Providing Nutrition Care to Patients with Lifestyle-Related Chronic Disease: Exploring the Role of Australian General Practitioners

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A thesis submitted in fulfillment of the requirements of the degree of
Doctor of Philosophy
November 2012
Statement of Originality

This thesis describes original research conducted by Lauren Ball in the School of Public Health at Griffith University. This work has not previously been submitted for a degree or diploma in any university. To the best of my knowledge and belief, this thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

Lauren Ball
Acknowledgements

I am an extremely grateful and fortunate young woman. My family have instilled a love of learning within me, and have always encouraged me to strive for personal achievement. My upbringing has provided me with a strong foundation for success in my studies, which I am thankful for.

My research journey has been shaped by my charismatic supervisors, and each has contributed to my research in a unique and valuable manner. Dr Michael Leveritt has mentored me through each step of my candidature, and has an exceptional ability to foster success within his students. Associate Professor Ben Desbrow and Professor Roger Hughes have also encouraged me in my research pursuits, and my research work was always challenged and improved by their innate ability to test the boundaries. Together, the three have actively supported my development as an early career academic and I look forward to future collaborations. In addition, Associate Professor Michael Yelland was instrumental in facilitating my relationships with General Practitioners and students within the School of Medicine at Griffith University, and also provided expertise from the perspective of an experienced practitioner. Thank you for your support.

Personally, there are three members of my family that I wish to acknowledge for their support and encouragement throughout my candidature. Thank you to my twin sister, Katie, and my Mum, Dianne for their pearls of wisdom. I love how we support one another though life’s exciting adventures, despite sometimes being thousands of kilometres away. Finally, a special thank you to (soon to be) Dr Chris Irwin. We started this crazy rollercoaster ride together, and I am proud to be sharing the journey with you. Thank you for your continual love and encouragement, and I look forward to our future together!
Abstract

The prevalence of lifestyle-related chronic disease is increasing in Australia. This rise in prevalence has been attributed to a range of factors, including poor nutrition behaviour. General Practitioners (GPs) are extensively involved in the management of patients with lifestyle-related chronic disease. One component of chronic disease management is nutrition care. This refers to any practice conducted by a health professional in an attempt to improve the nutrition behaviour and subsequent health outcomes of an individual.

The role of Australian GPs in providing nutrition care has been largely unstudied. Understanding this role is fundamental to the optimal management of patients with lifestyle-related chronic disease. The national primary health care strategy recommends a patient-centred approach to health care. The aim of this thesis was to explore the role of Australian GPs in providing nutrition care to patients in the context of the current patient-centred primary care system.

This thesis describes five research studies that were designed using principles of programmatic research, whereby each study progressed on the findings of the previous study to result in a complementing body of literature. The studies were also developed using a theoretical framework of a ‘patient-centred approach to chronic disease management’. The overall findings of the studies suggest that GPs, health professionals and individuals with lifestyle-related chronic disease, all perceive nutrition care to be important in chronic disease management. However, there are variable perceptions about the role of GPs in providing nutrition care.

In Study One, the nutrition care practices of GPs were described by observing 90 general practice consultations that involved nutrition care. The study found that Australian GPs provide a range of nutrition care practices in varying frequencies. Aspects of nutrition assessment, diagnosis and advice were often provided without following a systematic approach to nutrition care. As a result, patients may be receiving inconsistent nutrition care from Australian GPs.
Given this variation, it was important to complement this study with an investigation of patients’ experiences of receiving nutrition care from GPs.

In Study Two, the experiences, expectations and satisfaction of patients regarding nutrition care provision from GPs was explored through an online survey of 939 individuals with type 2 diabetes. Nearly all patients perceived that the ideal role of GPs in their disease management included nutrition care. They also reported high levels of satisfaction with the nutrition care they received. However, the participants did not receive nutrition care from GPs as often as they perceived to be beneficial, and held varying perceptions about the effectiveness of this care.

Study Three involved a systematic review of the literature investigating the effectiveness of nutrition care provided by GPs. Emphasis was placed on evidence surrounding the ability of GPs to facilitate patients to improve their nutrition behaviour and associated risk factors for lifestyle-related chronic disease. A total of nine studies involving 9564 participants were included in the review. The results indicated that GPs are capable of providing nutrition care that improves patients’ nutrition behaviour and subsequent risk factors for lifestyle-related chronic disease. However, the reviewed trials did not account for the barriers experienced by GPs when providing nutrition care. Therefore, the results may not be representative of the usual practices of Australian GPs. Further support may be required to enhance the self-efficacy of GPs providing nutrition care within consultations.

The patient-centred framework underpinning the thesis assumed significant interaction between patients, GPs and other health professionals in the management of lifestyle-related chronic disease. It was therefore important to explore the perceptions of a range of health professionals in relation to the nutrition care provided by GPs. This premise was the basis for Study Four. Twenty-eight individual semi-structured interviews were conducted with GPs,
practice nurses, dietitians, naturopaths and exercise physiologists. The findings suggest that health professionals perceive GPs to be largely ineffective at improving patients’ nutrition behaviour. In addition, tensions were apparent between health professional groups, which may have influenced their reported perceptions.

In the final study, the future demand on GPs to provide nutrition care in a patient-centred primary care system was explored. Study Five investigated individuals’ preferences for the provision of nutrition care from Australian health professionals. Thirty-eight semi-structured interviews were conducted with individuals living with a lifestyle-related chronic disease. Results of this study identified GPs as the most recognised health profession that provides nutrition care, followed by dietitians. Furthermore, GPs were regarded as the preferred provider of nutrition care because they were perceived to provide trustworthy and personalised nutrition care. As a result, the demand on GPs to provide nutrition care to patients living with lifestyle-related chronic disease is likely to increase in the future.

Collectively, these five studies highlight an increasing expectation of GPs to provide nutrition care to patients living with lifestyle related chronic disease. As a result, the overall approach of the Australian primary care system, including the role of GPs in providing nutrition care, needs further attention in order to facilitate patient-centred, nutrition-related chronic disease management. Future research should focus on the optimal provision of patient-centred nutrition care to individuals living with lifestyle related chronic disease by (i) exploring the effectiveness of individual and collaborative approaches to nutrition care provision from different Australian health professionals; and (ii) developing a model of care that best facilitates patients to improve their nutrition behaviour and subsequent health outcomes after receiving nutrition care in the Australian primary health care setting.
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<tr>
<td>%</td>
<td>Per cent</td>
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<td>≥</td>
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<td>AEP</td>
<td>Accredited Exercise Physiologist</td>
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<td>Accredited Practising Dietitian</td>
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<td>BMI</td>
<td>Body Mass Index</td>
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<td>CDM</td>
<td>Chronic Disease Management</td>
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<td>CME</td>
<td>Continuing Medical Education</td>
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<td>CVD</td>
<td>Cardiovascular Disease</td>
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<td>DAQ</td>
<td>Diabetes Australia Queensland</td>
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<td>ESPEN</td>
<td>European Society of Parenteral and Enteral Nutrition</td>
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<td>GP</td>
<td>General Practitioner</td>
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<td>HbA1c</td>
<td>Glycosylated Haemoglobin</td>
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<td>kcals</td>
<td>Kilocalories (calories)</td>
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<td>kg</td>
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<td>PIP</td>
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<td>QCC</td>
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<td>Royal Australian College of General Practitioners</td>
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<tr>
<td>RCT</td>
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<td>RFE</td>
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<tr>
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Publications and Presentations in Support of this Thesis

The research candidate has produced seven publications from the research included in this thesis. The publications are co-authored with other researchers, and include four original research papers, one systematic literature review, one narrative literature review and one opinion piece manuscript.

The contribution of the research candidate to each publication is outlined at the front of the relevant chapter. The details of these publications are listed in order as they appear in the thesis:


In addition, the research candidate has produced seven conference presentations using the research within this thesis. The research was presented at three international conferences, three national conferences and one local conference.

The details of the presentations are listed in order of recency:

1. **Ball L, Desbrow B, Leveritt M.** Patient expectations and experiences of nutrition care in general practice: Type II diabetes as a case study (Poster). International Congress of Dietetics, Sydney 2012.


4. **Ball L, Leveritt M.** An exploration of the views held by health professionals regarding nutrition care provided by general practitioners: an Australian perspective (Oral). Society of Academics in Primary Care, Bristol 2011.

5. **Ball L, Leveritt M.** The development of an online survey to explore patient experiences of nutrition care in general practice: Type II diabetes as a case study (Poster). Society of Academics in Primary Care, Bristol 2011.

7. **Ball L**, Hughes R, Desbrow B, Leveritt M. An exploration of the views held by health professionals regarding nutrition care provided by general practitioners (Poster). Griffith University Health and Medical Research Conference, Gold Coast 2010.
Chapter 1: Introduction

1.1 Introduction to the Problem

Chronic disease is a leading cause of worldwide death and disability, and refers to conditions of long duration and slow progression\(^1\). The World Health Organization describes chronic disease as an epidemic, and recommends that all countries implement comprehensive strategies to reduce the prevalence of chronic disease\(^2\). Within Australia, the prevalence of chronic disease is increasing and is expected to contribute to over three quarters of deaths in 2020\(^3\). Individuals who are living with a chronic disease such as cardiovascular disease and type 2 diabetes require high use of health care services\(^4\). Consequently, the health care costs associated with chronic disease are increasing, and currently account for over 80% of Australia’s health care expenditure\(^5\).

The increasing prevalence of chronic disease has been attributed to a range of causes including an ageing population, and lifestyle behaviours such as smoking, physical inactivity, and poor nutrition behaviour\(^6\). Specifically, nutrition behaviour refers to an individual’s long-term dietary intake, and is a major modifiable determinant of chronic disease\(^7\). The World Health Organization recommends that national health care systems focus on improving the nutrition behaviour of populations in order to prevent and manage chronic disease\(^7\).

Australia’s universal health care system is called Medicare Australia, and is often abbreviated to ‘Medicare’\(^8\). The Australian primary care setting is embedded within the Medicare system, and is defined as the initial contact point with the health care system for individuals requiring non-emergency health care\(^9\). General Practitioners (GPs) are usually the first health professional that patients consult in the primary care setting, and contribute significantly to the health services provided in Australia. In the 2011-2012 financial year, 85% of Australians attended at least one general practice consultation\(^10\). In total, over 118 million consultations were provided, equating
to an average of five consultations per Australian\textsuperscript{11}. General Practitioners are extensively involved in the management of individuals living with chronic disease\textsuperscript{4}, and nearly one third of consultations involve this care\textsuperscript{10}.

From a health service perspective, GPs have the largest potential influence on the health of Australians compared with other health professionals who may provide nutrition care such as dietitians, nutritionists, and nurses. Currently, GPs discuss nutrition in 7\% of consultations, which equates to over 7.9 million consultations each year\textsuperscript{10}. However, limited evidence exists regarding the nutrition care that Australian GPs provide. Little is known about the manner in which GPs provide nutrition care, the effectiveness of this care, and the feasibility of providing nutrition care in standard consultations.

This thesis explores the role of GPs in providing nutrition care to patients with lifestyle-related chronic disease.
1.2 Definition of ‘Nutrition Care’

Many Australian health professionals provide health care to individuals living with chronic disease. These health professionals may advocate for patients to improve their lifestyle behaviour, including nutrition behaviour. As a result, nutrition forms a component of the health care provided by many health professionals including GPs, nurses, dietitians, nutritionists, exercise physiologists and naturopaths. The term nutrition care has previously been defined in the context of dietetic practice, but not in the context of health care provided by other health professionals, including GPs.

The aim of this section is to provide a definition of nutrition care which can be used in the context of any health professional involved in the management of individuals with chronic disease, and in the research within this thesis. Defining nutrition care is important because the assumptions of the term will influence the interpretation and implications of the research within this thesis. For the purposes of the research within this thesis, nutrition care is defined as:

‘Any practice conducted by a health professional in an attempt to improve the nutrition behaviour and subsequent health outcomes of an individual.’

This definition of nutrition care focuses on the provision of care by a health professional and does not encapsulate all patient experiences regarding nutrition. For example, a patient may read nutrition-related material within the primary care setting, however this is not considered to be part of the nutrition care investigated in this thesis.

In 2003, the American Dietetic Association developed a detailed interpretation of nutrition care in detail, and labelled this the nutrition care process. The nutrition care process includes the following steps:
• **Nutrition Assessment**: A systematic process of obtaining, verifying, and interpreting data in order to make decisions about the nature and cause of nutrition-related problems;

• **Nutrition Diagnosis**: Diagnosis of a nutrition-related problem in the intake, clinical, or behavioural-environmental domains;

• **Nutrition Intervention**: Purposely-planned actions designed with the intent of changing a nutrition-related behaviour, risk factor, environmental condition, or aspect of health status for an individual;

• **Nutrition Monitoring and Evaluation**: A comparison of current findings with previous status, intervention goals, and/or reference standards.

The *nutrition care process* has been shown to improve the consistency of care provided by dietitians, and was adopted as an international framework for dietetic practice in 2010\(^9\). One of the limitations of this approach to nutrition care is the considerable time required to complete each of the prescribed steps\(^20\). General practice consultations are limited by time, and often involve more than one presenting ‘problem’. As a result, it is anticipated that the *nutrition care process* is not transferrable to general practice consultations, and differs considerably to the *nutrition care* provided by GPs.

This thesis did not aim to investigate the use of the *nutrition care process* by GPs or other health professionals. Instead, the *nutrition care process* was utilised to inform the investigation of *nutrition care* provided by GPs. The investigation was developed utilising a research framework, which is outlined in the following section.
1.3 Research Framework

Theoretical Framework

The context of this thesis is Australia’s national primary health care strategy, which recommends a patient-centred approach to health care\(^2\). This strategy mandates health care to focus on the needs of individual patients, families and their communities. In line with this, the theoretical framework of this thesis is a ‘patient-centred approach to chronic disease management’.

Figure 1 presents the current patient-centred model of primary care in Australia, which has been adapted for this thesis. The figure consists of five concentric circles which depict the integrated relationships between patients, health care providers and the broader health care system. The model acknowledges the influence of the health care system on the care provided by health professionals, and also acknowledges the influence of health care on patients’ health outcomes.

![Figure 1.1: Theoretical framework of a patient-centred approach to chronic disease management currently utilised within the Australian primary health care system. Adapted from the Royal Australian College of General Practitioners\(^2\).]
Within the five circles of the theoretical framework, the central two circles have been highlighted and represent the interface between GPs and patients. This interface incorporates the nutrition care provided by GPs to patients, and is the focus of this thesis. Each research study within this thesis investigates this interface in a unique manner (particularly Study 1, Study 2, Study 3). The third circle has been partially highlighted because the research also considers the influence of other health professionals that operate in the primary care setting (Study 4, Study 5).

**Research Aims**

The overall objective of this thesis is to explore the role of GPs in providing nutrition care to patients with chronic disease in the context of a patient-centred, primary care setting. This thesis incorporates five aims which were developed using principles of programmatic research. Programmatic research refers to a step-by-step approach to theory development. In line with this approach, each study was developed using a logical progression from the previous study in order to create a complementing body of literature.

The five research aims are as follows:

1. Describe the practices of Australian GPs when providing nutrition care to individuals living with chronic disease.
2. Examine the experiences, expectations and satisfaction of individuals living with chronic disease regarding the nutrition care they have received from GPs.
3. Investigate the effectiveness of nutrition care provided by GPs in improving patients’ nutrition behaviour and associated risk factors for chronic disease.
4. Explore the perceptions of health professionals regarding the nutrition care provided by GPs.
5. Explore individuals’ preferences regarding the provision of nutrition care from Australian health professionals and the factors influencing their preferences.

The five aims have been met by five research studies.

**Aim 1:** *Describe the practices of Australian GPs when providing nutrition care to individuals living with chronic disease.*

This first aim was developed in order to document the manner in which GPs provide nutrition care to individuals living with chronic disease. It was imperative to describe the nutrition care practices of GPs in order to ascertain the current scope of practice for GPs. This enabled comparisons to be made to general practice guidelines and other models of nutrition care such as the dietetic nutrition care process. Study One described the nutrition care practices of 18 Australian GPs through the direct observation of consultations by 4th-year medical students during their general practice rotation. Each GP was observed for five consultations that included nutrition care, totalling 90 observed consultations.

A quantitative methodology was appropriate for this research aim as the approach allowed for many consultations to be observed, and for the frequency of nutrition care practices performed by GPs to be calculated. The methodology involved the development of a nutrition care checklist based on best practice guidelines for GPs and the dietetic nutrition care process. The checklist enabled students to be trained for data collection, thereby maximising objective data interpretation by students.

This study demonstrated that Australian GPs perform many nutrition care practices in varying frequencies. The nutrition care practices of GPs appeared to be influenced by the gender and experience of the GP. The results suggest that the nutrition care provided by Australian GPs is
likely to be highly variable. This study is presented as ‘Chapter 3: Study One - Direct Observation of the Nutrition Care Practices of Australian General Practitioners’.

**Aim 2: Examine the experiences, expectations and satisfaction of individuals living with chronic disease regarding the nutrition care they have received from GPs.**

Following the description of the nutrition care practices of Australian GPs, the second aim was developed to explore the perceptions of individuals who have received nutrition care from a GP. These perceptions are fundamental in a patient-centred model of health care. Responding to these perceptions has been shown to improve patients’ health outcomes. In particular, investigating the experiences, expectations and satisfaction of individuals living with chronic disease was integral in exploring the current role of GPs in providing nutrition care to these patients. Study Two was undertaken to examine the perceptions of individuals living with chronic disease regarding the nutrition care they have received from GPs.

A quantitative methodology was the most appropriate approach to meet this research aim because the study attempted to compare many aspects of care to the nutrition care received from GPs. A 54-item online survey was completed by 939 individuals with type 2 diabetes. Type 2 diabetes was utilised as a model disease for the study for three reasons. Firstly, type 2 diabetes is a chronic disease in which health outcomes are influenced by individuals’ nutrition behaviour. Secondly, GPs are heavily involved in the management of patients living with type 2 diabetes. Thirdly, nutrition care is a key component of existing guidelines for the management of patients with type 2 diabetes by GPs.

In this study nearly all participants (84%) perceived that the ideal management of type 2 diabetes by GPs includes nutrition care although less than half of the participants (43%) had received this care from a GP. The participants were overwhelmingly satisfied with their GP. However, they possessed varying perceptions regarding the effectiveness of GPs in providing
nutrition care. This study is presented as ‘Chapter 4: Study Two - Patients’ Perceptions of Nutrition Care Received from Australian General Practitioners’.

**Aim 3:** Investigate the effectiveness of nutrition care provided by GPs in improving patients’ nutrition behaviour and associated risk factors for chronic disease.

The third research aim was developed in response to the results of Study 2, whereby individuals demonstrated varying perceptions regarding the effectiveness of GPs in providing nutrition care. In order to investigate the effectiveness of nutrition care provided by GPs, two factors were considered to be important. Firstly, GPs’ ability to improve patients’ nutrition behaviour such as dietary fat, fibre and sodium intake by providing nutrition care; and secondly, GPs’ ability to improve patients’ risk factors for chronic disease by providing nutrition care. It was beyond the scope of this thesis to conduct a longitudinal research study that measured the effectiveness of nutrition care provided by GPs. Therefore, Study Three encompassed a systematic literature review to critically analyse previous research that has investigated the effectiveness of GPs in providing nutrition care.

The systematic review comprised of nine randomised controlled trials, totalling 9564 participants. The interventions of each study were appropriate to standard consultations and involved the provision of brief nutrition care by GPs. The systematic review demonstrated that GPs have the potential to provide nutrition care that improves patients’ nutrition behaviour and reduces risk factors for chronic disease. However, the consistency and clinical significance of the outcomes were unclear. Further investigations were recommended. The systematic review is presented as ‘Chapter 5: Study Three - Effectiveness of General Practitioners Providing Nutrition Care to Patients with Chronic Disease’.
**Aim 4: Explore the perceptions of health professionals regarding the nutrition care provided by GPs.**

The fourth research aim was to explore the perceptions of health professionals regarding the nutrition care provided by GPs. Exploring the views of health professionals that provide nutrition care was required in order to consider the role demarcation between GPs and other health professionals. This investigation also allowed for insight into interprofessional collaboration regarding nutrition care for individuals living with chronic disease. Study Four explored the perceptions of health professionals regarding the nutrition care provided by GPs to individuals living with chronic disease.

A qualitative design was the most appropriate method to meet this research aim because the study attempted to understand the perceptions of individuals with common characteristics. Semi-structured interviews were conducted with 11 GPs, 3 practice nurses, 5 dietitians, 5 naturopaths and 4 exercise physiologists to investigate the perceived appropriateness, effectiveness and capacity of GPs to provide nutrition care to patients with chronic disease. A constant-comparison approach was utilised whereby data collection and analysis occurred simultaneously in order to identify the point of data saturation.

The health professionals perceived that the nutrition care provided by GPs is mostly ineffective at improving patients’ nutrition behaviour, and various reasons were provided to support this opinion. Tensions were apparent between health professional groups, which may have influenced their reported perceptions. This study is presented as ‘Chapter 6: Study Four - Health Professionals’ Views of Nutrition Care Provided by Australian General Practitioners’.

**Aim 5: Explore individuals’ preferences regarding the provision of nutrition care from Australian health professionals and the factors influencing their preferences.**
The fifth and final aim was developed to consider the future demand on GPs to provide nutrition care to individuals with lifestyle-related chronic disease in a patient-centred, primary care system. In order to achieve this aim, it was important to clarify whether Australians prefer to receive nutrition care from GPs compared with other health professionals who provide nutrition care. Some evidence has suggested that GPs are the most trusted health professional to provide nutrition care, even more so than dietitians\(^{28,29}\). However, it was unknown whether this perception extended to the context of chronic disease management. Therefore, Study Five was undertaken to investigate individuals’ preferences for nutrition care from Australian health professionals.

A qualitative design was the most appropriate method to meet this research aim as the study attempted to understand the experiences and perceptions of individuals with common characteristics\(^{27}\). Qualitative semi-structured interviews were conducted with 38 individuals with lifestyle-related chronic disease. In line with Aim 4, a constant-comparison approach was utilised for the study, whereby data collection and analysis occurred simultaneously in order to identify the point of data saturation. As a result, data collection did not cease until the point where additional interviews were not producing new information or perceptions.

In this study, GPs were the most recognised health profession that provided nutrition care, and were regarded as preferred providers of nutrition care. Many reasons were provided to justify these preferences. The results suggest that the future demand on GPs to provide nutrition care will be significant. This final study is presented as ‘Chapter 7: Study Five - Patients’ Preferences of Nutrition Care Provision from Australian Health Professionals’.
Chapter 2: Literature Review

2.1 Introduction

The purpose of this literature review is to improve the understanding of literature relevant to the topic of this thesis. The topic of nutrition care provided by Australian GPs has been separated into three important areas of research; the patient, the GP, and the primary care setting. The first section of the review introduces the critical role that patients have in the Australian health care system and in the process of receiving nutrition care. The section discusses the nutrition literacy of patients, the access to nutrition care services in Australia, as well as patients’ expectations of GPs regarding nutrition care. The second section of the review critically analyses GPs’ education and training in nutrition, their competence to provide nutrition care and strategies previously implemented to enhance the capacity of GPs to provide nutrition care. The third section of the review provides an overview of the Australian primary care setting, including the setting-based barriers and enablers to GPs providing nutrition care to patients, and the influence of Medicare policies on the nutrition care practices of GPs.

Peer-reviewed journal articles have been identified through bibliographic databases including Medline, PubMed, ISI Web of Knowledge and Proquest using a combination of search terms including chronic disease, competency, general practice, general practitioner, health literacy, medical nutrition education, medical student, nutrition, nutrition care, obesity, patient and primary care. Literature saturation was achieved by cross-matching reference lists and forward citation searching. Grey literature including Australian Government reports, websites and associated documents were sourced to inform discussion on the Australian primary care setting. International sources of information were utilised for areas of investigation with limited scope of Australian literature, as well as for the purpose of comparing international interventions and policies with those in Australia.
2.2 The Patient

2.2.1 Preface

Australia is moving towards a patient-centred health care system. The first objective listed in the 2009 Australian Primary Health Care Reform report was to focus the Australian health care system on patients’ needs and patients’ health outcomes. For this reason, it is important to firstly review literature relating to patients’ needs and health outcomes regarding nutrition care.

Traditionally, the term ‘patient’ referred to an individual of ill-health, who was receiving medical care or treatment. However, in recognition that healthy individuals (even those living with a chronic disease) often consult health professionals, the term ‘client’, or even ‘customer’ may be more appropriate. Nevertheless, in order to maintain consistency with published literature and reports, the word ‘patient’ will be used throughout this review section.

The following review section introduces the concept of nutrition literacy, including the use of GPs as a source of nutrition information. Secondly, methods of accessing nutrition care within the Australian health care system are described. Finally, after establishing GPs as the most widely utilised and trusted health profession in Australia, patients’ expectations of GPs regarding nutrition care are investigated. This review section highlights the considerable demand on GPs to provide nutrition care to patients, and the need for further research on the nutrition care provided by GPs.
2.2.2 Nutrition Literacy of Patients

*Nutrition literacy* is a term that refers to peoples’ capacity to obtain, process, and understand basic nutrition information\(^{31}\). This term has been investigated at a population level by measuring peoples’ awareness of the relationship between nutrition and health\(^{32-34}\), as well as peoples’ understanding of healthy foods\(^{34, 35}\). Most of these investigations have occurred in Europe\(^{32, 36-38}\), and indicate that population awareness regarding the health consequences of poor nutrition is increasing\(^{33, 36}\). It appears that populations display positive attitudes towards healthy food consumption, however this is not often translated into healthy eating behaviours\(^{38, 39}\).

The determinants of population-based nutrition behaviour are complex, and extend beyond nutrition literacy. Factors such as socioeconomic status, education, healthy food access, family dynamics and personal values have each been illustrated as influences of eating behaviour\(^{28, 40, 41}\). However, nutrition literacy plays an important role for individuals attempting to improve their nutrition behaviour. The most commonly identified factor influencing long-term improvements in nutrition behaviour is the source of nutrition information utilised by individuals\(^{28, 29}\).

Nutrition information sources present through various media including books, magazines, pamphlets, radio, television, internet, family, friends and health professionals. Individuals may be unintentionally exposed to each of these nutrition information sources in their activities of daily living, or these resources may be intentionally utilised by information-seeking consumers. Nutrition information sources are not equally effective at increasing the nutrition knowledge of individuals due to variances in the medium of the information source, and the accuracy of information provided\(^{42}\). Factors that have been shown to influence individuals’ nutrition
information sources include gender, age, education level and perceived expertise of the source\textsuperscript{42, 43}.

Eight population-based surveys have examined individuals’ trust and utilisation of nutrition information sources\textsuperscript{28, 29, 32, 36, 42-45}. These studies have demonstrated similar outcomes, which are illustrated in Table 2.1.

Table 2.1: Comparison of the most trusted sources of nutrition information and the most frequently utilised sources of nutrition information, in descending order\textsuperscript{28, 29, 32, 36, 42-45}.

<table>
<thead>
<tr>
<th>Most trusted nutrition information sources</th>
<th>Most frequently utilised nutrition information sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General Practitioners</td>
<td>Television/radio advertisements</td>
</tr>
<tr>
<td>2. Dietitians</td>
<td>Magazines/newspapers</td>
</tr>
<tr>
<td>3. Family/friends</td>
<td>Family/friends</td>
</tr>
<tr>
<td>4. Magazines/newspapers</td>
<td>Health Professionals</td>
</tr>
<tr>
<td>Least. Television/radio advertisements</td>
<td>Leaflets in clinics</td>
</tr>
</tbody>
</table>

Table 2.1 highlights that the most frequently utilised nutrition information sources are not necessarily the most trusted nutrition information sources. This may be accounted for by the considerable degree of nutrition information unintentionally acquired through media and social sources\textsuperscript{28}. It is likely that individuals seek trusted sources of information when required, despite unintentionally receiving information from less trusted sources. However, no peer-reviewed literature has distinguished between intentional and unintentional sources of nutrition information.

Of the eight studies, three have separately assessed the provision of nutrition information by GPs and dietitians\textsuperscript{42, 43, 45}. These studies suggest that populations hold nutrition advice from GPs in high regard, and perceive them to have expertise in nutrition, even more so than dietitians\textsuperscript{42, 43, 45}. As a result, there may be a considerable demand on GPs to provide nutrition care to patients in Australia. However, these studies are relatively dated, and were not conducted in the Australian setting. This warrants an exploration of patients’ perceptions of nutrition care provided by Australian health professionals.
2.2.3 Accessing Nutrition Care in Australia

_Nutrition care_ was defined in Chapter 1, Section 1.2 as any practice conducted by a health professional in an attempt to improve the nutrition behaviour and subsequent health outcomes of an individual. The provision of nutrition care is not restricted to a singular health profession, and has disseminated into health professions where nutrition is not a primary focus. In Australia, patients are able to self-refer to a range of health professionals, who may include nutrition care within their scope of practice. These include, but are not limited to:

- GPs – approximately 24000 in active practice[^46],
- Practice Nurses – approximately 9000 in active practice[^47],
- Dietitians – approximately 2600 in active practice[^48],
- Nutritionists – approximately 2200 in active practice[^15],
- Exercise Physiologists – approximately 1350 in active practice[^49], and
- Naturopaths – approximately 3000 in active practice[^17].

Patients living with a chronic disease, such as cardiovascular disease or type 2 diabetes, predominantly receive health care by GPs, as these conditions are typically identified or diagnosed in general practice consultations. General Practitioners are able to refer patients on to other health professionals for integrated, collaborative care. The decision for a GP to refer a patient to another health professional for nutrition care is dependent on the characteristics of the patient and the GP. For example, positive attitudes by patients towards nutrition, and low self-efficacy of GPs towards nutrition care are both associated with increased referral rates[^50].

Within the primary care setting, patients may consult a practice nurse. Practice nurses provide supplementary care to patients before or after a general practice consultation[^47], and patients are able to receive lifestyle advice for chronic disease management, including nutrition care[^47].
Approximately 60% of general practice clinics employ at least one practice nurse, and their role in providing nutrition care is growing\textsuperscript{51}.

Patients living with a chronic disease are eligible for subsidised nutrition care services under the Medicare Chronic Disease Management initiative, which was introduced in 2004\textsuperscript{52}. This initiative involves the provision of a ‘GP Management Plan’ (previously referred to as an Enhanced Primary Care plan) which can be completed by a GP or practice nurse, and facilitates patients to be referred by their GP for up to five subsidised consultations by an allied health professional(s) within a calendar year. Patients receive a rebate of AU$52.95 from Medicare for each consultation (accurate at November 2012)\textsuperscript{11}. This policy provides an opportunity for patients to access nutrition care within the Medicare-supported system. Despite the range of practitioners who may consider nutrition care to be within their scope of practice, Accredited Practising Dietitians (APDs) are the only health profession recognised as possessing credentials based on documented and assessed nutrition competencies\textsuperscript{14}. Subsequently, APDs are the only health profession eligible to act as nutrition care providers under this initiative\textsuperscript{52}.

