HIGH-RISK ANTENATAL WOMEN'S PERCEPTIONS OF DIETITIAN APPOINTMENTS WITH AN AIM OF REDUCING THE FAIL TO ATTEND RATE: A WORK-BASED STUDY IN THE WEST MORETON HOSPITAL HEALTH SERVICE

A Thesis-by-publication submitted by

Michelle Joy Lang (APD/AN), BHSc (Nut&Diet) (Hons.)

For the award of

Master of Professional Studies (Research)

2022

ABSTRACT

Maternal overweight and obesity, previous bariatric surgery, and being underweight prior to pregnancy are all high-risk pregnancy conditions that increase the likelihood of adverse health issues for both mother and baby. In West Moreton Health, 50% of high-risk antenatal women referred to a dietitian do not engage with the dietetics department. A mixed methods study was undertaken to determine the attributes of women who do not attend appointments and explore the attitudes and perceptions of women towards dietitian appointments and nutrition information. Quantitative findings suggest that distance from clinic had no impact on attendance at appointments, an observation supported by interviewed women. Further quantitative findings were that non-attendance was related to referrals for overweight and obesity, however not related to referral for underweight or bariatric surgery referrals. The qualitative study found that women who had not seen a dietitian previously had little appreciation of what to expect at their appointment and were nervous about attending due to the unknown. Women participating in the research project suggested that midwives should explain the appointment process in greater depth at time of referral to reduce this anxiety. The results from this study can be utilised to adjust service delivery in West Moreton Health, and hopefully improve engagement rates. There are many opportunities for future research, including interviewing women who did not attend appointments to see if their perceptions are the same, confirming whether women need better explanation or understanding of what a dietitian does to improve attendance, and further investigation is warranted into whether dietitian appointments during pregnancy provide the best value of health service resources.

CERTIFICATION OF THESIS

I Michelle Joy Lang declare that the Masters Thesis entitled "High-risk antenatal women's perceptions of dietitian appointments with an aim of reducing the fail to attend rate: A work-based study in the West Moreton Hospital Health Service" is not more than 40,000 words in length including quotes and exclusive of tables, figures, appendices, bibliography, references, and footnotes.

This Thesis is the work of Michelle Joy Lang except where otherwise acknowledged, with the majority of the contribution to the papers presented as a Thesis by Publication undertaken by the Student. The work is original and has not previously been submitted for any other award, except where acknowledged.

Signed:  Date: 14/7/2022

Endorsed by:
Dr Annette Brömdal
Principal Supervisor

Dr Hila Ariela Dafny
Associate Supervisor

Dr Lee Fergusson
Associate Supervisor

Student and supervisors' signatures of endorsement are held at the University.

STATEMENT OF CONTRIBUTIONS

Paper 1: High-risk antenatal women's perceptions of dietitian appointments and information. (Submitted for publication)

Student contributed 70% to this paper. Collectively Annette Brömdal, Hila Dafny and Lee Fergusson contributed the remainder.

ACKNOWLEDGEMENTS

This research has been supported by the Australian Government Research Training Program Scholarship.

What a journey this has been! I certainly wouldn't have come this far without the unwavering support of so many people. First, I would like to thank my amazing supervisors for their support throughout my first experience in this research journey, without you I would not have made it to this point. Netta, Hila and Lee, with your mixture of skills and expertise, I had the best supervision team.

To my Director Shelley Smith, thank you for your full support of my research journey. First, your support to apply for the opportunity and second, you made this process less stressful with your full and unwavering support of all my requests to complete this research project. I hope the Ipswich Hospital Nutrition and Dietetics Department can implement my suggestions from this project and improve the service we provide to our patients.

Thank you to my family, my husband Daniel for your support in commencing and completing my research project. This has a been a career goal of mine and you've always encouraged me to pursue my dreams. My two children, Natalie and Charlie, thank you for understanding, when I needed to take time to complete my research project.

And finally, to my parents Eric and Merilyn, for bringing me up to believe in myself and to know that I can achieve whatever I put my mind to. Your determination and commitment to all you do is an inspiration to me.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1: INTRODUCTION

The researcher has been working as a Senior Dietitian in the Chronic Conditions Service at Ipswich Community Health for 15 years. The role of the dietitian (Dietitians Australia, 2020) is to provide nutrition assessment and counselling to residents of the West Moreton Hospital Health Service (WMHHS). Referrals are accepted from all clinicians and departments within Queensland Health, for patients that reside in the district. The Hospital Health Service strategic plan aims to improve efficiency and ensure that clinicians are providing high-value care (West Moreton Health, 2020). This study will investigate the potential reasons behind the high Fail To Attend (FTA) rate amongst high-risk antenatal women to dietitian appointments. This problem is significant for the WMHHS dietetics department, and the health service as high FTA rates decrease clinician satisfaction and provide low-value care to the Health Service.

1.1 Background and Context

Overweight and obesity are an increasing health issue in Australia (Australian Institute of Health and Welfare, 2020). The definition of overweight is a Body Mass Index (BMI) of > 25 kgm^2 and obesity is a BMI > 30 kgm^2 (Whiteman et al., 2015). When combined with pregnancy, overweight and obesity increases the risks to both mother and baby and costs the health system more than that of a pregnancy for a mother in the healthy weight range (BMI 20 - 25 kgm^2) (Watson et al., 2013).

Pre-gravid obesity is one of the most frequent high-risk pregnancy situations (Department of Health, 2019). Along with pre-gravid underweight, pre-gravid obesity contributes a significantly large preventable cost to the health

care system. The Clinical Practice Guidelines: Pregnancy Care (Department of Health, 2019) outlines the health risks for the mother with obesity , including: stillbirth, maternal death, gestational diabetes, preeclampsia, congenital abnormality, preterm birth, and increased risk of caesarean section. Risks for the baby include low Apgar scores, macrosomia, and further associated risks such as shoulder dysplasia, birth injury, and neonatal death.

Similarly, women who are pre-gravid underweight (BMI < 20 kgm^2) are also considered to have a high-risk pregnancy with their infants at increased risk of preterm birth and low birth weight (Department of Health, 2019). Although many of the risks associated with obesity and pregnancy are improved after gastric surgery (Haseeb, 2019; Young, Drew, Ibikunle, & Sanni, 2018) there are still some risks with these pregnancies including the monitoring of micronutrient and vitamin supplementation (Różańska-Walędziak et al., 2021), nutritional deficiencies (Rottenstreich et al., 2019) and intrauterine growth restriction (IUGR) (Haseeb, 2019; Parker, Berghella, & Nijjar, 2016; Young et al., 2018). The issue of pre-gravid obesity is significant for the WMHHS as The Health of Queenslanders Report 2018: Report of the Chief Health Officer Queensland (Queensland Health, 2018) found that highest prevalence of obesity at conception was 29% in the West Moreton region (i.e., 10% above the state average). West Moreton also has the highest percentage of babies born above ideal weight range (>4000g) at 12.5% and the lowest percentage of babies born in the ideal weight range (2500-4000g).

During pregnancy, weight gain should be limited, as per the Institute of Medicine (2009) guidelines to reduce the risk of complications during pregnancy and birth. This is referred to as Gestational Weight Gain (GWG),

which is the amount of weight gained during pregnancy. The Queensland Clinical Guidelines: Pregnancy Care (2019) recommend referral to a dietitian for advice and monitoring for women who are affected by overweight, obesity, underweight or had bariatric surgery prior to their pregnancy.

In the studied population referrals to the dietitian are instigated by the midwife at booking in appointments, or during routine antenatal appointments as required. A referral to the dietitian due to a BMI > 25 kgm^2 is labelled the 'Obesity Protocol', while underweight and previous gastric surgery dietitian referrals are categorised as high-risk pregnancy referrals.

1.2 Problem Statement

Current service provision in WMHHS is providing 'low value care' because internal department data show that a high percentage of high-risk antenatal women (i.e., 50%) do not attend dietitian appointments. Although not documented, the outpatient manager at WMHHS reported that the current state-wide accepted FTA rate for outpatient clinics is 5%. It is likely that many of these high-risk antenatal women are not meeting pregnancy weight gain targets, which can lead to increased costs for their pregnancy care due to the associated complications.

There are limited Australian studies that explore the lived experience of high-risk antenatal women and why they do not engage in services aimed at promoting healthy lifestyle choices in pregnancy. By listening to and analysing the lived experiences of WMHHS women, the delivery of care can be improved to better meet their needs.

1.3 Research Aims

Considering the aforementioned health issues, this research project is organised around two studies. The first study seeks to ascertain the main attributes (such as BMI, age, distance lived from clinic and parity - number of pregnancies including the current one) of women that do not attend their dietitian appointments in the West Moreton region and establish if there are any trends. The researcher analysed referral data from a six-month period (April 2021-October 2021) of antenatal women who have been referred to the dietetics department.

The second study of this research seeks to explore high risk women's knowledge and attitudes regarding the importance of dietitian appointments. This part of the project will also explore the preferred delivery of care for this group of high-risk antenatal women in WMHHS. This will be achieved by interviewing five to ten high-risk antenatal women who attended their appointment in the study timeframe.

1.3.1 Research Questions

The following research questions guide this research project:

(1) Compare the attributes of women with a high-risk pregnancy who engaged vs those who did not engage with the dietitian during the six-month period?

(2) What are the knowledge and attitudes of women with a high-risk pregnancy concerning dietitian information, services, and appointments?

(3) What are the potential barriers women with a high-risk pregnancy experienced to attend their dietitian appointment during this time-period?

(4) How would women with a high-risk pregnancy prefer to receive their dietitian information, services and appointments?

1.4 Significance, Scope and Definitions

In the short term the answers to these research questions will provide information to adjust service delivery with an aim to increase the attendance rates of women who fall into this cohort of high-risk pregnancies. If more high-risk antenatal women attend appointments, the longer-term goal is the potential to decrease the gestational weight gain of these women and therefore, the cost of their pregnancy may be reduced to the health service.

This topic is significant as the researcher is focused on providing high-value care for the residents and management of the WMHHS. Internal department data from 2018/2019 demonstrate a 50% FTA rate for this patient group, which is deemed unacceptable compared to the Queensland Health accepted FTA rate of 5%. Despite numerous WMHHS dietitian department quality improvement projects aimed at reducing FTA rates in this group, there has been no reduction. An example of one of these projects, is that the department started calling women at triage instead of automatically booking appointments.

By conducting this research, the reasons for non-attendance can be better understood and insights into preferred delivery of care models may lead to a reduction in FTAs. Consequently, these high-risk women receive the dietetics information and services they need.

To further highlight the importance of this issue for the Australian healthcare system it is important to consider the increased costs these women exert on the system. There are limited Australian data to place a monetary cost

on obesity in pregnancy. A Queensland study by Watson et al. (2013) found women who were overweight or obese at the beginning of their pregnancy cost the health system $5 million more than their healthy weight counterparts over a 12-month period. Some more recent data from Whiteman et al. (2015) and Morgan et al. (2014) found that the cost of pregnancy and birth for mothers who are affected by overweight and obesity ranged from 23-37% more than those who were in the healthy weight range before pregnancy.

Obesity in pregnancy is a significant health issue that is a large financial burden on the health system. In the WMHHS, this problem is significant, as the district has the highest rate of pre-gravid obesity in Queensland. To exacerbate the issue further, these women are not attending dietitian appointments aimed at improving lifestyle choices, achieving recommended GWG and reducing the risks associated with their pregnancy.

1.5 Thesis Outline

This thesis will first outline the researcher's prior learning, followed by a literature review of the topic. It will then present the full manuscript submitted to a notable international Q1/D1 journal for consideration of publication. Finally, conclusions for the work-based project will be presented.

CHAPTER 2: WORK-BASED RESEARCH PROJECT / PROFESSIONAL STUDIES

This research project was conducted in the workplace of the researcher: West Moreton Hospital and Health Service (WMHHS) in the Ipswich region of Queensland, Australia. Professional Studies programs are gaining increased recognition as an effective method to advance workplaces and employees (Fergusson, Allred, & Dux, 2018; Fergusson, Brömdal, Gough, & Mears, 2020).

2.1 The nature of learning

The theories behind adult learning have changed significantly over time. In the 20th century learning was considered a cognitive process where information and facts were taught and it was assumed that the brain would convert this to knowledge which would lead to behaviour change (Merriam, 2008). Therefore, it was assumed that all learning needed to occur through formal learning processes.

In the 21st century, there has been a growing body of evidence to support that most adult learning occurs on the job, combining past learnings with the tasks people complete day to day. For example, Jennings (2012, p. 2) reports that "approximately 75% of the skills employees use on the job were learnt informally through discussions with co-workers, self-study, mentoring by managers and similar methods." This change is partly due to the rapidly changing technological world which lends itself to the requirement for workers to learn on the job rather than from books and lectures (Fergusson et al., 2018).

Merriam (2008, p. 97) supports this view by stating that "learning is a multidimensional phenomenon, not just a cognitive activity." Therefore, when planning learning opportunities for adults in the workplace it is essential to

consider all aspects of their lifestyle, jobs, and beliefs, thus recognising that learning does not only occur through formal education and courses.

2.2 Theoretical foundations of work-based learning pedagogy

Considering this change in theory regarding adult learning it is pertinent to consider the most relevant and effective ways that adults can achieve life-long learning, including improving productivity and progression in the workplace. One method to achieve this is through a work-based learning pedagogy.

Elkjaer (2009) reports that knowledge is the result of experience, and that full development of experience occurs when one is disrupted by difficult situations. This can be directly related to the workplace as difficult situations are often encountered in this environment; therefore, it is the perfect opportunity for the education sector to develop learning programs to meet the needs of adults and their employers.

More than 20 years ago, Armsby (2000) and Gregory (1994) reported that encouraging employees to complete 'real' research that brings their own expertise, leads to more meaningful research, ultimately benefiting the workplace. Since then, there has been a growing body of evidence that supports the notion that work-based learning pedagogy is an accepted medium for adults to achieve life-long learning and solve workplace problems (Bezanson, 2013; Fergusson, Shallies, & Meijer, 2019), which benefits both employers and employees (Jennings, 2012).

2.3 Professional Studies and why it suits enhancing your professional practice and personal development

Professional Studies programs are aimed at developing advanced domain specialists (Fergusson et al., 2020). Fergusson et al. (2020) explains that over

the last 30 years there has been an increase in the amount of non-routine work in workplaces which requires specialist skills, innovation and problem solving. In addition to this, workplaces are dynamic environments where there are numerous stakeholders, an organisational vision to consider, and a complex and constantly evolving environment (Fergusson et al., 2018). Therefore, workplaces require programs which allow mid- to senior-career professionals the opportunity to develop the appropriate skills to meet all these competing demands. As Gregory (1994, p. 51) described, work-based learning allows "practitioners to obtain professional fellowship at the same time of really improving their own effectiveness in the workplace."

The Professional Studies program meets these requirements. These programs allow professionals to learn about themselves through learning objectives, work-based learning and research to address and potentially solve organisational, social or work-based problems (Fergusson, Shallies, et al., 2019).

As a health practitioner who has been working in the industry for 20 years, I meet these criteria for partaking in the Professional Studies program. I can identify many areas in the workplace that require improvement to meet organisational goals and aims, however require guidance and support to progress to an advanced domain specialist who is able to implement a project to solve these workplace inefficiencies.

One such issue in my workplace is the high Fail To Attend (FTA) rate of high-risk antenatal patients. As described in the introduction, this impacts the organisation as high FTA rates cost the service in administration and practitioner time, and patients are not getting the care they need to improve health outcomes.

My aim for this project is to determine why high-risk antenatal women are not attending their dietitian appointments and recommend a more appropriate delivery of care. This will ensure more women are receiving dietetic education and support in meeting their pregnancy weight gain targets, and ultimately reduce the risk of complications associated in their pregnancy. This will benefit the organisation in saved costs and will increase the practitioner's ability to solve similar complex organisational issues.

Utilising reflective practice is essential in the process of exploring professional studies and will be discussed in the next section.

2.4 Reflective practice and professional practice.

Reflective practice is an essential component of Professional Studies. Reflective practice enables a practitioner to effectively examine past learnings and develop a project that will improve and build on the skills they need to become responsive practitioners in the ever-changing workplace environment (Fergusson, Shallies, et al., 2019). Reflective practice involves micro- and macro-reflective styles (Fergusson, van der Laan, & Baker, 2019).

Micro-reflection is an internal process involving self-reflection, self-study and can also result in behaviour modification. The micro-reflection continuous cycle as described by Fergusson, van der Laan, et al. (2019), includes: (1) my personal experiences in work; (2) reviewing and reflecting on my work experiences; (3) conceptualise, conclude and learn from reflection at work; (4) plan and experiment with new ways of working. I follow this process continually in my role as Senior Dietitian to improve patient consultations and service delivery.

Macro-reflection involves reflection at a project or program level. As explained by Fergusson, van der Laan, et al. (2019) the macro-reflection process includes: (1) reflect, learn, and engage in work and, as a result, (2) be in a better position to scope and plan a work-based project, along with developing a research component, resulting in (3) implementing the project and collecting data on it, which in turn leads to (4) a review and analysis of data and reporting findings. I currently utilise this process to identify, plan and implement quality improvement projects within the dietetics department.

The professional practice program encourages in-depth reflection, at both micro- and macro-levels to ensure that project planning not only provides answers to workplace problems but also meets the learning objectives of the employee. Nesbit (2012, p. 207) supports this by stating that "reflection for development requires more than just casual introspective thinking about events and experiences but needs systematic thinking leading to deep level analysis." Utilising both micro- and macro-reflection encourages the skills of double or triple loop learning with employees thereby being able to produce a more meaningful and effective project.

2.5 Linking Professional Studies based learning with the purpose of doing a Master of Professional Studies

The work-based learning pedagogy is directly related to my Master of Professional Studies Research Project as I have used my workplace knowledge and expertise to establish a project topic that will provide benefits to both my department / profession and the West Morton Hospital Health Service (WMHHS).

I have noticed over the last few years that there is one patient group that has the largest percentage of FTA dietitian appointments. This patient group is high-risk antenatal women and has been on my agenda to improve patient attendances. I have designed and implemented quality projects over the last few years to address this issue, however none of these measures has reduced the FTA rate in this population. Therefore, by following a research process during the Master of Professional Studies Research program, a more in-depth perspective on this phenomenon can be explored. I will also develop recommendations around the best delivery of care to adopt for this patient group, to ensure that they are receiving dietetic care to reduce the risk of complications associated with their pregnancy.

Ultimately, this will result in decreased costs to the WMHHS, as a patient who fails to attend costs the department approximately $300 in administration support and practitioner time. Although not within the scope of this research project, hopefully this will result in less pregnancy complications and therefore a further reduction in costs for the organization.

This chapter has addressed the theories and advantages of the Professional Studies program and how it relates to this research project. Chapter 3 will outline the current evidence in relation to engagement in services to address weight management in pregnancy, reasons for non-attendance, and effective interventions.

CHAPTER 3: LITERATURE REVIEW

3.1 Background and Context

This literature review is centred around four main areas: 1) attributes of antenatal women who do not attend appointments; 2) women's perceptions towards dietitian information and appointments; 3) reasons and barriers for high-risk antenatal women to not attend dietitian appointments; and 4) effective delivery of care and interventions. Reviewing these areas will aid to critically consider the need of reconceptualising the delivery of care for this cohort of high-risk antenatal women as part of the West Morton Hospital Health Service (WMHHS) system. In addition, it is important to highlight that the proposal for this project originated from internal data of the Ipswich Community Health dietitian service indicating an overall Fail to Attend (FTA) rate of 25-30% in 2018-2019. More specifically, it was found that the FTA rate for antenatal referrals was 50%, which was the highest for any sub-group. Considering these issues, a conceptual model to represent the literature review and main project concepts has been developed.

The conceptual model represents the process from inception of the project, or identification of the workplace issue to the potential long term workplace outcomes. The stimulus for the project is presented on the left followed by the main literature topics to explore, including engagement, reasons for FTA and effective interventions. Finally, the model presents potential outcomes from this project if recommendations are implemented and the possible long-term benefits to the health service if the FTA rate improves. The conceptual model is presented as Figure 1 below.

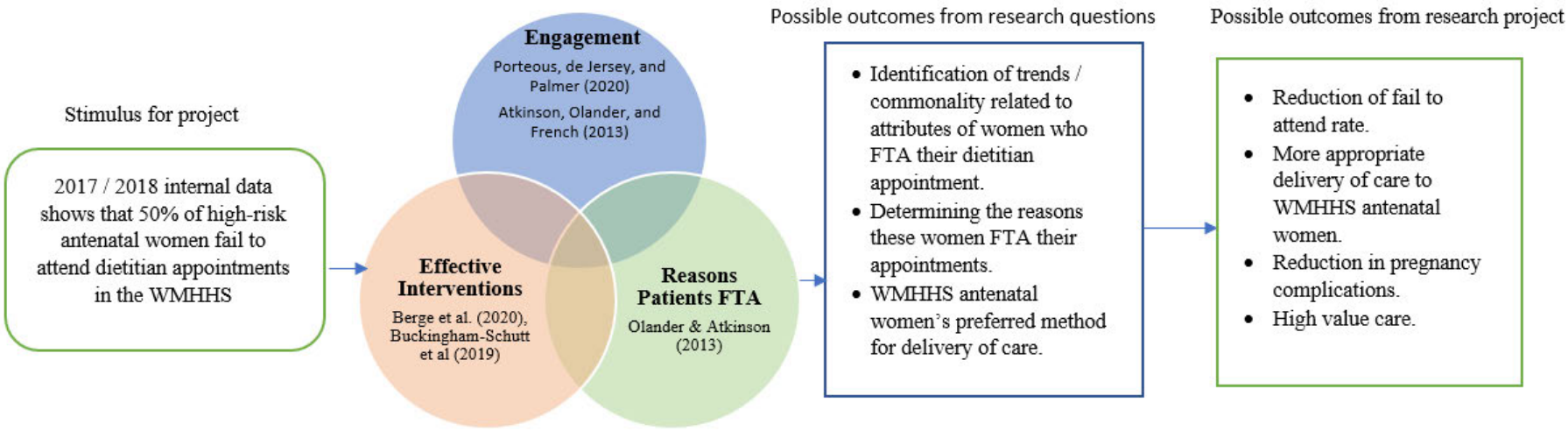

Figure 1. Conceptual model of the research project.

3.2 Attributes of women who do not attend antenatal appointments

The first step in assessing existing service delivery is to understand the current situation. By comparing the trends of attributes of women who do not attend their appointment compared to those that do, will aid the department in seeking strategies to engage the non-attenders. Therefore, phase 1 of this study will compare the attributes of women who do attend their appointment versus those who do not attend dietitian appointments in WMHHS. There are limited studies on this topic but of the two studies found one was focused on non-attendance at gestational diabetes clinics (Wong, Chong, Astorga, & Jalaludin, 2013), while the other was focused on weight management in pregnancy (Atkinson, French, Ménage, & Olander, 2017). These patient groups are similar to the study site one being in metropolitan Sydney and the other in the United Kingdom.

Both studies identified that multiparous women were less likely to attend appointments. Wong et al. (2013) also found that women who had a higher Body Mass Index (BMI) and non-European women were less likely to attend appointments. Logically, these attributes of non-attendance make sense as women who are looking after other children have difficulty finding time to attend, while those with a higher BMI potentially feel self-conscious about their weight and embarrassed to seek advice.

In a broader search on attributes of women who do not attend general antenatal appointments it was found that low income, low education, low social class, unmarried status and ethnic origin of the women (Ali, Dero, Ali, & Ali, 2018; Raatikainen, Heiskanen, & Heinonen, 2007) are all associated with non-attendance at antenatal appointments. Specifically, in a literature review by Ali et al. (2018), that encompassed worldwide studies, it was found that young age

(<18 years old), lower education levels, multiparity, and an unsupportive partner were all associated with non-attendance. These authors also report that increasing distance from clinic was a strong predictor of non-attendance. Meanwhile a study from Jamaica found that the main non-attenders were teenagers, unmarried mothers, women in short-term unions, smokers, and those with unsupportive friends or relatives (McCaw-Binns, La Grenade, & Ashley, 1995).

A similar study conducted by Kupek, Petrou, Vause, and Maresh (2002) examined the attributes of ladies in England and Wales who were considered late initiators of antenatal care. They found similar results to the previous studies with late initiation of antenatal care associated with maternal age (younger less likely), smoking status, and ethnicity. Results were similar for multigravida and primiparous women, however those who are multiparous were more likely to be late initiators. With regards to those who had a high obstetric risk pregnancy, which includes many health conditions including obesity, primiparous are likely to be late initiators.

With regards to ethnicity, all studies report that ethnic minorities in their study populations were less likely to attend antenatal appointments (Kupek et al., 2002; Raatikainen et al., 2007; Wong et al., 2013).

Few studies were located that report attributes of women who do not attend appointments aimed at weight management in pregnancy, so this study will add to the evidence regarding specific data for the WMHHS population. Many of the attributes mentioned in the literature will be investigated as part of this study.

3.3 Women's attitudes towards dietitian information and appointments

Several studies have looked into antenatal women's perceptions towards nutrition information and dietitian appointments during pregnancy. Knight-Agarwal, Cubbage, Sesleja, Hinder, and Mete (2019) learned that women acknowledge nutrition is important, particularly during pregnancy. Various studies reported that women do want clearer information, direction, and support regarding nutrition in pregnancy (Bookari, Yeatman, & Williamson, 2017; Heslehurst, Russell, et al., 2015b; Knight-Agarwal et al., 2019).

Interestingly, Bookari et al. (2017), Knight-Agarwal et al. (2019), Lavender and Smith (2016) and Walker et al. (2019) all reported that women obtain most of their nutrition and healthy eating information from the internet or apps. The reasons for this appear to be multifaceted, but includes women being unaware what services are available to them, for example, in a study by Walker et al. (2019) women were appreciative to have a health care professionals advice but only received the service if they requested it. Bookari et al. (2017) conducted semi-structured interviews with pregnant women who reported that information given by health care professionals was too vague and not practical enough.

Conversely, there are also studies that have found some women do not want to focus on nutrition and weight in pregnancy (Atkinson et al., 2017; Begley, 2002; Campbell, Johnson, Messina, Guillaume, & Goyder, 2011; Furness et al., 2011; Olander & Atkinson, 2013). Many of these studies need to be interpreted with caution as data for two of the studies were derived from the opinions of midwives (Atkinson et al., 2017; Furness et al., 2011), while one study included mainly university educated women (Begley, 2002).

Although there are studies that report women want clearer nutrition information during pregnancy (Atkinson et al., 2017; Begley, 2002; Walker et al., 2019), many women are accessing this information from the internet or apps (Knight-Agarwal et al., 2019; Lavender & Smith, 2016; Walker et al., 2019). One possible reason for this is that women are unaware what services are available to them.

This study will provide recent data related to this issue as the researcher listens to antenatal women's perceptions and beliefs towards nutrition information in pregnancy.

3.3.1 Women engagement in Dietitian antenatal appointments

There is limited recent research that specifically address engagement at dietitian antenatal appointments for high-risk women. One study addressed this topic based in Brisbane, Australia from Porteous, de Jersey, and Palmer (2020) who suggested that poor engagement in dietetic pregnancy weight management services is of a great concern due to the previously outlined benefits of attendance. The same authors report that over a six year period 9.6% of eligible women accepted a referral to dietetics services during their pregnancy (Porteous et al., 2020). One study in the United Kingdom completed by Heslehurst, Russell, et al. (2015a) found a 10% engagement rate in dietetic services.

When considering all weight loss services aimed at women affected by overweight or obesity in pregnancy, reported rates of engagement have been from 0-35% (Davis et al., 2012; Knight & Wyatt, 2010; West, 2010). More specifically Opie, Neff, and Tierney (2016) reported that 30% declined attending their group intervention while Atkinson, Olander, and French (2013) found that

51% of women declined referral to a weight management service and 64% who had agreed to referral disengaged from the service.

However, on a positive note a healthy lifestyle program implemented by Heslehurst, Dinsdale, et al. (2015) found that 91% of women enrolled with their service engaged with a dietitian. In other interventions aimed at women affected by overweight and obesity achieved an 82% retention rate (Phelan et al., 2011) while Jarman, Adam, Lawrence, Barker, and Bell (2019) reports a 70% retention rate. These studies demonstrate that engagement rates can be improved by ensuring that the service meets the needs of the target population.

Considering this data, a 50% engagement rate in the WMHHS is higher than most of the aforementioned studies. However, as demonstrated in section 1.5, overweight and obesity pre-pregnancy contributes a significant cost to the health service, therefore, it is still in the best interests of the WMHHS to improve engagement with the dietetics service.

3.4 Reasons for non-attendance

There is limited research into why antenatal women do not attend dietitian appointments, therefore this literature search was broadened to include reasons for non-attendance at all antenatal appointments. When examining these reasons several themes were identified across the analysed research literature. To aid discussion these themes have been divided into access issues, individual factors and an external influence which regularly comes up in the literature, namely midwifes' influence.

3.4.1 Access Issues

Reasons for non-attendance due to potential access issues include inconvenient time and location, work commitments, feeling unwell, lack of transportation and

caring for a child or relative (Davis et al., 2012; Leslie, Gibson, & Hankey, 2013; Olander & Atkinson, 2013; Wong et al., 2013). These reasons are consistently reported across the literature, however improvement in attendance cannot be overcome unless health services can overcome these barriers.

If lack of attendance is due to access issues, then semi-structured interviews can hopefully identify the barriers in WMHHS and develop some solutions. Marmot, Friel, Bell, Houweling, and Taylor (2008) explain that all groups in society can be empowered to contribute to decision making about how society operates, including health equity. The authors explain that this is achieved by empowering all groups within society to have a say in how policy is written and how services are provided (Taylor et al., 2008).

Minority groups are becoming more recognised in health care delivery and interventions introduced to reduce the gap (Jongen, McCalman, & Bainbridge, 2018; Wasserman et al., 2019), however, there is still a way to go to achieve optimisation (Trivedi, Grebla, Wright, & Washington, 2011; Wotherspoon & Williams, 2018). The intake process of referrals for the WMHHS dietitian department is demonstrated in Figure 2.

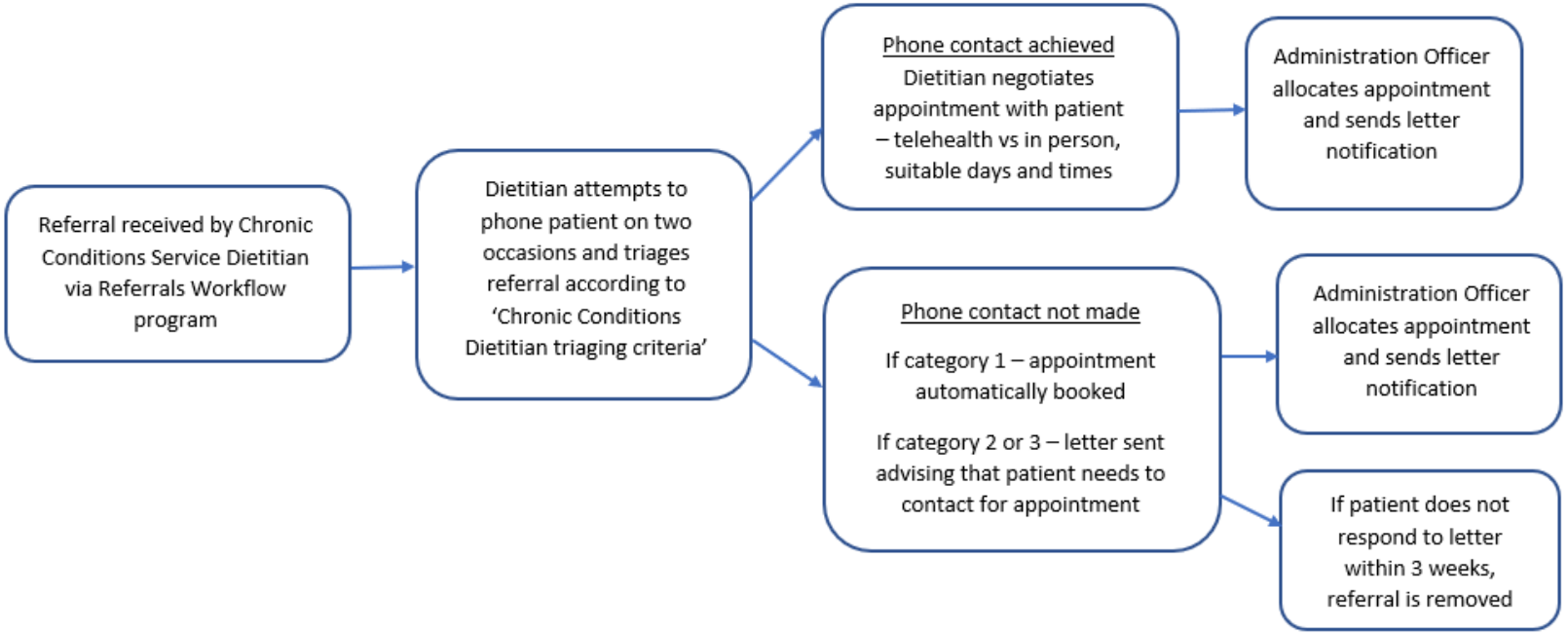

Figure 2. Current procedure for booking dietitian appointments.

The main issue identified from this process is that patients who cannot read or understand English are unlikely to engage if they cannot read the correspondence sent out. Appointment allocation is Monday to Friday, within business hours only which is another potential limitation of the existing system. Issues within the system of allocation of appointments will be explored during the semi-structured interviews.

Many of these access issues represented in the literature are likely true for the WMHHS women population. Appointments are available at Ipswich Community Health only, while antenatal appointments are at Ipswich Hospital. Due to the size of the district women's travel time could be 70 km one way. Telehealth appointments have recently been introduced as an option (due to Covid-19) however, women need the required technology for this to occur. Telehealth is the provision of health care services via telecommunications or digital communications technologies (Catalyst, 2018). Phase 2 of this study will explore the barriers to attendance with participants and delve into potential changes to service delivery that can overcome access issues. Further individual barriers to attending appointments will be explored in the following section.

3.4.2 Individual Issues

Although there are studies that report women want expert dietary advice in pregnancy (Bookari et al., 2017; Heslehurst, Russell, et al., 2015b; Knight-Agarwal et al., 2019), there are also studies that demonstrate a variety of barriers to women attending appointments to address obesity in pregnancy (Dadouch, Hall, Du Mont, & D'Souza, 2020; Furness et al., 2011; Heslehurst et al., 2017; Walker et al., 2019), which will be discussed below.

The most overwhelming concern reported by women regards their long-standing issue with weight, including many weight-loss attempts, and they feel embarrassed or uncomfortable about their pre-pregnancy weight (Dadouch et al., 2020; Furness et al., 2011; Heslehurst et al., 2017; Heslehurst, Russell, et al., 2015b; Swift et al., 2016).

The second major barrier for women attending appointments relates to learning about food and diet from family, friends or society (Armsby, 2000; Campbell et al., 2011; Dadouch et al., 2020; Walker et al., 2019), or feel that their family is unsupportive with dietary change, therefore there is no need to seek further advice (Furness et al., 2011; Heslehurst, Russell, et al., 2015b).

Further to this, many women feel that pregnancy is a time when they will gain weight and have no control over it, therefore they do not want to focus on weight at this time in their lives (Atkinson et al., 2017; Begley, 2002; Campbell et al., 2011; Furness et al., 2011; Olander & Atkinson, 2013). This is likely to be one of the greatest barriers to improving engagement in dietitian appointments, as if women are not wanting to focus on weight in pregnancy, they will not place importance on attending dietitian appointments.

Interestingly, a study by Atkinson et al. (2013) who completed semi-structured interviews with women who declined or disengaged from their pregnancy weight management program identified four common themes that relate to the individual domain. More specifically, women were, 1) wanting a better explanation of the service and what to expect; 2) unaware the referral was made; 3) offended by the referral; and 4) the service did not meet their needs or expectations. These issues will also be explored during the semi-structured interviews in Phase 2 of the study.

Learning what the barriers are for high-risk antenatal women attending dietitian appointments in the WMHHS and as such, not receiving important dietitian information and services, will add to the current lack of knowledge to better understand this phenomenon. This research will therefore contribute to the landscape and add insights into why women do not engage specifically with dietetic services aimed at weight management in pregnancy. It will look at both access and individual factors that can impact attendance.

A potential external barrier for attendance at appointments are the midwifes attitudes and opinions of obesity in pregnancy which will be addressed in the next section.

3.4.3 Influence of Midwives

Referrals for the dietitian in the WMHHS are always from the midwife, during booking in appointments or at a later stage in the pregnancy if indicated. The evidence overwhelmingly reports many barriers to women being offered appointments for weight management by their midwife.

Numerous authors have completed studies investigating the opinions of midwifes with regards to discussing the risks of obesity and offering services that support women during their pregnancy. The most reported barrier was that the health care practitioner did not feel comfortable, or have the skills to discuss weight gain in pregnancy (Davis et al., 2012; Guthrie, de Jersey, New, & Gallegos, 2020; Heslehurst, Dinsdale, et al., 2015; Holton, East, & Fisher, 2017; Lavender & Smith, 2016). In addition to lack of confidence, one study reports that midwives who have challenges with their own weight perception struggle to discuss the topic or that by discussing a sensitive topic with women they

believe they would not attend further antenatal appointments (Guthrie et al., 2020).

The other significant issue mentioned by numerous authors is the long list of items to discuss at an antenatal appointment in a limited amount of time (Armsby, 2000; Dadouch et al., 2020; Guthrie et al., 2020; Heslehurst, Dinsdale, et al., 2015; Holton et al., 2017). In these studies, midwifes report many competing demands, and therefore discussing the topic of obesity, an uncomfortable topic, is easier to not discuss. Midwives also report the challenge of finding the right bariatric equipment for these women which ultimately takes more appointment time. In a study by Holton et al. (2017) midwifes admitted that they will not bring up the option of referral if they get a poor reception when discussing the topic of obesity in pregnancy.

The scope of this study is not to assess the opinions of midwives however the semi-structured interviews will discuss with women their perceptions about the referral process. The perceptions and attitudes of midwifes are potentially another barrier to women attending antenatal services aimed at preventing excessive weight gain in pregnancy due to not discussing the topic of obesity in pregnancy or offering a referral to a weight management service.

3.5 Effective Delivery of Care

Currently there is no evidence for specific diet intervention, nor method of delivery to manage antenatal women living with overweight or obesity (Poston & Patel, 2014). These authors go on to question whether targeting gestational weight gain achieves outcomes that are statistically better (Poston & Patel, 2014). Many of the studies described in this section are of poor quality which is a likely reason why no evidence exists to describe the best delivery of care for

this patient group. Campbell et al. (2011) suggested that targeting women in pregnancy is not likely to be effective as external factors during pregnancy are so strong that the health care practitioner has limited effectiveness.

3.5.1 Effectiveness of dietitian interventions

There have been many studies trialling various interventions, with the aim to reduce gestational weight gain in women who are affected by overweight or obesity at the beginning of their pregnancy (Berge et al., 2020; Buckingham-Schutt, Ellingson, Vazou, & Campbell, 2019; Bull, Clayton, & Hendry, 2017; de Jersey et al., 2011).

Systematic reviews and meta-analysis provide the highest level of evidence in an area of practice. There were seven systematic reviews/meta-analyses found on this topic which were published from 2011 – 2020 (Flynn et al., 2016; Gardner, Wardle, Poston, & Croker, 2011; Oteng-Ntim, Varma, Croker, Poston, & Doyle, 2012; Pari-Keener et al., 2020; Tanentsapf, Heitmann, & Adegboye, 2011; Thangaratinam et al., 2012; Walker et al., 2018). Although four are now 'dated' the conclusions were positive for dietary intervention as Tanentsapf, Heitmann and Adegboye report that "dietary advice during pregnancy appears effective in decreasing GWG and long-term postpartum weight retention" (2011, p. 11). Oteng-Ntim et al. (2012) also found that lifestyle interventions for women with obesity and overweight during pregnancy restrict GWG. Thangaratinam et al. (2012) found that dietary interventions were effective in reducing GWG, but also reduced the risk of pre-eclampsia, gestational diabetes, gestational hypertension, and preterm births. Similarly, Flynn et al. (2016) made the same conclusion from nine out of 13 studies but reported a lack of information on control groups to make definitive conclusions.

Gardner et al. (2011) completed a meta-analysis of 12 intervention studies which also concluded that intervention is successful at reducing GWG. The main issues presented by Gardener and colleagues (2011) are that there was inadequate information for most of these studies to appropriately replicate the studies.

Pari-Keener et al.'s (2020) systematic review focused on studies that utilised a registered dietitian to implement Medical Nutrition Therapy (MNT) in antenatal patients who are underweight, normal weight or overweight and obese. Pari-Keener and colleagues (2020) found strong evidence to support the use of MNT to meet GWG targets in this population. These authors also site the lack of available studies (six were included), and variable methods of delivery of care indicate that further studies are required to determine the most effective method to deliver care. The studies included in this review were from heterogeneous populations therefore studies involving more diverse populations are also required.

These systematic reviews and one meta-analysis acknowledge that the quality of available studies was low-moderate and are unable to assess the content or delivery model (group vs individual) of successful interventions used in these studies as they were not always clearly reported. The evidence suggests that lifestyle interventions to reduce GWG during pregnancy can be effective, however the most effective model to deliver care is unclear.

Some of the studies have been successful in reducing weight gain of at-risk women during pregnancy, but the scope of the projects was not intended to determine whether there was a decrease in the maternal complications associated with the pregnancy. For example, Berge et al. (2020) and Buckingham-Schutt et

al. (2019) conducted studies in their populations which resulted in lower gestational weight gain. Berge et al. (2020) provided increased access to professional advice via group programs, that was tailored to the requirements of their minority population. Buckingham-Schutt et al. (2019) provided six one-on-one consultations with a dietitian to achieve a lower Gestational Weight Gain (GWG), however, both these studies recognise their relatively small samples were a limitation of their research projects.

A randomised controlled trial was conducted by Phelan et al. (2011) that implemented a low intensity intervention to control GWG in pregnancy. They included women in the healthy weight range and those who were affected by overweight or obesity. An initial one-on-one session was conducted to explain expected weight gain, calorie targets, provide a pedometer and educate regarding daily self-monitoring of eating. The study then completed a weekly mail out of information and three brief phone consultations from the dietitian. This study had a high retention rate of 82%. Outcomes were positive for women that were in their healthy weight range as their weight gain was within GWG targets and returned to prepartum weight. Women living with overweight and obesity women did not meet GWG targets, however, were more likely to return to prepartum weight six weeks post birth.

This study summarises the opinion of Opie et al. (2016, p. 365) who state "in routine clinical practice there remains a lack of clarity regarding the optimum delivery mode and dietary intervention design for achieving optimal nutrition or weight gain targets in obese pregnant women."

Mackeen et al. (2021) conducted a trial to reduce GWG in women with obesity and found no difference between usual care and enhanced care (involved education on GWG and appointments with a registered dietitian).

In a more recent Australian study it was found that a program aimed at reducing GWG and poor outcomes associated with obesity, specifically a BMI >40 kgm^2, was not effective at achieving GWG within targets or reducing poor obstetric or neonatal outcomes (Schulte, Monaghan, & Rane, 2021).

Considering this information, the question that then needs to be asked is whether managing GWG during pregnancy reduces the risk of poor outcomes for that pregnancy. A study completed by Yang et al. (2019) demonstrated that poor maternal and neonatal outcomes occur in women who are obese at the beginning of their pregnancy. Yang and colleagues (2019) suggested that public health strategies to reduce the burden of overweight and obesity is required before women fall pregnant for optimum outcomes and reduced health care costs rather than during pregnancy.

Meanwhile Bennett et al. (2018) found that interventions to reduce gestational diabetes risk by limiting GWG were effective, however not in women who had a high pre pregnancy BMI.

Considering this gap in knowledge around the best model of care to deliver dietetics service to high-risk antenatal populations or if at all, this research project is essential to guide service delivery decisions for the WMHHS population. Interviewing this group of women will provide valuable information around the participants' preferred delivery of care. If delivery of care is implemented as per the WMHHS population preferences, it is anticipated that the projects possible future outcomes (e.g., reduced FTA rate and associated cost

savings, improved clinician satisfaction and reduced pregnancy complications associated with excessive GWG) can be achieved.

3.5.2 Women's preferred delivery of care

When reviewing service delivery, it is vital to seek the perceptions of women to ensure it meets their expectations and needs (Bergerum, Engström, Thor, & Wolmesjö, 2020). Interestingly, women's preferred delivery of care as reported in the literature is contradictory to the limited evidence that does exist for best care.

Heslehurst et al. (2017); Lavender and Smith (2016) reported that women want advice from the nutrition expert, the dietitian. Their preferences for care are a more flexible, consistent service that focuses on healthy lifestyle (Atkinson et al., 2013; Furness et al., 2011; Lavender & Smith, 2016).

In contrast to this relaxed approach preferred by women, the existing evidence shows that to achieve GWG targets in women affected by overweight and obesity more intensive sessions that focus on calorie restriction are more effective (Armsby, 2000; de Jersey et al., 2011; Phelan, 2010; Tanentsapf et al., 2011).

Leslie et al. (2013) studied women's views regarding the preferred medium for delivery of care which showed that 41% preferred physical activity advice, 36% preferred access to exercise facilities, 14% individual consultations, and 12% a group on healthy eating. The evidence disputes this preference again, as Hill, Skouteris, and Fuller-Tyszkiewicz (2013) demonstrated that focusing on dietary changes are more effective than physical activity changes.

With regards to the medium of delivery, there are numerous studies describing that group programs are more cost effective than individual care for weight management (Davis et al., 2012; Flynn et al., 2016; Furness et al., 2011; Holton et al., 2017). Other reasons for the effectiveness of group programs in this population are the effectiveness of peer/social support in achieving behaviour change (Furness et al., 2011). As described above, the main barriers to attendance at antenatal appointments are adequate time, transport, and childcare issues, which means that engagement and attendance at intensive group programs will be a challenge for this population. It, therefore, creates a great challenge to develop services for antenatal women to meet best practice vs. patient preferences.

Considering there is a disparity between women's preferred delivery of care and what the evidence shows is more effective, it will likely remain difficult to improve engagement and fail to attend rates in this patient group.

3.5.3 Weight monitoring

Weight monitoring during pregnancy is an issue that comes up frequently in the studies when perceptions are sought from both women and midwives.

Women overwhelmingly want to be weighed at their antenatal appointments (Atkinson et al., 2013; Heslehurst et al., 2017; Heslehurst, Russell, et al., 2015b; Phelan et al., 2011). A study by Swift et al. (2016) found that 95% of women had been weighed at their appointments, however only 15% had the midwife discuss weight. Heslehurst, Dinsdale, et al. (2015); Holton et al. (2017) found that weight monitoring practices are inconsistent. This was demonstrated in a study by Guthrie et al. (2020) where midwives who felt confident with

having discussions around weight, weigh their patients regularly, while those with less confidence do not regularly weigh women.

In contradiction to women's preferences as reported above, Gardner et al. (2011) completed a meta-analysis that found it is too premature to suggest weight monitoring as an effective behaviour change strategy for the purpose of limiting GWG.

The completion of weight monitoring during pregnancy is dependent on the confidence of the midwife or health care professional. Women overwhelming want to be weighed, however the effectiveness of this as an intervention is not confirmed.

3.6 Conclusion

This literature review has shown that limiting GWG in antenatal women who are affected by overweight and obesity is multifaceted and complex. The goal of this research project is to determine the perceptions of high-risk antenatal women in the WMHHS on dietitian information and appointments, barriers to attending appointments and preferred delivery of care. The evidence shows there are numerous barriers to attending appointments, including the lack of confidence of referrers to discuss the topic of weight in pregnancy and initiate referral to services aimed at managing weight gain in pregnancy.

The best delivery of care for this group of women is currently unclear. Women want dietetic information, however, prefer less intense, less frequent contact which is contradictory to the evidence which suggests more intensive, specific information is needed to successfully limit GWG in antenatal women affected by overweight and obesity. This research project will determine

whether the perceptions and beliefs of women in the WMHHS are in line with the evidence. If this is the case, the goal of this research project was to ultimately improve engagement rates in the population group may not be achievable.

Chapter 4 will present the research paper for publication: High-Risk Antenatal Women's Perceptions of Dietitian Appointments and Information. This paper outlines the aim of the project, research methods, ethical considerations, results, discussion, and ends with a conclusion.

CHAPTER 4: RESEARCH PAPER FOR PUBLICATION: HIGH-RISK ANTENATAL WOMEN'S PERCEPTIONS OF DIETITIAN APPOINTMENTS AND INFORMATION

This chapter demonstrates the research process by presenting the research paper for publication. As per the University of Southern Queensland Thesis by Publication guidelines, this paper has been submitted to a notable international Q1/D1 journal. Note: Presentation of this *paper* is correct as it is submitted and not yet published.

Abstract

Problem: The community dietitian service at a metropolitan health service in Queensland, Australia has a non-engagement rate for high-risk antenatal women of 50%.

Aim: Determine which attributes are related to non-attendance at dietitian appointments, and women's perceptions and attitudes towards dietitian appointments during pregnancy.

Methods: An explanatory mixed-methods design was utilised, with first phase including 103 antenatal women referred to a dietitian in 2021 and compared the attributes of those who attended with those who did not engage. Queensland Health electronic databases were used to collect attribute data, which were then analysed with Jamovi (version 1.6) for descriptive, correlational, and regression analysis. Second phase included seven semi-structured interviews with women attending a dietitian appointment, and subsequently analysed through thematic analysis.

Results: Distance from clinic was not related to clinic attendance, and women reported they would attend regardless of distance or work status. Non-

attendance was related to higher gravidity, parity, and if referred for obesity, but not previous gastric sleeve or underweight referral. Six themes were identified from the interview data: “Women want to be treated like an individual,” “It’s all about expectations,” “Midwives hold the key,” “Preferences in receiving dietary information,” “Weight has been a long-term problem and is a sensitive topic,” and “Barriers to attendance.”

Conclusion: Antenatal services can adjust service delivery to improve engagement in weight management services during pregnancy. Telehealth appointments may reduce non-engagement due to distance from clinic. Demystifying the dietitian appointment, ensuring non-judgemental referral processes and collaboration between midwives and dietitians will ensure that women value the service.

Key words: (1) nutritionists, (2) antenatal care, (3) overweight, (4) obese, (5) midwife

Statement of significance

Problem or Issue	What is already known	What this paper adds
50% of high-risk antenatal women, referred by midwives, do not attend appointments with the community dietitian.	Rates of non-attendance for other weight management services are similar to the studied service. Distance to clinic, multiparous, unmarried, and higher BMI are related to non-attendance at antenatal	Midwives are the key to reducing uncertainty, fear and the stigma associated with referrals for weight management services during pregnancy, as women are unsure what to expect from dietitian appointments. Telehealth services may

	appointments. Stigma associated with overweight / obesity is a long-term issue for many women.	reduce non-engagement due to distance.

1. Introduction

Overweight and obesity are an increasing health issue in Australia (Australian Institute of Health and Welfare, 2020). The definition of overweight is a Body Mass Index (BMI) of > 25 kgm^2 and obesity is a BMI > 30 kgm^2 (Whiteman et al., 2015). When combined with pregnancy, overweight/obesity increases the risks to both mother and baby and costs the health system 23-37% more (Morgan et al., 2014; Watson et al., 2013) than a pregnancy for a mother in the healthy weight range (BMI 20–25 kgm^2). Parallel to this, pre-gravid obesity is one of the most frequent high-risk pregnancy situations (Department of Health, 2019). The Clinical Practice Guidelines: Pregnancy Care (Department of Health, 2019) outlines the health risks for the mother with obesity, including: stillbirth; maternal death; gestational diabetes; preeclampsia; congenital abnormality; preterm birth; and increased risk of caesarean section. Risks for the baby include low Apgar scores, macrosomia and further associated risks such as shoulder dysplasia, birth injury, and neonatal death (Department of Health, 2019).

Similarly, women who are pre-gravid underweight (BMI < 18.5 kgm^2) are also considered to have a high-risk pregnancy with their infants at increased risk of preterm birth and low birth weight (Department of Health, 2019). Although many of the risks associated with obesity and pregnancy are improved

after gastric surgery (Haseeb, 2019; Young et al., 2018) there are still some risks with these pregnancies including monitoring of micronutrient and vitamin supplementation (Różańska-Walędziak et al., 2021), nutritional deficiencies (Rottenstreich et al., 2019), and intrauterine growth restriction (Haseeb, 2019; Young et al., 2018).

Weight gain should be managed, as per the Institute of Medicine (Institute of Medicine, 2009) guidelines to reduce the risk of complications during pregnancy and birth associated with overweight/obesity, underweight and previous gastric surgery. This is referred to as gestational weight gain (GWG), which is the amount of weight gained during pregnancy. Clinical Guidelines for pregnancy care (Department of Health, 2019; Queensland Clinical Guidelines, 2021) recommend referral to a dietitian for advice and monitoring of GWG if women are overweight, obese, underweight, or had bariatric surgery prior to pregnancy.

This study was conducted at a metropolitan health service in Queensland, Australia. The hospital provides a maternity service and the midwifes are responsible for referring to the dietitian service. All referrals eligible for this study are classed as high-risk pregnancies, however in the Australian state this study was conducted in, referrals to the dietitian due to a BMI > 25 kgm^2 are cared for under the 'Obesity Protocol' to manage their pregnancy safely.

The evidence suggests that lifestyle interventions to reduce GWG during pregnancy can be effective, however the most effective model to deliver care is unclear (Flynn et al., 2016; Pari-Keener et al., 2020). The available systematic reviews assessing this issue acknowledge that the quality of available studies

was low-moderate and are unable to assess the content or delivery model (group vs individual) of successful interventions used in these studies as they were not always clearly reported (Flynn et al., 2016; Gardner et al., 2011; Oteng-Ntim et al., 2012; Pari-Keener et al., 2020; Tanentsapf et al., 2011; Thangaratinam et al., 2012; Walker et al., 2018).

Engagement in services aimed at weight management in pregnancy is poor with rates reported in the range of 0-50% (Atkinson et al., 2013; Olander & Atkinson, 2013; Opie et al., 2016). There are few studies that consider dietitian services specifically, however two have reported an engagement rate of 10% (Heslehurst, Russell, et al., 2015b; Porteous et al., 2020). In the studied population engagement rates are at 50%. When considering strategies to improve attendance it is important to consider the characteristics / attributes of those not attending (Dantas, Fleck, Oliveira, & Hamacher, 2018). There were no studies located that assess the attributes of women who do not attend dietitian antenatal appointments and those reviewing attendance at general antenatal or gestational diabetes clinics are dated. These dated studies found that multiparous, higher BMI, non-European, low income, long distances to clinic, unmarried, alcohol consumption, and younger age are related to non-attendance (Atkinson et al., 2017; Raatikainen et al., 2007; Wong et al., 2013).

Parallel to this, obtaining the thoughts of service users is imperative when reviewing healthcare services to ensure that women's needs are being met (Bergerum et al., 2020). Therefore, seeking the thoughts of women who are accessing the dietitian service is essential to review service delivery and referral processes in the health service studied. Women do want nutrition information in pregnancy (Knight-Agarwal et al., 2019), however they would like clearer

information, direction and support during pregnancy (Bookari et al., 2017; Heslehurst, Russell, et al., 2015b; Knight-Agarwal et al., 2019). Women obtain most of their nutrition information from the internet or apps (Bookari et al., 2017; Knight-Agarwal et al., 2019; Lavender & Smith, 2016; Walker et al., 2019) due to being unaware of what services are available to them. Despite wanting nutrition information, the main reason women are reluctant to attend weight management services in pregnancy is due to their long-standing issue with weight, including many weight-loss attempts, and feeling embarrassed or uncomfortable about their pre-pregnancy weight (Dadouch et al., 2020; Heslehurst, Russell, et al., 2015b; Swift et al., 2016).

Midwives have an important role to play as they are the first clinician that women will see in the antenatal process, and they generate the referrals in the study population. Midwives though could have the potential to negatively affect attendance at appointments for weight management as many do not feel comfortable or have the skills to discuss weight in pregnancy (Guthrie et al., 2020; Heslehurst, Dinsdale, et al., 2015; Holton et al., 2017; Lavender & Smith, 2016) and the limited amount of time they have in appointments to discuss numerous issues also presents as a barrier (Dadouch et al., 2020; Guthrie et al., 2020; Heslehurst, Dinsdale, et al., 2015; Holton et al., 2017). Midwives have reported not offering referrals when receiving negative responses form women when bringing up the topic of weight (Holton et al., 2017).

This study will provide new information about women's perceptions of dietitian appointments to monitor GWG in pregnancy and potential barriers to attendance in the studied population. It will consider local issues but also

broader systemic issues and women's thoughts around preferred delivery of care.

The aim of this study is to determine the attributes of women who do not engage with the dietitian service, explore women's thoughts of dietitian appointments and information in pregnancy and their preferred delivery of care. Therefore, the research questions for this study are: (1) Compare the attributes of women with a high-risk pregnancy who engaged vs those who did not engage with the dietitian during the six-month period? (2) What are the knowledge and attitudes of women with a high-risk pregnancy concerning dietitian information, services, and appointments? (3) What are the potential barriers women with a high-risk pregnancy experienced to attend their dietitian appointment during this time-period? (4) How would women with a high-risk pregnancy prefer to receive their dietitian information, services and appointments?

2. Methodology

This study utilised an explanatory mixed methods design with two phases, quantitative and qualitative.

2.1 Ethical Procedures

Human ethics approval was obtained by the authors' university ethics board – Human Research Ethics Committee (H20REA292) and the nominated Queensland Health Human Research Ethics Committee (QH11301374). Participating in phase two was voluntary and informed consent was obtained for participation and dissemination of results. Data were analysed anonymously.

2.2 Phase 1

The first phase of this study took place at a community health clinic, in Queensland, Australia. It involved descriptive, correlational and regression

analyses of a secondary database to compare the attributes of women who engaged with the community dietitian to those who did not.

2.2.2 Participants

The participants in Phase 1 were a prospective convenience sample including all antenatal women who were referred to the dietitian service over a six-month timeframe (March 2021 – August 2021). Referrals to the dietitian are only offered to high-risk pregnancies which includes obesity, underweight, and previous gastric sleeve. All participants lived in the study region of Queensland and received their antenatal care at the local public hospital.

There were 103 participants who ranged in age from 14-43 years old, 30% (*n* =31) of whom were unemployed. The main cultural backgrounds were 62.14% (*n* = 64) (Caucasian) Australian; 13.5 % (*n* = 14) New Zealander and Pacific Islander; 6.8% (*n* = 7) Australian Aboriginal but not Torres Strait Islander; 3.8% (*n* = 4) not stated; 2.9% (*n* = 3) Asian; 1.9% (*n* = 2) Indian, African and South American and the remainder cultural background were *n* = 1.

Most of the participants 79.6% (*n* = 82) were referred under the obesity protocol, 12.6% (*n* = 13) due to previous gastric sleeve surgery, while 7.7% (*n* = 8) were referred for being underweight prior to pregnancy.

2.2.3 Data Collection

All referrals for the community dietitian are entered into an electronic referral program. Date and reason for referral filters were utilised to export data to an excel spreadsheet of all antenatal women referred to the dietitian within the study timeframe, March 2021 to August 2021. The information obtained from this program included Unit Record Number, full name, date of birth, date of referral, and reason for referral. The spreadsheet was then extended to include

age, occupation, cultural background, marital status, smoker, alcohol consumption in pregnancy, suburb lived, distance from clinic, gravidity, parity, BMI, and attended appointment.

The Queensland Health integrated electronic Medical Records (ieMR) program was then utilised to complete the remaining information on the spreadsheet. Specifically, the patient information tab in ieMR contains the participants' address, occupation, and marital status. The booking in appointment entry by the midwife was then accessed to obtain smoker status, alcohol use, gravidity, parity, and BMI. Age was calculated by using the participant's date of birth, while distance to clinic was calculated by entering the woman's address in Google maps then calculating the driving distance to clinic utilising the direction function. Finally, the appointment booking system was accessed to determine whether the woman attended their initial dietitian appointment. Once all the required data were collected, identifiers (Unit Record Number, name, date of birth) were removed from the spreadsheet to ensure anonymity prior to data analysis. Two groups were then formed: women who attended their appointments (Group 1, $n = 51$); and women who did not attend (Group 2, $n = 52$).

2.2.4 Data Analysis

Descriptive, correlational, and regression analysis were completed using Jamovi version 1.6 (The jamovi project, 2021) to find if there were any common attributes (variables) of women who did not attend their appointments compared to those who did. The nominal variables were attendance at appointment; smoker; marital status; obesity referral; gastric sleeve referral; and underweight

referral. The interval variables were distance from clinic, gravidity, parity, and BMI.

2.3 Phase 2

Individual semi-structured interviews were conducted with patients who attended their appointment. The interviews utilised open ended questions to gain a better understanding of the knowledge and attitudes to dietitian appointments, as the health service women's experiences may be different to those identified in the literature. Refer to appendix one for a copy of the interview questions. Obtaining these women's perspectives in an individual semi-structured interview, provided valuable insights to answer research questions two to four.

2.3.1 Participants

Women who were referred during the study timeframe and attended their dietitian appointment were invited to participate in phase 2 at the end of their first appointment. If a woman from phase 1 was diagnosed with gestational diabetes, they were ineligible for phase 2. In the health service district, women who are diagnosed with gestational diabetes are discharged from the community health service dietitian as their care is taken over by the gestational diabetes team. Of the 51 participants who attended their appointment, seven were diagnosed with gestational diabetes, leaving 44 eligible for phase 2. Seven women agreed to participate in phase 2 of the study.

Participants who agreed to be interviewed chose their preferred location for the interview. The options were on site at the community health centre in Queensland in a consultation room, or via telehealth, or Microsoft TEAMS. The one-on-one interviews occurred at the participant's preferred day and time and could correspond with their review appointment if preferred. Five of the seven

(71.4%) interviews were conducted directly after the participant's review appointment, while two participants booked an interview time separate to their dietitian appointments. Three interviews were conducted in person at the community health centre, while four were conducted via telehealth, or Microsoft TEAMS.

The lead author conducted all new and review appointments with antenatal women during the study period, except when a woman requested an appointment on a day the researcher did not work. A woman's clinical needs were always prioritised over the research project. Of the seven interview participants, the average age was 28.8 (range 22-36), no (0%) participants consumed alcohol or smoked during pregnancy, and 71.4% were married, or in a de facto relationship. The average BMI of the seven women was 29.3 kgm^2, gravidity 1.86, parity 0.428, and 100% were employed.

2.3.2 Data Collection

Following the women's attendance at their initial dietitian appointment, they were invited to participate in phase 2 of the study. A review appointment was always offered and arranged first, then the woman was provided with the participant information sheet, outlining the aim of the study, and consent form, including a personalised explanation of the project and the interview process. A couple of women agreed to participate at that appointment and an interview day / time was arranged at the same time. The remainder of women were asked if they could be contacted in one week to determine their interest in the project. All women who were handed a participant information sheet were contacted one week after their appointment. If they did not answer, a second attempt to contact

was made. If they did not answer after two attempts, but attended a review appointment, they were then asked at this review appointment.

It was reiterated to all women that their clinical care would not be compromised due to participation or non-participation in the study. The first author conducted all interviews as part of the project, and the same questions were used for all interviews, however the semi-structured nature meant that different issues were discussed in all interviews. All interviews were recorded, and transcribed verbatim. Recordings were deleted after transcription, and names were changed to ensure anonymity.

2.3.3 Data Analysis

To make meaning of the seven women's lived experiences, including their thoughts of dietitian appointments and preferred delivery of care, interviews were transcribed into a word document to enable the researcher to identify recurring themes and sub-themes. Thematic analysis was manually conducted utilising Braun and Clarke's (Braun & Clarke, 2019) six-step process which includes: Step 1: Become familiar with the data; Step 2: Generate initial codes; Step 3: Search for themes; Step 4: Review themes; Step 5: Define themes and Step 6: Write up.

3. Results

In the results, we firstly present the findings of the quantitative analysis including demographic details for participants. This is followed by the thematic analysis from phase 2.

3.1 Phase 1

The non-engagement rate for the study period was 49.5% (n = 52). 79.6% (n = 82) of referrals were for the obesity protocol, 12.6% (n = 13) for previous gastric sleeve, and 7.7% (n = 8) for underweight. The average age of participants was

28.1 years with an average BMI of 34.4 kgm^2. 23.3% (*n* = 24) were smokers during their pregnancy and 8.7% (*n* = 9) drunk alcohol during pregnancy. 64% (*n* = 66) of women were married while the average gravidity was 2.79 and parity 1.1. The descriptive data from all participants (*n* = 103) is presented in Table 1.

The major differences between the descriptive of the attended versus non attendees were that 17.6% (*n* = 9) smoked compared to 28.8% (*n* = 15). Those who drank alcohol during pregnancy were 3.92% (*n* =2) of attenders compared to 13.5% (*n* = 7). Average gravidity was 2.33 compared to 3.23 and parity 0.78 versus 1.44. Refer to Table 2 for the descriptive analysis comparing attendees (group 1) and non-attendees (group 2).

Variables that are related to non-attendance at dietitian appointments were referral for obesity, increasing parity and increasing gravidity. Whereas underweight referral and gastric surgery referral are positively correlated with attendance at appointment. Correlational data analysis is presented in Table 3.

Table 1:

Descriptive statistics for all participants n = 103 in phase 1 of the study.

Descriptive	Age	Smoker	Alcohol	Marital Status	Obesity Referral	Gastric Sleeve Referral	Underweight referral	Distance from clinic (km)	Gravidity	Parity	BMI (kgm^2)	Attended DT appointment
Mean	28.1	23.3	8.74	64.1	79.6	12.6	7.7	15.0	2.79	1.12	34.4	49.5
Standard deviation	5.51	0.425	0.284	0.482	0.405	0.334	0.269	11	1.82	1.32	8.8	0.502

Table 2:

Descriptive statistics comparing those who attended their appointment (group 1) with those who did not (group 2).

		Age	Smoker	Alcohol	Marital status	Obesity Referral	Gastric Sleeve Referral	Underweight Referral	Distance from clinic	Gravidity	Parity	BMI (kgm^2)
Mean	Group 1	27.8	17.6	3.92	68.6	70.6	15.7	13.7	15.9	2.33	0.78	32.9
	Group 2	28.4	28.8	13.5	59.6	88.5	9.62	1.92	14.2	3.23	1.44	35.9
Standard deviation	Group 1	5.52	0.38	0.19	0.46	0.46	0.36	0.34	11.8	1.37	0.96	9.53
	Group 2	5.54	0.45	0.34	0.49	0.32	0.29	0.13	10.1	2.09	1.53	7.82
Skewness	Group 1	-0.05	1.75	4.89	-0.82	-0.93	1.94	2.17	1.04	0.88	1.15	0.0
	Group 2	0.45	0.96	2.21	-0.40	-2.48	2.82	7.21	1.4	1	1.44	0.58
Kurtosis	Group 1	-0.10	1.1	22.8	-1.37	-1.18	1.85	2.83	0.52	-0.07	1.03	-0.15
	Group 2	-0.42	-1.12	2.98	-1.91	4.31	6.2	52	2.38	0.64	2.42	0.03

Table 3:

*Correlation data for patient attributes, tested at the two-tailed level. R-values included in table, p-value represented as: * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$*

	Distance from clinic (km)	BMI (kgm^2)	Age	Smoker	Alcohol	Marital Status	Obesity referral	Gastric Sleeve Referral	Underweight referral	Gravidity	Parity
Distance from clinic (km)	-										
BMI	-0.02	-									
Age	0.05	0.10	-								
Smoker	-0.13	-0.01	-0.12	-							
Alcohol	-0.12	0.22*	-0.24*	0.23*	-						
Marital Status	0.11	-0.01	0.31**	-0.01	-0.12	-					
Obesity Referral	0.06	0.52***	-0.11	0.0	0.15	0.02	-				
Gastric Sleeve Referral	-0.10	-0.16	0.28**	0.06	-0.11	0.04	-0.75***	-			
Underweight Referral	0.03	-0.57***	-0.18	-0.07	-0.09	-0.08	-0.57***	-0.11	-		
Gravidity	0.0	0.11	0.30**	0.22*	0.30**	0.158	-0.020	0.077	-0.06	-	
Parity	0.01	0.26**	0.37***	0.074	0.23*	0.17	0.04	0.03	-0.10	0.82***	-
Attended DT appointment	0.07	-0.17	0.58	-0.13	-0.16	0.09	-0.32*	0.09	0.22*	-0.24*	-0.25*

Those variables that have been found to have a statistical difference with attending a dietitian appointment during regression analysis are alcohol intake (F = 2.97, p = .08), referral for obesity (F = 5.23, p = .02), referral for underweight (F = 5.16, p = .02), gravidity (F = 20.74, p = .01) and parity (F = 6.80, p = .01). Refer to Table 4 for the regression analysis.

Table 4:

Regression analysis with attendance at appointment the independent variable. P-value significance at *p ≤ .05.

	Sum of squares	***Df***	**Mean Square**	***F***	***P***
Age	9.28	1	9.28	0.30	0.58
Smoker	0.32	1	0.32	1.80	0.18
Alcohol	0.23	1	0.23	2.97	0.08
Marital Status	0.20	1	0.20	0.89	0.34
Obesity Referral	0.82	1	0.82	5.23	0.02*
Gastric Sleeve referral	0.09	1	0.09	0.85	0.35
Underweight referral	0.35	1	0.35	5.16	0.02*
Distance from clinic	72.3	1	72.3	0.59	0.44
Gravidity	20.7	1	20.74	6.62	0.01*
Parity	11.1	1	11.15	6.80	0.010*
BMI	243	1	242.6	3.2	0.077

3.2 Phase 2

Six themes emerged from the thematic analysis and these, with their sub-themes are presented in Table 5.

Table 5:

Themes and subthemes identified through thematic analysis.

Theme	Sub-theme
Women want to be treated like an individual	Women want one on one appointments so they can discuss their individual needs with a dietitian (face to face or telehealth)
	Don't refer to women as a statistic
	Need to target women early in the pregnancy
	Providing guidelines is not enough - we need help
	It's not just me but also the health of my baby
It's all about expectations	Previous encounter with a dietitian influences expectation
	Curiosity or wanting help determines attendance
	If you want help you will attend
	Are they going to tell me off?
	I know what I should be eating
	It's how they deliver the message that counts

Midwifes hold the key	Better collaboration between midwives and dietitians would make a difference
Preferences in receiving dietary information	Dietitians are the experts in nutrition
	Google is the most used tool to access nutrition information
	Women prefer written information that is convenient
Weight has been a long-term problem and is a sensitive topic	I know that I'm overweight/underweight, I have been my whole life
	If women are not ready to deal with it, they are not going to turn up
Barriers to attendance	The facility is difficult to access

3.2.1 Women want to be treated like an individual

This theme was represented across all interview participants. If women are being treated like an individual, they are more likely to attend/respond to recommendations. The five sub-themes that emerged under this theme are: Women want one-on-one appointments so they can discuss their individual needs with a dietitian (face-to-face or telehealth); Don't refer to women as a statistic; Need to target women early in the pregnancy**;** Providing guidelines is not enough - we need help; It's not just me but also the health of my baby.

Women want one-on-one appointments so they can discuss their individual needs with a dietitian (face-to-face or telehealth)

The women from the study expressed they did not want to attend group programs as they felt the information would not be tailored for them: “Because it's a group program. I don't think I would take it as seriously because I wouldn't know whether or not that actually categorically spoke to me” (Amelia). Conversely, women overwhelmingly wanted one-on-one appointments with the dietitian so they can express themselves properly and get specialised advice specific to their circumstances: “I get more out of an individual appointment 'cause you can actually explain how you're feeling correctly” (Isabella).

Women vary in their preferences for face-to-face vs telehealth appointments, and this is dependent on their personal circumstances and generally related to their work or home situation: “I like being in person with someone better. Um, and I think in terms of engagement, I think being there with someone is good” (Sophia) or “I definitely prefer the individual one. Like face-to-face or online” (Emma).

Don’t refer to women as a statistic

The women also expressed they did not want to be treated like a statistic. If the midwife states that they are being referred to the dietitian due to meeting the criteria, then women find this offensive: “She doesn't know what I look like. But again, I suppose it’s not about what you look like if you fall into the numbers then that’s what you are” (Amelia). They are more likely to attend or take the advice seriously if they are being treated like an individual and not read the ‘script’ on the paperwork: “She's just looking at me as a statistic and not as a person” (Emma). There were also comments from a couple of women about the

protocol for referral being named ‘the obesity protocol’ which they found offensive as well: “The protocol that led me to having the referral called the obesity protocol, which isn't particularly nice to be lumped in” (Ava).

Need to target women early in the pregnancy

Four women reported that if you target women early, they are more likely to respond to information and advice: “If they've put on too much weight by then, they just give up and keep going” (in reference to when women reach 2nd or 3rd trimester) (Isabella). All participants felt that all women who are pregnant should be offered the opportunity to see a dietitian early in their pregnancy, not just those who meet the criteria: “I think everybody should at least have one consultation with a dietitian just to put their mind as ease at the start” (Amelia).

Providing the guidelines is not enough - we need help

Three women reported that it’s no good telling women they fall into a certain category if adequate help is not provided as they won’t be able to change anything: “Well how do I do that? Well, you have to figure that out on your own” (Charlotte). These three women commented that doctors and midwives tell them they fit into the category, but it was the dietitian who provided them the information they needed to support change: “You guys seem to talk to us like we’re normal, whereas a doctor just basically they tell you to be healthy, like, you know, just do what you can. And that doesn't help me at all … You need help to actually do it” (Amelia).

It’s not just me but the health of my baby

Most women who were interviewed did acknowledge that the guidelines are in place not only for them, but for the health of their unborn baby: “The fact that it wasn't just about me, they did say, you know, um, just to make sure that, you

know, you and the baby are getting all the, the food that you need. I was like, ah, yeah, I definitely need to go" (Sophia). This was also expressed by other participants as well: "for the health of I suppose my unborn child as well" (Ava). One woman expressed her concern that at times it felt like the focus was too much on the baby on not on the wellbeing of the woman as well: "It's all about the baby and they want to make sure the baby is ok, but what about you?" (Amelia).

3.2.2 It's all about expectations

'It's all about expectations' is a very strong theme that was brought up numerous times by all women interviewed. The six sub-themes related to this topic are: A dietitian helped me in the past, so I knew what to expect; Women did not know what to expect from a dietitian appointment; Curiosity or wanting help determines attendance; Are they going to judge me or tell me off; I know what I should be eating; If you want help you will attend.

Previous encounter with a dietitian influences expectation

Three of the interviewed women had seen a dietitian in the past. All report that they had a positive experience with the dietitian, and they felt relaxed about attending during pregnancy due to this experience: "If I didn't have that experience, I probably would have been like super scared …. I sort of knew what I was going into and it just sort of like made me more comfortable if that makes sense" (Charlotte). This previous experience was reassuring to women, and they were keen to seek assistance from a dietitian during their pregnancy to double check they were still on track: "Well, I was looking forward to it 'cause I haven't seen one in a couple of years now. So just to make sure I was still on the right track and things haven't changed" (Isabella).

Conversely, four of the women who were interviewed had not seen a dietitian in the past. These women all reported feeling apprehensive about their dietitian appointment: "…. like really nervous …. I felt like I was going to get weighed asked about my diet …. but beyond that I really wasn't quite sure" (Ava). The main reason for apprehension was not knowing what was going to happen at the appointment: "I didn't have a lot (of expectations) because I didn't really know what was gonna happen if it makes sense" (Olivia).

Curiosity or wanting help determines attendance

Ultimately, the women who attended their appointments did so because they were curious about seeing dietitian: "I've never seen one so I thought why not when it was offered to come and see" (Olivia). The other motivation for attendance was when women were wanting help with their diet, so the appointment was an opportunity to receive this help: "I was a bit excited just because I, well, I'm just wanting to get that help" (Emma).

Are they going to judge me or tell me off?

All except one woman brought up the concern that the dietitian might judge them or 'tell them off': "It's almost an unsaid thing, um, that you jumped to the conclusion, oh, they're gonna judge me" (Ava). This concept was brought up numerous times during the interviews, including when discussing barriers to attendance and when discussing expectations prior to the appointment: "Some people might just see you going to tell them off for eating the wrong things, or being overweight, or the BMI being too high" (Olivia).

I know what I should be eating

Interestingly, some women spoke about knowing what they should be eating: "you know what you should and shouldn't be doing" (Ava). Some women think

a dietitian appointment is used as a check in for those who want to make sure they are on track rather than an opportunity to learn something new: “What are you going to tell me that I don't already know” (Amelia).

If you want the help, you will attend

Three participants did suggest that if a woman wants the help during the pregnancy, then they will do what they need to do to attend: “If it was a priority then you would make the time for it” (Sophia). These women also feel that there is always a work around for any perceived barriers: “And that's like most things, if you want to do it, you can normally find a way, where there’s the will there’s a way” (Olivia).

3.2.3 Midwives hold the key

As with most antenatal services, it is the midwives who refer patients to the dietitian services, therefore they do hold the key to improving engagement. There were two subthemes including: It’s how they deliver the message that counts and better collaboration between dietitians and midwives would make a difference.

It’s how they deliver the message that counts

All women agree that it is how the message is delivered that is the most important thing. Most women stated that if the suggestion to see a dietitian was made in an aggressive condescending manner they would not have attended: ‘Potentially if it, if it was brought up in a way that was like embarrassing or made me feel guilty, I probably could have just said, oh no, thank you’ (Sophia). Most of the women interviewed had a positive experience when the midwife discussed the dietitian referral with them: “but she came to me, um, in like a

very caring manner. Um, so it's like, okay, well you genuinely really care about me, so maybe I should totally check it out" (Emma).

Better collaboration between midwives and dietitians would make a difference

Five women reported that if there was better and obvious collaboration between dietitians and midwives this would make them and perhaps others place more importance on the service: "really important for both the midwife and the dietician, one is helping you bring the baby out and the other one ensuring that the baby comes out good" (Emma). One participant felt that there was no importance placed on the dietitian appointment by her midwife: "I had a midwife appt last Wednesday or Tuesday and this appt wasn't mentioned but my next appt at the hospital with mentioned … if you're glazing over it as well then it doesn't emphasise the importance of the appointment" (Amelia).

3.2.4 Weight has been a long-term issue and is a sensitive topic

All women, regardless of reason for referral reported that weight has been an issue for them most of their life. Only one participant stated that she was not sensitive about this topic. The two subthemes for this theme are: I know that I'm overweight/underweight, I have been my whole life and If people are not ready to deal with it, they are not going to turn up.

I know that I'm overweight/underweight, I have been my whole life

All women report long-term attempts at addressing their weight and to have it brought up during their antenatal appointment did bring back some of those emotions: "I have a history of like, um, being overweight and there's a lot of health anxiety associated with that … the protocol that led me to having the referral is called the obesity protocol, which isn't particularly nice to be lumped in' (Ava). Although many women expected for their weight to be brought up:

"It was okay. I, I expected her to say it" (Emma), one woman was not expecting it and therefore found the conversation distressing: "I cried, no seriously I cried and I think I told like a bunch of people that I fell into the obese category and I was mortified" (Amelia).

If people are not ready to deal with it, they are not going to turn up

When discussing barriers to attendance three women reported that if women are not ready to deal with the issue of their weight, then they won't turn up: "And if you're not ready to deal with that or face that or to fix that then why am I to talk to somebody about it?" (Amelia). One participant identifies from a Pacifika background and works in the health industry and made the following comment about 'her' people: "My peoples always ate this and nothing bad happened to them …. you'll find there's a lot of people like that who get ashamed. Like they feel ashamed about it" (Emma).

3.2.5 Preferences in receiving and accessing nutrition information

Another topic discussed with women was looking at their preferences in accessing nutrition information. The three subthemes were: Dietitians are the experts in nutrition; Google is the most used tool to access nutrition information and Women prefer written information that is convenient.

Dietitians are the experts in nutrition

It is recognised by all interviewed women that dietitians are the experts in nutrition and have the most up-to-date information: "So, it gives me a bit more confidence in the information because obviously a dietitian would have like trained for it and they have a passion in the area" (Emma). All interviewed women have had an appointment with the dietitian and could explain what a

dietitian does: “recommendations of like serving sizes and what food groups that you should be eating more or less of” (Sophia).

Google is the most used tool to access nutrition information

Six of the women interviewed admit to using google to access nutrition information in the first instance: “probably the internet, doctor google or, google predominately” (Olivia). However, these women do acknowledge that the information on google is not necessarily a reliable source of information. “There's so much of it that it's hard to really figure out what's suitable and not suitable for me” (Ava).

Women prefer written information that is convenient

Women prefer written information that they can refer to as needed: “I still do have all of the pamphlets and flyers like in a little book, so I go through that” (Isabella). In fact, six of the seven women referred to their preference for nutrition information to be in written form: “I suppose with all learning verbal and written is always preferable” (Ava). They also referred to the need for this information to be convenient to use: “The convenience of it's all being done for you by dietitians” (Olivia).

3.2.6 Barriers to attendance at dietitian appointments

One of the research questions was assessing barriers to attending dietitian appointments, however due to the women being interviewed having attended an appointment they had difficulty identifying barriers. The only subtheme is: The facility is difficult to access.

The facility is difficult to access

Four of the five women who attended a dietitian appointment in person at the community health centre reported that they had difficulty locating the clinic:

“You were a bit hard to find on my first appointment if I'm honest” (Isabella). One woman also commented that the parking situation is a deterrent as if you don’t want to pay the only available parking is a long walk away: “It's more getting here, if that makes sense. For like a half hour appointment … with parking up there. I think it's like $3 for an hour, if you don't want to pay for the parking and you park way down there, and it's a bit of a walk” (Charlotte).

4. Discussion

The purpose of this explanatory mixed-methods study was to explore the knowledge and attitudes of antenatal women with a high-risk pregnancy to dietitian appointments and explore potential barriers to attending their appointment.

A significant finding from this study confirms that distance from the clinic was not related to attendance at dietitian appointments in this health service. This is a significant outcome, considering studies in the past have found that distance is related to non-attendance at other antenatal appointments (Ali et al., 2018; Raatikainen et al., 2007). The health service has recently introduced the option of a telehealth appointments for all antenatal women which may explain why distance is not an issue for attendance in this service. This finding was confirmed during the qualitative phase as three of the women were adamant that they will do whatever they need to attend if they want the service and assistance with their diet. All the women who participated in the qualitative phase worked full-time, and two had an older child, but reported that distance would not stop them from attending an appointment that they wanted to attend. Considering most interviewed women are nulliparous, future studies could focus on those who are multiparous to determine whether this finding is similar for

this group of women as well. Dated research does show that multiparous women are less like to attend antenatal appointments (Wong et al., 2013) or engage in weight management programs particularly if they'd had no issues with previous pregnancies (Atkinson et al., 2017). The current study has also found that higher gravidity, and parity are associated with non-attendance in this cohort of women.

It is evident that the topic of weight / obesity is a sensitive long-term issue, (Dadouch et al., 2020; Heslehurst et al., 2017; Swift et al., 2016) and the semi-structured interviews with women who attended their appointments confirmed this view. This may also be the case for those who do not engage with the service, although further research into this group of women is required to establish this. Interestingly, women who were referred for obesity were less likely to attend their appointment, whereas referrals for underweight or gastric sleeve did not affect attendance. There are numerous studies that associate lack of attendance at appointments due to obesity stigma, (Nagpal, Liu, Gaudet, Cook, & Adamo, 2020; Sagi-Dain, Echar, & Paska-Davis, 2022) however there were no studies located that consider if the same stigma is associated with underweight or gastric sleeve referrals. Women who have a history of overweight/obesity expressed feelings of stigma associated with this, and there was reluctance/fear associated with attending a dietitian appointment amongst the interviewed women. The main reasons for the reluctance were the belief that they would get in trouble or be told off and, having no understanding what will happen at the appointment. The stigma associated with a woman affected by overweight / obesity during pregnancy has been reported in the literature (Dadouch et al., 2020; Heslehurst, Russell, et al., 2015b; Swift et al., 2016).

All referrals for the studied population were generated by midwives. The interviewed women overwhelmingly reported that the way this referral was brought up by the midwife and having a better understanding of what will happen during the dietitian appointment, are vital when seeking to encourage women to attend these sessions. Emerging evidence from this study has shown that if a midwife was not understanding, or made women feel at fault for their obesity, then these women would be reluctant to attend an appointment with the dietitian. Research has also concluded a more sensitive and transparent referral process may aid in the uptake of a weight management service for antenatal women (Atkinson et al., 2013) so this study is confirmation of this finding. Therefore, providing training for midwives on the importance of sensitivity when referring under the obesity protocol could be an important strategy, but also the health service should consider changing the name of the obesity protocol to something less offensive.

In addition, women who had not seen a dietitian in the past reported that they had no idea what to expect at their dietitian appointment, therefore demystifying what will happen at these appointments is an important strategy to increase and improve engagement. This is most certainly an issue that should be explored by not only antenatal dietitian clinics but if other dietetics services are having engagement issues. Dietitians need to consider how their services are pitched and marketed to ensure their target audience is aware of what to expect and the benefits from attending an appointment. As one participant explained, “I feel much less anxious about something when I know what's going to happen” (Ava). A recent study looking into the representation of dietitians on the internet found that the age and gender profile online is similar to the actual profession,

however there is a large discrepancy between what is displayed online and actual work settings (Porter & Collins, 2021). The study reports that misconceptions of health professional images have an impact on public health seeking behaviours (Porter & Collins, 2021) and, therefore potentially attendance at appointments.

Specific to the health service delivery model, the introduction of telehealth appointments is seen as a positive improvement for women, and it improves accessibility. However, some women's preference is to attend an appointment in person, and an issue for all women who attended clinic was the cost of parking, and not knowing where the clinic is. For women who are feeling uncertain about attending an appointment, not knowing where to go could certainly exacerbate their reasons not to attend (Olander & Atkinson, 2013). A simple solution for the dietetics department is to create maps and parking information to send with appointment letters or email invitations. This may improve engagement and attendance in those women with face-to-face appointments at the community health clinic to decrease the uncertainty around the venue. This strategy could easily be utilised with all dietitian patients, not just antenatal women.

Research supports that dietary intervention is effective at reducing Gestational Weight Gain (GWG) in pregnancy, however the best delivery of care to achieve this is unknown (Flynn et al., 2016; Pari-Keener et al., 2020). Despite evidence supporting the use of group programs particularly in weight management (Flynn et al., 2016; Holton et al., 2017) and gestational diabetes (Minschart et al., 2020), this group of women overwhelmingly did not want group programs and preferred one-on-one appointments with the dietitian: "I

prefer face to face dietician appointments. And when it's one-on-one" (Charlotte). Ultimately, the success of any health program is based on attendance of the target group. It appears that this may be one of the greatest hurdles with improving engagement in weight management services in pregnancy, providing a service that women see useful and want, that is also needs-assed and based on best practice.

Three of the interviewees reported that women should be targeted early in pregnancy, "it made me feel a lot more confident, I think early on is probably for me was the best" (Sophia), either prior to pregnancy or the first trimester for greatest effect. The current service delivery model requires referral from the midwife to the dietetics service which means that many of these women are not seeing the dietitian until the second or even the third trimester. The dietitian can have limited effect if seeing women this late in pregnancy which begs the question, is this the best model of care for this group of women? Perhaps health services need to consider whether this service is better provided via a similar program to the Medicare allied health care plan program via a General Practitioner when pregnancy is first identified? If these women are seen in their first trimester rather than second or third, we may be able to achieve better outcomes for them, and their baby.

Increasing gravidity and parity are related to non-attendance (Atkinson et al., 2013; Wong et al., 2013) and this was confirmed in this study. Interestingly, the women who agreed to interview in Phase 2 had lower average parity and gravidity than the whole study population which may indicate that the views of non-attenders is different.

All women who were interviewed for this study identified that dietitians were the experts in nutrition and could provide them with the most up-to-date information on food and nutrition: “it gives me a bit more confidence in the information because obviously a dietitian would have like trained for it and they have a passion in the area” (Emma). These women were interviewed after attending a dietitian appointment, so it is likely that this realisation or thoughts/reflection eventuated after the appointment rather than when the appointment was recommended. Since women who had not previously seen a dietitian reported that they did not know what to expect at the appointment, it is reasonable to assume that these perceptions and attitudes were made after their initial consultation.

5. Conclusion

The aim of this study was to determine women with a high-risk pregnancy’s thoughts of dietitian appointments and information, potential barriers to attendance, and to compare attributes of women who attend with those who do not.

In accordance with the findings from this study, attendance at dietitian appointments is not related to the distance the woman lives from the clinic with the introduction of the option to utilise telehealth a likely contributor to this phenomenon. Further research is required to confirm this theory. Women who are referred for obesity in pregnancy are less likely to attend than for other referral types which is likely associated with the stigma around overweight / obesity. Focusing on women referred for obesity in pregnancy is required to improve the non-engagement rate.

Women who had not seen a dietitian previously were anxious about attending their appointments as they did not know what to expect from the session. They reported that if there was more clarity and information about what would happen at the appointments, they would feel more comfortable to attend. This study stresses that midwives are the key to improving engagement in weight management services as how they discuss and bring up the referral can influence a women's feelings about and towards attendance. Conversely, women who had seen a dietitian previously knew what to expect and were excited for their appointments to confirm if they were on track during pregnancy.

It would be of interest to speak to women who did not attend their appointment to confirm whether this stigma and fear was a significant reason behind their non-engagement, or was it how the midwife discussed the referral with them that turned them away from attending? Would reducing this stigma and fear at the point of referral improve attendance at dietitian appointments, or perhaps the health department could consider revising the name of the obesity protocol to something less offensive?

Further studies are required to explore the perceptions and attitudes of women who do not engage in dietitian appointments in pregnancy. However, decreasing the unknowns around appointments will be a positive change clinicians can make to their services. An information letter about the service could be sent with the appointment letter and/or training for midwives who are submitting the referrals to decrease the unknowns about appointments. A pamphlet outlining clinic location and parking options would be helpful for those attending appointments in person.

It was outside the scope of this study to look at gestational diabetes clinics, however it would be of importance to examine attendance/engagement rates of this group program within and outside of the health service. This certainly raises questions about how to roll out health programs when the target population are not supportive of the best practice and cost-effective approach.

Improving collaboration between dietitians and the antenatal service is essential, and a review of service delivery may improve both engagement and outcomes.

The limitations of this study included small numbers of participants in Phase 2. The women interviewed in Phase 2 were included in Phase 1 data, however on average had lower gravidity and parity than Phase 1 participants. To get an accurate idea about why women do not attend appointments it is essential to speak to those who do not attend. This was not possible in this study due to ethical restrictions. There are also limitations associated with utlising a secondary data source in Phase 1, however data was checked by the researcher to minimise this impact.

This chapter has presented the publishable paper, including the results and recommendations for the research project. The final chapter will uncover the overall conclusions for this work-based project.

References

Ali S.A., Dero A.A., Ali S., Ali G. (2018). Factors affecting the utilization of antenatal care among pregnant women: a literature review. *J Preg Neonatal Med*, **2**(2). doi: https:doi.org/10.35841/neonatal-medicine.2.2.41-45

Australian Institute of Health and Welfare. (2020). *Australia's Health 2020*. Retrieved from Canberra: https://www.aihw.gov.au/reports-data/australias-health

Atkinson, L., French, D. P., Ménage, D., & Olander, E. K. (2017). Midwives' experiences of referring obese women to either a community or home-based antenatal weight management service: Implications for service providers and midwifery practice. *Midwifery, 49*, 102-109. doi: https:doi.org/10.1016/j.midw.2016.10.006

Atkinson, L., Olander, E. K., & French, D. P. (2013). Why don't many obese pregnant and post-natal women engage with a weight management service? *Journal of Reproductive and Infant Psychology, 31*(3), 245-256. doi: https:doi.org/10.1080/02646838.2013.809518

Bergerum, C., Engström, A. K., Thor, J., & Wolmesjö, M. (2020). Patient involvement in quality improvement – a 'tug of war' or a dialogue in a learning process to improve healthcare? *BMC Health Services Research, 20*(1), 1115. doi: https:doi.org/10.1186/s12913-020-05970-4

Braun V., Clarke V. (2019). Reflecting on reflexive thematic analysis. *Qualitative research in sport, exercise and health*, **11**(4), 589-97. doi: https:doi.org/10.1080/2159676X.2019.1628806

Bookari K., Yeatman H., Williamson M. (2017). Informing Nutrition Care in the Antenatal Period: Pregnant Women's Experiences and Need for Support. *BioMed research international* 2017, 4856527-16. doi: https:doi.org/10.1155/2017/4856527

Dadouch R, Hall C, Du Mont J, D'Souza R. (2020) Obesity in Pregnancy – Patient-Reported Outcomes in Qualitative Research: A Systematic Review.

Journal of Obstetrics and Gynaecology Canada, **42**(8), 1001-11. doi: https:doi.org/10.1016/j.jogc.2019.09.011

Dantas, L. F., Fleck, J. L., Oliveira, F. L. C., & Hamacher, S. (2018). No-shows in appointment scheduling–a systematic literature review. *Health Policy, 122*(4), 412-421. doi: https:doi.org/10.1016/j.healthpol.2018.02.002

Department of Health. (2019). *Clinical Practice Guidelines: Pregnancy Care*. Retrieved from Canberra: https://www.health.gov.au/resources/pregnancy-care-guidelines

Flynn A.C., Dalrymple K., Barr S., et al. (2016). Dietary interventions in overweight and obese pregnant women: a systematic review of the content, delivery, and outcomes of randomized controlled trials. *Nutrition Reviews*, **74**(5), 312-28. doi: https:doi.org/10.1093/nutrit/nuw005

Guthrie TM, de Jersey SJ, New K, Gallegos D. Midwife readiness to provide woman-centred weight gain support: Exploring perspectives across models of care. *Women and Birth* 2020. doi: https:doi.org/10.1016/j.wombi.2020.01.005

Haseeb, Y. A. (2019). A Review of Obstetrical Outcomes and Complications in Pregnant Women after Bariatric Surgery. *Sultan Qaboos University medical journal, 19*(4), e284-e290. doi: https:doi.org/10.18295/squmj.2019.19.04.003

Heslehurst, N., Russell, S., Brandon, H., Johnston, C., Summerbell, C., & Rankin, J. (2015a). Women's perspectives are required to inform the development of maternal obesity services: A qualitative study of obese pregnant women's experiences. *Health Expectations: An International*

Journal of Public Participation in Health Care & Health Policy, 18(5), 969-981. doi: https:doi.org/10.1111/hex.12070

Heslehurst N., Dinsdale S., Sedgewick G., Simpson H., Sen S., Summerbell C. D., Rankin J. (2015). An evaluation of the implementation of maternal obesity pathways of care: a mixed methods study with data integration. *PloS one*, **10**(5), e0127122. doi: https:doi.org/10.1371/journal.pone.0127122

Heslehurst N, Dinsdale S, Brandon H, Johnston C, Summerbell C, Rankin J. (2017). Lived experiences of routine antenatal dietetic services among women with obesity: A qualitative phenomenological study. *Midwifery*, **49**, 47-53. doi: https:doi.org/10.1016/j.midw.2016.11.001

Holton S, East C, Fisher J. (2017). Weight management during pregnancy: a qualitative study of women's and care providers' experiences and perspectives. *BMC Pregnancy and Childbirth*, **17**(1), 351. doi: https:doi.org/10.1186/s12884-017-1538-7

Institute of Medicine. (2009). Weight gain during Pregnancy: Reexamining the guidelines. *Washington DC: National Academy of Sciences*.

Knight-Agarwal, C. R., Cubbage, R., Sesleja, R., Hinder, M., & Mete, R. (2019). The nutrition-related information seeking behaviours and attitudes of pregnant women with a high BMI: A qualitative study. *Women and Birth*. doi: https:doi.org/10.1016/j.wombi.2019.03.005

Lavender, T., & Smith, D. M. (2016). Seeing it through their eyes: A qualitative study of the pregnancy experiences of women with a body mass index of 30 or more. *Health Expectations: An International Journal of Public*

Participation in Health Care & Health Policy, 19(2), 222-233. doi: https:doi.org/10.1111/hex.12339

Minschart, C., Amuli, K., Delameillieure, A., Calewaert, P., Mathieu, C., & Benhalima, K. (2020). Multidisciplinary Group Education for Gestational Diabetes Mellitus: A Prospective Observational Cohort Study. *Journal of clinical medicine, 9*(2), 509. doi: https:doi.org/10.3390/jcm9020509

Morgan, K. L., Rahman, M. A., Macey, S., Atkinson, M. D., Hill, R. A., Khanom, A., Paranjothy, S., Husain, M. J., Brophy, S. T. (2014). Obesity in pregnancy: a retrospective prevalence-based study on health service utilisation and costs on the NHS. *BMJ Open, 4*(2), e003983. doi: https:doi.org/10.1136/bmjopen-2013-003983

Nagpal, T. S., Liu, R. H., Gaudet, L., Cook, J. L., & Adamo, K. B. (2020). Summarizing recommendations to eliminate weight stigma in prenatal health care settings: A scoping review. *Patient Education and Counseling, 103*(11), 2214-2223. doi: https:doi.org/10.1016/j.pec.2020.06.017

Olander, E. K., & Atkinson, L. (2013). Obese women's reasons for not attending a weight management service during pregnancy. *Acta obstetricia et gynecologica Scandinavica, 92*(10), 1227-1230. doi: https:doi.org/10.1111/aogs.12195

Opie, R. S., Neff, M., & Tierney, A. C. (2016). A behavioural nutrition intervention for obese pregnant women: Effects on diet quality, weight gain and the incidence of gestational diabetes. *Aust N Z J Obstet Gynaecol, 56*(4), 364-373. doi: https:doi.org/10.1111/ajo.12474

Pari-Keener, M., Gallo, S., Stahnke, B., McDermid, J. M., Al-Nimr, R. I., Moreschi, J. M., Hakeem, R., Handu, D., Cheng, F. W. (2020). Maternal

and Infant Health Outcomes Associated with Medical Nutrition Therapy by Registered Dietitian Nutritionists in Pregnant Women with Malnutrition: An Evidence Analysis Center Systematic Review. *Journal of the Academy of Nutrition and Dietetics*. doi: https:doi.org/10.1016/j.jand.2019.10.024

Porteous, H., de Jersey, S., & Palmer, M. (2020). Attendance rates and characteristics of women with obesity referred to the dietitian for individual weight management advice during pregnancy. *The Australian & New Zealand journal of obstetrics & gynaecology*. doi: https:doi.org/10.1111/ajo.13128

Porter, J., & Collins, J. (2021). Do images of dietitians on the Internet reflect the profession? *Journal of human nutrition and dietetics, 34*(1), 106-114. doi: https:doi.org/10.1111/jhn.12793

Queensland Clinical Guidelines. (2021). *Obesity and pregnancy (including post bariatric surgery)* (5). Retrieved from Brisbane: https://www.health.qld.gov.au/__data/assets/pdf_file/0019/142309/g-obesity.pdf

Queensland Health. (2018). *The Health of Queenslanders 2018. Report of the Chief Health Officer Queensland.* Retrieved from Brisbane: https://www.health.qld.gov.au/__data/assets/pdf_file/0032/732794/cho-report-2018-full.pdf

Raatikainen, K., Heiskanen, N., & Heinonen, S. (2007). Under-attending free antenatal care is associated with adverse pregnancy outcomes. *BMC Public Health, 7*(1), 1-8. doi: https:doi.org/10.1186/1471-2458-7-268

Rottenstreich, A., Elazary, R., Goldenshluger, A., Pikarsky, A. J., Elchalal, U., & Ben-Porat, T. (2019). Maternal nutritional status and related pregnancy

outcomes following bariatric surgery: A systematic review. *Surgery for obesity and related diseases, 15*(2), 324-332. doi: https:doi.org/10.1016/j.soard.2018.11.018

Różańska-Walędziak, A., Bartnik, P., Kacperczyk-Bartnik, J., Czajkowski, K., Walędziak, M., & Kwiatkowski, A. (2021). Pregnancy after bariatric surgery–a narrative literature review. *Videosurgery and Other Miniinvasive Techniques, 16*(1), 30. doi: https:doi.org/10.5114/WIITM.2020.99281

Sagi-Dain, L., Echar, M., & Paska-Davis, N. (2022). Experiences of weight stigmatization in the Israeli healthcare system among overweight and obese individuals. *Israel journal of health policy research, 11*(1), 1-8. doi: https:doi.org/10.1186/s13584-022-00518-9

Swift, J. A., Pearce, J., Jethwa, P., Taylor, M. A., Avery, A., Ellis, S., Langley-Evans, S. C., McMullen, S. (2016). Antenatal weight management: women's experiences, behaviours, and expectations of weighing in early pregnancy. *Journal of pregnancy, 2016*. doi: https:doi.org/10.1155/2016/8454759

The jamovi project. (2021). jamovi (version 1.6) [computer software]. Retrieved from https://www.jamovi.org.

Walker, R., Choi, T. S. T., Quong, S., Hodges, R., Truby, H., & Kumar, A. (2019). "It's not easy" — A qualitative study of lifestyle change during pregnancy. *Women and Birth*. doi: https:doi.org/10.1016/j.wombi.2019.09.003

Watson, M., Howell, S., Johnston, T., Callaway, L., Khor, S.-L., & Cornes, S. (2013). Pre-pregnancy BMI: Costs associated with maternal underweight and obesity in Queensland. *Australian and New Zealand Journal of*

Obstetrics and Gynaecology, 53(3), 243-249. doi: https:doi.org/10.1111/ajo.12031

Whiteman, V. E., Salemi, J. L., Mejia De Grubb, M. C., Ashley Cain, M., Mogos, M. F., