type 2 diabetes taking maximal oral hypoglycaemic therapy: a randomized trial in primary care. *Diabet Med* 2004;21:491-6.
278. Epstein R, Franks P, Fiscella K, Shields C, Meldrum S, Kravitz R, et al. Measuring patient-centered communication in patient-physician consultations: theoretical and practical issues. *Soc Sci Med* 2005;61:1516-28.
279. Little P, Everitt H, Williamson I, Warner G, Moore M, Gould C, et al. Preferences of patients for patient centred approach to consultation in primary care: observational study. *BMJ* 2001;322:468-72.
280. Little P, Everitt H, Williamson I, Warner G, Moore M, Gould C, et al. Observational study of effect of patient centredness and positive approach on outcomes of general practice consultations. *BMJ* 2001;323:908-11.
281. Michie S, Miles J, Weinman J. Patient-centredness in chronic illness: what is it and does it matter? *Patient Educ Couns* 2003;51:197-206.
-

-
282. Bauman A, Fardy H, Harris P. Getting it right: why bother with patient-centred care? *Med J Aust* 2003;179:253-6.
 283. Stewart M. Towards a global definition of patient centred care. *BMJ* 2001;322:444-5.
 284. Kaplan R, Frosch D. Decision making in medicine and health care. *Annu Rev Clin Psychol* 2005;1:525-56.
 285. Stevenson F. General practitioners' views on shared decision making: a qualitative analysis. *Patient Educ Couns* 2003;50:291-3.
 286. Ogden J, Ambrose L, Khadra A, Manthri S, Symons L, Vass A, et al. A questionnaire study of GPs' and patients' beliefs about the different components of patient centredness. *Patient Educ Couns* 2002;47:223-7.
 287. Kinmonth A, Woodcock A, Griffin S, Spiegel N, Campbell M. Randomised controlled trial of patient centred care of diabetes in general practice: impact on current wellbeing and future disease risk. The Diabetes Care from Diagnosis Research Team. *BMJ* 1998;317:1202-8.
 288. Peel E, Parry O, Douglas M, Lawton J. Diagnosis of type 2 diabetes: a qualitative analysis of patients' emotional reactions and views about information provision. *Patient Educ Couns* 2004;53:269-75.
 289. Thorne S, Paterson B. Health care professional support for self-care management in chronic illness: insights from diabetes research. *Patient Educ Couns* 2001;42:81-90.
 290. Holmstrom I, Rosenqvist U. Misunderstandings about illness and treatment among patients with type 2 diabetes. *J Adv Nurs* 2005;49:146-54.
 291. Lawton J, Peel E, Parry O, Araoz G, Douglas M. Lay perceptions of type 2 diabetes in Scotland: bringing health services back in. *Soc Sci Med* 2005;60:1423-35.
 292. Parry O, Peel E, Douglas M, Lawton J. Patients in waiting: a qualitative study of type 2 diabetes patients' perceptions of diagnosis. *Fam Pract* 2004;21:131-6.
 293. Bower P, Roland M, Campbell J, Mead N. Setting standards based on patients' views on access and continuity: secondary analysis of data from the general practice assessment survey. *BMJ* 2003;326:258-63.
 294. Naithani S, Gulliford M, Morgan M. Patients' perceptions and experiences of 'continuity of care' in diabetes. *Health Expectations* 2006;9:118-29.
 295. Infante F, Proudfoot J, Powell Davies G, Bubner T, Holton C, Beilby J, et al. How people with chronic illnesses view their care in general practice: a qualitative study. *Med J Aust* 2004;181:70-3.
 296. Williams G, McGregor H, King D, Nelson C, Glasgow R. Variation in perceived competence, glycemic control, and patient satisfaction: relationship to autonomy support from physicians. *Patient Educ Couns* 2005;57:39-45.
 297. Broom D, Whittaker A. Controlling diabetes, controlling diabetics: moral language in the management of diabetes type 2. *Soc Sci Med* 2004;58:2371-82.
 298. Loewe R, Schwartzman J, Freeman J, Quinn L, Zuckerman S. Doctor talk and diabetes: towards an analysis of the clinical construction of chronic illness. *Soc Sci Med* 1998;47:1267-76.
 299. Lutfey K, Wishner W. Beyond 'compliance' is 'adherence'. Improving the prospect of diabetes care. *Diabetes Care* 1999;22:635-9.
 300. Glasgow R, Anderson R. In diabetes care, moving from compliance to adherence is not enough. Something entirely different is needed. *Diabetes Care* 1999;22:2090-2.
 301. Wens J, Vermeire E, Van Royen P, Sabbe B, Denekens J. GPs' perspectives of type 2 diabetes patients' adherence to treatment: a qualitative analysis of barriers and solutions. *BMC Fam Pract* 2005;6:20. Published online May 12 2005. doi:10.1186/1471-2296-6-20.
 302. Audet A, Davis K, Schoenbaum S. Adoption of patient-centered care practices by physicians: results from a national survey. *Arch Intern Med* 2006;166:754-9.
 303. Holmstrom I, Halford C, Rosenqvist U. Swedish health care professional's diverse understandings of diabetes care. *Patient Educ Couns* 2003;51:53-8.
 304. Cooper H, Booth K, Gill G. Using combined research methods for exploring diabetes patient education. *Patient Educ Couns* 2003;51:45-52.
 305. O'Flynn N, Britten N. Does the achievement of medical identity limit the ability of primary care practitioners to be patient-centred? A qualitative study. *Patient Educ Couns* 2006;60:49-56.
 306. Levinson W, Kao A, Kuby A, Thisted R. Not all patients want to participate in decision making. A national study of public preferences. *J Gen Intern Med* 2005;20:531-5.
 307. Vick S, Scott A. Agency in health care. Examining patients' preferences for attributes of the doctor-patient relationship. *J Health Econ* 1998;17:587-605.
 308. Parry O, Peel E, Douglas M, Lawton J. Issues of cause and control in patient accounts of Type 2 diabetes. *Health Educ Res* 2006;21:97-107.
-

-
309. Say R, Murtagh M, Thomson R. Patients' preference for involvement in medical decision-making: a narrative review. *Patient Educ Couns* 2006;60:102-14.
310. Shortus T, Rose V, Comino E, Zwar N. Patients' views on chronic illness and its care in general practice. *Australian Family Physician* 2005;34:397-9.
311. Alberti H, Boudriga N, Nabli M. Factors affecting the quality of diabetes care in primary health care centres in Tunis. *Diabetes Res Clin Pract* 2005;68:237-43.
312. Franks P, Fiscella K. Effect of patient socioeconomic status on physician profiles for prevention, disease management and diagnostic testing costs. *Med Care* 2002;40:717-24.
313. Hippisley-Cox J, O'Hanlon S, Coupland C. Association of deprivation, ethnicity, and sex with quality indicators for diabetes: population based survey of 53 000 patients in primary care. *BMJ* 2004;329:1267-70.
314. Overland J, Hayes L, Yue D. Social disadvantage: its impact on the use of Medicare services related to diabetes in NSW. *Aust N Z J Public Health* 2002;26:262-5.
315. Ashton C, Haidet P, Paternitti D, Collins T, Gordon H, O'Malley K et al. Racial and ethnic disparities in the use of health services: bias, preferences, or poor communication? *J Gen Intern Med* 2003;18:146-52.
316. Clark T, Sleath B, Rubin R. Influence of ethnicity and language concordance on physician-patient agreement about recommended changes in patient health behaviour. *Patient Educ Couns* 2004;53:87-93.
317. Fernandez A, Schillinger D, Grumbach K, Rosenthal A, Stewart A, Wang F et al. Physician language ability and cultural competence: and exploratory study of communication with Spanish-speaking patients. *J Gen Intern Med* 2004;19:167-74.
318. Furler J, Stewart A, Sims J, Naccarella L. Patient social and economic circumstances: GP perceptions and their influence on management. *Australian Family Physician* 2005;34:189-92.
319. Karliner L, Perez-Stable E, Gildengorin G. The language divide: the importance of training in the use of interpreters for outpatient practice. *J Gen Intern Med* 2004;19:175-83.
320. Suurmond J, Seeleman C. Shared decision-making in an intercultural context: barriers in the interaction between physicians and immigrant patients. *Patient Educ Couns* 2006;60:253-9.
321. van Wieringen J, Harmsen J, Bruijnzeels M. Intercultural communication in general practice. *Eur J Public Health* 2002;12:63-8.
322. Willems S, Swinnen W, De Maeseneer J. The GP's perception of poverty: a qualitative study. *Fam Pract* 2005;22:177-83.
323. Cooper L, Beach C, Johnson R, Inui T. Delving below the surface. Understanding how race and ethnicity influence relationships in health care. *J Gen Intern Med* 2006;21:S21-27.
324. Furler J, Harris E, Chondros P, Powell Davies G, Harris M, Young D. The inverse care law revisited: impact of disadvantaged location on accessing longer GP consultation times. *Med J Aust* 2002;177:80-3.
325. Ngo-Metzger Q, Legedza A, Phillips R. Asian Americans' reports of their health care experiences. Results of a national survey. *J Gen Intern Med* 2004;19:111-9.
326. Willems S, De Maesschalck S, Deveugele M, Derese A, De Maeseneer J. Socio-economic status of the patient and doctor-patient communication: does it make a difference? *Patient Educ Couns* 2005;56:139-146.
327. van Ryn M, Burke J. The effect of patient race and socio-economic status on physicians' perceptions of patients. *Soc Sci Med* 2000;50:813-28.
328. Piette J, Bibbins-Domingo K, Schillinger D. Health care discrimination, processes of care, and diabetes patients' health status. *Patient Educ Couns* 2006;60:41-8.
329. Johnson R, Saha S, Arbelaez J, Beach M, Cooper L. Racial and ethnic differences in patient perceptions of bias and cultural competence in health care. *J Gen Intern Med* 2004;19:101-10.
330. Balsa A, McGuire T. Prejudice, clinical uncertainty and stereotyping as sources of health disparities. *J Health Econ* 2003;22:89-116.
331. Moss B, Roberts C. Explanations, explanations, explanations: how do patients with limited English construct narrative accounts in multi-lingual, multi-ethnic settings, and how can GPs interpret them. *Fam Pract* 2005;22:412-8.
332. Knox S, Britt H. A comparison of general practice encounters with patients from English-speaking and non-English-speaking backgrounds. *Med J Aust* 2002;177:98-101.
333. Green A, Ngo-Metzger Q, Legedza A, Massagli M, Phillips R, Iezzoni L. Interpreter services, language concordance, and health care quality. *J Gen Intern Med* 2005;20:1050-6.
-

-
334. Kavanagh A, Goller J, King T, Jolley D, Crawford D, Turrell G. Urban area disadvantage and physical activity: a multilevel study in Melbourne, Australia. *J Epidemiol Community Health* 2005;59:934-40.
335. Laaksonen M, Prattala R, Helasoja V, Lahelma E. Income and health behaviours. Evidence from monitoring surveys among Finnish adults. *J Epidemiol Community Health* 2003;57:711-7.
336. Lindstrom M, Hanson B, Wirfalt E, Ostergren P. Socioeconomic differences in the consumption of vegetables, fruit and fruit juices. *Eur J Public Health* 2001;11:51-9.
337. Martikainen P, Brunner E, Marmot M. Socioeconomic differences in dietary patterns among middle-aged men and women. *Soc Sci Med* 2003;56:1397-410.
338. Shohaimi S, Welch A, Bingham S, Luben R, Day N, Wareham N, et al. Residential area deprivation predicts fruit and vegetable consumption independently of individual educational level and occupational social class: a cross sectional population study in the Norfolk cohort of the European Prospective Investigation into Cancer (EPIC-Norfolk). *J Epidemiol Community Health* 2004;58:686-91.
339. Turrell G, Hewitt B, Patterson C, Oldenburg B, Gould T. Socioeconomic differences in food purchasing behaviour and suggested implications for diet-related health promotion. *J Human Nutrition Dietetics* 2002;15:355-64.
340. Turrell G, Blakely T, Patterson C, Oldenburg B. A multilevel analysis of socioeconomic (small area) differences in household food purchasing behaviour. *J Epidemiol Community Health* 2004;58:208-15.
341. Wardle J, Steptoe A. Socioeconomic differences in attitudes and beliefs about healthy lifestyles. *J Epidemiol Community Health* 2003;57:440-3.
342. Lynch JW, Kaplan GA, Salonen JT. Why do poor people behave poorly? Variation in adult health behaviours and psychosocial characteristics by stages of the socioeconomic lifecourse. *Soc Sci Med* 1997;44:809-19.
343. De Irala-Estevez J, Groth M, Johansson L, Oltersdorf U, Prattala R, Martinez-Gonzalez M. A systematic review of socio-economic differences in food habits in Europe: consumption of fruit and vegetables. *Eur J Clin Nutrition* 2000;54:706-14.
344. Brown A, Ettner S, Piette J, Weinberger M, Gregg E, Shapiro M, et al. Socioeconomic position and health among persons with diabetes mellitus: a conceptual framework and review of the literature. *Epidemiol Rev* 2004;26:63-77.
345. Tunstall H, Shaw M, Dorling D. Places and health. *J Epidemiol Community Health* 2004;58:6-10.
346. Kawachi I, Subramanian S, Almeida-Filho N. A glossary for health inequalities. *J Epidemiol Community Health* 2002;56:647-52.
347. Cubbin C, Winkleby M. Protective and harmful effects of neighbourhood-level deprivation on individual-level health knowledge, behavior changes, and risk of coronary heart disease. *Am J Epidemiol* 2005;162:559-68.
348. Taylor SE, Repetti RL, Seeman T. Health psychology: what is an unhealthy environment and how does it get under the skin? *Annu Rev Psychol* 1997;48:411-47.
349. Walker C, Peterson C. Contextualising indicators of socio-economic status: chronic illness as lived experience of SES. *Australian Journal of Primary Health* 2003;9:141-148.
350. Bayliss E, Steiner J, Fernald D, Crane L, Main D. Descriptions of barriers to self-care by persons with comorbid chronic diseases. *Ann Fam Med* 2003;1:15-21.
351. Jerant A, von Friederichs-Fitzwater M, Moore M. Patients' perceived barriers to active self-management of chronic conditions. *Patient Educ Couns* 2005;57:300-7.
352. Karter A, Stevens M, Herman W, Ettner S, Marrero D, Safford M, et al. Out-of-pocket costs and diabetes preventive services. *Diabetes Care* 2003;26:2294-9.
353. Nyomba B, Berard L, Murphy L. The cost of self-monitoring blood glucose is an important factor limiting glycemic control in diabetic patients. *Diabetes Care* 2002;25:1244-5.
354. Piette J, Heisler M, Wagner T. Cost-related medication underuse among chronically ill adults: the treatments people forgo, how often, and who is at risk. *Am J Public Health* 2004;94:1782-7.
355. Wilson I, Rogers W, Chang H, Safran D. Cost-related skipping of medications and other treatments among Medicare beneficiaries between 1998 and 2000. *J Gen Intern Med* 2005;20:715-20.
356. Zgibor J, Songer J. External barriers to diabetes care: addressing personal and health systems issues. *Diabetes Spectrum* 2001;14:23-8.
357. Bowler S, Mitchell C, Majumdar S, Toth E, Johnson J. Lack of insurance coverage for testing supplies is associated with poorer glycemic control in patients with type 2 diabetes. *Can Med Assoc J* 2004;171:39-43.
-

-
358. Morris J, Donkin A, Wonderling D, Wilkinson P, Dowler E. A minimum income for healthy living. *J Epidemiol Community Health* 2000;54:885-9.
359. Piette J, Heisler M, Horne R, Alexander G. A conceptually based approach to understanding chronically ill patients' responses to medication cost pressures. *Soc Sci Med* 2006;62:846-57.
360. Walker C. Some illnesses are more expensive to live with than others. Melbourne: Chronic Illness Alliance; 1997.
361. Barnett R. Coping with the costs of primary care? Household and locational variations in the survival strategies of the urban poor. *Health Place* 2001;7:141-57.
362. Pearson M, Dawson C, Moore H, Spencer S. Health on borrowed time? Prioritizing and meeting needs in low-income households. *Health Soc Care* 1992;1:45-54.
363. Drenowski A, Darmon N, Briend A. Replacing fats and sweets with vegetables and fruits: a question of cost. *Am J Public Health* 2004;94:1555-9.
364. Schaffheutle E, Hassell K, Noyce P, Weiss M. Access to medicines: cost as an influence on the views and behaviour of patients. *Health Soc Care Community* 2002;10:197-95.
365. Alexander G, Casalino L, Tseng C, McFadden D, Meltzer D. Barriers to patient-physician communication about out-of-pocket costs. *J Gen Intern Med* 2004;19:856-60.
366. Paasche-Orlow M, Parker R, Gazmararian J, Nielsen-Bohlman L, Rudd R. The prevalence of limited health literacy. *J Gen Intern Med* 2005;20:175-84.
367. Schillinger D, Grumbach K, Piette J, Wang F, Osmond D, Daher C, et al. Association of health literacy with diabetes outcomes. *JAMA* 2002;288:475-82.
368. Hsu W, Cheung S, Ong E, et al. Identification of linguistic barriers to diabetes knowledge and glycemic control in Chinese Americans with diabetes. *Diabetes Care* 2006;29:415-6.
369. Baker D, Parker R, Williams M, Clark W. Health literacy and the risk of hospital admission. *J Gen Intern Med* 1998;13:791-8.
370. Howard D, Gazmararian J, Parker R. The impact of low health literacy on the medical costs of Medicare managed care enrollees. *Am J Med* 2005;118:371-7.
371. Speros C. Health literacy: concept analysis. *Journal of Advanced Nursing* 2005;50:633-40.
372. Gazmararian J, Williams M, Peel J, Baker D. Health literacy and knowledge of chronic disease. *Patient Educ Couns* 2003;51:267-75.
373. Kim S, Love F, Quistberg D, Shea J. Association of health literacy with self-management behavior in patients with diabetes. *Diabetes Care* 2004;27:2980-2.
374. Nutbeam D. Health literacy as a public health goal: a challenge for contemporary health education and communication strategies into the 21st century. *Health Prom Int* 2001;15:259-67.
375. Levin-Zamir D, Peterburg Y. Health literacy in health systems: perspectives on patient self-management in Israel. *Health Prom Int* 2001;16:87-94.
376. Kickbusch I. Health literacy: addressing the health and education divide. *Health Prom Int* 2001;16:289-97.
377. Parker R. Health literacy: a challenge for American patients and their health care providers. *Health Prom Int* 2001;15:277-83.
378. Williams M, Davis T, Parker R, Weiss B. The role of health literacy in patient-physician communication. *Fam Med* 2002;34:383-9.
379. Mayeaux E, Murphy P, Arnold C, Davis T, Jackson R, Sentell T. Improving patient education for patients with low literacy skills. *Am Fam Physician* 1996;53:205-11.
380. Davis T, Mayeaux E, Fredrickson D, Bocchini J, Jackson R, Murphy P. Reading ability of parents compared with reading level of pediatric patient education materials. *Pediatrics* 1994;93:460-8.
381. Berland G, Elliott M, Morales L, Algazy J, Kravitz R, Broder M et al. Health information on the internet: accessibility, quality, and readability in English and Spanish. *JAMA* 2001;285:2612-21.
382. Ralston J, Revere D, Robins L, Goldberg H. Patients' experience with a diabetes support programme based on an interactive electronic medical record: qualitative study. *BMJ* 2004;328:1159-63.
383. Kwon H, Cho J, Kim H, Song B, Ko S, Lee J, et al. Establishment of blood glucose monitoring system using the internet. *Diabetes Care* 2004;27:478-83.
384. Plescia M, Groblewski M. A community-oriented primary care demonstration project: refining interventions for cardiovascular disease and diabetes. *Ann Fam Med* 2004;2:103-9.
385. Addy C, Wilson D, Kirtland K, Ainsworth B, Sharpe P, Kimsey D. Associations of perceived social and physical environmental supports with physical activity and walking behavior. *Am J Public Health* 2004;94:440-3.
386. Ball K, Bauman A, Leslie E, Owen N. Perceived environmental aesthetics and convenience and company are associated with walking for exercise among Australian adults. *Prev Med* 2001;33:434-40.
-

-
387. Duncan M, Mummery K. Psychosocial and environmental factors associated with physical activity among city dwellers in regional Queensland. *Prev Med* 2005;40:363-72.
388. Ellaway A, Macintyre S, Bonnefoy X. Graffiti, greenery, and obesity in adults: secondary analysis of European cross sectional survey. *BMJ* 2005;doi:10.1136/bmj.38575.664549.F7.
389. King W, Belle S, Brach J, Simkin-Silverman L, Soska T, Kriska A. Objective measures of neighborhood environment and physical activity in older women. *Am J Prev Med* 2005;28:461-9.
390. van Lenthe F, Brug J, Mackenbach J. Neighbourhood inequalities in physical inactivity: the role of neighbourhood attractiveness, proximity to local facilities and safety in the Netherlands. *Soc Sci Med* 2005;60:763-75.
391. Green G, Gilbertson J, Grimsley M. Fear of crime and health in residential tower blocks. A case study in Liverpool, UK. *Eur J Public Health* 2002;12:10-15.
392. Moore L, Diez Roux A. Associations of neighborhood characteristics with the location and type of food stores. *Am J Public Health* 2006;96:325-31.
393. Block J, Scribner R, DeSalvo K. Fast food, race/ethnicity, and income: a geographic analysis. *Am J Prev Med* 2004;27:211-7.
394. Cummins S, McKay L, MacIntyre S. McDonald's restaurants and neighbourhood deprivation in Scotland and England. *Am J Prev Med* 2005;29:308-10.
395. Morland K, Wing S, Diez Roux A. The contextual effect of the local food environment on residents' diets: The Atherosclerosis Risk in Communities Study. *Am J Public Health* 2002;92:1761-7.
396. Ellaway A, Macintyre S. Shopping for food in socially contrasting localities. *Br Food J* 2000;102:52-7.
397. Sloane D, Diamant A, Lewis L, Yancey A, Flynn G, Nascimento L, et al. Improving the nutritional resource environment for healthy living through community-based participatory research. *J Gen Intern Med* 2003;18:568-75.
398. Horowitz C, Colson K, Hebert P, Lancaster K. Barriers to buying healthy foods for people with diabetes: evidence of environmental disparities. *Am J Public Health* 2004;94:1649-54.
399. Schillinger D, Grumbach K, Piette J, Wang F, Osmond D, Daher C, et al. Association of health literacy with diabetes outcomes. *Journal of the American Medical Association* 2002;288:475-482.
400. Darmon N, Ferguson E, Briend A. A cost constraint alone has adverse effects on food selection and nutrient density: an analysis of human diets by linear programming. *Journal of Nutrition* 2002;132(12):3764-3771.
401. Steptoe A, Perkins-Porras L, McKay C, Rink E, Hilton S, Cappuccio F. Psychological factors associated with fruit and vegetable intake with biomarkers in adults from a low-income neighbourhood. *Health Psychology* 2003;22(2):148-155.
402. Blaxter M. Whose fault is it? People's own conceptions of the reasons for health inequalities. *Social Science & Medicine* 1997;44(6):747-56.
403. Wardle J, Steptoe A. Socioeconomic differences in attitudes and beliefs about healthy lifestyles. *Journal of Epidemiology & Community Health* 2003;57:440-443.
404. Oldroyd J, Proudfoot J, Infante F, Powell Davies G, Bubner T, Holton C, et al. Providing healthcare for people with chronic illness: the views of Australian GPs. *Medical Journal of Australia* 2003;179:30-33.
405. Carlisle R, Avery A, Marsh P. Primary care teams work harder in deprived areas. *Journal of Public Health Medicine* 2002;24(1):43-48.
406. Furler J, Harris E, Chondros P, Powell Davies G, Harris M, Young D. The inverse care law revisited: impact of disadvantaged location on accessing longer GP consultation times. *Medical Journal of Australia* 2002;177:80-83.
407. Peyrot M. Theory in behavioral diabetes research. *Diabetes Care* 2001;24:1703-5.
408. Anderson R, Funnell M, Hernandez C. Choosing and using theories in diabetes education research. *Diabetes Educ* 2005;31:513-8.
409. Srinivasan M, Przyblski M, Swigonski N. The Oregon Health Plan. Predictors of office-based diabetic quality of care. *Diabetes Care* 2001;24:162-7.
410. Ridgeway N, Harvill D, Harvill L, Falin T, Forester G, Gose O. Improved control of type 2 diabetes mellitus: a practical education/behavior modification program in a primary care clinic. *South Med J* 1999;92:667-72.
411. Alderson P. The importance of theories in health care. *BMJ* 1998;317:1007-10.
412. Whiteley B. Principles of research in behavioral science. 2nd edition ed. New York: McGraw-Hill; 2002.
413. Baron R, Kenny D. The moderator-mediator variable distinction in social psychological research: conceptual, strategic and statistical considerations. *J Pers Soc Psychol* 1986;51:1173-82.
-

-
414. Hanney S, Gonzalez-Block M, Buxton M, Kogan M. The utilisation of health research in policy-making: concepts, examples and methods of assessment. *Health Res Policy Syst* 2003;1:2. Published online January 13 2003. doi:10.1186/1478-4505-1-2.
415. Dobrow M, Goel V, Upshar R. Evidence-based health policy: context and utilisation. *Soc Sci Med* 2004;58:207-17.
416. Bowen S, Zwi A. Pathways to "evidence-informed" policy and practice: a framework for action. *PLoS Med* 2005;2:e166.
417. Ruback R, Innes C. The relevance and irrelevance of psychological research: the example of prison crowding. *Am Psychol* 1988;43:683-93.
418. Weinstein N, Rothman A. Revitalizing research on health behavior theories. *Health Educ Res* 2005;20:194-7.
419. Rose V. Assessing consumers ratings of quality in general practice requires more than just rating scales. *Health Issues* 2005;83:18-21.
420. Ford G. Patient satisfaction surveys in Australian public hospitals. *Health Issues* 2001;68:21-5.
421. Williams B, Coyle J, Healy D. The meaning of patient satisfaction: an exploration of high reported levels. *Soc Sci Med* 1998;47:1351-9.
422. Moffatt S, White M, Mackintosh J, Howel D. Using quantitative and qualitative data in health services research - what happens when mixed method findings conflict? *BMC Health Serv Res* 2006;6:28. Published online 8 March 2006. doi:10.1186/1472-6963-6-28.
423. Kalucy L. Evaluating coordinated care: complex problems do not have simple solutions. *Australian Journal of Primary Health - Interchange* 1999;5:33-42.
424. Creswell J, Fetters M, Ivankova N. Designing a mixed methods study in primary care. *Arch Fam Med* 2004;2:7-12.
425. Creswell J, Plano Clark V, Gutmann M, Hanson W. Advanced mixed methods research designs. In: Tashakkori A, Teddlie C, editors. *Handbook of mixed methods in social and behavioral research*. Thousand Oaks, California: Sage Publications; 2003.
426. Morgan D. Practical strategies for combining qualitative and quantitative methods: applications to health research. *Qualitative Health Research* 1998;8:362-76.
427. Tashakkori A, Teddlie C. *Handbook of mixed methods in social and behavioral research*. Thousand Oaks, California: Sage Publications; 2003.
428. King T. Racial disparities in clinical trials. *New Eng J Med* 2002;346:1400-2.
429. Noah B. The participation of underrepresented minorities in clinical research. *Am J Law Med* 2003;29:221-38.
430. Aldrich R, Kemp L, Williams J, Harris E, Simpson S, Wilson A et al. Using socioeconomic evidence in clinical practice guidelines. *BMJ* 2003;327:1283-5.
431. Foster M, Kendall E, Dickson P, Chaboyer W, Hunter B, Gee T. Participation and chronic disease self-management: are we risking inequitable resource allocation? *Australian Journal of Primary Health* 2003;9:132-40.
432. Garfield S, Malozowski S, Chin M, Narayan K, Glasgow R, Green L, et al. Considerations for diabetes translational research in real-world settings. *Diabetes Care* 2003;26:2670-3.
433. Greenhalgh T, Collard A, Begum N. Sharing stories: complex intervention for diabetes education in minority ethnic groups who do not speak English. *BMJ* 2005;330:628-34.
434. Morse J. Approaches to qualitative-quantitative methodological triangulation. *Nurs Res* 1991;40:120-3.
435. Rice P, Ezzy D. *Qualitative research methods: a health focus*. Melbourne: Oxford University Press; 1999.
436. Fairfield City Council. State of the community report 2003; Retrieved 10 June 2003 from <http://www.fairfieldcity.nsw.gov.au/upload/rllsg56174/State%20of%20Community%20Report%20the%20Final%20document.pdf>.
437. WHO Regional Office for Europe. Social determinants of health. The solid facts. Copenhagen: World Health Organization; 1998.
438. Green S. How many subjects does it take to do a regression analysis? *Multivariate Behavioral Research* 1991;25:499-510.
439. Jaccard J, Turrisi R, Wan C. Interaction effects in multiple regression. Newbury Park, CA: Sage; 1990.
440. Cohen J. A power primer. *Psychol Bull* 1992;112:155-9.
441. Toobert D, Glasgow R. Assessing diabetes self-management: the summary of diabetes self-care activities questionnaire. In: Bradley C, editor. *Handbook of psychology and diabetes*. Chur, Switzerland: Harwood Academic; 1994.
-

-
442. Toobert D, Hampson S, Glasgow R. The Summary of Diabetes Self-Care Activities Measure. Results from 7 studies and a revised scale. *Diabetes Care* 2000;23:943-50.
443. Pajares F, Hartley J, Valiante G. Response format in writing self-efficacy assessment: greater discrimination increases prediction. *Measurement and Evaluation in Counseling and Development* 2001;33:214-221.
444. Rapley P, Passmore A, Phillips M. Review of the psychometric properties of the Diabetes Self-Efficacy Scale: Australian longitudinal study. *Nursing and Health Sciences* 2003;5:289-97.
445. National Primary Care Research and Development Centre. General Practice Assessment Questionnaire (GPAQ) Manual. Manchester: University of Manchester; 2003.
446. Ramsay J, Campbell J, Schroter S, Green J, Roland M. The General Practice Assessment Survey (GPAS): tests of data quality and measurement properties. *Fam Pract* 2000;17:372-9.
447. Campbell J, Ramsay J, Green J. Age, gender, socioeconomic, and ethnic differences in patients' assessments of primary health care. *Qual Safety Health Care* 2001;10:90-5.
448. Bower P, Mead N, Roland M. What dimensions underlie patient responses to the General Practice Assessment Survey? A factor analytic study. *Fam Pract* 2002;19:489-95.
449. Rose V. Socioeconomic barriers to diabetes self-care: development of a factor analytic scale. *Australasian Epidemiologist* 2005;12:15-7.
450. Nelson M. Recruitment in primary care research. *Australian Family Physician* 2004;33:1039-40.
451. Bowling A. Mode of questionnaire administration can have serious effects on data quality. *Am J Public Health* 2005;27:281-91.
452. Tabachnick B, Fidell L. Using multivariate statistics. USA: Allyn & Bacon; 2001.
453. Killip S, Mahfoud Z, Pearce K. What is an intraclass correlation coefficient? Crucial concepts for primary care researchers. *Ann Fam Med* 2004;2:294-308.
454. Perneger T. What's wrong with Bonferroni adjustments. *BMJ* 1998;316:1236-8.
455. Aiken L, West S. Multiple regression: testing and interpreting interactions. Newbury Park, CA: Sage; 1991.
456. Frazier P, Tix A, Barron K. Testing moderator and mediator effects in counseling psychology research. *J Couns Psychol* 2004;51:115-34.
457. Judd C, McClelland G, Culhane S. Data analysis: continuing issues in the everyday analysis of psychological data. *Annu Rev Psychol* 1995;46:433-65.
458. Groenewald T. A phenomenological research design illustrated. *International Journal of Qualitative Methods* 2004;3:4. Retrieved 4 June 2004 from http://www.ualberta.ca/~ijqm/backissues/3_1/pdf/groenewald.pdf.
459. Giorgi A, Giorgi B. Phenomenology. In: Smith J, editor. *Qualitative psychology: a practical guide to research methods*. London: Sage; 2003.
460. Ritchie J, Herscovitch F. From Likert to love it: engaging blue collar workers in focus group inquiries. *J Occup Health Safety - Aust N Z* 1995;11:471-9.
461. Stewart D, Shamdasani P. Focus groups: theory and practice. Thousand Oaks, CA: Sage; 1990.
462. Smith J, Osborn M. Interpretative phenomenological analysis. In: Smith J, editor. *Qualitative psychology: a practical guide to research methods*. London: Oxford University Press; 2003.
463. McLafferty I. Focus group interviews as a data collecting strategy. *J Adv Nurs* 2004;48:187-94.
464. Kitzinger J. The methodology of focus groups: the importance of interactions between research participants. *Sociol Health Illness* 1994;16:103-21.
465. Kitzinger J. Qualitative research: introducing focus groups. *BMJ* 1995;311:299-302.
466. Kaplowitz M. Statistical analysis of sensitive topics in group and individual interviews. *Quality and Quantity* 2000;34:419-31.
467. Webb C, Kevern J. Focus groups as a research method: a critique of some aspects of their use in nursing research. *J Adv Nurs* 2001;33:798-805.
468. Wilkinson S. Focus group methodology: a review. *International Journal of Social Research Methodology* 1998;1:181-203.
469. Russell C, Gregory D. Evaluation of qualitative research studies. *Evidence Based Nurs* 2003;6:36-40.
470. Twohig P, Putnam W. Group interviews in primary care research: advancing the state of the art of ritualized research? *Fam Pract* 2002;19:278-84.
471. Temple B, Edwards R. Interpreters/translators and cross-language research: reflexivity and border crossings. *International Journal of Qualitative Methods* 2002;1:1. Retrieved 15 March 2003 from <http://www.ualberta.ca/~ijqm/>.
-

-
472. Morse J, Barrett M, Mayan M, Olson K, Spiers J. Verification strategies for establishing reliability and validity in qualitative research. *International Journal of Qualitative Methods* 2002;1:2. Retrieved 15 March 2003 from <http://www.ualberta.ca/~ijqm/>.
473. Mays N, Pope C. Assessing quality in qualitative research. *BMJ* 2000;320:50-2.
474. Barbour R. Checklists for improving rigour in qualitative research: a case of the tail wagging the dog? *BMJ* 2001;322:1115-7.
475. Gross R, Olfson M, Gameroff M, Carasquillo O, Shea S, Feder A, et al. Depression and glycemic control in hispanic primary care patients with diabetes. *J Gen Int Med* 2005;20:460-6.
476. Humphreys J, Jones J, Jones M, Hugo G, Bamford E, Taylor D. A critical review of rural medical workforce retention in Australia. *Aust Health Rev* 2001;24:91-102.
477. McDermott R, Rowley K, Lee A, Knight S, O'Dea K. Increase in prevalence of obesity and diabetes and decrease in plasma cholesterol in a central Australian Aboriginal community. *Med J Aust* 2000;172:480-4.
478. Diabetes Australia. Identification of priority needs for nutrition information materials to cater for Australia's culturally and linguistically diverse (CALD) communities: Diabetes Australia.
479. Nathan S, Rotem T, Haora P. Utilisation review of selected outpatient services by population groups in South Eastern Sydney Area Health Service. Diabetes Centre, Prince of Wales Hospital: South Eastern Sydney Area Health Service; 2001.
480. Nathan S, Rotem T, Furber S, Haora P. Utilisation review of selected outpatient services by population groups in South Eastern Sydney Area Health Service. Diabetes Education Centre, St George Hospital and Community Health Service: South Eastern Sydney Area Health Service; 2001.
481. Kline P. An easy guide to factor analysis. Cornwall, UK: Routledge; 1994.
482. Bryman A, Cramer D. Quantitative data analysis with SPSS release 10 for windows: a guide for social scientists. New York: Routledge; 2001.
483. Krieger N, Williams D, Moss N. Measuring social class in US public health research: concepts, methodologies, and guidelines. *Annu Rev Public Health* 1997;18:341-78.
484. Bruce D, Davis W, Cull C, Davis T. Diabetes education and knowledge in patients with type 2 diabetes from the community. The Fremantle Diabetes Study. *J Diabetes Complications* 2003;17:82-9.
485. Coonrod B, Betschart J, Harris M. Frequency and determinants of diabetes education among adults in the U.S. population. *Diabetes Care* 1994;17:852-8.
486. Strine T, Okoro C, Chapman D, Beckles G, Balluz L, Mokdad A. The impact of formal diabetes education on the preventive health practices and behaviors of persons with type 2 diabetes. *Prev Med* 2005;41:79-84.
487. Morgan D. Focus groups as qualitative research. Thousand Oaks, CA: Sage; 1988.
488. Krueger R. Focus groups: a practical guide for applied research. Thousand Oaks, CA: Sage; 1988.
489. Twohig P, Putnam W. Group interviews in primary care research: advancing the state of the art of ritualized research? *Family Practice* 2002;19:278-284.
490. Behling O, Law K. Translating questionnaires and other research instruments: problems and solutions. Thousand Oaks, California: Sage Publications; 2000.
491. Aranguri C, Davidson B, Ramirez R. Patterns of communication through interpreters: a detailed sociolinguistic analysis. *J Gen Intern Med* 2006;21:623-9.
492. DiMatteo R. Social support and patient adherence to medical treatment: a meta-analysis. *Health Psychol* 2004;23:207-18.
493. Harris M, Hobbs C, Powell Davies G, Simpson S, Bernard D, Stubbs A. Implementation of a SNAP intervention in two divisions of general practice: a feasibility study. *Med J Aust* 2005;183:S54-8.
494. Alazri M, Neal D. The association between satisfaction with services provided in primary care and outcomes in Type 2 diabetes mellitus. *Diabet Med* 2003;20:486-90.
495. Collins K, O'Cathain A. The continuum of patient satisfaction - from satisfied to very satisfied. *Soc Sci Med* 2003;57:2465-70.
496. Freeman J, Loewe R. Barriers to communication about diabetes mellitus: patients' and physicians' different view of the disease. *J Fam Pract* 2000;49:507-12.
497. Parchman M, Romero R, Pugh J. Encounters by patients with type 2 diabetes - complex and demanding: an observational study. *Ann Fam Med* 2006;4:40-5.
498. Deveugele M, Derese A, De Bacquer D, van den Brink-Muinen A, Bensing J, De Maeseneer J. Consultation in general practice: a standard operating procedure? *Patient Educ Couns* 2004;54:227-33.
499. Martin C, Banwell C, Broom D, Nisa M. Consultation length and chronic illness care in general practice: a qualitative study. *Med J Aust* 1999;171:77-81.
-

-
500. Pollock K, Grime J. Patients' perceptions of entitlement to time in general practice consultations for depression: qualitative study. *BMJ* 2002;325:687-92.
501. Gilson L. Trust and the development of health care as a social institution. *Soc Sci Med* 2003;56:1453-68.
502. Tran A, Haidet P, Street R, O'Malley K, Martin F, Ashton C. Empowering communication: a community-based intervention for patients. *Patient Educ Couns* 2004;52:113-21.
503. Walker A, Becker N. Health inequalities across socio-economic groups: comparing geographic-area-based and individual-based indicators. *Public Health* 2005;119:1097-104.
504. Donovan J. The benefits of the Pharmaceutical Benefits Scheme to the Australian community and the impact of increased copayments. *Health Issues* 2002;71:17-20.
505. Bartley M, Blane D, Montgomery S. Socioeconomic determinants of health. *Health and the life course: Why safety nets matter*. *BMJ* 1997;314:1194-8.
506. Hawkes R, Ford G. Pain, penny-pinching and positive ageing: how charging fees for health services affects older women. Melbourne: Brotherhood of St Laurence; 2001.
507. Paradies Y. Confounding and interaction in epidemiology. *Australasian Epidemiologist* 2005;12:23-5.
508. Chapin R, Williams D, Adair R. Diabetes control improved when inner-city patients received graphic feedback about glycosylated hemoglobin levels. *J Gen Intern Med* 2003;18:120-4.
509. Szreter S, Woolcock M. Health by association? Social capital, social theory, and the political economy of public health. *Int J Epidemiol* 2004;33:650-67.
510. Edwards C, Staniszewska S, Crichton N. Investigation of the ways in which patients' reports of their satisfaction with healthcare are constructed. *Sociol Health Illness* 2004;26:159-83.
511. Staniszewska S, Henderson L. Patients evaluations of their health care: the expression of negative evaluation and the role of adaptive strategies. *Patient Educ Couns* 2004;55:185-92.
512. Wolpert H, Anderson B. Management of diabetes: are doctors framing the benefits from the wrong perspective? *BMJ* 2001;323:994-6.
513. Macfarlane J, Holmes W, Macfarlane R, Britten N. Influence of patients' expectations on antibiotic management of acute lower respiratory tract illness in general practice: questionnaire study. *BMJ* 1997;315:1211-4.
514. Britten N. Patients' demands for prescriptions in primary care. *BMJ* 1995;310:1084-5.
515. Cockburn J, Pit S. Prescribing behaviour in clinical practice: patients' expectations and doctors' perceptions of patients' expectations--a questionnaire study. *BMJ* 1997;315:520-3.
516. Little P, Dorward M, Warner G, Stephens K, Senior J, Moore M. Importance of patient pressure and perceived pressure and perceived medical need for investigations, referral, and prescribing in primary care: nested observational study. *BMJ* 2004;328:444-6.
517. O'Connor P. Improving diabetes care by combating clinical inertia. *Health Serv Res* 2005;40:1854-61.
518. Hayhow B, Lowe M. Addicted to the good life: harm reduction in chronic disease management. *Med J Aust* 2006;184:235-7.
519. McLeod J, Kessler R. Socioeconomic status differences in vulnerability to undesirable life events. *J Health Soc Behav* 1990;31:162-72.
520. Greenhalgh T, Seyan K, Boynton P. "Not a university type": focus group study of social class, ethnic, and sex differences in school pupils' perceptions about medical school. *BMJ* 2004;328:1541-6.
521. Snibbe A, Markus H. You can't always get what you want: educational attainment, agency, and choice. *J Personality Soc Psychol* 2005;88:703-20.
522. Popay J, Bennett S, Thomas C, Williams G, Gatrell A, Bostock L. Beyond 'beer, fags, egg and chips'? Exploring lay understandings of social inequalities in health. *Sociol Health Illness* 2003;25:1-23.
523. Singh-Manoux A, Marmot M. The role of socialisation in explaining social inequalities in health. *Soc Sci Med* 2005;60:2129-33.
524. Foster H, Tilse C. Referral to rehabilitation following traumatic brain injury: a model for understanding inequities in access. *Soc Sci Med* 2003;56:2201-10.
525. Powell Davies G, Hu W, McDonald J, Furler J, Harris E, Harris M. Developments in Australian general practice 2000-2002: what did these contribute to a well functioning and comprehensive primary health care system? *Aust New Zealand Health Policy* 2006;3. Published online 15 January 2006. doi:10.1186/1743-8462-3-1.
526. Prochaska J, DiClemente C. Transtheoretical therapy: toward a more integrative model of change. *Psychotherapy* 1982;19:276-88.
-

- 527. Bridle C, Riemsma R, Pattenden J, Sowden A, Mather L, Watt I, et al. Systematic review of the effectiveness of health behaviour interventions based on the transtheoretical model. *Psychol Health* 2005;20:283-301.
 - 528. Adams J, White M. Why don't stage-based activity promotion interventions work? *Health Educ Res* 2005;20:237-43.
 - 529. Coulter A, Entwistle V, Gilbert D. Sharing decisions with patients: is the information good enough? *BMJ* 1999;318:318-22.
 - 530. Renders C, Valk G, Griffin S, Wagner E, Eijk J, Assendelft W. Interventions to improve the management of diabetes mellitus in primary care, out-patient and community settings. *Cochrane Database of Systematic Reviews* 2001;1:CD001481.
 - 531. Piette J, Weinberger M, McPhee S. The effect of automated calls with telephone nurse follow-up on patient-centered outcomes of diabetes care: a randomized controlled trial. *Med Care* 2000;38:218-30.
 - 532. Vinker S, Nakar S, Ram R, Lustman A, Kitai E. Quality of diabetes care in the community: a cross-sectional study in central Israel. *Israel Med Assoc J* 2005;7:643-7.
 - 533. Cobin R. Subspecialist care improves diabetes outcomes. *Diabetes Care*; 2002;25:1654-6.
 - 534. Amthauer H, Gaglio B, Glasgow R, Dortch W, King D. Lessons learned: patient strategies for a type 2 diabetes intervention in a primary care setting. *Diabetes Educ* 2003; 29: 673-81.
 - 535. CGPIS. National Divisions Diabetes Program (NDDP). Divisions diabetes and CVD quality improvement project. Centre for GP Integration Studies; 2003.
-

APPENDIX A

Patient Information Sheet and Consent Form

APPENDIX B
Survey Instrument

APPENDIX C

Normality of Continuous Variables

APPENDIX D
Survey Participation by GP

APPENDIX E

Scatterplots of diabetes self-efficacy and diabetes self-management variables

APPENDIX F
Papers published from PhD Research