From a health service perspective, the capacity for health professions to provide nutrition care is variable. The maximum capacity for APDs to provide nutrition care is approximately 630,000 consultations per annum\textsuperscript{53}. As a comparison, GPs currently provide nutrition care in approximately 7% of consultations, which equates to over 7.9 million occurrences per year\textsuperscript{10}. This comparison demonstrates that Australians receive nutrition care from GPs at a greater rate than APDs, even though APDs are promoted as Australia’s ‘nutrition specialists’\textsuperscript{48}. Based on capacity, it is likely that GPs have the largest potential influence on the health of Australians compared with other health professions that provide nutrition care.
2.2.4 Patients’ Expectations of Nutrition Care by General Practitioners

Understanding patients’ expectations regarding nutrition care is essential to achieving patient satisfaction. A high level of satisfaction with a GP is associated with improved health outcomes of patients\(^{54}\), potentially due to patients being more likely to adhere to the lifestyle changes recommended by their GP. It is therefore important to investigate patients’ expectations of nutrition care provided by GPs in order to maximise the potential improvements in health outcomes as a result of this care.

Six studies have investigated patients’ expectations of GPs with regards to nutrition care\(^{55-60}\), and are summarised in Table 2.2. None of the studies were conducted in Australia, despite the considerable demand on Australian GPs to provide nutrition care. Nevertheless, these studies indicate that patients intentionally consult GPs for nutrition care and also expect GPs to provide this care. This body of literature provides impetus to explore patients’ expectations of GPs with regards to nutrition care in the Australian setting.

Two of the investigations suggest that nutrition care is not provided at the same rate as expected by patients\(^{56,57}\). As a result, it is important to explore the barriers experienced by GPs to providing nutrition care. A recent Australian study has concluded that GPs possess an unwillingness to provide nutrition care\(^{61}\). However, several factors may hinder the provision of nutrition care, and will be discussed further in Chapter 2, Section 2.4.3 (Barriers and Enablers to Nutrition Care in the Primary Care Setting).
Table 2.2: Summary of literature investigating patients’ expectations of nutrition care provided by GPs, in order of recency.

<table>
<thead>
<tr>
<th>Author &amp; Year</th>
<th>Country</th>
<th>Aim</th>
<th>Method</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Van Dillen &amp; Hiddink., 2008[55]</td>
<td>The Netherlands</td>
<td>Compare patient and doctor communicative characteristics regarding nutrition communication.</td>
<td>Interview assisted questionnaire of 603 patients (RR=65%) and 267 family doctors (RR=45%).</td>
<td>Patients more strongly believed that nutrition was an influence on health than family doctors. Patients more often rated their own nutrition knowledge as good when compared to family doctors. Family doctors showed a higher interest in nutrition than patients.</td>
</tr>
<tr>
<td>Johansson et al., 2005[56]</td>
<td>Sweden</td>
<td>Explore the extent that patients expect and receive lifestyle advice from GPs concerning alcohol, smoking, physical exercise and diet.</td>
<td>Posted quantitative questionnaire to 2890 female and 1792 male participants who had attended a GP in the previous 6 weeks (RR=69%).</td>
<td>74% of patients who expected advice concerning diet received it. 13.3% of patients received advice regarding diet. Male gender, poorer self-rated health and scheduled appointments were significant predictors of lifestyle advice.</td>
</tr>
<tr>
<td>Duaso &amp; Cheung., 2002[57]</td>
<td>UK</td>
<td>Examine patient’s recall and perceptions of lifestyle counselling received from practice nurses.</td>
<td>Posted quantitative questionnaire to 516 randomly selected patients who had attended a GP in the practice previously (RR=64%).</td>
<td>30% of patients who expected advice concerning diet received it. 5.8% of patients received advice regarding diet. Patients who received advice perceived it to be helpful.</td>
</tr>
<tr>
<td>Serra-Majem et al., 1999[58]</td>
<td>Spain</td>
<td>Investigate the relationship between attitudes towards modifying nutrition and reliance on GPs as nutrition educators.</td>
<td>Interview of 1747 participants from the Canary Islands aged 6-74 yrs (RR=67%).</td>
<td>GPs were the most commonly relied upon source for nutrition information. Positive attitudes towards improving dietary behaviours were associated with an increased reliance on GPs for education.</td>
</tr>
<tr>
<td>Eggleston et al., 1995[59]</td>
<td>UK</td>
<td>Determine patient’s preferences for receiving health promotion advice from GPs or practice nurses.</td>
<td>Posted quantitative questionnaire to 1750 patients who had attended a GP in the participating practices previously (RR=75%).</td>
<td>Nearly half of respondents expressed preferences for receiving advice on weight control from either a GP or practice nurse. Considerably fewer patients prefer advice from practice nurses only (3%) compared with a GP only (27%).</td>
</tr>
<tr>
<td>Stott &amp; Pill., 1990[60]</td>
<td>UK</td>
<td>Investigate the views of low SES women regarding the desirability of GP intervention in their lifestyle habits.</td>
<td>Quantitative questionnaire &amp; qualitative interview of 130 participants involved in a previous study[62].</td>
<td>Although the majority of women were in favour of lifestyle counselling by GPs, most respondents expected the counselling to be relevant to their presenting problem. They placed importance on their right to accept or reject the advice given.</td>
</tr>
</tbody>
</table>

*GP = General Practitioner*  
*SES = Socioeconomic Status*  
*RR = Response Rate*  
*UK = United Kingdom*
2.2.5 Summary

Patients’ nutrition literacy levels and population-based awareness of nutrition appear to be increasing. For individuals attempting to improve their nutrition behaviour, the most frequently utilised sources of nutrition information may not be the most trusted sources. International literature suggests that GPs are the most trusted source of nutrition information.

Within Australia, the provision of nutrition care is not restricted to a singular health profession. A range of health professionals may include nutrition care in their scope of practice, including GPs, practice nurses, dietitians, nutritionists, exercise physiologists and naturopaths. Patients living with a chronic disease are eligible to receive subsidised consultations with a dietitian under the Medicare Chronic Disease Management initiative. However, from a workforce capacity perspective GPs have the largest potential influence on the health of Australians compared with other health professions that provide nutrition care.

Patients intentionally consult GPs for nutrition care. It is possible that nutrition care is not provided at the same rate as expected by patients; however this is yet to be investigated in Australia. Further investigation of the perceptions of patients receiving nutrition care by GPs is warranted in Australia.
2.3 The General Practitioner

2.3.1 Preface

Australia currently boasts over twenty-four thousand GPs in active service\(^6\). Most operate in private practice arrangements and are aged between 40-60 years\(^6\). On average, an Australian GP will conduct nearly five thousand consultations each year, which totalled over 118 million consultations provided throughout Australia in the latest financial year\(^1\).

The following review section explores the feasibility of the provision of nutrition care by GPs by investigating three important practitioner-related areas. Firstly, the medical nutrition education received by GPs is reviewed as an indication of the adequacy of training in this area. Secondly, the nutrition-related knowledge, skills and attitudes of GPs are explored as an indication of whether the training has translated into a competence to provide nutrition care to patients. Lastly, initiatives that attempt to enhance the overall capacity of GPs to provide nutrition care are reviewed.

This review section highlights the perceived lack of medical nutrition education received by GPs, and debatable competence to provide nutrition care. However, the review also highlights the potential for GPs’ role in nutrition care to be enhanced through a variety of strategies.
2.3.2 General Practitioners’ Education and Training in Nutrition

Until recently, nutrition was not recognised as a medical discipline, or a central theme of medical education\(^6^4\). However, a focus on medical nutrition education has emerged since the mid 20\(^{th}\)-century as a result of the important role of nutrition in modern chronic diseases and conditions. The first published statement regarding the adequacy of medical nutrition education was in 1949, in a large investigation of nutrition and chronic disease\(^6^5\). The authors of this study stated that medical nutrition education in the USA was ‘woefully inadequate’, as the GPs involved in the study were not able to improve the nutrition behaviour of participating individuals in order to reduce their serum cholesterol levels.

Since this time, concern over inadequate medical nutrition education has continued both internationally\(^6^6\), and in Australia\(^6^7\). In 1979 the National Health and Medical Research Council (NHMRC) released guidelines for nutrition education in Australian medical schools\(^6^8\). Fifty-two nutrition topics were deemed by the NHMRC to be neglected in medical training, and listed as essential components of future medical training in Australia\(^6^9\). These topics were refined in 1993, and only 23 were regarded as essential\(^7^0\).

Limited research has explored the nutrition-related content of medical education courses in Australia. A recent study indicated that only six of the eighteen medical schools in Australia specify any nutrition content in their curricula\(^7^1\). Similar findings are reported in literature on USA medical schools. In 1985, only 27% of USA medical schools conducted a separate nutrition course\(^7^2\). Since this time, many studies report that the quantity of medical nutrition education in the USA has decreased\(^7^3\)-\(^7^6\).

Numerous barriers exist regarding the inclusion of nutrition into medical curricula. These barriers include a reduction of didactic education, and an increase of curricular content due to
medical advancements in numerous fields\textsuperscript{76-79}. Opportunities exist for the incorporation of nutrition themes into problem-based learning, which is now the primary method of medical education\textsuperscript{80, 81}. As a result, the learning experiences of students may differ over time\textsuperscript{82}, so the adequacy of medical nutrition education may be difficult to measure based on curricular review. Therefore, a more appropriate assessment of the adequacy of medical nutrition education involves an investigation of the competence level of medical graduates. The competency level of medical graduates reflects the education received throughout their medical training\textsuperscript{83}. Therefore, an investigation of GPs’ competence to provide nutrition care is warranted.
2.3.3 General Practitioners’ Competence to Provide Nutrition Care

*Competence* refers to a set of behaviours that describe capable performance in a particular role\(^84\). A level of knowledge, skills and attitudes are required to perform these behaviours, and constitute the term *competency*\(^84\). The introduction of competency standards for health care occurred in the 1980s, and aims to enhance the quality of health care provided to patients\(^84, 85\).

The strengths and limitations of competency standards have been debated since its introduction\(^86-88\). However, competency standards now exist for many Australian health professions including nurses\(^13\), dietitians\(^14\), speech pathologists\(^89\) and pharmacists\(^90\). Australian GPs do not abide by pre-determined competency standards, however the Royal Australian College of General Practitioners (RACGP) utilises competencies as the basis for curriculum guidelines. The RACGP Curriculum for Chronic Disease outlines general competencies that are expected of GPs when providing care to patients with chronic disease, but does not prescribe specific behaviours\(^91\). Therefore, the following review section explores literature relating to the competence of GPs in providing nutrition care to patients. Relevant literature have been categorised into the constituents of competence; ‘knowledge’, ‘skills’ and ‘attitudes’.

**Knowledge**

General practitioners are perceived as one of the most trusted sources of health information in the Australian community\(^92\). Despite this perception, GPs often regard themselves as ill equipped to provide nutrition-related advice to patients\(^93-95\). A perceived inadequate level of nutrition knowledge is a well-reported barrier to GPs providing nutrition care to patients\(^96-99\). Six studies have examined the nutrition-related knowledge of GPs\(^100-105\), and are summarised in Table 2.3.
Table 2.3: Summary of literature investigating the nutrition-related knowledge of GPs, in order of recency.

<table>
<thead>
<tr>
<th>Author &amp; Year</th>
<th>Country</th>
<th>Aim</th>
<th>Method</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hiddink et al., 1997&lt;sup&gt;100&lt;/sup&gt;</td>
<td>The Netherlands</td>
<td>Investigate the knowledge seeking behaviour of primary-care physicians and implementation of nutrition guidance strategies to patients.</td>
<td>Survey to random sample of 1000 primary care physicians practicing between 5-15 years in The Netherlands (63% RR).</td>
<td>Two most utilised sources of nutrition information were dietitians (72%) and literature (34%). Almost all respondents said they gave nutrition information to patients and asked patients to see a dietitian.</td>
</tr>
<tr>
<td>Kirby et al., 1995&lt;sup&gt;101&lt;/sup&gt;</td>
<td>USA</td>
<td>Explore family practice residents' nutrition knowledge and understanding of nutrition concepts, as well as discuss a method of teaching nutrition in a residency program.</td>
<td>Family practice residents participated in four teaching sessions during a 5-month period conducted by a fellow resident who was also a dietitian. Nutrition knowledge was tested pre- and post-nutrition course.</td>
<td>Participants showed a significant improvement in post-test scores of nutrition knowledge. Factors most influential in increasing residents' nutrition knowledge include increasing residents' interest in nutrition, and providing support for their knowledge and its application.</td>
</tr>
<tr>
<td>Jack et al., 1990&lt;sup&gt;102&lt;/sup&gt;</td>
<td>USA</td>
<td>A follow-up survey of family physicians' interest in and knowledge of nutrition.</td>
<td>Survey of 42 practicing family physicians previously surveyed by authors. Survey included 33 nutrition topic areas.</td>
<td>The physicians rated nutritional skills as less relevant on the second questionnaire than on the first. More emphasis on nutrition medical education may be required.</td>
</tr>
<tr>
<td>Mlodinow et al., 1989&lt;sup&gt;103&lt;/sup&gt;</td>
<td>USA</td>
<td>Assess the nutrition knowledge of family practitioners and medical students before they receive medical nutrition education.</td>
<td>Survey to random sample of 243 family physicians &amp; 218 general internists, and all 24 medical students at UCLA about to commence a class in nutrition.</td>
<td>Family physicians scored higher than medical students. A significant negative correlation was found between the number of years since graduation from medical school and respondents' knowledge about nutrition.</td>
</tr>
<tr>
<td>Dappen et al., 1986&lt;sup&gt;104&lt;/sup&gt;</td>
<td>USA</td>
<td>Examine the nutrition knowledge of residents in family practice settings.</td>
<td>Survey of 199 residents from eight family practice residences in California, USA.</td>
<td>Low level of nutrition knowledge with 54% of questions answered correctly. No differences amongst residents in terms of their year of training or who had received formal nutrition education.</td>
</tr>
<tr>
<td>Young et al., 1983&lt;sup&gt;105&lt;/sup&gt;</td>
<td>USA</td>
<td>Determine core competencies of nutrition knowledge and skills for primary care physicians.</td>
<td>Survey to 445 practicing physicians and 752 department chairpersons in every USA medical school (46% RR).</td>
<td>50 nutrition competencies were identified as essential and were intended to be used as guidelines for medical education in nutrition.</td>
</tr>
</tbody>
</table>

RR = Response Rate  
USA = United States of America  
UCLA = University of California, Los Angeles
Limited research has explored the nutrition-related knowledge of GPs. The most recent study was in 1997, indicating that this area of research is not up-to-date. Furthermore, no studies have examined the nutrition-related knowledge of Australian GPs. However, the nutrition-related knowledge of medical students has been explored in more detail, and provides indication of the nutrition knowledge of future GPs.

Despite the diversity of the research objectives, some common themes have emerged from the reviewed literature. Firstly, a common barrier to the provision of nutrition care by GPs is their own perceived lack of nutrition knowledge. Secondly, GPs perceive that they have not received sufficient nutrition education in order to develop the level of nutrition knowledge required to provide nutrition care to patients. Thirdly, the nutrition knowledge of GPs appears to be negatively correlated with the number of years since graduation.

Generally, these investigations have concluded that GPs possess inadequate nutrition knowledge, and must be improved. However, limited research has attempted to determine the sufficient level of nutrition knowledge required by GPs in order to provide effective nutrition care to patients. One study, which was conducted over 25 years ago, claims to have determined the required nutrition knowledge of primary care physicians in the USA, by developing fifty nutrition competencies for American family practice. However, the nutrition competencies only describe essential skills of primary care physicians, and sufficient nutrition knowledge was viewed as a pre-requisite to acquiring the essential skills. Nutrition-related education that increases GPs’ nutrition knowledge is subsequently difficult to develop due to the absence of an appropriate benchmark to compare curricula and learning outcomes.

A 2008 European study evaluated the nutrition knowledge of hospital-based doctors and nurses against the European Society of Parenteral and Enteral Nutrition (ESPEN) guidelines for nutritional screening, assessment and treatment. By using the ESPEN guidelines to evaluate
nutrition knowledge, the authors infer that the guidelines represent a pre-determined sufficient level of knowledge required for practice. The key finding of this investigation was that the most common cause for insufficient provision of nutrition care was a lack of nutrition knowledge.

It is not currently known whether Australian GPs possess sufficient nutrition knowledge to provide effective nutrition care to patients. Although GPs often perceive themselves as possessing insufficient nutrition knowledge, it is difficult to clarify this without comparison to a pre-determined sufficient level of knowledge. Further investigation into the level of nutrition knowledge required for competent provision of nutrition care is required in the Australian context.

**Skills**

The skill component of competence refers to the ability to execute a required task\textsuperscript{116}. It is important to delineate the knowledge and skill components of competence, because an individual may possess adequate knowledge about a task (‘know-how’), but not possess the ability to perform the task (‘do-how’).

The skills required for effective provision of nutrition care includes an ability to identify patients who require nutrition care. This refers to any patient who may experience improved health outcomes from improved nutrition behaviour. Secondly, competent provision of nutrition care is anticipated to include some components of the dietetic nutrition care process\textsuperscript{18}. Other skills that are likely to enhance the quality of nutrition care may include counselling and motivational interviewing skills. Four studies have examined the nutrition-related skills of GPs\textsuperscript{100, 117-119}, and are summarised in Table 2.4.
Table 2.4: Summary of literature investigating the nutrition-related skills of GPs, in order of recency.

<table>
<thead>
<tr>
<th>Author &amp; Year</th>
<th>Country</th>
<th>Aim</th>
<th>Method</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Katz et al., 2005\textsuperscript{117}</td>
<td>Israel</td>
<td>Test the hypothesis that family practitioners’ self-efficacy of skills relating to obesity would be enhanced after participating in an interactive course on obesity management.</td>
<td>29 family practitioners participated in an interactive obesity management course comprising six-4 hour sessions over six months.</td>
<td>Post-course efficacy appraisals were significantly higher than pre-course appraisals.</td>
</tr>
<tr>
<td>Guo et al., 2002\textsuperscript{118}</td>
<td>USA</td>
<td>Investigate the nutrition and physical activity counselling skills and practices of family practice residents.</td>
<td>Survey of 110 family practice residents from four clinics in Texas, USA (93% RR).</td>
<td>Family practice residents do not perform nutrition care at optimal rates. Skill performance may be influenced by attitudes of family practice residents.</td>
</tr>
<tr>
<td>Nawaz 2000\textsuperscript{119}</td>
<td>USA</td>
<td>Determine the rate of physician/patient discussions regarding diet, exercise, and smoking and to assess the effect of these skills and discussions on behaviour change.</td>
<td>Telephone survey of 433 adults who had a routine check-up in the past year. Questioned whether their physicians had asked them about their dietary habits, exercise, or smoking, and about any efforts to modify these behaviours during this time.</td>
<td>Diet was addressed in 50% of the patients, exercise with 56% and smoking status with 77%. Respondents who were asked about their diet were more likely to have modified their fat or fibre intake in the previous year than those not asked, and were somewhat more likely to have lost weight.</td>
</tr>
<tr>
<td>Hiddink et al., 1997\textsuperscript{97}</td>
<td>The Netherlands</td>
<td>Investigate the implementation of nutrition guidance strategies (skills) to primary care patients.</td>
<td>Survey to random sample of 1000 primary care physicians practicing between 5-15 years in The Netherlands (63% RR).</td>
<td>Almost all respondents said they gave personal nutrition information to patients and asked patients to make an appointment with a dietitian to receive nutrition education.</td>
</tr>
</tbody>
</table>

\textit{USA} = United States of America \quad RR = Response Rate
Limited research has explored the nutrition-related skills of GPs, and no studies have investigated the skills of Australian GPs. Interestingly, the latest study to investigate the nutrition-related knowledge of GPs is also the first study to investigate the nutrition-related skills of GPs. This suggests a shift in research focus, from nutrition-related knowledge to nutrition-related skills of GPs.

The majority of studies that have investigated the nutrition-related skills of GPs have focused on the rate of nutrition care provision. It appears that although GPs perceive nutrition as a high priority for patient care, GPs provide nutrition care at sub-optimum rates\(^9\), \(^{10}\), \(^{12}\). This suggests that GPs may not possess appropriate skills to recognise and implement nutrition care when required. It is also possible that GPs possess appropriate nutrition care skills, but do not implement these skills for other reasons. These reasons may include personal factors such as insufficient nutrition knowledge, or inappropriate attitude towards nutrition, as well as external factors such as time restrictions and other treatment priorities\(^{10}\), \(^{10}\). The barriers experienced by GPs to nutrition care provision are explored further in Chapter 2, Section 2.4.3 (*Barriers and Enablers to Nutrition Care in the Primary Care Setting*).

**Attitude**

The attitude component of competence refers to a state of readiness towards a task\(^{12}\). Originally, attitude was not deemed as a component of competence\(^12\), \(^{12}\). However, it is now widely recognised as an important component of competence because an appropriate attitude is essential to competent health care provision\(^14\), \(^{84}\), \(^{86}\), \(^{116}\). Seven studies have explored the nutrition-related attitudes of GPs\(^9\), \(^{10}\), \(^{12}\), \(^{117}\), \(^{12}\), \(^{12}\), and are summarised in Table 2.5.
Table 2.5: Summary of literature investigating the nutrition-related attitudes of GPs, in order of recency.

<table>
<thead>
<tr>
<th>Author &amp; Year</th>
<th>Country</th>
<th>Aim</th>
<th>Method</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Katz et al., 2005</td>
<td>Israel</td>
<td>Test whether family practitioners’ self-efficacy and <em>attitude</em> to obesity would be enhanced after participating in an interactive obesity management course.</td>
<td>29 family practitioners participated in an interactive obesity management course comprising six 4-hour sessions over six months.</td>
<td>Post-course efficacy appraisals were significantly higher than pre-course appraisals.</td>
</tr>
<tr>
<td>Nicholas et al., 2005</td>
<td>Australia</td>
<td>Determine whether GPs consider <em>(attitude)</em> nutrition counselling for chronic conditions.</td>
<td>Mail survey to Hunter Urban Division GPs (399). 50% RR.</td>
<td>GPs were less likely to consider nutrition for hypertension, ischaemic heart disease and overweight, than for diabetes, lipid disorders and obesity.</td>
</tr>
<tr>
<td>Hiddink et al., 1997</td>
<td>The Netherlands</td>
<td>Identify the determinants of nutrition guidance practices by primary-care physicians.</td>
<td>Survey to random sample of 1000 primary-care physicians practicing between 5-15 years in The Netherlands. 63% RR.</td>
<td>Driving forces for nutrition guidance include an active interest in nutrition, basic level of nutrition knowledge, and positive <em>attitudes</em> towards nutrition guidance practices.</td>
</tr>
<tr>
<td>Kushner 1995</td>
<td>USA</td>
<td>Assess the <em>attitudes</em>, practice behaviour and barriers to the delivery of nutrition counselling by primary-care physicians.</td>
<td>Survey to 2250 primary-care physicians in USA. 49% RR.</td>
<td>Nearly three quarters of respondents felt dietary counselling is important and the responsibility of the physician, however most respondents spend less than 5 minutes discussing diet with patients.</td>
</tr>
<tr>
<td>Levine et al., 1993</td>
<td>USA</td>
<td>Determine nutrition-related <em>attitudes</em> of primary-care physicians.</td>
<td>Survey to 30,000 primary-care physicians with three parts: demographic, attitude and behaviour survey. 11% RR.</td>
<td>Physicians reported a favourable attitude towards nutrition in their practice, however physicians rarely reviewed the nutritional status of their patients.</td>
</tr>
<tr>
<td>Jack et al., 1990</td>
<td>USA</td>
<td>A follow-up survey of family physicians’ interest <em>(attitude)</em> in, and knowledge of, nutrition.</td>
<td>Survey of 42 practicing family physicians previously surveyed by authors. Survey of 33 nutrition topic areas.</td>
<td>The physicians rated nutritional skills as less relevant on the second questionnaire than on the first. More emphasis on nutrition counselling skills may be appropriate in medical education.</td>
</tr>
<tr>
<td>Wells et al., 1984</td>
<td>USA</td>
<td>Examine physicians’ health habits and <em>attitudes</em> to counselling about smoking, weight, exercise and alcohol.</td>
<td>Survey of random sample of members of a county medical society (201 respondents).</td>
<td>Physicians with ‘better’ personal health habits and more positive attitudes toward counselling counselled a broader range of patients and counsel more aggressively.</td>
</tr>
</tbody>
</table>

*GP*= General Practitioner  
*USA*= United States of America  
*RR*= Response Rate
In addition to the studies listed in Table 2.5, the nutrition-related attitudes of medical students have been widely investigated\textsuperscript{98, 107, 109, 115, 124, 125}, and provide further indication of the attitudes of future GPs. Most of the investigations conclude that GPs possess a positive attitude towards nutrition, and place nutrition as a high priority for patient care\textsuperscript{98, 99, 120}. However, some studies disagree with this view, and state that GPs do not possess satisfactory attitudes towards nutrition\textsuperscript{97, 109, 125}. The variety of study methodologies utilised in these studies may assist to explain the conflicting conclusions. For example, the studies that incorporated questionnaires or surveys\textsuperscript{93, 98, 115, 125} are unlikely to appropriately address important contextual information that may be better explored through qualitative investigations.

One study investigated the nutrition-related attitudes of 181 Australian GPs through a quantitative survey\textsuperscript{93}. In 2005, Nicholas et al., explored whether Australian GPs consider providing nutrition care for a range of nutrition-related chronic conditions\textsuperscript{93}. The participating GPs were less likely to consider providing nutrition care for hypertension, ischaemic heart disease and overweight, in comparison to diabetes, lipid disorders and obesity. These results indicate that GPs’ readiness to provide nutrition care may be variable dependent on the patient’s medical condition.

The importance that GPs place on nutrition appears to decrease after graduation\textsuperscript{102, 103, 115}. A number of interventions have attempted to enhance the importance placed on nutrition by conducting short courses in nutrition, and have been successful in improving the nutrition-related attitudes and self-efficacy of participating GPs\textsuperscript{107, 117, 124}. Some studies have even observed higher rates of nutrition care provision as a result of the improved nutrition-related attitude of GPs\textsuperscript{107, 123}. Further investigation is required to assess the impact of these improvements in attitude on the provision of nutrition care and ultimately, patients’ health outcomes.
2.3.4 Approaches to Enhance the Nutrition Care Provided by General Practitioners

Reader’s Note:

The information in this section has been published as a literature review paper:


The co-authors of this publication confirm that the research candidate has made the following contributions to this paper:

- Developed the paper design.
- Participated in the literature retrieval and appraisal.
- Participated in the manuscript preparation for submission to journal.

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Signed: ___________________ Date: 22/11/12

Chapter 2, Section 2.3.3 highlighted the reported concern over the competence of GPs to provide nutrition care. However, based on the increasing presentation of lifestyle-related chronic disease in general practice\textsuperscript{10}, the demand on GPs to provide nutrition care appears to be increasing. In order to meet this demand, it is imperative that strategies are implemented to enhance the nutrition care provided by GPs. Various approaches have been implemented internationally to address this need, however interventions to enhance the nutrition care provided by Australian GPs have been relatively limited.
The following section critically reviews the international literature on approaches to enhance the capacity and overall provision of nutrition care by GPs. Relevant literature have been categorised into four main approaches: medical nutrition education, continuing medical education, GP-centred approaches and practice-centred approaches.

**Medical Nutrition Education Approach**

Medical nutrition education refers to the incorporation of nutrition concepts into pre-vocational medical degrees. This approach utilises a linear progression from learning objectives, to assessment outcomes towards graduate competencies. The rationale for this approach is that greater coverage of nutrition topics in medical curricula will enhance the nutrition-related competencies of graduating students. The importance of medical nutrition education has been recognised by numerous international institutions, which have implemented initiatives to enhance the quantity and quality of nutrition education during health professional training\(^{77,126,127}\). In the UK, efforts to raise the profile of nutrition amongst health professionals culminated in the publication of a nutrition core curriculum in 1994\(^{128}\). A similar endorsement for the inclusion of nutrition education as a component of the curriculum for most health professionals came from the American Dietetic Association four years later\(^{129}\).

Significant progress toward the incorporation of medical nutrition education in the USA occurred through the establishment of the Nutrition Academic Award (NAA) in 1998 in response to a congressional mandate to increase the quantity of nutrition content in USA medical curricula\(^{130}\). The NAA Curriculum Committee developed a consensus document of knowledge, skills and attitude learning objectives for medical nutrition education, with an emphasis on outcomes-based educational objectives for nutrition in medical education\(^{131}\). The document covers 23 nutrition topics, each with a set of competencies for undergraduates, residents and specialists. The topics cover five broad areas including an overview of nutrition, lifespan
nutrition, cardiovascular nutrition, endocrine nutrition, and other organ systems\textsuperscript{131}. Despite issues of curriculum crowding, 21 USA universities received funding to develop and implement aspects of the NAA curriculum within their respective medical programs\textsuperscript{130}. This initiative encouraged innovative and creative ways to integrate nutrition into medical curricula with the aim to establish nutrition as an integral component of medical education. However, due to funding constraints, to date, no outcome evaluation of the NAA program on the nutrition care provision of graduate students has been conducted.

Two limitations of the approach to increasing medical nutrition education exist. Firstly, this approach assumes that the competencies acquired throughout training will assure implementation of nutrition care when appropriate. Therefore, robust evidence from longitudinal evaluation is required to assess whether the provision of medical nutrition education results in increased delivery of nutrition care by GPs, and improved patient-related health outcomes. Secondly, the development of appropriate learning outcomes in medical curricula requires consensus surrounding the appropriate role of GPs in providing nutrition care to patients, which has not been reached in the Australian setting. Therefore, further clarification of this role is required before development of prescribed nutrition competencies and related learning outcomes can be considered in Australia.

\textit{Continuing Medical Education Approach}

In most countries, GPs are required to undertake Continuing Medical Education (CME), which refers to educational activities that maintain, develop or increase knowledge, skills and professional performance\textsuperscript{79}. Topics studied for CME are mostly elective in nature, allowing for GPs to identify activities that meet their desired learning needs. Subsequently, GPs represent a captive audience in the areas chosen for study. However, GPs tend to pursue education around topics they are already confident with, whilst avoiding areas in which their knowledge and
confidence are lacking. This potentially limits the capacity of CME to enhance competencies in areas of learning need.

Several formats are available for CME, including live presentations, web-based programs, CDs, audio-tapes and journal based activities. An example of a nutrition-specific CME activity is the RACGP accredited “Clinical Nutrition” module offered by Monash University, Australia. This online course provides GPs with a basic overview of nutrition care related to multiple common disease states as well as addressing part of the nutrition care process. However, the uptake of this course by GPs is very low, and this course became unviable in 2012. In order for nutrition CME to increase the capacity of GPs to provide nutrition care, GPs are required to actively choose to enrol and participate in such activities. The above example represents one of the few nutrition-specific activities available to Australian GPs, which also limits the capacity of CME to enhance the competence of GPs providing nutrition care.

Although this approach is yet to be evaluated specifically, it is difficult to determine how CME would have a major impact on the nutrition care provided by GPs due to the variable uptake of these activities. Some evidence suggests that attendance at a CME program in nutrition results in significantly higher opinions of the importance of nutrition. It also appears that higher opinions of nutrition are reflected in the quality of nutrition care provided to patients. At present there is no evidence that this approach improves the long-term health outcomes of patients after receiving nutrition care by GPs, and collecting this evidence requires longitudinal evaluation. Therefore, longitudinal evaluation of CME strategies on patients’ health outcomes is required.
General Practitioner Centred Approach

General Practitioners are anticipated to be the largest providers of nutrition care in the Australian primary care setting. The rationale for a GP-focused approach is that initiatives that directly facilitate GPs to provide nutrition care will enhance the rate and effectiveness of care provided. Most of this research has been conducted by the International Heelsum collaboration, based in the Netherlands, with findings presented at triennial Heelsum workshops. The overarching aim of the Heelsum workshops is to advocate for research and advancements that assist GPs to appropriately incorporate nutrition concepts during consultations\textsuperscript{136}. A wide range of interventions have occurred through this collaboration such as determining the barriers and driving forces for GPs providing nutrition care\textsuperscript{137}, exploring communication styles of GPs providing nutrition care\textsuperscript{137}, and developing minimal intervention strategies for GPs to utilise in the provision of nutrition care\textsuperscript{138}.

Many of the interventions implemented from this collaboration have demonstrated positive outcomes. For example, the identification of driving forces for nutrition care provision by GPs has resulted in the development of strategies that exemplify these driving forces, such as the availability of tools to implement nutrition care. Following this, resources such as the minimal intervention strategy relating to overweight and obesity have also been trialled, with plans for future implementation\textsuperscript{138}.

Interventions that target the determinants of nutrition care provision by GPs such as perceived barriers, driving forces, communication styles and resources may result in short-term improvements in delivery due to the upstream focus of this approach. Additionally, an underlying notion of this approach is that current university training inadequately prepares GPs to competently provide nutrition care to patients\textsuperscript{139}. It would appear that constant intervention
is required to increase the preparedness of GPs, inferring that this approach will not ultimately address the initial problem of inadequate competencies possessed by graduating GPs.

In Australia, the Lifescrpts © program and the Active Nutrition Script program are examples of strategies that aim to facilitate the provision of nutrition care by delivering care in a similar manner to prescription medication140, 141. Although this program is evidence-based and theoretically effective, it has not received positive evaluation due to minimal uptake by GPs142, and variability in the target patient group by GPs141. It is suggested that in Australia, GPs perceive barriers to providing nutrition care, such as inadequate time and nutrition knowledge, to be more excessive than driving forces, even with this resource to assist implementation142.

**Practice Setting Approach**

Patients encounter a variety of health care messages through the experience of consulting a GP. Some of these interactions may not include time spent with a GP, such as reading material in the waiting room of a general practice clinic143. Although this approach does not necessarily encompass nutrition care provision by GPs, these interactions augment the nutrition care received by patients through additional interactions in the practice setting. Additionally, some research suggests that the waiting room could be utilised for completing nutrition-related activities such as the Stage of Change questionnaire or interactive nutrition assessment questionnaires on a computer144.

The aim of the practice setting approach is to supplement the nutrition care provided to patients by GPs. For example, the Medicare Chronic Disease Management initiative enables patients living with a chronic disease to receive subsidised nutrition care from dietitians52. Although this approach has resulted in an increased provision of nutrition care to patients, the success of this strategy is unclear because the existing reviews of the program have not included a review of patients’ health outcomes145-147.
Limited research has evaluated the impact of supplementary information or health care on the nutrition care provided by GPs. These approaches should be evaluated by investigating the influence of the supplementary information or health care on the effectiveness of nutrition care provided by GPs. Subsequently, this is a challenging area of research and further research is required to determine the long-term effects of practice setting approaches to enhance the nutrition care provided by Australian GPs.

2.3.5 Summary

The medical nutrition education provided at Australian and international medical schools is perceived as inadequate. The movement towards problem-based learning provides the opportunity for nutrition topics to be incorporated into relevant case studies. However, the ability to assess the adequacy of medical nutrition education subsequently relies on investigating the competence of medical graduates.

Literature assessing the nutrition-related competencies of GPs indicates a perceived lack of appropriate knowledge, skills and attitudes to effectively provide nutrition care. However, limited literature has described the level of competence required for the effective provision of nutrition care. Importantly, it is difficult to determine the nutrition-related competencies required by GPs before clarifying the ideal role of GPs in providing nutrition care.

Internationally, many strategies have been implemented to enhance the nutrition care provided by GPs. Although some of the strategies have received positive evaluations, it is unlikely that one approach will comprehensively address this need. Importantly, consideration of the unique characteristics of the Australian primary care setting is required prior to the implementation of recommended strategies.
2.4 The Primary Care Setting

2.4.1 Preface

A detailed exploration of nutrition care provided by Australian GPs requires an understanding of the setting in which they operate. The Australian primary care setting refers to the immediate physical, operational and financial environment in which GPs practice\textsuperscript{21}. Notably, the Australian primary care setting forms a key component of the Australian primary health care system, which is the first contact point for individuals requiring non-emergency health care\textsuperscript{148}.

The following review section explores the influence of the Australian primary care setting on the nutrition care practices of GPs. Firstly, the administrative processes utilised within GP clinics are investigated, including determinants of billing and consultation length. Secondly, the barriers and enablers of nutrition care that are experienced by GPs are explored, which are predominantly setting-generated. Finally, the influence of government policies on the practices of GPs is explored in the context of nutrition care and chronic disease. This includes Chronic Disease Management plans and pay-for-performance incentive schemes. This review section highlights the possibility that the current Australian primary care service model is not optimal for the provision of patient-centred nutrition care by Australian GPs.
2.4.2 Introduction to the Australian Primary Care Setting

Australia’s universal health care system is called Medicare Australia, and is often abbreviated to ‘Medicare’\(^8\). Medicare aims to provide affordable and accessible high quality health care to all Australians\(^8, 149\). Health care provision through this system includes fully subsidised treatment in all Australian public hospitals, as well as partially subsidised treatment for a range of primary health care services\(^8\).

The Australian primary care setting is embedded within the Medicare system, and acts as the first contact point for individuals requiring non-emergency health care\(^9\). General practitioners are viewed as the forefront of this system, and are often referred to as ‘gate keepers’ of health care due to their ability to refer patients on to medical specialists, allied health professionals and other health care providers as required\(^9\).

General practice consultations are arranged on a self-referring basis, whereby a patient will present a problem, or Reason For Encounter (RFE) to a GP. There are no restrictions on the types of problems that patients are able to present within a consultation. Patients may present more than one RFE per consultation, with an average of 155 problems managed per 100 consultations\(^10\). This arrangement promotes the utilisation of GPs for the treatment and management of a wide range of health conditions, including chronic disease.

Medicare subsidises general practice consultations by reimbursing patients with a predetermined rebate. The rebate value is dependent on the ‘level’ of the consultation, which is determined by the consultation content and length. Table 2.6 describes these levels. Patients are required to pay an out-of-pocket expense if the consultation fee is higher than the rebate provided by Medicare.
Table 2.6: Determinants of general practice consultation billing in Australia\textsuperscript{150}. Rebate values are correct at November 2012.

<table>
<thead>
<tr>
<th>Level</th>
<th>Time requirement</th>
<th>Content requirement</th>
<th>Medicare rebate</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>No time requirement</td>
<td>Professional attendance for an obvious problem characterised by the straightforward nature of the task that requires a short patient history and limited examination and management.</td>
<td>AU$16.60</td>
</tr>
<tr>
<td>B</td>
<td>No time requirement</td>
<td>Professional attendance involving taking a selective history, examination of the patient with implementation of a management plan in relation to one or more problems.</td>
<td>AU$36.30</td>
</tr>
<tr>
<td>C</td>
<td>Minimum of 20 minutes</td>
<td>Professional attendance involving taking a detailed history, an examination of multiple systems, arranging any necessary investigations and implementing a management plan in relation to one or more problems.</td>
<td>AU$70.30</td>
</tr>
<tr>
<td>D</td>
<td>Minimum of 40 minutes</td>
<td>Professional attendance involving taking an exhaustive history, a comprehensive examination of multiple systems, arranging any necessary investigations and implementing a management plan in relation to one or more complex problems.</td>
<td>AU$103.50</td>
</tr>
</tbody>
</table>

Most consultations (83%) are recorded and processed as ‘Level B\textsuperscript{10}, and usually (80%) do not incur an out-of-pocket expense\textsuperscript{151}. The average length of a consultation is approximately fifteen minutes\textsuperscript{152}. A variety of appointment systems are available for general practice clinics, including sequential bookings, wave bookings or block bookings\textsuperscript{153}. Managing appointments are challenging because the booking system needs to provide adequate time for consultations, as well as accommodate cancellations. Discrepancies between the time allocated for a consultation and the true consultation length immediately places time pressures on GPs.

Numerous factors have an augmenting effect (i.e. add additional time) on the length of a consultation\textsuperscript{154}. These factors include GPs who are female, older, or Australian; and patients who are female, in a rural setting, of high socioeconomic status, or have chronic, social, or
psychological conditions. Approximately 7% of consultations include nutrition care, accounting for over 7.9 million consultations each year. However, because many consultations involve more than one RFE, the time spent on nutrition care, and the direct effect of nutrition care on consultation length is unclear.

2.4.3 Barriers and Enablers to Nutrition Care in the Australian Primary Care Setting

Reader’s Note:
The information in this section has been published as an opinion piece manuscript.


Barriers to Nutrition Care

General practitioners experience many barriers to providing nutrition care, which are well documented and appear to be consistent across many countries. Commonly reported barriers include a perceived lack of time, perceived lack of nutrition knowledge, and poor self efficacy regarding the provision of nutrition care. Interestingly, these barriers appear to be driven by the characteristics of the primary care setting. For example, Table 2.7 compares the average general practice consultation length of fifteen minutes, with the recommended lengths of dietetic consultations for patients with type 2 diabetes and overweight/obesity. The recommended appointments and consultation lengths are stipulated in best practice guidelines for dietitians and are supported by international guidelines such as the American Dietetic Association practice guidelines and the New Zealand Dietetic Association practice guidelines for type 2 diabetes.
Table 2.7: Recommended lengths of consultations for Australian dietitians.\textsuperscript{157, 158}

<table>
<thead>
<tr>
<th>Condition</th>
<th>Appointment</th>
<th>Recommended Length for Dietitians</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 2 diabetes</td>
<td>Initial</td>
<td>≥60 mins</td>
</tr>
<tr>
<td></td>
<td>First and Second review</td>
<td>30-45 mins</td>
</tr>
<tr>
<td></td>
<td>Three month review</td>
<td>45-60 mins</td>
</tr>
<tr>
<td>Overweight/obesity</td>
<td>Weekly, then monthly for 2-3 months</td>
<td>≥20 mins</td>
</tr>
</tbody>
</table>

The recommended consultation lengths for dietitians are significantly longer than the average general practice consultation length of fifteen minutes.\textsuperscript{152} However, limited research has investigated the effectiveness of nutrition care provided in varying consultation lengths or by different health professions. It is possible that the quality and quantity of nutrition care provided by GPs is limited by the restrictions of consultation length. In spite of this, there is no evidence to suggest that nutrition care provided by GPs requires the same consultation length as recommended for dietitians.

Two other widely reported barriers to GPs providing nutrition care are a lack of nutrition knowledge and subsequent poor self-efficacy of nutrition care skills.\textsuperscript{98, 99, 107, 109, 155, 161, 162} The literature review section 2.3.3 (General Practitioners’ Competence to Provide Nutrition Care) demonstrated that GPs may not possess sufficient nutrition knowledge or skills to provide nutrition care. However, some studies have demonstrated that GPs have the potential to influence patients’ nutrition behaviour and health outcomes through the provision of nutrition care.\textsuperscript{163, 164} Interestingly, the positive health outcomes of nutrition care reported in these studies were measured against control groups of ‘usual care’. In other words, each study incorporated the use of a nutrition care protocol which was feasible for general practice consultations, and measured this against ‘usual care’. This suggests that structured care guidelines may be required for enhanced provision of nutrition care by GPs.
**Enablers of Nutrition Care**

Enablers of nutrition care refer to situations or circumstances that may trigger GPs to provide nutrition care within a consultation. These enablers may be categorised as patient-related enablers, and practitioner-related enablers. The leading patient-related enabler is a patient’s request for nutrition care\(^\text{137,155,162}\). This may include requests for information or advice relating to a nutrition-related chronic condition such as overweight or obesity, type 2 diabetes, cardiovascular disease, as well as advice on general healthy eating. Conversely, practitioner-related enablers include a high interest in nutrition and a priority for nutrition in the overall care plan for a patient\(^\text{97,165}\).

The enablers described above may be incorporated into strategies that aim to increase the rate of nutrition care provision by GPs. For example, over 30% of consultations include the management of a nutrition-related chronic disease\(^\text{10}\). Since the leading patient-related enabler is a patient’s request for nutrition care, strategies that provoke patients to ask for nutrition care within these consultations may increase the rate at which nutrition care is provided. Additionally, strategies that enhance GPs’ interest in nutrition, such as nutrition-specific activities in medical education, may increase the priority placed on nutrition by GPs. In turn, this may increase the rate of nutrition care that is provided by GPs to patients living with chronic disease.
2.4.4 Influence of Medicare Policies on the Nutrition Care Practices of General Practitioners

The Australian government directly provides over $6.1 billion each year to Australian primary care through Medicare\(^{166}\). As a result, the operational and financial procedures of the Australian primary care setting reflect the funding pathways available through Medicare, namely the Medicare Benefits Schedule (MBS). The MBS has undergone modifications as a result of the current primary health care reform\(^{21}\), however it still receives ongoing criticism regarding the appropriateness of its funding framework. The former Medicare Director of Professional Services Review, Dr Tony Webber, estimates that between AU$2 billion and AU$3 billion is being inappropriately spent each year\(^{167}\). The rationale for this perception is that the MBS funding framework influences the care provided by GPs because of the over-inflated payments provided for particular practices\(^{167}\). Three Medicare funding pathways are likely to affect the nutrition care provided in the primary care setting because of their influence on GPs’ practices. These are the MBS criteria for consultation levels, the MBS Chronic Disease Management initiative, and the Practice Incentives Program (PIP).

Firstly, the MBS criteria for consultation levels are used to determine the rebate amounts provided to patients. As described in section 2.4.2 (Introduction to the Australian Primary Care Setting), most consultations (83%) are recorded and processed as ‘Level B’\(^{10}\) (see Table 2.6), which does not stipulate a minimum consultation length. General Practitioners are able to provide longer consultations if required, with a minimum of 20 or 40 minutes (‘Level C’ or ‘Level D’ respectively). However, these consultations require the time to be allocated in advance, otherwise patients scheduled for following appointments will experience considerable waiting times. As a result, longer consultations account for less than 15% of appointments registered with Medicare\(^{10}\), and therefore may not provide sufficient opportunity for nutrition care provision by GPs.
Secondly, the MBS Chronic Disease Management initiative enables patients to receive subsidised consultations with allied health professionals for care relating to a chronic condition\textsuperscript{52}. Eligible patients are referred by their GP for up to five subsidised consultations with one or more allied health professional per year. Referring GPs are required to complete two documents, entitling them to receive a front-loaded payment of AU$253.45. However, refereed allied health professionals are required to complete each consultation before a rebate of AU$52.95 is issued. Interestingly, this means that if a patient attends all five referred consultations, an allied health professional would receive rebates totalling AU$264.75 for a minimum of 100 minutes of patient consultation time, whereas the referring GP would have received rebates totalling nearly as much (AU$253.45), for a task requiring minimal time. These payments are likely to be key income avenues for clinic owners, who reportedly place pressure on GPs to meet target referral rates for this initiative\textsuperscript{167}. In speculation, the considerable payments available to GPs through this initiative may encourage GPs to refer patients to receive nutrition care elsewhere in preference to providing nutrition care in consultations. However, very few studies have actually investigated the appropriateness of the utilisation of MBS items, and warrants further research in this area.

Thirdly, the Practice Incentive Program (PIP) aims to improve patients’ health outcomes by encouraging continuing improvements in general practice through financial incentives\textsuperscript{168}. General practice clinics are able to claim incremental rewards for practices related to diabetes, asthma, cervical screening and Indigenous health\textsuperscript{168}. Incentives are provided for clinics that utilise particular structures for patient management, as well as for GPs that complete particular tasks within a consultation. A systematic literature review on pay-for-performance incentive schemes, such as the PIP, demonstrated that GPs who claimed incentives were more likely to comply with national requirements than GPs who did not claim incentives\textsuperscript{169}. This infers that
the PIP has influenced GPs to adhere to the guidelines for the conditions included. However, these incentives are known to create a ‘distortion effect’, whereby incentives for particular tasks may unintentionally discourage GPs from completing other tasks that aren’t included in the program. Nutrition care is not a practice or service included in the PIP. Therefore, if a “distortion effect” is true, this program may discourage GPs from providing nutrition care in consultations. Ultimately, the effect of the PIP on nutrition care provided by GPs has not been investigated in Australia, and is warranted.
2.4.5 Summary

The Australian primary care setting represents an important opportunity for nutrition care provision by GPs, largely due to the underpinning Medicare rebates available to patients, the open-ended nature of conditions available for treatment, and the ability of GPs to refer patients to additional health care providers as required.

General Practitioners experience considerable barriers to providing nutrition care in consultations. Incorporating nutrition care into chronic disease management provided by GPs may extend individual consultation times, restricting the time available for following consultations and increasing subsequent patients’ waiting times. Longer consultations are available, which also incur a higher rebate amount. However, these consultations constitute a small proportion of total consultations registered through Medicare. Furthermore, three prominent Medicare funding pathways may exacerbate the barriers to GPs providing nutrition care in consultations.

It is important to focus on nutrition care in the Australian primary care setting due to the high rate of chronic disease presentation in general practice and the influence of nutrition on patients’ health outcomes relating to chronic disease. Despite the consensus that nutrition is an important feature of chronic disease management, it appears that many setting-based barriers require attention in order to support GPs to provide nutrition care to patients with chronic disease.
2.5 Conclusion

2.5.1 Summary of Literature Review

This literature review explored the topic of nutrition care provided by Australian GPs through three areas of investigation; the patient, the GP, and the primary care setting. Firstly, it appears that patients intentionally consult GPs for nutrition care, and perceive GPs to be a trustworthy source of nutrition information. However, the experiences, expectations and satisfaction of patients who have received nutrition care from GPs require further investigation in the Australian context.

Secondly, the nutrition-related competencies of GPs are generally perceived by GPs and medical educators as inadequate for providing effective nutrition care to patients. However, the competencies required for GPs to provide effective nutrition care have not been investigated in Australia because the role of GPs in this context is currently unclear. In addition to competencies, the ability of GPs to provide effective nutrition care to patients with chronic disease is currently unknown.

Thirdly, the current service delivery model of Australian primary care may be influencing the nutrition care practices of GPs. In particular, three Medicare funding pathways have been identified as exacerbating the barriers to GPs providing nutrition care in consultations. Therefore, studies that explore the role of GPs in providing nutrition care need to consider the current Australian primary care context in order to incorporate these influential factors.

Overall, this literature review has identified many areas requiring research in order to explore the role of GPs in providing nutrition care to individuals living with chronic disease in a patient centred, primary care setting. As a result of the literature review, five specific research aims were developed.
2.5.2 Research Aims

The research framework of this thesis has been described in Chapter 1, Section 1.3. The research framework includes five research aims which were developed after conducting the literature review.

The five research aims are as follows:

1. Describe the practices of Australian GPs when providing nutrition care to individuals living with chronic disease.
2. Examine the experiences, expectations and satisfaction of individuals living with chronic disease regarding the nutrition care they have received from GPs.
3. Investigate the effectiveness of nutrition care provided by GPs in improving patients’ nutrition behaviour and associated risk factors for chronic disease.
4. Explore the perceptions of health professionals regarding the nutrition care provided by GPs.
5. Explore individuals’ preferences regarding the provision of nutrition care from Australian health professionals and the factors influencing their preferences.

The five research aims have been met by five studies. Each study is presented as an individual chapter, encompassing the next five chapters.
Chapter 3:
Study One - Direct Observation of the Nutrition Care Practices of Australian General Practitioners

Reader's Note:

The information in this section has been submitted for publication as an original research paper:


The co-authors of this publication confirm that the research candidate has made the following contributions to this study:

• Developed the study design.
• Completed the human research ethics application.
• Designed and pilot tested the data collection instrument.
• Conducted student training sessions for data collection and liaised with students for data collation.
• Conducted statistical analysis of the data.
• Prepared manuscript for submission to journal.

Signed: ______________________ Date: 22/11/12

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Signed: ______________________ Date: 22/11/12
3.1 Abstract

This observational study aimed to record and describe the practices of Australian GPs when providing nutrition care to patients. Nutrition care referred to the provision of nutrition-related advice or counselling in an attempt to improve the nutrition behaviour of patients. Eighteen GPs (13 male, 5 female) were observed by 4th-year medical students during their university general practice rotation. Each GP was observed for five consultations which included nutrition care, totalling 90 observed consultations. In each consultation, students completed a 31-item nutrition care checklist which listed the practices that could feasibly occur in a standard general practice consultation. Each practice was marked with either a ‘Yes’ (completed), ‘No’ (did not complete) or ‘Completed by Practice Nurse’. Twenty-eight nutrition care practices were observed at least once. The frequency of practices was highly variable. The most frequently observed practices were measuring and discussing blood pressure (76.7%, n=69), followed by asking the patient general questions about their current diet (74.4%, n=67). Approximately half of the consultations included a statement of a nutrition-related problem (52.2%, n=47), and the provision of nutrition advice which focused on a nutrient (45.6%, n=41) or food group (52.2%, n=47). Consultations with male GPs, as well as GPs with more than 25 years experience were associated with an increased number of nutrition care practices per consultation. In conclusion, Australian GPs appear to perform many nutrition care practices in varying frequencies. As a result, patients may be receiving diverse quantities and qualities of nutrition care from Australian GPs. Further research is required to identify the most effective nutrition care practices that improve the nutrition behaviour of patients.
3.2 Introduction

General Practitioners often comprise the first contact point for individuals requiring non-emergency health care in Australia. The Australian primary care setting has experienced a shift in the health needs of patients from communicable to non-communicable health conditions. As a result, GPs are increasingly involved in the health care of individuals with non-communicable chronic diseases such as cardiovascular disease and type 2 diabetes, as well as lifestyle-related co-morbidities such as overweight and obesity, hypertension and hyperlipidaemia.

Nutrition is important in the prevention and management of lifestyle-related chronic diseases. As a result, nutrition is included in practice guidelines for the management of patients with chronic disease in general practice. Considering the increasing rate of chronic disease presentation in general practice, the demand on GPs to provide nutrition care to patients is likely to be increasing.

Nutrition care refers to any practice conducted by a health professional in an attempt to improve the nutrition behaviour and subsequent health outcomes of an individual (see Chapter 1, Section 1.2 ‘Definition of Nutrition Care’). In 2003, the dietetic workforce developed a detailed interpretation of nutrition care, called the nutrition care process. The nutrition care process is described as a systematic pathway of nutrition assessment, nutrition diagnosis, nutrition intervention and nutrition evaluation. Each step in the nutrition care process encompasses a variety of discrete practices. For example, when conducting a nutrition assessment on a patient, dietitians may perform practices such as assessing the patient’s anthropometry (e.g. weight, height, waist circumference), discussing the patient’s family history and social situation, discussing any nutrition-related symptoms (e.g. abdominal pain or discomfort), in addition to an assessment of the patient’s current dietary intake.
This prescribed approach to nutrition care has been shown to improve the consistency of care provided by the dietetic workforce, and was adopted as an international framework for dietetic practice in 2010\textsuperscript{20}. However, limitations to the nutrition care process exist, namely a considerable time requirement to complete each of the prescribed steps\textsuperscript{20}. General practice consultations are limited by time, and often involve more than one presenting ‘problem’\textsuperscript{10}. As a result, it is anticipated that the nutrition care process is not transferrable to general practice consultations, and differs considerably to the nutrition care provided by GPs.

The role of GPs in providing nutrition care is currently unclear and has not been investigated in detail. General Practitioners hold diverse opinions regarding their ideal role in providing nutrition care to patients, as well as the most effective and efficient method of providing this care\textsuperscript{171}. As a result, GPs may be providing variable nutrition care to patients with lifestyle-related chronic disease. Patients trust the nutrition advice provided by GPs\textsuperscript{28}, and international research suggests they intentionally consult GPs for nutrition advice\textsuperscript{39}. Therefore, it is important to understand the manner in which GPs provide nutrition care to patients with chronic disease. Understanding the nutrition care practices of GPs will contribute to evidence of GPs’ influence on patients’ health outcomes relating to nutrition and chronic disease, and may inform the scope of practice for GPs in this context. Therefore, the aim of this study was to describe the nutrition care practices of Australian GPs. In particular, this study described the discrete practices that GPs perform when providing nutrition care to patients.

3.3 Methods

Study Design

The nutrition care practices of participating GPs were recorded through direct observation of patient consultations. Medical students’ observations have previously been shown to be an appropriate method to document the practices of health professionals\textsuperscript{172-174}. Eighteen 4\textsuperscript{th}-year
medical students from Griffith University were assigned a ‘Nutrition Care Activity’ as part of their mandatory activities undertaken whilst on their general practice rotation. The ‘Nutrition Care Activity’ involved completing a nutrition care checklist on the first five consultations that the student observed and that involved nutrition care. Each student completed the checklists whilst observing the same GP, totalling 90 observed consultations of 18 GPs. The study protocol was approved by the Griffith University Human Research Ethics Committee (PBH/46/11/HREC).

Participants

Each medical student was assigned one supervising-GP for the duration of their general practice rotation. The supervising-GPs were invited to participate in the study, and were provided with a plain language information sheet about the study, informed consent form and short demographic questionnaire. Each GP provided informed consent and listed their gender, years of experience as a GP, specialty area and the suburb in which their practice was located, as these characteristics have been shown to influence the practices of GPs.152,175,176

Nutrition Care Checklist

The nutrition care checklist was developed in consultation with the research team after a review of current guidelines for chronic disease management in general practice and the dietetic nutrition care process.18 The guidelines for chronic disease management and the dietetic nutrition care process were reviewed in order to identify discrete nutrition care practices. All practices that were identified as being possible in a standard general practice consultation were included in the checklist. The logic for each included practice is listed in Table 3.1. The checklist was reviewed by three GPs that did not participate in the study, and feedback was provided on the face validity of the checklist. The reviewing GPs suggested minor changes to the wording of the checklist, which were implemented prior to data collection. The final checklist consisted of 31 practices listed in accordance with the domains of the dietetic
nutrition care process; Nutrition Assessment (Practices 1-20); Nutrition Diagnosis (Practice 21); Nutrition Intervention (Practices 22-27) and Nutrition Monitoring and Evaluation (Practices 28-31). Each practice was marked with either a ‘Yes’ (completed), ‘No’ (did not complete) or ‘Completed by Practice Nurse’.
Table 3.1: Practices included in the Nutrition Care Checklist, and the logic for inclusion.

<table>
<thead>
<tr>
<th>Nutrition Care Practice</th>
<th>Inclusion Logic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Did the GP discuss or ask the patient how they feel about their current weight?</td>
<td>Discussing weight is a component of clinical practice guidelines(^a) for GPs</td>
</tr>
<tr>
<td>2. Did the GP ask the patient what their weight is?</td>
<td>Measuring weight is a component of clinical practice guidelines(^a) for GPs</td>
</tr>
<tr>
<td>3. Did the GP measure the patient’s weight?</td>
<td>Measuring weight is a component of clinical practice guidelines(^a) for GPs</td>
</tr>
<tr>
<td>4. Did the GP ask the patient about their parents’ health?</td>
<td>Investigating family history is a component of clinical practice guidelines(^a) for GPs</td>
</tr>
<tr>
<td>5. Did the GP ask the patient about their weight history?</td>
<td>Investigating weight history is a component of clinical practice guidelines(^a) for GPs</td>
</tr>
<tr>
<td>6. Did the GP ask or measure the height of the patient?</td>
<td>Measuring the patient’s height is required in order to determine the patient’s BMI.</td>
</tr>
<tr>
<td>7. Did the GP calculate or determine the BMI of the patient?</td>
<td>Measuring BMI is a component of clinical practice guidelines(^a) for GPs</td>
</tr>
<tr>
<td>8. Did the GP measure the patient’s waist circumference?</td>
<td>Measuring waist circumference is a component of clinical practice guidelines(^a) for GPs</td>
</tr>
<tr>
<td>9. Did the GP measure the patient’s hip circumference?</td>
<td>Measuring hip circumference is required to determine the patient’s waist-hip ratio</td>
</tr>
<tr>
<td>10. Did the GP calculate or determine the patient’s waist-hip ratio?</td>
<td>Determining waist-hip ratio is a component of clinical practice guidelines(^a) for GPs</td>
</tr>
<tr>
<td>11. Did the GP measure the patient’s sum of skin folds?</td>
<td>Obtaining relevant anthropometric data is a component of the nutrition care process(^b)</td>
</tr>
<tr>
<td>12. Did the GP measure the patient’s blood pressure?</td>
<td>Measuring blood pressure is a component of clinical practice guidelines(^a) for GPs</td>
</tr>
<tr>
<td>13. Did the GP discuss the patient’s blood pressure reading?</td>
<td>Measuring blood pressure is a component of clinical practice guidelines(^a) for GPs</td>
</tr>
<tr>
<td>14. Did the GP arrange to measure the patient’s serum cholesterol levels?</td>
<td>Measuring serum cholesterol levels is a component of clinical practice guidelines(^a) for GPs</td>
</tr>
<tr>
<td>15. Did the GP discuss the patient’s cholesterol levels?</td>
<td>Measuring serum cholesterol levels is a component of clinical practice guidelines(^a) for GPs</td>
</tr>
<tr>
<td>16. Did the GP perform a systematic dietary assessment (diet history)?</td>
<td>Assessing the patient’s dietary intake is a component of clinical practice guidelines(^a) for GPs and the nutrition care process(^b)</td>
</tr>
<tr>
<td>17. Did the GP ask the patient general questions about their current diet?</td>
<td>Assessing the patient’s dietary intake is a component of clinical practice guidelines(^a) for GPs and the nutrition care process(^b)</td>
</tr>
<tr>
<td>Nutrition Care Practice</td>
<td>Inclusion Logic</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>18. Did the GP ask the patient about any family influence on their diet (shopping, cooking)?</td>
<td>Assessing the patient’s dietary intake is a component of clinical practice guidelines for GPs and the nutrition care process.</td>
</tr>
<tr>
<td>19. Did the GP ask the patient about the cooking methods they use when preparing foods?</td>
<td>Assessing the patient’s dietary intake is a component of clinical practice guidelines for GPs and the nutrition care process.</td>
</tr>
<tr>
<td>20. Did the GP ask the patient about any other influences on their diet (work, social life)?</td>
<td>Assessing the patient’s dietary intake is a component of clinical practice guidelines for GPs and the nutrition care process.</td>
</tr>
<tr>
<td>21. Did the GP state a ‘nutrition-related problem’?</td>
<td>Stating a nutrition-related problem is a component of the nutrition care process.</td>
</tr>
<tr>
<td>22. Did the GP provide nutrition advice which focused on a nutrient?</td>
<td>Providing nutrition advice is a component of the nutrition care process.</td>
</tr>
<tr>
<td>23. Did the GP provide nutrition advice which focused on a food/s?</td>
<td>Providing nutrition advice is a component of the nutrition care process.</td>
</tr>
<tr>
<td>24. Did the GP suggest any strategies for the patient to implement the nutrition advice?</td>
<td>Providing strategies to improve a patient’s nutrition intake is a component of clinical practice guidelines for GPs and the nutrition care process.</td>
</tr>
<tr>
<td>25. Did the GP suggest a nutrition-related supplement to the patient?</td>
<td>The use of a nutrition-related supplement may be required for some patients.</td>
</tr>
<tr>
<td>26. Did the GP discuss the interaction between the patient’s current diet and medication (drug-nutrient interaction)?</td>
<td>Some patients may be consuming foods that interact with their current medication.</td>
</tr>
<tr>
<td>27. Did the GP provide the patient with a nutrition-related information handout?</td>
<td>The use of a nutrition-related handout may be used to supplement nutrition advice provided in a consultation.</td>
</tr>
<tr>
<td>28. Did the GP request the patient to book a follow up appointment relating to nutrition?</td>
<td>Providing continuing care for preventive activities is a component of clinical practice guidelines for GPs.</td>
</tr>
<tr>
<td>29. Did the GP discuss the possibility of referring the patient to another health professional for further nutrition care?</td>
<td>Referring on to another health professional is a component of clinical practice guidelines for GPs.</td>
</tr>
<tr>
<td>30. Did the GP refer the patient to another health professional for further nutrition care?</td>
<td>Referring on to another health professional is a component of clinical practice guidelines for GPs.</td>
</tr>
<tr>
<td>31. Did the GP refer the patient to any other health service or organisation (e.g. Lighten Up program, commercial weight loss program, community health organisation)?</td>
<td>Referring on to a specialised health service, if appropriate, is a component of the nutrition care process.</td>
</tr>
<tr>
<td>32. Did any additional tasks or practices occur in the consultation? Please provide details:</td>
<td>This question provides the opportunity to note down additional tasks that were not included in the checklist.</td>
</tr>
</tbody>
</table>

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*The clinical practice guidelines for GPs include guidelines for care of overweight and obesity in adults, and patients with type 2 diabetes.*

*The Nutrition Care Process refers to nutrition-specific care as intended to be provided by a Registered Dietitian (relevant to USA setting) and has been adapted to the Australian setting for use by Australian dietitians.*
Data Collection

In order to maximise the reliability of data collection, each student participated in a training workshop prior to the commencement of their general practice rotation. The workshop was conducted by the research candidate and provided information on the study design and the nutrition care checklist. Students were instructed to complete each checklist during the consultation. Each of the practices listed in the checklist were discussed in detail and each student provided verbal confirmation that they understood each of the practices prior to leaving the workshop. Students were provided with prepaid self-addressed envelopes and were asked to mail the five checklists to the research candidate upon the completion of the rotation.

Consultations were identified as applicable to the current study if nutrition was discussed in the context of weight management, type 2 diabetes, cardiovascular disease (including hypertension and hyperlipidaemia), general healthy eating or in relation to a specific nutrient such as sodium, calcium, or iron. Consultations relating to acute medical problems such as suspected or diagnosed food intolerances were not included. Consultations with patients under the age of 18 years, or patients receiving advice for their child under the age of 18 years were not included.

Multiple strategies were used to minimise the possibility of a Hawthorne effect, which in this instance refers to altered behaviour of the GP due to the presence of the observing student. Firstly, the plain language information sheet stated that the nutrition care checklist incorporated all possible nutrition care practices in a consultation, and was not deemed as ‘ideal’ nutrition care. Secondly, observing and recording the first five consultations that included nutrition care reduced the likelihood that GPs or students would select which consultations to include in the study. Thirdly, students were instructed to remain silent for the duration of the consultation and avoid eye contact with the GP and the patient.
Data analysis

All analyses were conducted using the SPSS statistical software package version 19\textsuperscript{178}. The gender and age of participating GPs were compared to the Australian Institute of Health and Welfare Workforce Data\textsuperscript{63} using a Chi-square Goodness of Fit analysis and One-Sample t-test respectively, to test for representativeness of the sample. The gender of the participating GPs was compared to the number of years in practice using a Pearson's Chi-squared test. Frequency statistics were calculated for each nutrition care practice. Demographic characteristics of the participating GPs including the gender and number of years in practice were compared with the frequency of nutrition care practices using Pearson’s Chi-Squared tests. Statistical significance level was set at $P<0.05$.

3.4 Results

Participant Characteristics

Thirteen male (72%) and five female (28%) GPs participated in the study and their mean age was $51.3\pm7.9$ years (mean, standard deviation). When compared with the demographics of the Australian general practice workforce\textsuperscript{63}, the proportion of male GPs in the sample was higher than expected ($P=0.016$), however their ages were similar ($P>0.05$). The GPs had been practicing for $23.2\pm7.3$ years (mean, standard deviation) and no association was found between the gender of the GPs and the number of years in practice ($P>0.05$).

Five of the GPs reported a specific interest area in their general practice: Skin (n=2), Mental Health (n=1), Chronic Disease (n=1) and Obstetrics & Gynaecology (n=1). The remaining 13 GPs did not report any specific interest. All practice suburbs were located in metropolitan regions in South East Queensland, Australia.
**Nutrition Care Practices**

The frequency of nutrition care practices observed in the consultations is outlined in Table 3.2. Twenty eight of the 31 practices in the checklist were observed at least once in a consultation. The three practices that were not observed in any consultation were measuring the patient’s hip circumference, determining the patient’s waist-hip ratio, and measuring the patient’s sum of skin folds. The most frequently observed practices were measuring and discussing a patient’s blood pressure (76.7%, n=69 each), followed by asking the patient general questions about their current diet (74.4%, n=67). The least frequently observed practices were discussing a referral to a nutrition-related health service or organisation other than a health professional (1.1%, n=1), discussing the interaction between a patient’s current diet and medication (10.0%, n=9), and performing a systematic dietary assessment such as a diet history or 24-hour recall (11.1%, n=10).
Table 3.2: Observation frequency of each nutrition care practice.

<table>
<thead>
<tr>
<th>Nutrition Care Practice</th>
<th>Yes % (n)</th>
<th>No % (n)</th>
<th>Completed by the Practice Nurse % (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Did the GP discuss or ask the patient how they feel about their current weight?</td>
<td>57.8% (52)</td>
<td>42.2% (38)</td>
<td>-</td>
</tr>
<tr>
<td>2. Did the GP ask the patient what their weight is?</td>
<td>32.2% (29)</td>
<td>67.8% (61)</td>
<td>-</td>
</tr>
<tr>
<td>3. Did the GP measure the patient’s weight?</td>
<td>43.3% (39)</td>
<td>42.2% (38)</td>
<td>14.4% (13)</td>
</tr>
<tr>
<td>4. Did the GP ask the patient about their parents’ health?</td>
<td>11.1% (10)</td>
<td>88.9% (80)</td>
<td>-</td>
</tr>
<tr>
<td>5. Did the GP ask the patient about their weight history?</td>
<td>48.9% (44)</td>
<td>51.1% (46)</td>
<td>-</td>
</tr>
<tr>
<td>6. Did the GP ask or measure the height of the patient?</td>
<td>34.4% (31)</td>
<td>54.4% (49)</td>
<td>11.1% (10)</td>
</tr>
<tr>
<td>7. Did the GP calculate or determine the BMI of the patient?</td>
<td>37.8% (34)</td>
<td>51.1% (46)</td>
<td>11.1% (10)</td>
</tr>
<tr>
<td>8. Did the GP measure the patient’s waist circumference?</td>
<td>12.2% (11)</td>
<td>78.9% (71)</td>
<td>8.9% (8)</td>
</tr>
<tr>
<td>9. Did the GP measure the patient’s hip circumference?</td>
<td>-</td>
<td>100% (90)</td>
<td>-</td>
</tr>
<tr>
<td>10. Did the GP calculate or determine the patient’s waist-hip ratio?</td>
<td>-</td>
<td>100% (90)</td>
<td>-</td>
</tr>
<tr>
<td>11. Did the GP measure the patient’s sum of skin folds?</td>
<td>-</td>
<td>100% (90)</td>
<td>-</td>
</tr>
<tr>
<td>12. Did the GP measure the patient’s blood pressure?</td>
<td>76.7% (69)</td>
<td>14.4% (13)</td>
<td>8.9% (8)</td>
</tr>
<tr>
<td>13. Did the GP discuss the patient’s blood pressure reading?</td>
<td>76.7% (69)</td>
<td>23.3% (21)</td>
<td>-</td>
</tr>
<tr>
<td>14. Did the GP arrange to measure the patient’s serum cholesterol levels?</td>
<td>41.4% (37)</td>
<td>58.9% (53)</td>
<td>-</td>
</tr>
<tr>
<td>15. Did the GP discuss the patient’s cholesterol levels?</td>
<td>50% (45)</td>
<td>50% (45)</td>
<td>-</td>
</tr>
<tr>
<td>16. Did the GP perform a systematic dietary assessment (diet history)?</td>
<td>11.1% (10)</td>
<td>88.9% (80)</td>
<td>-</td>
</tr>
<tr>
<td>17. Did the GP ask the patient general questions about their current diet?</td>
<td>74.4% (67)</td>
<td>25.6% (23)</td>
<td>-</td>
</tr>
<tr>
<td>18. Did the GP ask the patient about any family influence on their diet?</td>
<td>26.7% (24)</td>
<td>73.3% (66)</td>
<td>-</td>
</tr>
<tr>
<td>Nutrition Care Practice</td>
<td>Yes % (n)</td>
<td>No % (n)</td>
<td>Completed by the Practice Nurse % (n)</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-----------</td>
<td>----------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td>19. Did the GP ask the patient about the cooking methods they use when preparing foods?</td>
<td>16.7% (15)</td>
<td>83.3% (75)</td>
<td>-</td>
</tr>
<tr>
<td>20. Did the GP ask the patient about any other influences on their diet? (work, social life)</td>
<td>37.8% (34)</td>
<td>62.2% (56)</td>
<td>-</td>
</tr>
<tr>
<td>21. Did the GP state a ‘nutrition-related problem’?</td>
<td>52.2% (47)</td>
<td>47.8% (43)</td>
<td>-</td>
</tr>
<tr>
<td>22. Did the GP provide nutrition advice which focused on a nutrient?</td>
<td>45.6% (41)</td>
<td>54.4% (49)</td>
<td>-</td>
</tr>
<tr>
<td>23. Did the GP provide nutrition advice which focused on a food/s?</td>
<td>52.2% (47)</td>
<td>47.8% (43)</td>
<td>-</td>
</tr>
<tr>
<td>24. Did the GP suggest any strategies for the patient to implement the nutrition advice?</td>
<td>25.6% (23)</td>
<td>74.4% (67)</td>
<td>-</td>
</tr>
<tr>
<td>25. Did the GP suggest a nutrition-related supplement to the patient?</td>
<td>14.4% (13)</td>
<td>85.6% (77)</td>
<td>-</td>
</tr>
<tr>
<td>26. Did the GP discuss the interaction between the patient’s current diet and medication?</td>
<td>10.0% (9)</td>
<td>90.0% (81)</td>
<td>-</td>
</tr>
<tr>
<td>27. Did the GP provide the patient with a nutrition-related information handout?</td>
<td>16.7% (5)</td>
<td>83.3% (75)</td>
<td>-</td>
</tr>
<tr>
<td>28. Did the GP request the patient to book a follow up appointment relating to nutrition?</td>
<td>30.0% (27)</td>
<td>70.0% (63)</td>
<td>-</td>
</tr>
<tr>
<td>29. Did the GP discuss referring the patient to another health professional for further nutrition care?</td>
<td>36.7% (33)</td>
<td>63.3% (57)</td>
<td>-</td>
</tr>
<tr>
<td>30. Did the GP refer the patient to another health professional for further nutrition care?</td>
<td>25.6% (23)</td>
<td>74.4% (67)</td>
<td>-</td>
</tr>
<tr>
<td>31. Did the GP refer the patient to any other health service or organisation (e.g. Lighten Up program, commercial weight loss program, community health organisation)</td>
<td>1.1% (1)</td>
<td>98.9% (89)</td>
<td>-</td>
</tr>
</tbody>
</table>

*BMI=Body Mass Index*  
*GP=General Practitioner*  
*n=number*
In over half of the consultations the GP stated a nutrition-related problem (52.2%, n=47). The most commonly stated nutrition-related problems were excess food or energy intake (n=19), inadequate iron or vitamin B12 intake (n=6) and excess sugar intake (n=5). Nearly half of the consultations included nutrition advice that focused on a nutrient (45.6%, n=41). The most common nutrient-related advice was to reduce fat intake (n=14), reduce carbohydrate intake (n=9), and increase iron or B12 intake (n=4). Over half of the consultations included nutrition advice which focused on a food or food group (52.2%, n=47). The most common food-related advice was to increase fruit and vegetable intake (n=18), increase lean red meat intake (n=12) and reduce the intake of processed foods (n=3). A nutrition-related strategy was suggested to patients in approximately one-quarter of consultations (25.6%, n=23). The most common strategies were to avoid take away foods (n=5), consume smaller portions of meals (n=5) and to use less oil when cooking (n=3).

In some consultations (17%, n=15), nutrition care practices were performed in the absence of expected related practices. For example, in six consultations the GP stated a nutrition-related problem without asking the patient any questions about their current nutrition intake. In nine consultations the GP provided nutrition advice without asking the patient any questions about their current nutrition intake. In four consultations the GP stated a nutrition-related problem but did not provide any nutrition advice, suggest any nutrition strategies or refer the patient on for further nutrition care.

The GP requested the patient to attend a follow-up consultation to review their nutrition progress in approximately one-third of consultations (30.0%, n=27). Most follow-up timeframes were either four weeks (n=10), two weeks (n=5) or one week (n=4) from the original consultation. Although over a third of consultations included a discussion about referring the patient on to another health professional for further nutrition care (n=36.7%, n=33), only one
quarter of consultations resulted in a referral (25.6%, n=23). The most commonly referred health professional was a dietitian (n=20), followed by a diabetes educator (n=3).

**Effect of Demographics on General Practitioners’ Nutrition Care Practices**

An association was found between the frequency of some nutrition care practices and the gender of participating GPs, as shown in Table 3.3. Consultations with male GPs were more likely to include measuring the height of a patient (46.2% vs. 4%, \( \chi^2 = 11.773, P=0.001 \)), determining the BMI of a patient (49.2% vs. 8%, \( \chi^2 = 11.526, P=0.001 \)), discussing referring a patient onto another health professional for further nutrition care (46.2% vs. 3%, \( \chi^2 = 9.070, P=0.003 \)), and referring a patient to another health professional for further nutrition care (33.8% vs. 4%, \( \chi^2 = 8.454, P=0.004 \)) when compared with consultations with female GPs.

Table 3.3: Effect of gender on nutrition care practices of GPs (only statistically significant associations shown).

<table>
<thead>
<tr>
<th>Nutrition Care Practice</th>
<th>Consultations with a Male GP (n=65)</th>
<th>Consultations with a Female GP (n=25)</th>
<th>Statistical Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Did the GP ask or measure the height of the patient?</td>
<td>30 (46.2%)</td>
<td>1 (4.0%)</td>
<td>( P=0.001 )</td>
</tr>
<tr>
<td>7. Did the GP calculate or determine the BMI of the patient?</td>
<td>32 (49.2%)</td>
<td>2 (8.0%)</td>
<td>( P=0.001 )</td>
</tr>
<tr>
<td>29. Did the GP discuss referring the patient to another health professional for further nutrition care?</td>
<td>30 (46.2%)</td>
<td>3 (12.0%)</td>
<td>( P=0.003 )</td>
</tr>
<tr>
<td>30. Did the GP refer the patient to another health professional for further nutrition care?</td>
<td>22 (33.8%)</td>
<td>1 (4.0%)</td>
<td>( P=0.004 )</td>
</tr>
</tbody>
</table>

*BMI=Body Mass Index  GP=General Practitioner  n=number*

Additionally, an association was found between the frequency of some nutrition care practices and the number of years the GPs had been in practice, as shown in Table 3.4. Consultations with GPs with at least 25 years experience were more likely to include measuring the patient’s
weight (55.6% vs. 31.1%, \( \chi^2 = 8.156, P = 0.004 \)), asking the patient about their parent’s health (22.2% vs. 0%, \( \chi^2 = 11.250, P = 0.001 \)), asking the patient about their weight history (62.2% vs. 35.6%, \( \chi^2 = 6.403, P = 0.011 \)), determining the BMI of the patient (51.1% vs. 24.4%, \( \chi^2 = 5.440, P = 0.020 \)), performing a systematic dietary assessment (20.0% vs. 2.2%, \( \chi^2 = 7.200, P = 0.007 \)), asking the patient general questions about their diet (84.4% vs. 64.4%, \( \chi^2 = 4.731, P = 0.030 \)), asking the patient about the influence of their family on their diet (40.0% vs. 13.3%, \( \chi^2 = 8.182, P = 0.004 \)), and asking the patient about the cooking methods used when preparing foods (24.4% vs. 6.7%, \( \chi^2 = 6.225, P = 0.044 \)) compared with consultations with GPs with less than 25 years experience.

Table 3.4: Effect of experience on nutrition care practices of GPs (only statistically significant associations shown).

<table>
<thead>
<tr>
<th>Nutrition Care Practice</th>
<th>Consultations with GPs with less than 25 years experience (n=45)</th>
<th>Consultations with GPs with more than 25 years experience (n=45)</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Did the GP measure the patient’s weight?</td>
<td>14 (31.1%)</td>
<td>25 (55.6%)</td>
<td>P=0.004</td>
</tr>
<tr>
<td>4. Did the GP ask the patient about their parents’ health?</td>
<td>0 (0%)</td>
<td>10 (22.2%)</td>
<td>P=0.001</td>
</tr>
<tr>
<td>5. Did the GP ask the patient about their weight history?</td>
<td>16 (35.6%)</td>
<td>28 (62.2%)</td>
<td>P=0.011</td>
</tr>
<tr>
<td>7. Did the GP calculate or determine the BMI of the patient?</td>
<td>11 (24.4%)</td>
<td>23 (51.1%)</td>
<td>P=0.020</td>
</tr>
<tr>
<td>16. Did the GP perform a systematic dietary assessment?</td>
<td>1 (2.2%)</td>
<td>9 (20.0%)</td>
<td>P=0.007</td>
</tr>
<tr>
<td>17. Did the GP ask the patient general questions about their current diet?</td>
<td>29 (64.4%)</td>
<td>28 (62.2%)</td>
<td>P=0.030</td>
</tr>
<tr>
<td>18. Did the GP ask the patient about any family influence on their diet?</td>
<td>6 (13.3%)</td>
<td>18 (40.0%)</td>
<td>P=0.004</td>
</tr>
<tr>
<td>19. Did the GP ask the patient about the cooking methods they use when preparing foods?</td>
<td>3 (6.7%)</td>
<td>11 (24.4%)</td>
<td>P=0.044</td>
</tr>
</tbody>
</table>

*BMI=Body Mass Index  GP=General Practitioner  n=number*
3.5 Discussion

The aim of this study was to describe the nutrition care practices of Australian GPs. The findings of this study are important considering the increasing demand on GPs to provide nutrition care to patients living with chronic disease. The results show that GPs perform many nutrition care practices in varying frequencies. Some of the nutrition care practices, such as asking general questions about a patient’s diet, occurred as frequently as routine clinical care practices such as measuring blood pressure. However, some nutrition care practices, such as measuring a patient’s waist circumference or providing nutrition-related information handouts, occurred in less than one-quarter of consultations.

When compared to the dietetic nutrition care process, the GPs in this study appeared to follow a similar approach to nutrition care provision (nutrition assessment, nutrition diagnosis, nutrition intervention and nutrition evaluation)\(^\text{18}\). However, the GPs performed practices relating to nutrition assessment most frequently, and each of the successive components were performed less frequently. For example, GPs asked the patient about their diet in three quarters of consultations (nutrition assessment), stated a nutrition-related problem in half of the consultations (nutrition diagnosis), provided nutrition advice in half of the consultations (nutrition intervention), suggested nutrition strategies in one quarter of the consultations (nutrition intervention), and requested a follow-up consultation in one third of the consultations (nutrition evaluation).

Although the nutrition care process was adopted as an international framework for dietetic practice in 2010\(^\text{20}\), no studies have examined the use of the nutrition care process by other health professionals. Limitations to the nutrition care process exist including the considerable time required to complete the process, and this may limit the feasibility of using this approach in general practice consultations. Furthermore, some studies have shown that GPs can influence
patients’ nutrition behaviour and risk of lifestyle-related chronic disease by providing brief interventions that do not include all components of the nutrition care process\textsuperscript{, 163, 164}. Subsequently, the optimal manner in which GPs provide nutrition care is likely to be different to the dietetic nutrition care process.

Australian GPs have reported that one strategy to enhance the nutrition care provided by GPs is to develop a nutrition care process specifically for GPs\textsuperscript{171}. In particular, the development of a nutrition care process for GPs may increase the consistency of nutrition care practices performed by GPs, as the dietetic nutrition care process has increased the consistency of care provided by dietitians\textsuperscript{20}. The results of the current study suggest that GPs perform nutrition care practices in variable frequencies. In order to develop a specific nutrition care process for GPs, further investigation is required to clarify the most effective practices and the most efficient model for providing nutrition care to patients living with chronic disease. Furthermore, investigating the perceptions of patients who have received nutrition care from a GP can provide further insight into the nutrition care practices provided by GPs in Australia.

Two demographic characteristics of the GPs in this study were associated with higher frequencies of nutrition care practices. Firstly, consultations with male GPs were more likely to include determining the BMI of a patient, and referring a patient to another health professional when compared to consultations with female GPs. Gender has been shown to influence the practice style of both Australian and international GPs, as well as the type of conditions presented in consultations\textsuperscript{175, 176}. It is possible that the male GPs in this study measured the height and subsequent BMI of patients as an avenue to raise the topic of nutrition with the patient. However, it is also possible that the male GPs consulted a higher proportion of patients in which weight or BMI was relevant to their medical condition. Secondly, the more experienced GPs performed seven nutrition care practices more frequently than the less experienced GPs.
Interestingly, all of the seven practices are components of Nutrition Assessment, as defined in the dietetic nutrition care process\textsuperscript{18}. Therefore, more experienced GPs may be assessing a patient’s nutrition status in more detail than less experienced GPs. However, more experienced, older GPs have been shown to hold longer consultations than their younger, less experienced counterparts\textsuperscript{152}. It is therefore possible that the more experienced GPs spent more time with their patients in order to complete more nutrition care practices when compared to the less experienced GPs. Nevertheless, the associations found between the demographic characteristics of GPs and their nutrition care practices should be considered with caution. The current study was not designed to accurately compare demographic characteristics with nutrition care practices. A study of this nature would require a larger sample of GPs and a controlled patient group.

From a health service perspective, Australian GPs have an important role in providing nutrition care to patients with lifestyle-related chronic disease. In the 2011-2012 financial year, Australian GPs provided over 118 million consultations, and nearly 8 million of these consultations involved discussions relating to nutrition\textsuperscript{10}. Considering the size of the general practice workforce and the frequency of nutrition care practices observed in this study, GPs are likely to be performing nutrition care practices at a significant rate. For example, approximately half of the observed consultations in this study involved the provision of nutrition advice to patients. Based on the number of consultations that involve nutrition each year in Australia, the annual rate of nutrition advice could be as high as 4 million consultations, or 175 consultations per GP in Australia. As a result, GPs have a remarkable opportunity to influence the nutrition behaviour and health outcomes of many Australians living with chronic disease through the provision of nutrition care. This opportunity is important for future planning of primary care services in Australia and requires further consideration.
The current study has two noteworthy limitations. Firstly, the participating GPs were supervising-GPs of 4th-year medical students and were affiliated with Griffith University. Consequently, these GPs may have had a higher interest in best practice care and student teaching and therefore may have provided more detailed nutrition care compared with GPs who are not involved in student supervision and teaching. Secondly, although strategies were adopted to minimise the likelihood of the Hawthorne effect, it is possible that the presence of a student observer resulted in GPs modifying their nutrition care practices. It is therefore possible that the results of this study are overestimating the nutrition care practices performed during consultations.

3.6 Conclusion

Australian GPs appear to perform many nutrition care practices in varying frequencies. As a result, GPs may be providing variable nutrition care to patients living with chronic disease. Further research is required to explore the perceptions of patients regarding the nutrition care received from GPs in order to further describe the role of GPs in providing nutrition care.
Chapter 4: 
Study Two - Patients’ Perceptions of Nutrition Care 
Received from Australian General Practitioners

Reader’s Note:

The information in this section has been published as an original research paper:

Ball L, Hughes R, Desbrow B, Leveritt M. Patients’ Perceptions of Nutrition Care Received from General Practitioners: Focus on Type 2 Diabetes. Family Practice 2012; 29(6):p719-25.

The co-authors of this publication confirm that the research candidate has made the following contributions to this study:

• Developed the study design.
• Completed the human research ethics application.
• Designed and pilot tested the data collection instrument, including use of the online survey tool.
• Arranged for participant recruitment through Diabetes Australia, Queensland.
• Conducted statistical analysis of the data.
• Prepared manuscript for submission to journal.
• Presented the research findings at an international conference.

Signed: ___________________________ Date: 22/11/12

Signed: ___________________________ Date: 22/11/12

Signed: ___________________________ Date: 22/11/12
4.1 Abstract

In Australia, GPs are central to managing individuals with chronic disease. Due to the influence of lifestyle behaviour on chronic disease health outcomes, GPs may counsel an individual about nutrition to assist the individual to improve their nutrition behaviour. Patients with a positive regard for their health care are more likely to adhere to lifestyle changes which have been recommended by a health professional. It is unclear whether this relationship extends to the context of nutrition and general practice. The management of type 2 diabetes presents as a relevant scenario to investigate patients’ perceptions of nutrition care provided by Australian GPs. This study examines the perceptions of individuals with type 2 diabetes with respect to the nutrition care they have received from GPs. 939 individuals (11% response rate) with type 2 diabetes completed a 54-item online survey. Individual survey items related to demographic information, health-related attributes, perspectives on ideal care, and reflections on previous care. 84% of respondents perceived that the ideal management of type 2 diabetes by GPs includes nutrition care, however only 43% of respondents reported to have received this care from a GP. Over 91% of respondents were satisfied with their GP regarding nutrition care, but only 34% of respondents believed this care had been effective in improving their personal nutrition behaviour. Patients may not receive nutrition care from GPs as often as they perceive to be beneficial, and despite being satisfied with the overall care received, have variable perceptions about the effectiveness of the nutrition care component. Further research is required to clarify the relationship between patients’ perceptions of ideal nutrition care, their actual expectations of nutrition care and satisfaction with nutrition care received.
4.2 Introduction

Preventing and managing chronic disease is fundamental to modern health care systems. Many chronic diseases such as type 2 diabetes and cardiovascular disease are influenced by lifestyle factors, which broadly encompass nutrition, physical activity and smoking. As a consequence, achieving optimal health outcomes often relies on patients adopting healthy lifestyle behaviours. It is therefore important that models of health care incorporate factors that will facilitate patients to improve their health-related lifestyle behaviours.

In Australia, GPs are central to managing the health care of individuals who live with a chronic disease, and it is expected that GPs will either provide, or coordinate, all related aspects of health care. In order to assist individuals to improve their health behaviour, GPs may engage in lifestyle-related care. For example, GPs may counsel an individual about nutrition in an attempt to assist the individual to improve their nutrition behaviour and subsequent health outcomes. This has previously been referred to as ‘nutrition care’ (see Chapter 1, Section 1.2 ‘Definition of Nutrition Care’). Study One has demonstrated that GPs provide a variety of nutrition care practices in consultations.

Over the past two decades, health care provided to individuals has changed from a practitioner-centred approach towards a more patient-centred approach. The concept of patient-centred care is a key feature of the present Australian health care reform, perhaps due to observed improvements in the health outcomes of patients associated with a patient-centred approach. One of the reasons for these improvements is that patient-centred care usually improves patients’ regard for their received health care, which increases the likelihood that patients will adhere to the lifestyle changes recommended by health professionals. It is therefore imperative that GPs, as central health care providers for individuals with chronic disease,
provide patient-centred care in order to maximise the probability that patients will adhere to recommended changes in behaviour.

Despite this general relationship between the perceptions of patients and subsequent adherence to lifestyle recommendations, the views of patients regarding the nutrition care they have received from GPs has not yet been investigated in Australia. Although GPs have been shown to provide a variety of nutrition care practices in consultations (Study One), GPs have expressed concern over their competence to provide this care\textsuperscript{171}. Therefore, it is important to explore patients’ nutrition-related perceptions, particularly their experiences, expectations and satisfaction in order to further investigate the role of GPs in providing nutrition care to patients living with chronic disease.

This paper examines the perceptions of nutrition care received from GPs by individuals with type 2 diabetes. Type 2 diabetes has been selected as the model disease for the study for three reasons. Firstly, type 2 diabetes is a chronic disease in which health outcomes are influenced by individuals’ nutrition behaviour\textsuperscript{25}. Secondly, GPs are heavily involved in the management of patients living with type 2 diabetes\textsuperscript{10}. Thirdly, nutrition care is a key component of existing guidelines for the management of patients with type 2 diabetes by GPs\textsuperscript{26}.

4.3 Methods

Survey Instrument

This study utilised a quantitative questionnaire approach to explore patients’ perceptions of nutrition care in accordance with the best practice guidelines for the management of type 2 diabetes in Australian general practice\textsuperscript{26}. A cross-sectional online survey was developed using \textit{LimeSurvey™} version 1.82\textsuperscript{181}. The best practice guidelines for management of type 2 diabetes in
Australian general practice were used to inform the survey content\textsuperscript{26}. After a review of relevant literature and discussions with patients with type 2 diabetes who were known to the research team, some additional topics were identified as requiring investigation, and were included in the survey, such as diabetes-related characteristics and private health insurance coverage. Fifty-four survey items were clustered into four sections as shown in Table 4.1, each with a distinct rationale for investigation and a variety of response modes. The study protocol was approved by the Griffith University Human Research Ethics Committee (PBH/30/10/HREC).
Table 4.1: Online survey design, including rationale for investigation and modes of responses.

<table>
<thead>
<tr>
<th>Section</th>
<th>Rationale for Investigation</th>
<th>Area of Enquiry</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General Demographics</td>
<td>Allows indication of representativeness of the sample by a comparison to the total potential participant pool.</td>
<td>Age&lt;sup&gt;a&lt;/sup&gt;</td>
<td>MCQ</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gender&lt;sup&gt;a&lt;/sup&gt;</td>
<td>MCQ</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Education Level</td>
<td>MCQ</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Household Income</td>
<td>MCQ</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Medicare Eligibility and Private Health Insurance</td>
<td>Yes/No</td>
</tr>
<tr>
<td>2. Health-related Attributes</td>
<td>Enables identification of relationships between participant characteristics and patient perceptions.</td>
<td>Years since Diagnosis</td>
<td>MCQ</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Diabetes Medication</td>
<td>MCQ</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Frequency of Diabetes-Related GP consultation&lt;sup&gt;b&lt;/sup&gt;</td>
<td>MCQ</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Preference of continuity of GP (i.e. Same GP each consultation)</td>
<td>Yes/No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Consultation with additional health care providers</td>
<td>MCQ</td>
</tr>
<tr>
<td>3. Perspective on Ideal care&lt;sup&gt;c&lt;/sup&gt;</td>
<td>Enables comparison between patient perspectives of the ideal level of GP nutrition care and the documented best practice guidelines for care in this context.</td>
<td>Explanation of 'diabetes', relevant physiology, associated risk factors and potential complications of diabetes&lt;sup&gt;b&lt;/sup&gt;</td>
<td>5-p Likert</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Monitoring weight and waist circumference&lt;sup&gt;b&lt;/sup&gt;</td>
<td>5-p Likert</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explanation of impact of nutrition on diabetes management&lt;sup&gt;b&lt;/sup&gt;</td>
<td>5-p Likert</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provision of individual dietary modification recommendations&lt;sup&gt;b&lt;/sup&gt;</td>
<td>5-p Likert</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Discussion of further information available to patients&lt;sup&gt;b&lt;/sup&gt;</td>
<td>5-p Likert</td>
</tr>
<tr>
<td>4. Reflections on previous care</td>
<td>Enables reflection of patient satisfaction of nutrition care received in the general practice setting and resulting perceived enablement of healthy nutrition practices.</td>
<td>Occurrences of practices listed in Section 3</td>
<td>MCQ</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Satisfaction of identified practices</td>
<td>5-p Likert</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Perceived adequacy of nutrition-related support</td>
<td>MCQ</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Perceived relationship between support and health outcomes</td>
<td>MCQ</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Perceived effectiveness of nutrition care received</td>
<td>3-p Likert</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Areas of excellent care provided</td>
<td>Open</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Areas of care requiring improvement</td>
<td>Open</td>
</tr>
</tbody>
</table>

<sup>a</sup>Demographic questions derived in compatible format to Diabetes Australia, Queensland database.

<sup>b</sup>Care Practices derived from best practice guidelines for management of type 2 diabetes in Australian general practice.<sup>26</sup>

<sup>c</sup>Questions relate to care practices provided from an unidentified health professional.

GP = General Practitioner
MCQ = Multiple Choice Question
p = Point
Sections One and Two related to the general demographics and health-related attributes of respondents, respectively. Questions within these sections were included to enable the identification of associations between respondents’ characteristics and perceptions. Where possible, question response formats were composed in a comparable format to the Diabetes Australia, Queensland (DAQ) information database to enable comparisons between the survey sample and the potential participant pool. Additional demographic questions were included that were relevant to the Australian general practice context due to the potential to influence health services received by respondents, such as possession of a Medicare card, chronic disease management plan and private health insurance. A number of health-related attributes were also included due to the potential influence on the nature of health care received by respondents, such as frequency and continuity of general practice consultations, and consultations with additional health care providers.

The third survey section related to the perspectives of respondents regarding ‘ideal nutrition care’. This information enabled a comparison between the perspectives of patients regarding preferred nutrition care and the documented best practice guidelines for care in this context. Questions were modelled from the recommended practices listed in the best practice guidelines for type 2 diabetes management in general practice. General-care practices were included in addition to nutrition-specific practices for use as references to other aspects of care that are usually expected to be provided by GPs. The fourth survey section focused on respondents’ reflections of nutrition care previously received from their GP. This information enabled respondents to identify practices that had been provided by their GP, as well as report on their satisfaction with this received care. Questions reflected the content of Section Three, as derived from the best practice guidelines for the management of type 2 diabetes in general practice.
Initial survey piloting consisted of a review of the online survey by five GPs. These GPs provided feedback on face validity and appropriateness of question wording. Recommendations for changes to survey wording included minor editing, which was completed prior to further piloting. Secondary survey piloting consisted of the online completion of the survey by ten individuals with type 2 diabetes, for feedback on the interpretation and understanding of survey items. The primary purpose of this pilot phase was to minimise question ambiguity. After completion of the survey, these individuals were asked to comment on their interpretation of each survey item, as well as the clarity of item wording and survey layout. The recommendations to survey wording for the purposes of maximising question interpretation and understanding included minor editing, and this was completed prior to data collection. The finalised survey was intended to take approximately fifteen minutes to complete, and was only available in English.

**Participant Sampling**

The potential participant pool were individuals with type 2 diabetes who were registered with Diabetes Australia, Queensland (DAQ) in February 2011 (n=9,518). DAQ is Queensland’s primary organisation for support, advocacy and research for people with type 2 diabetes. An introductory email was sent by DAQ to the potential participant pool including a brief description of the study, assurance of confidentiality, a link to complete the survey and contact details of the research team. Confidentiality of survey responses was ensured through the certified anonymous LimeSurvey™ program. Two reminder emails were sent to the potential participant pool; 2 and 4 weeks after the initial email.
Data Analysis

All analyses were conducted using the SPSS statistical software package version 19. Descriptive statistics were calculated for each survey item including frequency distribution, mean and mode responses. Gender and age were compared between survey respondents and the total potential participant pool using Chi-square Goodness of Fit analyses to test for representation of the survey sample. Level of education was compared between survey respondents and the 2008 AusDiab survey using Chi-square Goodness of Fit analysis. Participants’ expectation for nutrition care, rate of receiving nutrition care and satisfaction with nutrition care were compared with demographic characteristics including gender, level of education and income using Pearson’s Chi-squared tests. In order to comply with the assumptions underpinning Chi-square analyses, categories were collapsed to ensure that fewer than 20% of cells remained below minimum counts. Statistical significance level was set at P<0.05.

4.4 Results

Of the 9,518 emails sent to potential participants, 925 emails failed to reach a recipient, and a further 17 individuals contacted the research team informing that they were unable to access the survey on their computer. 950 people accessed the survey, with 939 (99%) meeting the eligibility criterion of being diagnosed with type 2 diabetes. An accurate response rate is difficult to determine because there was no way to estimate the number of potential participants that were sent the email, but did not read it. Nevertheless, the response rate was calculated to be at least 11%. The general demographics of respondents are illustrated in Table 4.2. No difference was observed between the survey respondents and the potential participant pool with regards to gender (P>0.05). A difference in age was observed between the survey respondents and the potential participant pool (P=0.008). From inspection of the data, survey
respondents reported lower age groups than the potential participant pool. A difference in education level was observed between the survey respondents and the 2008 AusDiab participant pool (P<0.001). From visual inspection of the data, survey respondents reported a higher education level than the 2008 AusDiab participant pool.

Table 4.2: Demographic characteristics of survey respondents (n=939).

<table>
<thead>
<tr>
<th></th>
<th>Number of Respondents (n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong>a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>505</td>
<td>53.2</td>
</tr>
<tr>
<td>Female</td>
<td>434</td>
<td>46.8</td>
</tr>
<tr>
<td><strong>Age</strong>b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;25 years</td>
<td>1</td>
<td>0.1</td>
</tr>
<tr>
<td>25-34 years</td>
<td>5</td>
<td>0.5</td>
</tr>
<tr>
<td>35-44 years</td>
<td>43</td>
<td>4.5</td>
</tr>
<tr>
<td>45-54 years</td>
<td>161</td>
<td>16.9</td>
</tr>
<tr>
<td>55-64 years</td>
<td>359</td>
<td>37.8</td>
</tr>
<tr>
<td>65-74 years</td>
<td>274</td>
<td>28.8</td>
</tr>
<tr>
<td>&gt;75 years</td>
<td>90</td>
<td>9.5</td>
</tr>
<tr>
<td><strong>Education Level</strong>c</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary School</td>
<td>30</td>
<td>3.4</td>
</tr>
<tr>
<td>Some High School</td>
<td>240</td>
<td>25.7</td>
</tr>
<tr>
<td>Completed High School</td>
<td>179</td>
<td>19.2</td>
</tr>
<tr>
<td>Completed University/TAFE</td>
<td>484</td>
<td>51.7</td>
</tr>
<tr>
<td><strong>Income</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Income</td>
<td>54</td>
<td>6.0</td>
</tr>
<tr>
<td>$1 - $79 per week ($52 - $4,159 per year)</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>$80 - $199 per week ($4,160 - $10,399 per year)</td>
<td>28</td>
<td>3.1</td>
</tr>
<tr>
<td>$200 - $399 per week ($10,400 - $20,799 per year)</td>
<td>118</td>
<td>12.8</td>
</tr>
<tr>
<td>$400 - $599 per week ($20,800 - $31,199 per year)</td>
<td>123</td>
<td>13.3</td>
</tr>
<tr>
<td>$600 - $799 per week ($31,200 - $41,599 per year)</td>
<td>120</td>
<td>13.0</td>
</tr>
<tr>
<td>$800 - $1,499 per week ($41,600 - $77,999 per year)</td>
<td>231</td>
<td>24.8</td>
</tr>
<tr>
<td>$1,500 or more per week ($78,000 or more per year)</td>
<td>251</td>
<td>26.9</td>
</tr>
<tr>
<td><strong>Medicare and Private Health Insurance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Possession of Medicare Card</td>
<td>922</td>
<td>98.2%</td>
</tr>
<tr>
<td>Utilisation of Medicare Program</td>
<td>453</td>
<td>48.2%</td>
</tr>
<tr>
<td>Private Health Insurance</td>
<td>663 (593 with Extras Cover)</td>
<td>70.6% (63.2% with Extras Cover)</td>
</tr>
</tbody>
</table>

aNo significant difference was observed between the survey respondents and the potential participant pool with regards to gender (P>0.05).
bA difference in age was observed between the survey respondents and the potential participant pool (p=0.008). From visual inspection of the data, survey respondents reported lower age groups than the potential participant pool.
cA difference in education level was observed between the survey respondents and the 2008 AusDiab report (P<0.001). From visual inspection of the data, survey respondents reported a higher education level than the 2008 AusDiab participant pool.
Typically, respondents perceived that all components of the best practice guidelines for type 2 diabetes formed the ideal diabetes management by GPs, as shown in Table 4.3. Perspectives of ideal management indicated that nutrition care (84%) was perceived to be of similar benefit as general diabetes care practices such as explaining risk factors for type 2 diabetes (86%) and prescribing medications when appropriate (85%). Less emphasis was placed on specific lifestyle-related care practices such as monitoring weight (70%) and monitoring waist circumference (59%). No associations were observed between the perception of nutrition in ideal care, and gender (P>0.05), level of education (P>0.05) or income (P>0.05).

Table 4.3: Respondents’ perceived ideal care, rate of received care and satisfaction of practices received from GPs, in order of perceived ideal care.

<table>
<thead>
<tr>
<th>Ideal Care</th>
<th>Previous Care</th>
<th>Satisfied with Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explain potential complications of type 2 diabetes</td>
<td>87</td>
<td>75</td>
</tr>
<tr>
<td>Explain risk factors for type 2 diabetes</td>
<td>86</td>
<td>84</td>
</tr>
<tr>
<td>Prescribe appropriate medication</td>
<td>85</td>
<td>81</td>
</tr>
<tr>
<td>Provide nutrition advice</td>
<td>84</td>
<td>43</td>
</tr>
<tr>
<td>Explain diabetes physiology</td>
<td>83</td>
<td>72</td>
</tr>
<tr>
<td>Explain term ‘diabetes’</td>
<td>81</td>
<td>74</td>
</tr>
<tr>
<td>Referral to further care or information</td>
<td>78</td>
<td>86</td>
</tr>
<tr>
<td>Provide written information on type 2 diabetes</td>
<td>72</td>
<td>49</td>
</tr>
<tr>
<td>Provide exercise advice</td>
<td>71</td>
<td>54</td>
</tr>
<tr>
<td>Monitor weight</td>
<td>70</td>
<td>71</td>
</tr>
<tr>
<td>Monitor waist circumference</td>
<td>59</td>
<td>30</td>
</tr>
</tbody>
</table>

\*Ideal Care’ refers to the percentage of respondents who claimed that the respective practice would ‘Definitely’ assist in the management of type 2 diabetes. Measured by a 5-pt Likert scale where 5 is ‘Definitely’ and 1 is ‘Not at all’.
\*Previous Care’ refers to the percentage of respondents who perceive themselves as having received this care by a GP in the past.
\*Satisfied with Care’ refers to the percentage of respondents who reported themselves as satisfied with each respective practice. Satisfaction was described as scoring 4 or 5 on a 5-pt Likert scale where 1 was ‘Not Satisfied at all’, 4 was ‘Satisfied’ and 5 was ‘Very Satisfied’. Respondents were asked all questions, regardless of whether they reported to have received the respective care practice.
A clear discrepancy was identified between respondents’ preference for nutrition care, and the nutrition care practices reported as being received from a GP. For example, 84% of respondents stated that receiving nutrition care would be beneficial to the management of their diabetes, however only 43% of respondents have received nutrition care from their GP. These experiences are contrary to other diabetes-related practices such as explaining risk factors of diabetes, or prescribing medication for diabetes, where similar proportions of patients who perceived the practice to be beneficial also received the practice from GPs. For example, 86% of respondents reported that the ideal management of type 2 diabetes encompassed an explanation of diabetes risk factors, and 84% of respondents reported to have previously received this care from a GP.

Males were more likely to receive nutrition care from GPs compared to other health professionals (P<0.001). Conversely, females were more likely to receive nutrition care from other health professionals than from GPs (P<0.001). No associations were found between the source of nutrition care and level of education (P>0.05), or income (P>0.05).

Over 91% of respondents were either ‘satisfied’, or ‘very satisfied’ with the nutrition care they have received from their GP. The degree of satisfaction with nutrition care was similar to satisfaction with other diabetes-related practices such as explaining medication options (91% satisfied), explaining diabetes-related risk factors (93% satisfied), and potential diabetes-related complications (90% satisfied). Males reported higher satisfaction levels than females regarding the nutrition care received from GPs (P=0.015). No associations were found between satisfaction levels and level of education (P>0.05), or income (P>0.05).

Despite the high level of satisfaction reported, a mixed response was identified with regards to the perceived effectiveness of the nutrition care received. When asked on a 3-point Likert scale if receiving nutrition care had been effective in improving their personal nutrition behaviour,
34% of respondents responded with ‘Definitely Effective’, 42% reported ‘Somewhat Effective’, whilst 24% reported nutrition care as ‘Not effective’.

4.5 Discussion

The aim of this study was to examine the perceptions of individuals with type 2 diabetes regarding the nutrition care they have received from GPs. This study is important because a knowledge of patients’ perceptions of nutrition care, particularly their experiences, expectations and satisfaction, will contribute to the understanding of the role of GPs in providing nutrition care, and will also allow GPs to identify methods to improve future nutrition care.

This study suggests that respondents strongly perceive that the ideal management of type 2 diabetes by GPs includes nutrition care. The preference for nutrition care is comparable to other care practices such as explaining the risk factors of type 2 diabetes and prescribing medications when appropriate. These results indicate a clear agreement between patients and expert groups\(^26\) regarding the important role of nutrition in diabetes management provided by GPs. This finding also reflects the importance of health promotion activities in general practice, as evidenced by national guidelines for GPs\(^12\).

General Practitioners experience substantial barriers in the delivery of nutrition care to patients; primarily time deficits and poor self-efficacy relating to nutrition\(^171, 183, 184\). These barriers may explain why only 43% of the survey respondents reported that they have previously received nutrition care from their GP. It appears that although GPs regard nutrition care as important\(^171, 185, 186\), and it constitutes part of best practice guidelines\(^26\), the barriers to nutrition care provision are pervasive, to the extent that less than half of patients are receiving this care. Furthermore, based on the results of Study 1, patients’ understanding of the nutrition
care they have received be impeded by the variability of nutrition care practices provided by GPs.

Despite less than half of the respondents reporting to have received nutrition care, the reported satisfaction levels regarding nutrition care are extremely high. This finding raises an issue as the level to which patients’ expectations are met has traditionally been regarded as one of the major indicators of patient satisfaction. ‘Patient expectation’ in the primary care context has previously been defined as performed tests or provision of information that is anticipated by the patient in the consultation. Therefore, it is possible that although patients perceive that the ideal management of type 2 diabetes encompasses nutrition care, patients may not necessarily expect a GP to provide nutrition care in a given consultation. This suggests that the relationship between patients’ perceptions of ideal care and expectations of actual care is not aligned, and requires further investigation.

The high level of patient satisfaction with regards to nutrition care is interesting, considering the low self-efficacy reported by GPs for providing nutrition care. In Australia, patients are not exclusively registered to one general practice, and are therefore not restrained to a singular GP. Potentially, these ratings of satisfaction are a result of the ability to visit an alternate GP if dissatisfied, thereby enhancing satisfaction ratings by patients. This may also explain the high satisfaction levels regarding other practices listed in the survey, as well as previous literature exploring patient satisfaction with Australian GPs.

Interestingly, the male participants in the survey reported higher satisfaction levels than females with regards to the nutrition care received from GPs. The male participants were also more likely to receive nutrition care from GPs rather than other health professionals. Therefore, the male respondents may be utilising GPs for nutrition care due to their high satisfaction
levels. Alternatively, male respondents may be more satisfied because they have received nutrition care more frequently. Further research is required to clarify this association is between gender and satisfaction with nutrition care. Furthermore, the validity of patient satisfaction as an indicator of quality care provision has been questioned due to the assumptions of consumers’ determinants of satisfaction\textsuperscript{190-192}. Many factors have been identified as contributing to patient satisfaction with the care received from GPs, such as frequency and continuity of general practice consultations\textsuperscript{193-196}, however this has not yet been investigated in a nutrition-specific context.

This study suggests that individuals do not necessarily perceive that the nutrition care received from GPs results in improved personal nutrition behaviour. This finding demonstrates a dissociation between patient satisfaction and perceived effectiveness of care. The aim of nutrition care is to improve the health outcomes of patients via improvements to their nutrition behaviour\textsuperscript{171}. Therefore, it is important that the effectiveness of nutrition care is appropriately measured. Measurements should include patients’ nutrition behaviour in conjunction with their health outcomes. These measures will allow GPs to determine whether the nutrition care provided is resulting in improved health outcomes for their patients. Further research is required to explore the effectiveness of nutrition care provided by GPs on improving patients’ health outcomes.

This study contributes to the body of knowledge regarding patients’ perceptions of nutrition care received from GPs. However, a number of limitations of the study are noted. Those individuals who have a particular interest in their diabetes management may have been more likely to participate in the current survey, thereby potentially influencing the overall results of the study. Despite this, the survey portrays perceptions of a considerable number of people living with type 2 diabetes, and is therefore important for consideration.
This study experienced a lower response rate (11%) when compared to evidence of expected response rates for online surveys (24-31%)\(^\text{197}\). It should be acknowledged that online surveys assume that potential participants actively manage the e-mail account listed with the host organisation. This assumption may be overestimated with an organisation such as DAQ, where a greater mean age of members may result in less activity online\(^\text{198}\). Furthermore, a difference was observed for education levels of survey respondents in comparison to a recent large survey of Australians living with type 2 diabetes\(^\text{182}\). Education levels were assessed in comparison to the 2008 AusDiab survey, which utilised ‘door-to-door’ methods of participant sampling rather than an online survey. This methodological difference may explain why there was an observed difference in respondents’ education levels, as people with higher education levels are more likely to be comfortable with email communication, and regularly manage their e-mail account\(^\text{198}\). This difference may influence respondents’ perceptions of the diabetes-related care, and should be taken into consideration before generalising the findings to other Australians living with type 2 diabetes.

4.6 Conclusion

Patients living with type 2 diabetes perceive that the ideal management of type 2 diabetes by GPs includes nutrition care. Patients may not be receiving nutrition care from GPs as often as they perceive to be beneficial, and despite being satisfied with the overall care received, have variable perceptions about the effectiveness of the nutrition care component. Further research is required to explore the effectiveness of nutrition care provided by GPs on improving patients’ health outcomes. In addition, the relationship between individual’s perceptions of ideal nutrition care, expectation of actual nutrition care and satisfaction with nutrition care received requires investigation.
Chapter 5:
Study Three - Effectiveness of General Practitioners Providing Nutrition Care to Patients with Chronic Disease

Reader's Note:

The information in this section has been accepted for publication as a systematic literature review:


The co-authors of this publication confirm that the research candidate has made the following contributions to this study:

- Developed the research design, article selection process and inclusion criteria.
- Completed all steps of the article selection process.
- Cross-matched selected articles with a peer-researcher.
- Extracted and collated study information for assessment.
- Assessed the quality of each included study.
- Assessed the overall outcomes of the included studies.
- Prepared manuscript for submission to journal.
- Presented the research findings at a national conference.

Signed: ______________________  Date: 22/11/12

Signed: ______________________  Date: 22/11/12

Signed: ______________________  Date: 22/11/12
5.1 Abstract

Nutrition is important in the management of lifestyle-related chronic disease, and the demand on GPs to provide nutrition care is increasing. However, GPs and patients hold variable perceptions regarding the effectiveness of GPs at improving the nutrition behaviour and associated health outcomes of patients. The aim of this systematic review was to investigate the effectiveness of nutrition care provided by GPs in improving the nutrition behaviour and subsequent health outcomes of patients with lifestyle-related chronic disease. A systematic literature review was conducted using the Cochrane Library, MEDLINE® and ISI Web of Knowledge databases using search terms relating to GPs, nutrition care, and lifestyle-related chronic disease. Randomised controlled trials that investigated a nutrition care intervention that was feasible within standard general practice consultations, and utilised outcome measures relevant to nutrition behaviour or indicators of health, were included in the review. Of the 131 articles screened for inclusion, nine studies, totalling 9564 participants, were included in the review. Five interventions observed improvements in the nutrition behaviour of participants, such as a reduction in energy consumption, reduction in meat consumption, increase in fruit and vegetable intake, increase in fish intake and increase in fibre intake. Seven interventions observed modest improvements in risk factors including reductions in weight, reductions in serum lipid levels and reductions in blood pressure. This systematic review demonstrates that GPs have the capability to provide nutrition care that improves the nutrition behaviour and health outcomes of patients with lifestyle-related chronic disease. However, the consistency and clinical significance of the intervention outcomes are unclear. Further investigation of the outcomes of nutrition care currently provided by Australian GPs is required.
5.2 Introduction

Lifestyle-related chronic diseases such as overweight and obesity, type 2 diabetes and cardiovascular disease account for over 60% of deaths worldwide. As a result, the prevention and management of these conditions are a key focus of primary health care systems. General practitioners are extensively involved in the health care of individuals with lifestyle-related chronic disease, and over one third of consultations involve this care.

The importance of optimal nutrition in the prevention and management of lifestyle-related chronic disease is well-documented. Additionally, nearly two thirds of the risk factors for overweight and obesity, type 2 diabetes and cardiovascular disease relate to nutrition behaviour. Improvements in the nutrition behaviour of individuals, such as reducing saturated fat and sodium intake, have been shown to reduce risk factors associated with lifestyle-related chronic disease, such as hyperlipidaemia and hypertension. In order to assist individuals to improve their nutrition behaviour, GPs may provide nutrition care within a consultation. Nutrition care is a core principle of best practice guidelines for the management of chronic disease, and includes practices such as the assessment of a patient’s nutrition intake, the provision of nutrition-related advice, and the evaluation of the impact of nutrition behaviour on patients’ health outcomes. As a result of increasing presentation rates of lifestyle-related chronic disease in general practice, the demand on GPs to provide nutrition care is growing.

General practitioners hold diverse perceptions regarding the level of complexity involved in providing nutrition care, as well as their role in providing nutrition care. However, patients perceive nutrition care to be an important part of the care provided by GPs for lifestyle-related chronic disease management (Study 2). ‘Effective’ health care is perceived by GPs to incorporate appropriate investigation, diagnosis and management of conditions in order to assist patients to improve their health status. Therefore, it is important that the nutrition
care provided by GPs is effective at improving the nutrition behaviour and subsequent risk factors in patients with lifestyle-related chronic disease. Therefore, the aim of this study was to systematically review published literature that investigated the effectiveness of nutrition care provided by GPs in improving the nutrition behaviour and subsequent risk factors in individuals with lifestyle-related chronic disease.

5.3 Methods

All applicable items from the Preferred Reporting Items of Systematic Reviews and Meta Analyses (PRISMA) guidelines were included\(^\text{201}\).

**Search strategy**

A literature search was conducted using the Cochrane Library, MEDLINE\(^\text{®}\) and ISI Web of Knowledge databases. The following search terms and Medical Subject Headings (MeSH) were used to identify all relevant peer-reviewed publications:

- For nutrition care: Nutrition Care OR Nutrition Advice OR Nutrition Therapy (MeSH) OR Diet (MeSH) OR Diet Therapy (MeSH) OR Food Habits (MeSH) OR Health Education (MeSH).
- For lifestyle-related chronic disease: Chronic Disease OR Overweight OR Obesity OR Weight Loss OR Hypertension (MeSH) OR Type 2 Diabetes Mellitus (MeSH) OR Hypercholesterolemia OR Hyperlipidemia OR Cardiovascular Disease.
- For general practitioner: General Practitioners (MeSH) OR Family Physicians (MeSH) OR Primary Care Physicians (MeSH) OR Family Doctor OR Family Practice OR General Practice.

All randomised controlled trials (RCTs) published in English, with at least one search term from each category were included for consideration. No historical limitation was applied to the years
of publication. Cross-matching reference lists and forward citation searches were conducted in order to identify additional studies for consideration.

**Study selection**

Studies that investigated the effectiveness of nutrition care provided by GPs by measuring patients’ nutrition behaviour and/or changes to risk factors for lifestyle-related chronic disease were included in the review. The inclusion criteria were studies of adult populations (>18 years of age). Specific eligibility criteria were also developed in relation to the intervention:

1. The nutrition care must have been provided by a GP or international equivalent, such as a family physician or primary care physician. Studies investigating the effectiveness of other primary care health professions such as practice nurses, nutritionists or dietitians were not included.

2. The effectiveness of the intervention must have been investigated using a control group, such as a ‘no care’ group, or a ‘usual care’ group. Studies comparing the effectiveness of nutrition care between different health professions were not included.

3. The nutrition care must have occurred in general practice consultations. Interventions investigating other aspects of the general practice setting such as self-help resources or computer technologies, in the absence of GP-facilitated nutrition care, were not included.

4. The intervention must have included identical baseline and follow-up measurements of either nutrition behaviour or risk factors for lifestyle-related chronic disease. Interventions that did not assess changes to these measurements over time were not included.

The article selection process is illustrated in Figure 5.1.
Data extraction

Articles for inclusion were selected independently by the research candidate and another research team member using the same search strategy. Relevant articles were identified independently, and differences in selections were discussed prior to reaching final consensus. For each study, the sample description, intervention protocol, outcome variables and results were extracted by careful review of each manuscript into a spreadsheet for comparison.
Outcomes assessed

Relevant study outcomes to the review were those that measured patients’ nutrition behaviour, and those that measured patients’ modifiable risk factors related to lifestyle-related chronic disease. Many studies that were reviewed also included outcomes that reflected other lifestyle behaviours such as smoking and physical activity. These studies were only included in the review if they also measured patients’ nutrition behaviour or risk factors related to lifestyle-related chronic disease. Nutrition behaviour outcomes included overall dietary intake, energy consumption and macronutrient intake. Health outcomes included body weight, Body Mass Index (BMI), waist circumference, blood pressure and serum lipid levels. Outcomes were assessed through differences in mean from 0-18 months after each intervention. Additional outcomes measured within this timeframe were also included, such as six-monthly and nine-monthly outcomes. Clinical outcomes including diagnosis of cardiovascular disease and death were not reported in the studies, and therefore not included in the review.

Quality assessment

The methodological quality of each study was assessed by the research candidate and another research team member using the American Dietetic Association Quality Criteria Checklist (QCC)\textsuperscript{202}. The QCC is a tool commonly used to assess studies in the field of nutrition, and its content is based on the quality constructs and domains identified by the Agency for Healthcare Research and Quality\textsuperscript{203}. The checklist includes ten sections that assess the applicability to practice and scientific validity of each study. Through this tool, the quality attributes of each study were classified as positive, neutral or negative.

5.4 Results

Of the 131 articles originally screened, nine interventions were chosen for the review\textsuperscript{163, 164, 204-210}. The reasons for excluding 122 articles fell within four criteria as shown in Figure 5.1. Of
these articles, 74 were immediately excluded because they did not investigate the effectiveness of nutrition care provided by GPs. Of the studies that did investigate the effectiveness of nutrition care, the interventions were often conducted by a research assistant, practice nurse or other health professional (n=27)\textsuperscript{211-214}. These studies were excluded because they did not investigate the effectiveness of nutrition care provided by GPs. Additionally, a number of studies were excluded because they were not deemed to be randomised controlled trials (n=11)\textsuperscript{215}. For example, one study compared the effectiveness of nutrition care provided by GPs to the nutrition care provided by dietitians and did not incorporate a control group\textsuperscript{216}.

The nine interventions included in the review consisted of 9564 participants; 5533 participating in an intervention and 4031 acting as controls. The studies were published between 1989\textsuperscript{204} and 2008\textsuperscript{163}, and four dated since the year 2000\textsuperscript{163, 164, 205, 206}. Five of the studies were conducted in the USA\textsuperscript{163, 164, 204, 207, 208}, three were conducted in Europe\textsuperscript{205, 206, 210}, and one was conducted in Australia\textsuperscript{209}. The number of participants included in each study ranged from 77\textsuperscript{210} to 3179\textsuperscript{205}.

The interventions incorporated between one and six consultations with a GP, where the GP provided basic nutrition care to the participant. Three of the studies included nutrition-related training for the GPs of between two and five hours, which were conducted prior to the intervention\textsuperscript{204, 207, 209}, and two of the studies utilised the national dietary guidelines as supporting material for the nutrition care\textsuperscript{205, 208}.

Each study’s sample description, intervention protocol, outcome variables and results are presented in Table 5.1. Eight studies incorporated at least one nutrition behaviour outcome, typically in the form of usual dietary intake\textsuperscript{163, 164, 204-209}. Eight studies incorporated at least one risk factor, such as weight, waist circumference, serum lipid levels or blood pressure\textsuperscript{163, 204-210}. Eight interventions utilised a follow-up period of 12 months\textsuperscript{163, 204-210} and one intervention utilised a follow-up period of 18 months\textsuperscript{164}.
Five interventions observed improvements in the nutrition behaviour of participants, such as a reduction in energy consumption of 0.7MJ/day\textsuperscript{206}, a reduction in excessive alcohol consumption of 36\%\textsuperscript{204}, a reduction in meat consumption to 3 serves or less per week\textsuperscript{205} and a reduction in fat intake of 5-10\%\textsuperscript{206-208}. The interventions also observed an increase in fruit and vegetable intake by two serves per week\textsuperscript{205}, an increase in fish intake to at least one serve per week\textsuperscript{205}, and an increase in fibre intake of 0.55g/1000kcals\textsuperscript{208}. The five interventions that were conducted most recently observed significant reductions in participants’ body weight or BMI of 0.4-2.3kg, or 0.2-0.81kg/m\textsuperscript{2} respectively\textsuperscript{163, 164, 205-207}. Reductions in serum cholesterol levels of 0.46-0.83mmol/L and reductions in diastolic blood pressure of 4.0mmHg were also observed\textsuperscript{209}.

The quality attributes of each study are displayed in Table 5.2. Overall, the quality of the studies were variable, with two of the studies received a ‘positive’ quality assessment rating\textsuperscript{163, 208}, and seven received a ‘neutral’ quality assessment rating\textsuperscript{164, 204-207, 209, 210}. Both of the studies that received a ‘positive’ quality assessment rating incorporated nutrition behaviour measures and risk factor outcome measures\textsuperscript{163, 208}. However, only one of these studies observed an improvement in the nutrition behaviour of participants (specifically reduced fat and increased fibre intake)\textsuperscript{208}, and one observed an improvement in participants’ body weight\textsuperscript{163}. Due to the nature of the interventions, some of the quality assessment criteria were not feasible to be met, such as the use of blinding by the GPs. Furthermore, a neutral rating was allocated to many of the assessment criteria due to lack of information in the articles, rather than poor intervention design. Common information missing from articles included the method for allocating participants to groups, the reasons for participant withdrawal, and if ‘intention to treat’ statistical analysis was implemented.
Table 5.1: Studies selected for inclusion in the systematic review.

<table>
<thead>
<tr>
<th>Study Details</th>
<th>Sample</th>
<th>Intervention Protocol</th>
<th>Outcome Measures</th>
<th>Follow Up Period</th>
<th>Summary of Findings</th>
</tr>
</thead>
</table>
| 1. Christian, et al., USA (2008) | Overweight (BMI >25kg/m²) men and women with type 2 diabetes. | A: Intervention Group, n=155. Patients identified goals for nutrition and physical activity using a tailored computer program. Progress towards goals was reviewed every 3 months by a GP.  
B: Control Group, n=155. Patients were provided with a pack of health education materials, including nutrition. Patients were reviewed every 3 months by a GP but no prompts for nutrition advice provided. | Nutrition Behaviour Measures: Energy Intake³.  
Risk Factor Measures: Weight, BMI, Waist Circumference, HbA1C, Serum Lipids, Blood Pressure. | 12 months | 32% of participants in the intervention group lost 6 or more pounds at the completion of follow up, compared with 18.9% of controls (odds ratio, 2.2;P=0.006). No other differences in outcome measures were observed between groups. |
| 2. Martin et al., USA (2008) | Overweight (BMI >25kg/m²), low-income women. | A: Intervention Group, n=68. Patients received 6 x 15 min physician-counselled consultations on the topic of weight loss. Each visit was one month apart, and patients received oral and written information.  
B: Control Group, n=69: Patients received no directed advice for weight loss and were seen as needed for regular medical care. | Nutrition Behaviour Measures: Usual dietary intake⁵.  
Risk Factor Measures: Weight. | 18 months | Participants in the intervention group lost more weight than participants in the control group (-1.52kg vs. +0.61; P=0.01) at 9 months post intervention, but not at 12 months or 18 months. No other differences in outcome measures were observed between the groups. |
B: Control Group, n=1587. Patients received 1 x 15m GP-administered 'sham' nutrition care session without use of brochure or provision of personalised advice. | Nutrition Behaviour Measures: Usual dietary intake⁵.  
‘Healthy Diet score⁶.  
Risk Factor Measures: Weight, Blood pressure | 12 months | Participants in the intervention group reduced their BMI (-0.41kg/m²; P=0.02) and intake of meat and increased their intake of fruit and vegetables, fish products and olive oil (P<0.001). No other differences in outcome measures were observed between groups. |
### Study Details

<table>
<thead>
<tr>
<th>Sample</th>
<th>Intervention Protocol</th>
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<th>Follow Up Period</th>
<th>Summary of Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>4. van der Veen et al., 2002</strong>&lt;br&gt;Netherlands&lt;br&gt;(2002)</td>
<td>Men and women with lifestyle-related chronic disease (hyperlipidaemia, hypertension or type 2 diabetes).&lt;br&gt;A: Intervention Group, n=71. GPs assessed each patient's state of change regarding their nutrition behaviour and then provided tailored counselling. GPs provided between 1-3 consultations, each 2 weeks apart. Note - depending on the stage of change, this sometimes included referral to dietitian. B: Control Group, n=72. Patients received 'usual care' from their GP.</td>
<td><strong>Nutrition Behaviour Measures:</strong>&lt;br&gt;Usual dietary intake.</td>
<td>12 months</td>
<td>Participants in the intervention group reduced their saturated fat intake (-5.7% vs. -2.6%; P=0.001), consumed less energy (0.8mJ), lost weight (-0.7kg), and reduced their BMI (-0.3kg/m²) at 6 months post intervention, but not at 12 months. No other differences were observed between the groups.</td>
</tr>
<tr>
<td><strong>5. Ockene et al., 2002</strong>&lt;br&gt;USA&lt;br&gt;(1999)</td>
<td>Men and women with hyperlipidaemia (upper 25th percentile of population).&lt;br&gt;A: Physician Training Group, n=333. GPs participated in nutrition counselling training and then provided patients with one nutrition counselling consultation. B: Physician Training + Office-support Group, n=315. GPs participated in training and also utilised office-based support to assist in providing patients with one nutrition counselling consultation. C: Control Group, n=279. Patients received 'usual care' from their GP.</td>
<td><strong>Nutrition Behaviour Measures:</strong>&lt;br&gt;Usual dietary intake.</td>
<td>12 months</td>
<td>Participants in the Physician Training + Office-support group reduced their saturated fat intake (-10.3%; P=0.01) and lost weight (-2.3kg; P&lt;0.001). The average consultation times for the two intervention groups were 5.5 mins more than the control group. No other differences in outcome measures were observed between the groups.</td>
</tr>
<tr>
<td>Study Details</td>
<td>Sample</td>
<td>Intervention Protocol</td>
<td>Outcome Measures</td>
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<td>6. Beresford et al., USA (1997)</td>
<td>Men and women seeking health care from their GP</td>
<td>A: Intervention Group, n=859. During one consultation, GPs provided patients with a booklet on healthy eating which was based on social learning theory and national dietary guidelines, and verbally encouraged patients to improve their dietary behaviour. B: Control Group, n=959. Patients received 'usual care' from their GP.</td>
<td>Nutrition Behaviour Measures: Total and relative intake of fat and fibre. Risk Factor Measures: Weight, Height, BMI, Serum lipid levels.</td>
<td>12 months</td>
</tr>
<tr>
<td>7. Salkeld et al., Australia (1997)</td>
<td>Men and women with lifestyle-related chronic disease (hyperlipidaemia, hypertension or overweight (BMI &gt;30kg/m²).</td>
<td>A: Video Intervention Group, n=269. GPs were trained in a cardiovascular disease risk reduction program and provided a video to each patient in one consultation. B: Video and Self Help Intervention Group, n=231. GPs were trained in a cardiovascular disease risk reduction program and provided a video and self-help resources to each patient in one consultation. C: Control Group, n=255. GPs assessed each patient’s risk factors and provided feedback.</td>
<td>Nutrition Behaviour Measures: Dietary fat intake. Risk Factor Measures: Weight, BMI, Blood Pressure, Serum lipid levels.</td>
<td>12 months</td>
</tr>
<tr>
<td>8. Alli et al., Italy (1992)</td>
<td>Men and women with hypertension who were taking antihypertensive medication.</td>
<td>A: Intervention Group, n=40. GPs provided 'simple' dietary advice to patients 6 times over a 12 month period, using a leaflet on low sodium nutrition. B: Control Group, n=37. Patients received 'usual care' from their GP.</td>
<td>Nutrition Behaviour Measures: Nil. Risk Factor Measures: Weight, Height, Blood pressure</td>
<td>12 months</td>
</tr>
<tr>
<td>Study Details</td>
<td>Sample</td>
<td>Intervention Protocol</td>
<td>Outcome Measures</td>
<td>Follow Up Period</td>
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<tr>
<td>9. Logsdon et al., 204 USA (1989)</td>
<td>Men and women seeking health care from their GP.</td>
<td><strong>A:</strong> Intervention Group, n=1409. GPs provided one 15 minute consultation promoting healthy behaviours, including nutrition, in line with preventive guidelines. <strong>B:</strong> Control Group, n=809. Patients received ‘usual care’ from their GP.</td>
<td><strong>Nutrition Behaviour Measures:</strong> Usual dietary intake(^b), Alcohol Intake <strong>Risk Factor Measures:</strong> Weight</td>
<td>12 months</td>
</tr>
</tbody>
</table>

\(^a\)Energy Intake was assessed using a validated Food Frequency Questionnaire  
\(^b\)No measurement description of ‘Usual Dietary Intake’ was provided in these studies.  
\(^c\)‘Healthy Diet Score’ was calculated by the authors based on the 1998 Italian Guidelines for Correct Nutrition  
\(^d\)Total and relative intakes of fat and fibre were assessed using a validated Food Frequency Questionnaire  
\(^e\)Dietary fat intake was assessed using an adapted food questionnaire  

BMI = Body Mass Index  
CVD = Cardiovascular Disease  
GP=General Practitioner  
HbA1c = Glycosylated Haemoglobin  
HDL-C = High Density Lipoprotein Cholesterol  
lb=pounds  
m = months  
mmHg = milligrams of mercury  
mins = minutes  
SOC = Stage of Change
Table 5.2: Quality attributes of each study included in the systematic review. The QCC recommends an overall ‘positive’ score if criteria 2, 3, 6, 7 and one additional criterion received a positive score. If the overall positive score is not reached, an overall ‘neutral’ score is recommended. An overall ‘negative’ score is recommended if six or more criteria are not met\textsuperscript{202}.

<table>
<thead>
<tr>
<th>Study Details</th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
<th>8.</th>
<th>9.</th>
<th>10.</th>
<th>Overall quality rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Christian, et al.,\textsuperscript{163}</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>Ø</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>Ø</td>
</tr>
<tr>
<td>2. Martin et al.,\textsuperscript{164}</td>
<td>+</td>
<td>+</td>
<td>Ø</td>
<td>+</td>
<td>Ø</td>
<td>Ø</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>Ø</td>
</tr>
<tr>
<td>3. Sacerdote et al.,\textsuperscript{205}</td>
<td>+</td>
<td>Ø</td>
<td>+</td>
<td>+</td>
<td>Ø</td>
<td>Ø</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>Ø</td>
</tr>
<tr>
<td>4. van der Veen et al.,\textsuperscript{206}</td>
<td>+</td>
<td>Ø</td>
<td>+</td>
<td>+</td>
<td>Ø</td>
<td>+</td>
<td>+</td>
<td>Ø</td>
<td>Ø</td>
<td>+</td>
<td>Ø</td>
</tr>
<tr>
<td>5. Ockene et al.,\textsuperscript{207},\textsuperscript{207}</td>
<td>+</td>
<td>+</td>
<td>Ø</td>
<td>-</td>
<td>Ø</td>
<td>+</td>
<td>+</td>
<td>Ø</td>
<td>+</td>
<td>+</td>
<td>Ø</td>
</tr>
<tr>
<td>6. Beresford et al.,\textsuperscript{208}</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>Ø</td>
<td>+</td>
<td>+</td>
<td>Ø</td>
</tr>
<tr>
<td>7. Salkeld et al.,\textsuperscript{209}</td>
<td>+</td>
<td>+</td>
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<td>-</td>
<td>Ø</td>
<td>Ø</td>
<td>+</td>
<td>+</td>
<td>Ø</td>
</tr>
<tr>
<td>8. Alli et al.,\textsuperscript{210}</td>
<td>+</td>
<td>Ø</td>
<td>Ø</td>
<td>+</td>
<td>Ø</td>
<td>Ø</td>
<td>+</td>
<td>Ø</td>
<td>+</td>
<td>+</td>
<td>Ø</td>
</tr>
<tr>
<td>9. Logsdon et al.,\textsuperscript{204}</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>Ø</td>
<td>-</td>
<td>Ø</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>Ø</td>
</tr>
</tbody>
</table>

1. Clear Research Question
2. Participant Selection Free from Bias
3. Comparable Study Groups
4. Participant Withdrawals Described
5. Use of Blinding
6. Description of Intervention Protocol
7. Outcomes Clearly Defined
8. Appropriate Statistical Analysis
9. Conclusions Supported by Results
10. Unlikely Funding Bias

+ = positive
Ø = neutral
- = negative
5.5 Discussion

This systematic review investigated the effectiveness of nutrition care provided by GPs in improving the nutrition behaviour and subsequent risk factors of patients with lifestyle-related chronic disease. The interventions suggest that GPs are capable of being effective at providing nutrition care to individuals with lifestyle-related chronic disease.

Interestingly, the studies that observed improvements in participants’ nutrition behaviour were not necessarily the same studies that observed improvements in participants’ risk factors. For example, Beresford et al., (1997) observed improvements in participants’ energy, fat and fibre intake, but no improvements in risk factors such as weight or serum lipid levels. Conversely, Martin et al., (2008) observed improvements in participants’ body weight, but not in any measures of nutrition behaviour. It is possible that the different findings were due to differences in the outcomes measured. For example, five of the studies measured ‘usual dietary intake’ but failed to describe the dietary methodology used to assess the effectiveness of the intervention. Furthermore, three of the interventions only measured one component of dietary intake (e.g. energy intake), and therefore reduced the likelihood of observing improvements in nutrition behaviour.

Of the three interventions that provided nutrition-related training to GPs, one observed significant improvements in participants’ dietary fat intake and body weight, another observed improvements in participants’ serum lipid levels and blood pressure and one observed improvements in participants’ alcohol behaviour and body weight. Interestingly, two of the studies incorporated four identical outcome measures into the interventions (dietary fat intake, body weight, blood pressure and serum lipid levels), but observed contradictory outcomes. Therefore, the impact of nutrition-related training on the effectiveness of the nutrition care provided may differ under various circumstances. However, the inconsistencies
observed in the reviewed studies indicate that the positive impact of nutrition-related training for GPs requires further investigation.

No association was apparent between the magnitude of outcomes and the number of consultations that were included in the interventions. For example, of the six interventions that observed significant reductions in participants’ body weight, three interventions incorporated one consultation each\textsuperscript{204, 205, 207}, two interventions incorporated between three and four consultations each\textsuperscript{163, 206}, and one intervention incorporated six consultations\textsuperscript{164}. Therefore, it would appear that the number of consultations is not a determining factor for the effectiveness of nutrition care provided by GPs. This suggests that effective nutrition care can be provided in relatively few consultations, and may require a significant increase in GPs’ workload.

Typically, weight loss interventions that involve lifestyle-modification observe significant improvements in outcomes measured six months after the intervention, and then trend back towards baseline 12 months after the intervention\textsuperscript{217}. Interestingly, two studies in the current review observed similar trends, with participants losing a significant amount of weight at six months\textsuperscript{206} and nine months\textsuperscript{164} after the intervention, but regressed back towards baseline body weight at 12 months and 18 months after the intervention. As a result, the overall effectiveness of the reviewed studies may be underestimated because the final follow-up measures in each study were taken at least 12 months after the intervention commenced. Previous literature indicates that short-term improvements in risk factors result in long term reductions in risk of disease, and are therefore important\textsuperscript{25, 218}.

Despite observing significant improvements in patients’ nutrition behaviour and risk factors, the current review does not compare the magnitude of effect of GP-provided nutrition care with other health professionals or services that provide nutrition care to individuals with lifestyle-
related chronic disease. Interestingly, a 12-month intervention utilising a commercial weight loss program (Weight Watchers) observed an average weight loss of 5.06kg for completing participants, which is higher than the observed weight loss reported in the reviewed studies (0.4-2.3kg)\(^{163, 164, 205-207, 219}\). However, the commercial program involved a relatively high participant burden, with weekly meetings and weigh-ins, and also observed a lower completion rate (61%) than the reviewed studies (64-93%). This finding indicates that high-intensity interventions may result in improved health outcomes, however the overall impact may be reduced due to high attrition rates\(^{220}\). Assessing the provision of nutrition care by GPs is important because the primary care setting may provide exposure to individuals who prefer to receive nutrition care from GPs rather than other health professionals. Further investigation into the preference of individuals regarding nutrition care provided by health professionals is required to confirm this potential implication.

The interventions that were reviewed demonstrate the potential for GPs to provide effective nutrition care to patients. However, the studies that were reviewed may not reflect the current nutrition care practices of GPs. Each of the interventions included a ‘usual care’ group that acted as a control, and the results imply that the usual practices of GPs do not include nutrition care. Therefore, it is important that GPs provide nutrition care to patients when appropriate in order to promote healthy nutrition behaviour and improve associated risk factors. Furthermore, Study 1 demonstrated that GPs provide variable nutrition care to patients, and therefore may not be reflective of the nutrition care interventions in the reviewed studies. Lastly, each of the interventions utilised a protocol for the provision of nutrition care. This suggests that in order to replicate the outcomes of the studies, GPs may require a nutrition care protocol for daily practice, and the development of appropriate protocols subsequently requires investigation.
Many of the outcome measures that improved following the nutrition care interventions are key indicators of chronic disease management, such as weight and dietary intake\textsuperscript{6}. However, none of the studies explored the clinical significance of the outcomes. Clinical significance of health outcomes such as body weight are usually estimated as losses greater than 5% of initial body weight\textsuperscript{221}. However, for each study that measured body weight, the results are reported in absolute terms rather than a percentage of initial body weight. Therefore, the clinical significance of the health outcomes is difficult to determine, and requires further investigation.

The quality of the reviewed interventions requires consideration, with two studies receiving positive quality scores, and seven receiving neutral quality scores. Due to the nature of the interventions, some of the quality assessment criteria were not feasible to meet, such as the use of blinding by the GPs. Furthermore, a neutral rating was allocated to many of the assessment criteria due to lack of information in the articles, rather than poor intervention design. Common information missing from articles included the method for allocating participants to groups, the reasons for participant withdrawal, and if ‘intention to treat’ statistical analysis was implemented. In addition, the nutrition behaviour of participants was usually monitored using self-reported data, and it is therefore important to carefully consider the reliability of this data due to the potential variability in reporting\textsuperscript{222}.

Overall, the studies observed variability in their nutrition behaviour measures and risk factor measures. It is possible that this was due to variability in the nutrition care provided by GPs using variable intervention protocols. For example, the dietary advice provided by GPs was described by three studies as tailored\textsuperscript{163, 206, 208}, and by three studies as in line with national dietary guidelines\textsuperscript{204, 205, 208}. Therefore, the nutrition behaviour change required by patients may have been variable within and across studies, contributing to inconsistencies in study outcomes.
An important limitation to the current review is that the eligibility criteria for included studies is restrictive, and does not account for alternative interventions conducted by non-GP health professionals or supplementary services available in the primary care setting. Typically, primary care systems allow individuals to select the type of treatment to be received, as well as the type of health care provider. Therefore, the reviewed interventions do not account for individual preferences regarding their health care, and other nutrition care services that are not provided by GPs. Consequently, the factors that promote the use of GPs as a source of nutrition care within the primary care system require exploration.

5.6 Conclusion

This systematic review demonstrates that GPs have the capability to provide nutrition care that improves the nutrition behaviour and risk factors of patients with lifestyle-related chronic disease. However, the consistency and clinical significance of the intervention outcomes are unclear. Further investigation is required to explore patients’ preferences regarding the provision of nutrition care from Australian health professionals.
Chapter 6:
Study Four - Health Professionals’ Views of Nutrition Care Provided by General Practitioners

Reader’s Note:

The information in this section has been published as an original research paper:


The co-authors of this publication confirm that the research candidate has made the following contributions to this study:

- Developed the study design.
- Completed the human research ethics application.
- Designed and pilot tested the semi-structured interview questions.
- Conducted all participant recruitment and participant interviews.
- Transcribed the interview recordings.
- Conducted the thematic analysis and participated in discussions for confirmation of themes.
- Prepared manuscript for submission to journal.
- Presented the research findings at a national conference.

Signed: ___________________________  Date: 22/11/12

Signed: ___________________________  Date: 22/11/12
6.1 Abstract

The aim of this qualitative study was to explore the perceptions of key health professionals relating to the nutrition care provided by GPs. Twenty-eight health professionals across a range of disciplines (GPs (n=11), practice nurses (n=3), dietitians (n=5), naturopaths (n=5), and exercise physiologists (n=4)) individually participated in a semi-structured telephone interview, guided by an inquiry logic informed by the literature. Interviews were transcribed verbatim and analysed thematically using a constant comparison approach. Health professionals, including GPs, perceived that nutrition care provided by GPs was mostly ineffective at improving patients’ nutrition behaviour. This was reportedly due to (i) insufficient nutrition care competencies possessed by GPs; (ii) challenges with the Australian primary care funding model because it discourages GPs from providing nutrition care; and (iii) a low prioritisation of nutrition care in general practice. Participants’ perceptions were generally based on their encounters with patients, rather than objective evidence. Tensions were apparent between health professional groups which may have influenced their reported perceptions. Without systematic changes to the Australian primary health care model, the demand on GPs to provide nutrition care will increase, therefore mandating support for GPs providing this care. In order to anticipate the future demand on GPs to provide nutrition care, further research is required to explore patients’ preferences regarding nutrition care provision by Australian health professionals.
6.2 Introduction

Chronic disease represents a substantial and increasing proportion of the burden of disease and associated health care expenditure in Australia\textsuperscript{4,5}. In 2007 more than 86\% of Australians were reported to be suffering from one or more long-term health conditions\textsuperscript{4}, and over 81\% of health care expenditure was allocated to chronic disease\textsuperscript{5}. Over two thirds of the risk factors for overweight/obesity, cardiovascular disease and type 2 diabetes relate to nutrition behaviour\textsuperscript{6}. The importance of optimal nutrition for chronic disease management is widely recognised by governing bodies such as the World Health Organization\textsuperscript{3,7}, and nutrition care is included as a key feature of chronic disease management within current best practice guidelines\textsuperscript{26}. Nutrition care in this context is defined as any practice conducted by a health professional in an attempt to improve the nutrition behaviour and subsequent health outcomes of an individual, including nutrition-related assessment, education and evaluation (Chapter 1, Section 1.2).

As a result of the increasing prevalence of chronic disease, the Australian primary care setting has experienced an increase in chronic disease presentation by patients; from 46.5 to 50.8 per 100 encounters from 1998-2008, resulting in an extra 4.8 million consultations per year\textsuperscript{10,224}. General practitioners are considered to be the ‘gate keepers’ of Australian primary care because they operate as the initial contact point for patients requiring non-emergency care, and are able to refer patients to health professionals for specialised treatment when required\textsuperscript{9}. A predominant referral pathway for patients with chronic disease is the Chronic Disease Management initiative (previously known as Enhanced Primary Care)\textsuperscript{52}. This initiative encourages GPs to plan and coordinate interdisciplinary, team-based care for eligible patients living with chronic disease, and provides access to partially subsidised consultations with allied health professionals. An underlying assumption of this initiative is that an interdisciplinary
approach to chronic disease management, including nutrition care, is the optimal mode of health service provision for patients’ health outcomes.

Accredited Practising Dietitians (APDs) are the only recognised Australian health profession with assessed nutrition competencies, and subsequent approval to provide nutrition care as part of a Chronic Disease Management (CDM) Plan. In 2009 it was reported that 124 111 nutrition consultations were provided by APDs under the CDM initiative\textsuperscript{11,53}. Based on the number of full-time-equivalent APDs working in primary health care, the maximum capacity for dietetic consultations is approximately 630 000 per annum\textsuperscript{53}. As a comparison, GPs discuss nutrition concepts in approximately 7\% of consultations, which equates to over 7.9 million occurrences per year\textsuperscript{10}. This suggests that GPs are the largest providers of nutrition care in the Australian primary care system. In addition, GPs are capable of improving the nutrition behaviour and subsequent health outcomes of patients by providing basic, brief nutrition care (Study 3). However, nutrition care practices of GPs in Australia are somewhat variable (Study 1) and are not universally perceived to be effective by patients with chronic disease (Study 2).

Nutrition care can be provided outside the CDM initiative by a range of health professionals, irrespective of their formal nutrition competencies, such as GPs,\textsuperscript{12} nurses,\textsuperscript{13} dietitians,\textsuperscript{14} nutritionists,\textsuperscript{15} exercise physiologists\textsuperscript{16} and naturopaths\textsuperscript{17}. However, the professional boundaries of these health professional groups are currently unclear. Furthermore, with a current focus on interdisciplinary care, the optimal interaction between health professionals providing nutrition care requires clarification.

Previous literature has explored GPs’ perceptions of their role in providing nutrition care,\textsuperscript{171, 185} yet no known studies have examined the perspectives of a range of health professionals on the nutrition care provided by GPs. Exploring the views of health professionals involved in nutrition care may provide an understanding of the factors influencing nutrition-specific interdisciplinary
collaboration, perceptions of professional boundaries and opportunities for improved patient care. The aim of the current study was to explore the perceptions of health professionals regarding the nutrition care provided by GPs to patients living with chronic disease.

6.3 Methods

Overview

A semi-structured qualitative interview design was employed. Semi-structured interview questions were developed as open-ended questions to guide discussions. Interview questions were informed by a review of published literature using an inquiry logic that reflected the investigative aims of the study. Table 6.1 outlines each question, including the inquiry logic in relation to generation of information from participants.

Table 6.1: Interview questions and inquiry logic for the semi-structured interviews.

<table>
<thead>
<tr>
<th>Interview Questions</th>
<th>Inquiry Logic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please tell me about your experience and current involvement in the domain of general practice.</td>
<td>Identify experiences important to the development of perceptions and viewpoints regarding nutrition care provided by GPs.</td>
</tr>
<tr>
<td>How effective do you think nutrition care in the general practice setting is currently, and potentially?</td>
<td>Identify perceived feasibility of effective nutrition care practices by GPs.</td>
</tr>
<tr>
<td>To what extent do you think that general public patients perceive GPs as having expertise in the field of nutrition care?</td>
<td>Determine what the health professional perceives the influence of patient expectations is on nutrition care practices.</td>
</tr>
<tr>
<td>To what extent do you think GPs feel competent in providing nutrition care?</td>
<td>Explore the feasibility of nutrition care provision by GPs.</td>
</tr>
<tr>
<td>To what extent do you think that GPs are competent for nutrition care in the general practice setting?</td>
<td>Consider perceptions of health professionals on GP competency levels based on their experiences.</td>
</tr>
<tr>
<td>What are some of the barriers and opportunities to nutrition care provision in the general practice setting?</td>
<td>Consider perceptions of health professionals regarding barriers and opportunities for nutrition care by GPs.</td>
</tr>
<tr>
<td>Do you have anything else you would like to add?</td>
<td>Provide opportunity for open expression of views of the health professional.</td>
</tr>
</tbody>
</table>

GP=General Practitioner
**Participant Recruitment**

The research team identified groups of health professionals whose professional association specifically claim they have a role in providing nutrition care to patients living with chronic disease, and are therefore likely to include nutrition care in their service provision. Identified health professional groups were GPs, practice nurses, APDs, naturopaths, and Accredited Exercise Physiologists.

In order to access the identified health professional groups, purposive non-probability sampling through invitation and self-selection was utilised, as shown in Table 6.2. The contact details of professional groups and potential participants were sourced from professional association websites. Potential participants were provided with an information sheet outlining the rationale and process of the interview. Participant recruitment continued until saturation of themes from each inquiry question was reached.

Table 6.2: Contact method for identified health professional groups.

<table>
<thead>
<tr>
<th>Professional Group</th>
<th>Contact Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accredited Exercise Physiologists</td>
<td>Convenience and snowball sampling of exercise physiologists working in a private practice or general practice capacity were utilised through researcher contacts. Email addresses were already available to researcher, or provided by word of mouth.</td>
</tr>
<tr>
<td>Accredited Practising Dietitians</td>
<td>Introductory email sent out through the Dietitians Association of Australia national Private Practice Interest Group list serve. Interested participants were asked to contact the research candidate individually.</td>
</tr>
<tr>
<td>General Practitioners, Practice Nurses</td>
<td>A list of medical centres and contact details were accessed through the Queensland Yellow Pages Online(^{225}). Telephone calls to medical centres were conducted to obtain email address of practice manager, who was then asked to forward the email to general practitioners and practice nurses in each clinic.</td>
</tr>
<tr>
<td>Naturopaths</td>
<td>Email addresses accessed through publically available information was accessed online via Medibank Private Queensland Naturopath Listing(^{226}), and Queensland Yellow Pages Online Listing(^{225}).</td>
</tr>
</tbody>
</table>
**Data Collection and Analysis**

Each interview question was asked in an identical manner, and no additional prompts were necessary. Interview duration averaged 17 minutes, with a range of 9 to 26 minutes. Interviews were audio-taped with participants’ permission and were transcribed verbatim.

Data analysis was conducted using a constant comparative approach to thematic analysis, including open and axial coding\(^{27,227}\). Firstly, the research candidate manually coded sections of the transcripts and organised these into categories with common themes. Secondly, these themes were entered into a Microsoft Excel spreadsheet in order to link themes according to their properties and dimensions\(^{27}\). Saturation of themes occurred when additional interviews did not produce new themes, with confirmation by the research team members. Post analysis discussion and verification of themes was conducted to identify common or dissident viewpoints amongst interviewed participants. Original transcripts were edited grammatically to provide examples of key and/or contradicting themes. The study protocol was approved by the Griffith University Human Research Ethics Committee (PBH/12/10/HREC).

**6.4 Results**

A total of 28 individuals participated in the study. Their general characteristics are reported in Table 6.3. The average number of years in practice was 13.9 (range 4-42 years), however GPs reported considerably more years in practice (average 20.3 years, range 15-42 years) than allied health professionals (average 10.6 years, range 3-30 years). Nearly all participants (25/28, 93%) reported providing nutrition care to patients on a regular basis, and several allied health professionals (10/17, 59%) reported that they formally collaborated with GPs regarding nutrition care provision.
Table 6.3: Participants’ general characteristics.

<table>
<thead>
<tr>
<th>Participant Group</th>
<th>Number of participants (n)</th>
<th>Years in practice (average, range)</th>
<th>Provide nutrition care to patients on a regular basis (n, %)</th>
<th>Formal collaboration with GPs in nutrition care (n, %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accredited Exercise Physiologists</td>
<td>4</td>
<td>6.0 (3-10)</td>
<td>4/4 (100%)</td>
<td>1/4 (25%)</td>
</tr>
<tr>
<td>Accredited Practising Dietitians(a)</td>
<td>5</td>
<td>13.4 (4-30)</td>
<td>5/5 (100%)</td>
<td>5/5 (100%)</td>
</tr>
<tr>
<td>General Practitioners(b, c, d)</td>
<td>11</td>
<td>20.3 (15-42)</td>
<td>9/10 (90%)</td>
<td>N/A</td>
</tr>
<tr>
<td>Naturopaths</td>
<td>5</td>
<td>11.5 (6-21)</td>
<td>5/5 (100%)</td>
<td>2/5 (40%)</td>
</tr>
<tr>
<td>Practice Nurses(e)</td>
<td>3</td>
<td>17.0 (8-23)</td>
<td>2/3 (67%)</td>
<td>2/3 (67%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>28</strong></td>
<td><strong>13.9 (4-42)</strong></td>
<td><strong>25/27 (93%)</strong></td>
<td><strong>10/17 (59%)</strong></td>
</tr>
</tbody>
</table>

\(a\) Includes a representative of the Dietitians Association of Australia.

\(b\) Includes a representative of the Australian Medical Association.

\(c\) Includes a representative of the Gold Coast Division of General Practice.

\(d\) Includes a representative of the General Practice Education Training Program (administered by the Royal Australian College of General Practitioners), however is not a GP themselves, and practice demographic has been excluded from calculations.

\(e\) Two of the practice nurses also worked as practice managers.

Table 6.4 summarises the key themes and sub-themes relating to health professionals’ perceptions of nutrition care provided by GPs.
Table 6.4: Key response themes relating to nutrition care provided by GPs.

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrition care provided by GPs is ineffective</td>
<td>1. Nutrition care by GPs is superficial and variable.</td>
</tr>
<tr>
<td></td>
<td>2. Observations of patient dissatisfaction suggest ineffective practice.</td>
</tr>
<tr>
<td>GPs have nutrition care competency deficits</td>
<td>1. Inadequate GP education in nutrition care.</td>
</tr>
<tr>
<td></td>
<td>2. A lack of interprofessional awareness.</td>
</tr>
<tr>
<td>Medicare reimbursement distorts service delivery</td>
<td>1. Medicare reimbursement promotes short consultations,</td>
</tr>
<tr>
<td></td>
<td>creating time poverty in general practice.</td>
</tr>
<tr>
<td></td>
<td>2. Frustrations regarding privileged access and control of Medicare reimbursement by GPs working against interdisciplinary care.</td>
</tr>
<tr>
<td>GPs do not have enough time to provide nutrition care</td>
<td>1. Observations of patient dissatisfaction related to superficial care.</td>
</tr>
<tr>
<td></td>
<td>2. Inadequate time to effectively provide nutrition care.</td>
</tr>
<tr>
<td></td>
<td>3. Time poverty forces prioritisation of issues, and nutrition is</td>
</tr>
<tr>
<td></td>
<td>often a lower order priority, often neglected.</td>
</tr>
<tr>
<td>Interdisciplinary tensions exist between health professions</td>
<td>1. Professional chauvinism evident about the most effective nutrition care provider, despite limited evidence.</td>
</tr>
<tr>
<td></td>
<td>2. Frustrations regarding privileged access and control of Medicare reimbursement by GPs working against interdisciplinary care.</td>
</tr>
<tr>
<td></td>
<td>3. Vested interests may moderate attitudes.</td>
</tr>
<tr>
<td></td>
<td>4. A lack of interprofessional awareness limits active referral.</td>
</tr>
</tbody>
</table>

GP=General Practitioner

Despite many participants (19/28, 68%) stating that GPs have a role in providing nutrition care to patients for chronic disease management, most (including 8/11 GPs) viewed the effectiveness of this care as limited. This strong theme of ineffectiveness was moderated by another less common theme that the effectiveness of nutrition care varied greatly between GPs.

“Generally speaking I would say it’s [nutrition care by GPs] a bit ordinary...I don’t think on the whole GPs do it very well.” (GP, 16 years experience)
Of the few interviewees (2/28) who reported nutrition care as effective in the primary care setting, this rating was attributed to the role of the practice nurse, rather than the GP.

“General practice now is not just GPs; it’s a team including practice nurses whom are often in practices doing the prevention, have a role in prevention and giving people advice about diet and other lifestyle issues.” (GP, 15 years experience)

Ineffectiveness tended to reflect a perception of superficiality of nutrition care, as articulated in the following response.

“It’s [nutrition care] not that effective from my perspective. I think it’s very generalised when patients visit a GP. They [GPs] don’t have any nutrition background and [for] a lot of them, what they do is very generalised, a blanket approach.... and a lot of the time they [patients] come in and say ‘oh my doctor said that I should do this’ which is just something that they tell every client to do.” (Accredited Exercise Physiologist, 6 years experience)

Interestingly, participants’ perceptions tended to be inferred by anecdotal reports of patient dissatisfaction rather than objective evidence. Many of the allied health professionals (8/14, 57%) described situations with patients who had previously seen a GP for nutrition care, and then proceeded to seek nutrition care elsewhere. Within these described experiences, two main themes emerged; patient confusion after receiving conflicting advice from health professionals (6/14, 43%), and patients’ dissatisfaction with nutrition care provided by GPs (5/14, 36%).

“They’ve [patients] come to us and said ‘Look I’ve just been to my GP, they’ve told me to lose weight, how do I do that?’ or ‘They’ve told me I need to eat better, what should I be
eating?...The GP hasn’t given them the answer at all...so they [patients] often seek information elsewhere.” (Exercise Physiologist, 6 years experience)

Furthermore, the limited training of GPs in nutrition care underpinned the perception that the nutrition care provided by GPs is ineffective.

“It [nutrition] doesn’t seem to be much on the radar during university education...It’s more of an afterthought or a little add on instead of a foundation of the training, so in the end they [GPs] leave university with very little knowledge about nutrition.” (GP, 12 years experience)

The comments regarding competency deficits did not always imply that GPs were not interested in nutrition as a component of chronic disease management, and some reports were made about GPs demonstrating an active interest in nutrition and pursuing further education. However, further education and interest in this field was not always consistent with evidence-based nutrition care for chronic disease management.

“They [GPs] don’t have the knowledge. Some GPs who have gone off on a tangent, they’re very devoted to nutrition but it’s more alternative nutrition therapy...more about the Echinacea and herbal medicine, rather than what we know as nutrition therapy, and I think there are more and more GPs picking up that qualification and that interest.” (Dietitian, 15 years experience)

The Medicare remuneration system was viewed by participants as counterintuitive to GPs spending adequate time with patients generally, and particularly in the context of providing effective nutrition care.
“If only we could have a remuneration model that would allow us to spend more time during opportunistic visits or actually schedule an appointment arising, let’s say a full hour to really get the message across.” (GP, 12 years experience)

Participants also criticised the Medicare Chronic Disease Management Plan by not targeting early intervention for chronic disease, because the initiative is dependent on patients seeking care from GPs once they were unwell, before being referred for nutrition care. This system seemed to perpetuate inefficient treatment approaches rather than prevention and early intervention.

“Only patients who are already very sick can access them [Chronic Disease Management Plans], instead of those where we can see that if we would do a little bit right now, they don’t get very sick in the first place...Say for a prediabetic, there’s just no way under Medicare that he can access a nutritionist, but 5 years down the track when everything has derailed and he’s terribly sick, no problem we can do a care plan and he can get access. It’s wrong.” (GP, 12 years experience)

A sense of concern was clearly identified when participants discussed the cultural portrayal of GPs as all-knowing, despite perspectives of limited effectiveness of nutrition care provision.

“GPs are made to be the centre of everything, and they know it all. I’m not saying that’s bad, but that’s just the way it is. Whenever there’s an advertisement, it always says ‘check with your medical practitioner before starting this’. So it’s actually promoted that the GP knows something about everything.” (Dietitian, 15 years experience)

Nearly all interviewees (25/28, 89%) stated that a lack of time was the most significant determinant of the effectiveness of GPs in providing nutrition care. The words time, or lack of time were used 248 times by the 28 participants in relation to nutrition care provision by GPs,
indicating a consistent theme throughout the interviews. Having inadequate time for patient interactions was reported to have numerous consequences influencing nutrition care effectiveness.

“I think GPs can be effective [at nutrition care], but when a patient sees a GP they will generally have their list of four or five problems and we get to sneak in a 20 or 30 seconds about diet – and often gets lost in all the other advice we’re trying to give.” (GP, 22 years experience)

This issue of nutrition being a lower order priority was reported to be more evident in bulk billing practices.

“I think the biggest concern is that the majority of surgeries I work with are bulk billing surgeries, and their consultations are less than 10 minutes, and they try and turn patients around in that period of time. So I don’t think they can facilitate appropriate care, and neither do they have the time to up skill their own knowledge in those areas.” (Dietitian, 10 years experience)

Responses during interviews across disciplinary groups demonstrated a range of tensions that appear to work against interdisciplinary care. A lack of awareness of the utility of, and roles of, different health professionals was noticed amongst comments from participating GPs. Some GPs perceived the advice they provided as consistent with, and as effective as, dietitians.

“I think people [who] end up with dietitians realise that the advice wasn’t that different to what the GP was telling them, just a little bit more specific.” (GP, 22 years experience)

This view contradicts a strong theme by non-GP participants, suggesting that the most appropriate way for GPs to enhance their nutrition care provision was to increase referrals to
allied health professionals. These health professionals were perceived to be less constrained by time and have more specific nutrition care competencies (such as dietitians and naturopaths).

“If we could delegate that [nutrition care] to another professional who could do it, that would be good. But you know, I think the impact is probably reduced, I think we probably need to investigate some alternative methods of imparting the information ourselves.”

(GP, 26 years experience)

There was a noticeable cynicism amongst some non-GP participants towards the nutrition care provided by GPs.

“I mean they’re all talking about evidence based medicine, which is all very nice, but we are sitting through all of these complicated chemical medical scenarios because you’ve just been told by some rep who shouted you some seminar somewhere or a trip to the islands...really, it’s hard to assume that they can even ask a person anything about their lifestyle or diet.” (Naturopath, 6 years experience)

“At the end of the day they’re my main business provider, so I don’t want to try to belittle them with the information they don’t know.” (Dietitian, 8 years experience).

6.5 Discussion

The aim of the current study was to explore the perceptions of key health professionals regarding the nutrition care provided by GPs. Participants perceived that nutrition care provided by GPs was largely ineffective due to a complex interaction of issues, ranging from individual barriers such as competency in practice, through to system-wide restraints such as the design of the Medicare funding system. These perceptions are consistent with previous investigations of GPs’ self-efficacy surrounding nutrition care171, and patients’ concern over the effectiveness of nutrition care provided by GPs (Study 2). However, the findings contradict
evidence regarding GPs’ capability to improve patients’ nutrition behaviour and subsequent health outcomes by providing basic, brief nutrition care (Study 3).

The participants provided a common reason for the perceived patient dissatisfaction with nutrition care provided by GPs, which is that the nutrition care is superficial. This care is perceived as insufficient to effectively promote behaviour change. Primary reasons for this view include a perception that nutrition care may be more effective when provided by a health professional with nutrition-specific competencies, and these health professionals are perceived as possessing the appropriate time required for patients. Despite these views of ineffectiveness, the current Medicare system positions GPs as the gatekeepers to primary care system. Without systematic changes to this model, the demand on GPs to provide nutrition care will increase, therefore mandating support for GPs providing nutrition care in this context.

Participants’ perceptions regarding a lack of medical nutrition education received by GPs is consistent with international literature declaring that GPs receive insufficient medical nutrition education to effectively improve the nutrition behaviour and subsequent health outcomes of patients.66, 228, 229 The perception that GPs are under-prepared for nutrition care has previously been shown in a study of Australian medical educators171. However, the results of Study 2 contradict this viewpoint, and demonstrate that patients are satisfied with the nutrition care provided by GPs. In addition, Study 3 suggests that their nutrition care has the potential to be effective.

The strong theme of a lack of time to provide nutrition care in consultations may infer that nutrition is low on the priority list for chronic disease management by GPs. The average length of a general practice consultation in Australia is approximately 15 minutes.154 As a comparison, the recommended consultation lengths for APDs for patients with type 2 diabetes and

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overweight/obesity range from 20 to 60 minutes\textsuperscript{157, 158}. These recommendations encompass the time available to conduct a full diet history, anthropometry assessment and discussion of metabolic outcomes at each consultation. It may be inferred that the nutrition care possible by GPs is limited by the restrictions of available time for consultation. However, Study 3 has demonstrated that GPs are capable of improving the nutrition behaviour and subsequent health outcomes of patients with chronic disease by providing brief nutrition care.

A lack of awareness of the roles of different health professions was noticed amongst comments from the participants. Furthermore, the research team noted underlying conflict and competitive attitudes during the participant interviews. This conflict appeared to mostly surround the ambiguous nature of respective health profession identities and subsequent health care roles. A number of response themes already reported from non-GPs in this study sample (such as ineffectiveness of nutrition care, nutrition competency deficits, excessive access to Medicare funds) clearly suggest negative attitudes about the Medicare system and the role of GPs in providing nutrition care. Competing interests suggests that the Medicare CDM initiative may not be promoting optimal health care to patients with chronic disease due to hindered interdisciplinary collaboration.

The motivation for allied health professionals to recommend that GPs refer all patients for nutrition care may be interpreted as a strategy to enhance patients’ health outcomes. However, this may also be viewed as a vested interest in increasing the business generated through this referral system. These comments also reflect an assumption held by allied health professionals who believe themselves to be more capable of providing nutrition care than GPs within the current health care system, despite limited evidence supporting this notion\textsuperscript{215, 216}. Further research is required to explore patients’ preferences of nutrition care provided by Australian health professionals.
There are two noteworthy limitations to this study. Firstly, variations in the geographical location and recruitment methods of each health professional group may have influenced the perceptions provided by key health professionals. Furthermore, recruitment based on self selection may have resulted in selection bias, meaning that the views of interviewed health professionals may not be reflective of the norms of these groups. Despite this, the views represented in this study demonstrate the need for further investigation of methods to enhance interdisciplinary nutrition collaboration, and support GPs to provide nutrition care to patients living with chronic disease.

6.6 Conclusion

This study highlighted that nutrition care provision in the Australian primary care setting is a complex issue. It appears that health professionals, including GPs, perceive that nutrition care provided by GPs is mostly ineffective at improving patients’ nutrition behaviour. Common reasons provided to support this viewpoint were that (i) GPs have inadequate nutrition competencies; (ii) the Medicare reimbursement system discourages effective nutrition care practices; and that (iii) GPs do not place priority on nutrition within consultations. Tensions were apparent between health professional groups and may have influenced their reported perceptions. Each health professional group perceived their own profession as providing optimal nutrition care to patients with chronic disease, and suggested that GPs increase referrals to each respective profession. Further research is required to explore patients’ preferences regarding nutrition care provided by Australian health professionals.
Chapter 7: Study Five - Patients’ Preferences of Nutrition Care Provision from Australian Health Professionals

Reader’s Note:

The information in this section has been submitted for publication as an original research paper:

Ball L, Desbrow B, Leveritt M. Patients Prefer to receive Nutrition Care from General Practitioners compared with other Health Professionals that Provide Nutrition Care in Australia. Australian Journal of Primary Health, 2013 (Online early view).

The co-authors of this publication confirm that the research candidate has made the following contributions to this study:

- Developed the study design.
- Completed the human research ethics application.
- Designed and pilot tested the semi-structured interview questions.
- Conducted participant recruitment and participant interviews.
- Transcribed the interview recordings.
- Conducted the thematic analysis and participated in discussions for confirmation of themes.
- Prepared manuscript for submission to journal.

Signed: ________________________ Date: 22/11/12

Signed: ________________________ Date: 22/11/12
7.1 Abstract

This qualitative study explored individuals’ preferences regarding the provision of nutrition care from Australian health professionals and the factors influencing their preferences. Thirty-eight individuals aged 53±8 years, living with a lifestyle-related chronic disease or risk factor for lifestyle-related chronic disease, participated in a semi-structured telephone interview. Participants were asked questions regarding their perceptions of which Australian health professionals provide nutrition care, their preferences for this care and the factors influencing their preferences. Interviews were transcribed verbatim and analysed thematically using a constant comparison approach. General Practitioners were the most recognised health professional that provided nutrition care to patients, followed by dietitians. General Practitioners were regarded as preferred providers of nutrition care because they were perceived to provide trustworthy and personalised nutrition care. Participants reported confusion regarding the professional differences between dietitians and nutritionists, and appealed for more information to be available to individuals that are considering consulting an Australian health professional for nutrition care. The findings of this study suggest that GPs are the preferred providers of nutrition care in the Australian setting. Considering the increasing presentation of patients with lifestyle-related chronic disease in general practice, it is anticipated that the demand on GPs to provide nutrition care to patients will increase in the future.
7.2 Introduction

Chronic disease is a leading cause of worldwide death and disability\(^1\). Within Australia, the prevalence of chronic disease is increasing and is expected to contribute to over three quarters of deaths in 2020\(^3\). Nutrition is a major modifiable determinant of many lifestyle-related chronic diseases including cardiovascular disease and type 2 diabetes, as well as co-morbidities such as overweight and obesity\(^6\). Improvements in the nutrition behaviour of individuals have been shown to improve risk factors and health outcomes associated with lifestyle-related chronic disease\(^199\). Subsequently, nutrition is a key component of both prevention and management strategies for lifestyle-related chronic disease\(^7,230\).

Nutrition care refers to any practice conducted by a health professional in an attempt to improve the nutrition behavior and subsequent health outcomes of an individual (Chapter 1, Section 1.2). In Australia, the provision of nutrition care is not restricted to a singular health profession. Many health professionals such as GPs\(^12\), nurses\(^13\), dietitians\(^14\), nutritionists\(^15\), exercise physiologists\(^16\) and naturopaths\(^17\) provide nutrition care. The manner in which these health professionals provide nutrition care has not been well researched, but is anticipated to differ in many ways, including the delivery, content and duration of the nutrition care; the cost of the service; the reliance on evidence-based guidelines; and the perceived effectiveness of the nutrition care. In addition, these differences are likely to be influenced by the nutrition-related qualifications of the health professional.

From a health services perspective, the capacity for health professionals to provide nutrition care is variable. For example, over 24 000 GPs currently practice in Australia, and approximately 85% of Australians consult a GP at least once each year\(^10\). General practitioners provide nutrition care in approximately 7% of consultations, which equates to over 7.9 million consultations each year\(^10\). As a comparison, Accredited Practising Dietitians (APDs) are
considered to be ‘specialists’ in providing nutrition care\textsuperscript{48}, but have a considerably lower capacity of approximately 630 000 consultations each year\textsuperscript{53}. Based on capacity, it is likely that GPs have the largest potential influence on the health of Australians compared with other health professionals that provide nutrition care.

Health professionals hold diverse perceptions regarding their role in providing nutrition care to patients with lifestyle-related chronic disease\textsuperscript{231}. There is evidence that GPs can be effective at improving the nutrition behaviour and associated health outcomes of patients with lifestyle-related chronic disease (Study 3). However, GPs and other health professionals report concerns regarding GPs’ competence to provide nutrition care, and generally promote their own profession as the optimal source of nutrition care for patients with lifestyle-related chronic disease (Study 4).

Patients have been described as ‘consumers’ of healthcare\textsuperscript{232}; and their perceptions have been shown to drive the utilisation and subsequent demand on healthcare services\textsuperscript{233}. Patients’ perceptions of health care have received increased attention in the past decade,\textsuperscript{179} and are a focus of the current Australian healthcare reform\textsuperscript{180}. Patients consider multiple factors when selecting a health professional or health service, including the convenience, trust and accessibility of the professional or service, and recommendations provided by family and friends\textsuperscript{234, 235}. Interestingly, patients generally do not consider the effectiveness of a service, or the reliance on evidence-based health care practices when selecting a health professional or health service\textsuperscript{236, 237}.

Patients’ perceptions regarding the health professionals that provide nutrition care in Australia have not been investigated. It is important to investigate patients’ perceptions of the health professionals that provide nutrition care in Australia because these perceptions have
implications for the planning of future primary care services in Australia. Therefore, the aim of the following study was to explore individuals’ preferences regarding the provision of nutrition care from Australian health professionals and the factors influencing this decision. The study further explored individuals’ perceptions regarding nutrition care provided by GPs and the likelihood they would consult a GP for this care.

7.3 Methods

Overview

A semi-structured qualitative interview design was employed, utilising open-ended questions to guide discussions. Interview questions were informed by a review of published literature using an inquiry logic that reflected the investigative aims of the study. The interview protocol was piloted on three potential participants known to the research team, and modifications to question wording were incorporated prior to the commencement of data collection. Table 7.1 outlines each question, including the logic for generating the information from participants.

Table 7.1: Interview questions and inquiry logic for the semi-structured interviews.

<table>
<thead>
<tr>
<th>Interview Questions</th>
<th>Inquiry Logic</th>
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<tbody>
<tr>
<td>May I please confirm your age?</td>
<td>Confirm eligibility for participation in study.</td>
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<td>Do you have any of the following conditions?</td>
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<td>- High blood pressure</td>
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<td>- High cholesterol</td>
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<td>- Type 2 diabetes</td>
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<td>Do you describe yourself as(^a):</td>
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<td>- Being above your most ideal weight</td>
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<td>- Needing to improve your diet</td>
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<td>- Needing to exercise more</td>
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<td>Please describe any previous advice you have received about healthy eating(^b) from a health professional.</td>
<td>Identify experiences important to the development of perceptions regarding nutrition care provided by GPs.</td>
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<td>Please name the different types of health professionals that regularly provide healthy eating(^b) advice.</td>
<td>Investigate the participant’s familiarity with health professionals that provide nutrition care.</td>
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<td>Interview Questions</td>
<td>Inquiry Logic</td>
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<td>Which of these health professionals is most appropriate to your needs and why?</td>
<td>Explore the preferences for accessing nutrition care from different health professionals.</td>
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<td>How would you decide which health professional to consult for advice on healthy eating?</td>
<td>Understand determinants of selecting a health professional to consult for nutrition care.</td>
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<td>What are your thoughts about going to a GP for advice on healthy eating?</td>
<td>Explore the perceived appropriateness of GPs as a source of nutrition care.</td>
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<td>Are there any situations where you would decide to visit a GP for advice on healthy eating rather than another health professional?</td>
<td>Understand enablers to utilising GPs as a source of nutrition care instead of other health professionals.</td>
</tr>
<tr>
<td>Are there any situations where you would decide to visit another health professional rather than a GP for advice on healthy eating?</td>
<td>Understand enablers to utilising other health professionals as a source of nutrition care instead of GPs.</td>
</tr>
<tr>
<td>What are some advantages to receiving advice on healthy eating from a GP rather than other health professionals?</td>
<td>Investigate the perceived advantages.</td>
</tr>
<tr>
<td>What are some disadvantages to receiving advice on healthy eating from a GP rather than other health professionals?</td>
<td>Understand barriers to utilising GPs as a source of nutrition information.</td>
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<tr>
<td>Do you have anything else to add?</td>
<td>Provide participant with an opportunity to provide further information.</td>
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</tbody>
</table>

*aParticipants that reported to have one of the listed lifestyle-related chronic diseases were not asked the questions relating to risk factors for these conditions because they were already deemed as eligible for study inclusion.

*bAfter initial piloting of the interview questions, the term ‘healthy eating advice’ was included in the interview questions instead of the term ‘nutrition care’. This was done to promote clear understanding of questions to participants.

Potential participants were male and female individuals aged ≥40 years, with at least one self-reported lifestyle-related chronic disease, or at least one self-reported modifiable risk factor for lifestyle-related chronic disease. These eligibility criteria were applied to increase the likelihood of participants having previous interactions with health professionals, and being identified as
candidates for nutrition care. The lifestyle-related chronic diseases were hypertension, hyperlipidaemia, and type 2 diabetes; and the risk factors for lifestyle-related chronic disease were overweight or obesity, poor nutrition behaviour and sedentary lifestyle. Participants were asked if they had previously been diagnosed with one of the listed lifestyle-related chronic diseases, or perceived themselves to currently have at least one of the listed risk factors for lifestyle-related chronic disease.

**Participant Recruitment**

Convenience and snowball sampling were utilised to recruit participants. Information about the study was included in a community newspaper, a university e-research newsletter and the university Facebook site. Interested participants were asked to contact the research team to receive further information, provide informed consent and arrange an individual interview. Interviews were conducted via telephone at a time convenient to the participant. After each interview, participants were asked whether they knew of anyone else who may be eligible and interested in volunteering for the study.

**Data Collection and Analysis**

Data collection and analysis were conducted simultaneously, and participant recruitment continued until saturation of themes occurred. This referred to the point in time when additional interviews did not produce new information or perceptions from participants. Each interview was conducted in an identical manner using the questions listed in Table 7.1. The research candidate’s background was not discussed during the interviews. Prompting was used to explore themes as they arose within the interviews. Interviews were recorded with participants’ permission, and transcribed verbatim.
Data analysis was conducted using a constant comparative approach to thematic analysis, including open and axial coding\textsuperscript{27, 227}. Firstly, the research candidate manually coded sections of the transcripts and organised these into categories with common themes. Secondly, these themes were entered into a Microsoft Excel spreadsheet in order to link themes according to their properties and dimensions\textsuperscript{27}. Where appropriate, the frequency of participants’ responses was calculated, such as the number of participants who were aware of a particular Australian health profession who provides nutrition care. Post analysis discussion and verification of themes were conducted between the research team members to identify common or dissident viewpoints amongst interviewed participants. Original transcripts were edited grammatically to provide examples of key and/or contradicting themes.

The study protocol was reviewed and approved by the University’s Human Research Ethics Committee (PBH/06/12/HREC).

7.4 Results

A total of 39 individuals contacted the research team between April and May 2012 and offered to participate in the study. One individual did not meet the inclusion criteria for the study, and did not participate. The remaining 38 individuals participated in the study and their demographic characteristics and eligibility criteria are displayed in Table 7.2. The average age of participants was 53±8 years (mean, standard deviation) and most (n=29) were female. Eighteen participants had previously been diagnosed with at least one lifestyle-related chronic disease (hyperlipidaemia n=10; hypertension n=8; type 2 diabetes n=2). Twenty participants reported to have at least one modifiable risk factor for lifestyle-related chronic disease (being overweight n=13; having a poor diet n=14, being physically inactive n=13).
Table 7.2: Demographic characteristics of participants.

<table>
<thead>
<tr>
<th>Participant Number</th>
<th>Age (years)</th>
<th>Sex (M/F)</th>
<th>Previous diagnosis of lifestyle-related chronic disease(^a)</th>
<th>Presence of one or more modifiable risk factors for chronic disease(^b)</th>
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</tr>
</tbody>
</table>

\(^a\)Lifestyle-related chronic diseases were self-reported, and included hypertension, hyperlipidaemia, and type 2 diabetes. If participants reported to have a lifestyle-related chronic disease, they were immediately deemed to be eligible and were not asked about risk factors.

\(^b\)Risk factors for lifestyle-related chronic disease were self-reported, and included being overweight or obese, poor nutrition behaviour and having a sedentary lifestyle.
A summary of themes identified from participant interviews are displayed in Table 7.3.

Table 7.3: Summary of themes from participant interviews.

<table>
<thead>
<tr>
<th>Area of Inquiry</th>
<th>Summary of Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience of nutrition care</td>
<td>1. Many participants had previously received nutrition care from an Australian health professional.</td>
</tr>
<tr>
<td>Awareness of Australian health professionals that</td>
<td>2. GPs were the most recognised providers of nutrition care, followed by dietitians, then nutritionists.</td>
</tr>
<tr>
<td>provide nutrition care</td>
<td>3. Participants were confused about the professional difference between dietitians and nutritionists.</td>
</tr>
<tr>
<td>Preference for Australian health professionals</td>
<td>4. GPs were regarded as preferred providers of nutrition care, followed by dietitians.</td>
</tr>
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<td></td>
<td>5. GPs were considered to provide personalised and professional nutrition care.</td>
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<tr>
<td></td>
<td>6. Dietitians were considered as having a strong knowledge base of nutrition.</td>
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<tr>
<td></td>
<td>7. Participants requested further information to be available for patients considering nutrition care.</td>
</tr>
</tbody>
</table>

Fifteen participants had previously received nutrition care from a GP. In most circumstances, the nutrition care was provided in the context of lifestyle-related chronic disease management.

“My GP detected high blood sugar in me and then checked my diet.” (Participant 21)

“When I have my high blood pressure checked he [GP] talks to me about nutrition.”

(Participant 14)

“When the cholesterol alarm was raised, she [GP] did talk to me about changing my eating habits.” (Participant 25)

Other interactions with health professionals for nutrition care were often with dietitians (n=6), nutritionists (n=6) or naturopaths (n=7). Twelve participants had never previously received nutrition care from a health professional.
Awareness of health professionals that provide nutrition care

When participants were asked to name the different health professionals that provide nutrition care, nearly all (n=33) participants named GPs as a provider of nutrition care. Many participants also named dietitians (n=28) and nutritionists (n=23), and some named naturopaths (n=10). Other health professionals that were less frequently named included nurses (n=6), pharmacists (n=6) and personal trainers (n=5).

Occasional comments referred to dietitians as health professionals that ‘punish’ individuals through restrictive eating, and also use negative counselling styles.

“From hearing what different people have said about dietitians, I don’t think that would be any good for me. They can be a little bit, not down to earth enough.” (Participant 12)

“The word dietitian sounds like diet, and I wouldn’t want that.” (Participant 23)

Preferred providers of nutrition care

Most participants (n=21) regarded GPs to be their preferred provider of nutrition care, followed by dietitians (n=12). Two main reasons were provided to justify GPs as a preferred provider of nutrition care. Firstly, GPs were regarded as providing the most trustworthy and personalised nutrition care because they had the most detailed understanding of participants’ medical conditions. Secondly, GPs were regarded as the first contact point for all health care needs, and participants relied on GPs to provide nutrition care if required.

“I trust my doctor’s advice more than anyone else. They [GPs] know more about you in your entirety, so can suggest stuff that is actually manageable for you. A nutrition specialist doesn’t have any relationship with you and they might suggest things that wouldn’t work.” (Participant 18)
“Going to the doctor is the first stop for many people, and a GP is far more qualified and have had a lot more training on physiology and the human body than other health professionals.” (Participant 21)

“I think a doctor is the best person to go to. If you need further care to eat better then they [the GP] will give you tips and strategies.” (Participant 26)

On the other hand, the participants who regarded dietitians as the preferred provider of nutrition care provided different reasons. Dietitians were perceived as having a strong knowledge base of food due to training in the field.

“Dietitians are the experts in food, and I think they’re the experts in what we should be eating and what we shouldn’t be eating and what to do about a healthy diet.” (Participant 14)

“I would go to a dietitian because food and dietetics is their specialty area. They’ve been trained.” (Participant 8)

Participants stated that they would rather receive nutrition care from a GP than other health professionals when the care was in relation to a personal health problem or medical condition. It was commonly stated that the nutrition care provided in these situations would be relevant and personalised because it was related to the participant’s health.

“If I was having issues with high cholesterol and diabetes and weight issues then my GP would be my first port of call for nutrition.” (Participant 20)

“If I was very overweight and there were other health problems...I would go and see my GP and ask for steps to take to get better, including nutrition.” (Participant 27)

“Lately with this high cholesterol, my doctor mentioned it [nutrition] to me...and she should be the one to tell me to watch my diet.” (Participant 36)
On the other hand, participants stated that they would rather receive nutrition care from a health professional that is not a GP, such as a dietitian, nutritionist or naturopath if they had a particular question, or topic they wanted to discuss.

“If I had a specific thing in mind, like I wanted specific advice about something, then I could go to a specialist rather than a GP.” (Participant 5)

“If I had a question about food and nutrition and wanted to learn more then I might go to a dietitian that works in the area.” (Participant 20)

**Advantages and disadvantages of receiving nutrition care from a GP**

Several advantages were reported regarding the nutrition care provided by GPs. Participants reported GPs to be professional, friendly and familiar with patients’ medical history. As a result, participants perceived GPs as providing personalised care because they are able to take a patient’s medical history into consideration when providing nutrition care. Other benefits such as availability and affordability of GPs were noted as well.

“They [GPs] are professional, and can give you advice not just on healthy eating, but how you are physically. They take into consideration other factors that are important as well.” (Participant 5)

“They’ve [GPs] got an overall view of the person, especially if it is a regular patient...so they’ve got all of those things at their fingertips, so that’s a good way to help with your nutrition.” (Participant 16)

Some disadvantages were reported regarding the nutrition care provided by GPs. Although participants held GPs in high regard, concerns about the amount of nutrition training and subsequent nutrition knowledge were apparent. Some participants also perceived that nutrition
was not a high priority for GPs and therefore GPs may not want to provide nutrition care to patients.

“I don’t think they have the knowledge or can be up to date because they’re not a specialist in one area.” (Participant 13)

“They know a little bit about a lot, rather than knowing a lot about a little. But a little bit of talk on nutrition may be all that someone remembers, and all that is needed to make a difference in their lifestyle.” (Participant 33)

Desire for more information

A sense of confusion was noted regarding participants’ perceptions of dietitians and nutritionists. Many participants regarded themselves as not understanding the professional difference between a dietitian and a nutritionist.

“I was probably thinking a nutritionist, but I’m not sure, and now I’m confused. I’m not sure if they have more training than a dietitian, one of them has more training than the other, but I’m not sure.” (Participant 18)

“I would go to a nutritionist I imagine rather than a dietitian. I don’t actually know really what a dietitian does.” (Participant 21)

Throughout the interviews, it became obvious that participants want more information to be available on the topic of health professional roles in Australia.

“We generally don’t know about the other professional services, and who can offer advice about healthy eating and that. I want to know about that.” (Participant 3)
Participants clearly regarded GPs to be a trustworthy source of information regarding appropriate health professionals, and relied on GPs to suggest consulting other health professionals if needed.

“If you asked me for $100 to tell you the name of the best health professional [to provide nutrition care] I wouldn’t be able to do it. I’m sure they exist but they must be pretty obscure because I wouldn’t have a clue how to find one. I just ask my doctor.”

(Participant 33)

“I would ask my doctor who I should speak to. Of course there is always the Internet...but you really don’t know what you’re getting, so my first preference would definitely be a doctor.”

(Participant 9)

7.5 Discussion

The aim of the current study was to explore which health professional Australians would prefer to consult for nutrition care as well as the factors influencing this decision. This is the first Australian study to investigate individuals’ perceptions of the different health professionals that may provide nutrition care for chronic disease management. The findings of this study suggest that patients with, or at risk of, lifestyle-related chronic disease prefer to receive nutrition care from GPs rather than other health professionals such as dietitians, nutritionists and naturopaths. Furthermore, patients want more information regarding the professional differences between Australian health professionals that provide nutrition care, and are particularly confused about the difference between a dietitian and a nutritionist.

General practitioners were perceived by participants to be trustworthy providers of nutrition care because they consider patients’ medical history in their care. It is likely that patients perceive GPs to have a more detailed understanding of patients’ medical history because of a
strong sense of familiarity. In addition, GPs are the first contact point for patients seeking health care in Australia\(^9\), and many patients consult the same GP over time\(^{239}\). However, other health professionals such as dietitians and exercise physiologists also examine patients’ medical history as part of routine practice\(^{16, 18}\). Therefore, the familiarity with GPs appears to be a major determinant of participants’ preference to receive nutrition care from GPs. This familiarity is likely to be driven by the accessibility and comparatively low cost of consulting a GP, which is a characteristic of the Australian primary health care system.

In line with this, the awareness of the Australian health professionals that provide nutrition care appears to be limited. Overwhelmingly, the participants in this study appealed for more information to be available on the topic of health professional roles in Australia. Increasing the awareness of health professionals that provide nutrition care may increase the likelihood that individuals consult these health professionals for nutrition care. Internationally, decision aids in the form of pamphlets or videos have been used to help individuals understand the options, potential benefits and harms for receiving different options of health care\(^{240}\). Decision aids have been shown to improve individuals’ knowledge of different options for health care and make informed decisions regarding their own care\(^{240}\). Developing a decision aid regarding the range of Australian health professionals that provide nutrition care may assist individuals to understand the roles of different health professionals and make informed decisions about their own nutrition care needs.

It is anticipated that the effectiveness of nutrition care provided by different Australian health professionals is variable due to differences in the manner in which these health professionals provide nutrition care. Although evidence suggests that dietitians and GPs are both capable of providing effective nutrition care, which is defined as nutrition care that improves the nutrition behaviour and subsequent risk factors for individuals with lifestyle-related chronic disease
limited research exists on other health professionals that provide nutrition care in Australia, including naturopaths, nurses and exercise physiologists. Subsequently, further investigation into the differences in the provision of nutrition care by Australian health professionals is required. This will assist to determine the capability of these health professionals to improve individuals’ nutrition behaviour and subsequent risk factors for lifestyle-related chronic disease.

The participants in this study were concerned about the level of nutrition education GPs had received, but regarded GPs as having superior knowledge of medical conditions, and therefore perceived GPs as preferred providers of nutrition care. Interestingly, Australian GPs have also reported concerns regarding the amount of nutrition education received during their training (Study 4). However, the findings in the current study suggest that patients perceive nutrition care to be ‘non-specialised’, and therefore ideally provided by their GP. In addition, the perceived benefits to receiving nutrition care from GPs, such as personal and professional care, may outweigh patients’ concerns of inadequate nutrition education. Therefore, factors such as trustworthiness, familiarity and professionalism are likely to be important determinants in patients’ nutrition care preferences.

Australia is currently in the process of implementing a primary health care reform, which focuses on the importance of providing patient-centred care. Patients’ perceptions have been shown to drive the utilisation and subsequent demand on health services. Therefore, the results of this study suggest that individuals with lifestyle-related chronic disease are likely to consult GPs for nutrition care in preference to other Australian health professionals. The implications of these preferences are important. Considering the increasing presentation of patients with lifestyle-related chronic disease in general practice consultations, it is anticipated that the demand on GPs to provide nutrition care to patients will increase in the future.
The current study has two noteworthy limitations. Firstly, participants were recruited through convenience and snowball sampling, and nearly a third of participants had not previously received nutrition care from a health professional. Despite this, selection bias was possible, whereby individuals with a higher interest in nutrition or health professionals may have volunteered for the study, and their perceptions may not be reflective of the general Australian population. Secondly, the participants in this study were residents of South East Queensland, and their perceptions of health professionals may have been influenced by the health services available in the geographical area, and may not be reflective of other areas of Australia, such as rural and remote communities.

7.6 Conclusion

The findings of this study suggest that GPs are the preferred provider of nutrition care for patients with lifestyle-related chronic disease. Considering the increasing presentation of patients with lifestyle-related chronic disease in general practice consultations, it is anticipated that the demand on GPs to provide nutrition care to patients will increase in the future. The nutrition care provided by GPs requires further attention and support in order to optimise health outcomes of patients with lifestyle-related chronic disease in Australia.
Chapter 8: Conclusions

8.1 Overview of Findings

The research in this thesis has improved the understanding of the role of Australian GPs in providing nutrition care to individuals living with chronic disease. A patient-centred approach to chronic disease management has been utilised as a framework for the series of investigations (Chapter 1, Section 1.3). The main findings of each research study are outlined in Table 8.1.

Table 8.1: Overview of the aims of the thesis and the main findings of each research study.

<table>
<thead>
<tr>
<th>Study</th>
<th>Research Aim</th>
<th>Main Findings</th>
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</table>
| One   | Describe the practices of Australian GPs when providing nutrition care to individuals with chronic disease. | 1. GPs provide variable nutrition care practices to individuals with chronic disease.  
2. The nutrition care practices of GPs may be related to their demographics, particularly gender and years of experience as a GP. |
| Two   | Examine the experiences, expectations and satisfaction of individuals with chronic disease (type 2 diabetes) regarding the nutrition care they have received from GPs. | 1. Individuals perceive that the ideal management of type 2 diabetes by GPs includes nutrition care.  
2. Individuals are not receiving nutrition care from GPs as often as they perceive to be beneficial.  
3. Individuals are highly satisfied with the overall care provided by GPs. |
| Three | Investigate the effectiveness of nutrition care provided by GPs in improving patients’ nutrition behaviour and associated risk factors for chronic disease. | 1. GPs have the capability to provide nutrition care that improves patients’ nutrition behaviour and subsequent risk factors for chronic disease.  
2. Intervention protocols or guidelines for nutrition care may be required to facilitate effective nutrition care provision by GPs. |
<table>
<thead>
<tr>
<th>Study</th>
<th>Research Aim</th>
<th>Main Findings</th>
</tr>
</thead>
</table>
| Four  | Explore the perceptions of health professionals regarding the nutrition care provided by GPs to individuals with chronic disease. | 1. Health professionals, including GPs, perceive that nutrition care provided by GPs is mostly ineffective at improving patients’ nutrition behaviour.  
2. The perceived barriers to GPs providing effective nutrition care are (i) inadequate nutrition-related competencies, and (ii) limited scope for nutrition care within the current model of primary care in Australia.  
3. Tensions exist between health professions. Each health profession investigated perceived themselves as the optimal provider of nutrition care. |
| Five  | Explore individuals’ preferences regarding the provision of nutrition care from Australian health professionals and the factors influencing their preferences. | 1. GPs are the most recognised health profession that provides nutrition care to patients, followed by dietitians.  
2. GPs are regarded as preferred providers of nutrition care because they are perceived to provide trustworthy and personalised nutrition care.  
3. Individuals want more information to be available on the professional differences between health professions who provide nutrition care in Australia.  
4. The demand on GPs to provide nutrition care will increase in the future. |

*GP=General Practitioner*

The findings of the five research studies and the literature review have been considered as a collective and integrated body of research. Overall, it appears that there is little consensus regarding the role of GPs in providing nutrition care. Although GPs, health professionals and individuals with chronic disease perceive nutrition care to be important in chronic disease management, they hold variable perceptions regarding the role of GPs in providing nutrition care.

Two of the studies investigated patients’ perceptions of nutrition care provided by GPs (Study 2 and Study 5). The findings of these studies complement one another, with both indicating that individuals perceive nutrition care to be an important role of GPs for chronic disease.
management. Both of these studies suggest that the expectation of GPs to provide nutrition care will increase in the future. Participants in Study 2 reported that they do not receive nutrition care from GPs as often as they perceive to be beneficial, and participants in Study 5 perceived GPs to be the preferred provider of nutrition care amongst Australian health professionals.

Participants in Study 2 reported high levels of satisfaction with GPs regarding nutrition care. This finding contrasts with the perceptions of health professionals, including GPs (Study 4). In Study 4, participating health professionals stated that it may not be appropriate for GPs to provide nutrition care to individuals with chronic disease. Their opinions were based on reports of patients’ dissatisfaction with GPs regarding nutrition care. Notably, the perceptions of participating health professionals reflected literature on this topic (Chapter 2), particularly concerns of inadequate medical nutrition education, and barriers to GPs providing nutrition care.

Study 4 revealed that health professionals perceive GPs to be ineffective at providing nutrition care to individuals with lifestyle-related chronic disease. However, Study 3 revealed that GPs are capable of providing nutrition care that improves patients’ nutrition behaviour and subsequent risk factors for chronic disease. The interventions reviewed in did not account for the considerable barriers to nutrition care provision within the current model of primary care in Australia, as outlined in the literature review (Chapter 2). Therefore, the studies may not have reflected the current nutrition care provided by Australian GPs to patients with lifestyle-related chronic disease.

Despite the conflicting perceptions and evidence regarding the effectiveness of GPs at providing nutrition care (Study 2, Study 3, Study 4), participants in Study 5 did not appear to consider this issue when indicating their preference for nutrition care provision by Australian health
professionals. Instead, participants considered education, professionalism, trustworthiness and familiarity in their decision to choose GPs as the preferred provider of nutrition care in Australia. The perceptions of health professionals (Study 4) did not align with this study, as each health professional perceived their own profession to be the optimal provider of nutrition care to individuals with lifestyle-related chronic disease in Australia.

8.2 Implications of the Research

The findings within this thesis have important implications for patients, GPs, other health professionals, Medicare Locals and the Australian Federal Government. These implications have been considered and outlined in accordance with the research framework of a patient-centred approach to chronic disease management (see Figure 1.1 below). Specifically, the implications for each group within the framework have been summarised in Table 8.2, and then described in detail.

![Theoretical framework of a patient-centred approach to chronic disease management currently utilised within the Australian primary health care system. Adapted from the Royal Australian College of General Practitioners.](image)
Table 8.2: Summary of research implications for each group within the theoretical framework.

<table>
<thead>
<tr>
<th>Group</th>
<th>Main Implications</th>
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| **Patients**                  | 1. Patients may be receiving diverse quantities and qualities of nutrition care (Study 1, Study 2).  
                                | 2. Patients feel uninformed about the role of different health professions in providing nutrition care (Study 5). |
| **General Practitioners**     | 1. The demand on GPs to provide nutrition care is likely to increase in the future (Chapter 2, Study 5).  
                                | 2. GPs are capable of providing effective nutrition care, but perceive themselves to be ineffective which may reduce the likelihood of them providing nutrition care (Chapter 2, Study 3, Study 4).  
                                | 3. It may be difficult for GPs to enhance their role in providing nutrition care because of resistance from other health professionals (Study 4). |
| **Primary Care Health Professionals** | 1. Patients’ utilisation of nutrition care services provided by other health professionals in the primary care setting may continue to be relatively low (Study 5).  
                                        | 2. The current advocacy activities of health professionals may not be improving patients’ awareness levels of different health professions (Study 5).  
                                        | 3. The practices required for effective nutrition care may not be consistent across all health professions (Chapter 2, Study 3).  
                                        | 4. Professional rivalry between health professions may limit the efficacy of interdisciplinary nutrition care, and the uptake of nutrition care services by patients (Study 4, Study 5). |
| **Medicare Locals**           | 1. There is a lack of clarity about an optimal service delivery model to support patients with lifestyle-related chronic disease due to conflicting expectations of GPs, patients and other health professionals (Chapter 2, Study 2, 4, 5).  
                                | 2. The relationship between patients’ perceptions of ideal health care, expectations of actual health care and satisfaction with health care services is not well understood (Study 2, Study 5).  
                                | 3. Personal factors such as professionalism, trustworthiness and familiarity may drive patients’ utilisation of services rather than the perceived benefit of the service (Study 5). |
| **Australian Federal Government** | 1. Alternative models of primary care service delivery are required to meet the government’s aim to manage chronic disease in a patient-centred manner (Chapter 2, Study 4, Study 5).  
                                        | 2. The practices of GPs and other health professionals are influenced by the current model of primary care service delivery, rather than the potential improvement in patients’ health outcomes (Chapter 2, Study 4).  
                                        | 3. Effective interdisciplinary care is hindered by conflicting values, attitudes and perceived scope of practice of health professionals (Study 4).  
                                        | 4. The increasing demand on GPs to provide nutrition care will incur significant cost to the primary care system (Chapter 2, Study 5). |
Patients

The research within this thesis has highlighted numerous implications for patients. It appears that patients, GPs and health professionals hold contrasting views regarding the provision of nutrition care within the Australian primary care setting, including the roles of different health professions.

The provision of nutrition care to patients is currently not consistent with principles of patient-centred care. Patients prefer to receive nutrition care from GPs rather than other health professionals (Study 5). However, GPs and other health professionals do not necessarily perceive nutrition care to be an important role for GPs (Study 4). It appears that GPs and health professionals have formed their perceptions on the current model of primary care service delivery in Australia, rather than objective evidence of patients’ health outcomes after receiving nutrition care from GPs (Study 3). Therefore, the validity of these perceptions may be limited. Patients do not feel informed about the role of other health professionals in providing nutrition care. This is likely to contribute to patients’ preferences for GPs as nutrition care providers (Study 5).

Patients expect nutrition care to be provided by GPs (Study 2). However, the nutrition care provided by GPs appears to be variable (Study 1). As a result, patients are likely to be receiving diverse amounts and components of nutrition care from Australian GPs. The implication of this on patients’ health outcomes is yet to be determined. Specifically, the practices required by GPs for effective nutrition care are unknown, and this may hinder the overall effectiveness of GPs at improving the nutrition behaviour and subsequent health outcomes of patients.
General Practitioners

The research within this thesis has important implications for GPs. The most important is that the demand on GPs to provide nutrition care is anticipated to increase in the future. This rising demand will reflect the increasing rate of chronic disease presentation in primary care, and patients’ expectations and preference for receiving nutrition care from GPs (Study 2, Study 5).

This thesis has shown that GPs are capable of providing nutrition care that improves the nutrition behaviour and subsequent health outcomes of patients (Study 3). All of the interventions reviewed in Study 3 utilised brief nutrition care protocols. This suggests that GPs may not need to improve their nutrition knowledge, skills or attitudes in order to be effective at providing nutrition care. However, GPs are concerned about their competency and effectiveness relating to nutrition care (Study 4). These perceptions have been shown to reduce the likelihood of GPs providing nutrition care in consultations. Therefore, despite GPs being capable of providing effective nutrition care, the barriers perceived by GPs appear to be hindering the provision of nutrition care to patients.

Health professionals including dietitians, nutritionists, nurses and naturopaths perceive that GPs should not be providing nutrition care to patients, and this is a notable challenge to the profession of GPs. It will be difficult for GPs to enhance their role in nutrition care because they may experience resistance from other health professionals. These health professionals, such as dietitians, rely on GPs for referral of patients and subsequent business generated. If GPs enhance their role in providing nutrition care, other health professionals may anticipate lower rates of referrals and subsequently be resistant.
Primary Care Health Professionals

The research within this thesis has highlighted implications for health professionals operating in the Australian primary care setting. The implications stem from contradicting perceptions held by patients and health professionals. Firstly, patients perceive GPs to be the preferred providers of nutrition care in Australia (Study 5). This finding implies that the utilisation of nutrition care services provided by other health professionals may continue to be relatively low. This may influence the professional viability of other health professions, such as dietitians, who are relatively new to the primary care setting compared with GPs.

Another factor influencing the utilisation of nutrition care services provided by other health professionals is patients’ perceptions that nutrition care is non-specialised and therefore appropriate to be provided by a GP, not a ‘specialist’ health professional (Study 5). In line with this, patients report that they feel uninformed about the roles of different health professions that provide nutrition care in Australia (Study 5). Health professionals may need to consider how they are perceived by patients in order to better understand patients’ expectations of their profession. In addition, the advocacy activities of health professions and their relevant professional associations appear to be ineffective at raising patients’ awareness of their capacity to provide nutrition care.

Finally, the practices required for effective nutrition care provision may not be consistent across all health professions. Research within this thesis demonstrates that GPs are capable of providing effective brief nutrition care. This type of nutrition care differs considerably to the nutrition care process utilised by dietitians (Study 3). Health professionals should consider their approach to nutrition care in the context of their position within the Australian primary care setting, the perceptions held by potential patients, and their subsequent relationships with patients.
Medicare Locals

Medicare Locals are independent, locally run, not-for-profit companies, which are responsible for coordinating the primary health care services in a given region. Medicare Locals were introduced in the 2010-2012 Australian primary health care reform, and are required to align their activities with the health care needs of the population living within their region\(^242\). The research within this thesis has revealed an important implication for Medicare Locals, which is the need to understand the differences and relationships between individuals’ perceptions of ideal health care, expectations of actual health care, and satisfaction with health care services. These differences are important in evaluating and planning for the nutrition care services within a Medicare Local region.

For example, Study 2 illustrated that patients’ perceptions of ideal care by GPs do not necessarily align with expected care or satisfaction with care. Within this study, participants reported that the optimal management of type 2 diabetes by GPs includes nutrition care. Participants were highly satisfied with the care provided by GPs, despite less than half of them receiving nutrition care in the past. Based on the accepted relationship between patients’ expectations and satisfaction with health care services\(^193\), it is questionable whether patients expect GPs to provide nutrition care, despite perceiving this care to be beneficial to their health.

Patients perceive factors such as professionalism, trustworthiness and familiarity to be very important in deciding which health professional to consult for nutrition care (Study 5). This finding suggests that the demand on nutrition care services within a given region may be driven by the personal attributes of the provider, rather than on the perceived benefit of the service in improving individuals’ nutrition behaviour and subsequent health outcomes. This poses a challenge for Medicare Locals in providing optimal models of service delivery, especially in a context of health professional workforce shortages, including GPs.
**Federal Government**

The research within this thesis has revealed important implications for the Federal Government. These are related to the current model of primary care service delivery in Australia. The government’s aim to manage chronic disease in a patient-centred manner is unlikely to be met within the current model of primary care, because the model is not patient-centred. For example, the nutrition care that GPs and other health professionals provide appears to be influenced by the model of primary care service delivery, rather than patients’ need for nutrition care, and potential improvements in health outcomes.

Within this model, eligible patients are able to receive a number of subsidised consultations with allied health professionals for enhanced chronic disease management. This initiative assumes that interdisciplinary care is patient-centred, and is the ideal way to improve the outcomes of patients living with chronic disease. However, GPs and other health professionals do not appear to be providing interdisciplinary care in the intended manner. Challenges such as conflicting values, attitudes, and perceived scope of practice are likely to be hindering interdisciplinary care, and requires consideration.

The demand on GPs to provide nutrition care is anticipated to increase in the future because patients prefer to receive nutrition care from GPs rather than other health professionals. This preference will increase the overall demand on the workforce of GPs, and place pressure on GPs across Australia. Considering the substantial cost of training additional GPs, the economic consequence of this increasing demand is likely to be significant. The model of primary care service delivery in Australia needs to change if the government’s aim of patient-centred care is to be met.
8.4 Recommendations for Practice

As a result of the research within this thesis, recommendations for practice have been made. Firstly, GPs are concerned about their competency and effectiveness relating to nutrition care. However, GPs are capable of providing brief nutrition care that improves the nutrition behaviour and subsequent health outcomes of patients with chronic disease. Therefore, efforts are required to increase GPs’ awareness of their capability to provide effective nutrition care. Increasing GPs’ awareness of this capability may reduce the barriers to GPs providing nutrition care, including perceived inadequate nutrition knowledge and low self-efficacy. In turn, this may facilitate GPs to provide nutrition care more often to patients, which will also meet patients’ desire to receive nutrition care from GPs more frequently.

Secondly, patients feel uninformed about the roles of different Australian health professionals who provide nutrition care. Therefore, further information should be available for patients who are considering consulting a health professional for nutrition care. Facilitating patients to be informed about the health care services available in Australia is important in creating a patient-centred health care system[^243]. Internationally, decision aids in the form of pamphlets and videos have been used to help individuals understand the options, potential benefits and biases for receiving different options of health care[^240]. Decision aids have been shown to improve individuals’ knowledge of different options and assist patients to make informed decisions regarding their own care[^240]. Developing a decision aid regarding the range of Australian health professionals that provide nutrition care may assist individuals to understand the roles of different health professionals and make informed decisions about their own nutrition care needs.

Thirdly, the barriers to GPs providing nutrition care appear to be more pervasive than the enablers to providing this care (Chapter 2). Reducing the barriers experienced by GPs is
anticipated to enhance the quantity and quality of nutrition care provided by GPs. Many of the barriers such as inadequate time and lack of reimbursement stem from the service delivery model of primary care in Australia, and require attention. Three aspects of the model currently limit the provision of nutrition care by GPs. These include the consultation management software utilised within general practice clinics, the MBS item numbers, and the use of incentives to influence the practices of GPs.

A variety of appointment systems are available for general practice clinics in Australia. Appointment systems tend to utilise sequential bookings, wave bookings or block bookings. Managing appointments are challenging because the booking system should provide adequate time for consultations, as well as accommodate cancellations. Discrepancies between the time allocated for a consultation and the true consultation length immediately places time pressure on GPs, thus reducing the likelihood of GPs providing nutrition care. Increasing the time allocated for each appointment to 15 minutes will reduce the time pressures on GPs, but is challenging in practice.

The income generated through general practice consultations are influenced by the MBS items available for billing. Currently there is no MBS item for the provision of nutrition care. This is a barrier to GPs providing nutrition care (Chapter 2 and Study 4). By introducing an MBS item for nutrition care, GPs may perceive nutrition care to be within their role in chronic disease management; and this may facilitate GPs to provide nutrition care in consultations. Importantly, the process for introducing MBS item numbers is challenging, and the cost implications of this recommendation require further investigation.

Finally, GPs who receive incentives for care practices are more likely to comply with best-practice guidelines compared to GPs that do not receive incentives for care practices.
Including nutrition care as an item in the Australian Practice Incentives Program may facilitate GPs to provide nutrition care as part of best-practice guidelines for the management of chronic disease. Again, the cost implications of this recommendation require further investigation.

8.5 Recommendations for Further Research

As a result of the research within this thesis, five recommendations for further research have been made. The rationale for each recommendation is also described below:

1. *Investigate which nutrition care practices are essential for GPs to provide effective nutrition care.*

   Study 1 demonstrated that GPs provide variable nutrition care practices to patients during consultations. Clarifying the practices that are essential for facilitating patients to improve their nutrition behaviour and subsequent health outcomes will inform the development of intervention protocols and guidelines for nutrition care by GPs. Within this research, different populations and chronic diseases should be investigated to determine whether the practices required to be effective are consistent, or dependent on the characteristics of patients.

2. *Understand the influence of the demographics of GPs on their nutrition care practices.*

   Study 1 suggested that the nutrition care practices of GPs may be influenced by their demographics, particularly gender and years of experience as a GP. Clarifying the influence of the demographics of GPs will facilitate better understanding of the determinants of nutrition care provision by GPs. In turn, this will inform strategies aimed to empower GPs to provide nutrition care during consultations.
3. **Conduct a randomised controlled trial to investigate the effectiveness of GPs and other health professionals that currently provide nutrition care in Australia.**

Study 3 systematically reviewed the literature relating to GPs’ effectiveness in providing nutrition care. Although the literature suggests that GPs are capable of providing effective nutrition care, the quality of the reviewed studies was not optimal. In Study 4, each health professional participating in the study perceived that their own profession was best suited to provide nutrition care to individuals with chronic disease. Conducting a randomised controlled trial will inform the ideal scope of practice regarding nutrition care for different health professionals in Australia by allowing for investigation into the relative effectiveness, economic cost and accessibility for individuals living with chronic disease in Australia.

4. **Investigate the determinants of effective nutrition care provided by different health professions.**

Study 1 demonstrated that GPs provide nutrition care differently to dietitians, yet the literature suggests that both professions are effective at improving patients’ nutrition behaviour and subsequent health outcomes. This suggests that the determinants of effective nutrition care provision are not consistent across health professional groups. Investigating the determinants of effective nutrition care for different health professions will inform the scope of practice for Australian health professionals that provide nutrition care, and enhance the understanding of training needs of different health professions. In addition, this research will enhance the ability to develop strategies to increase patients’ awareness of the role, scope and approach to nutrition care of different health professions in Australia.
5. Explore and clarify the relationship between patients’ perceptions of ideal nutrition care, expectations of nutrition care and satisfaction with nutrition care.

Study 2 highlighted the variation and potential inconsistency between patients’ perceptions of ideal nutrition care, expectations of nutrition care and satisfaction with nutrition care. By exploring the relationship between these variables it will be possible to better understand the meaning and validity of each variable, as well as the appropriateness of these measurements as indicators of quality health care. As a result, Medicare Locals can utilise one or more of these measures to inform the planning and evaluation of nutrition care services to individuals in a given region in Australia.
References


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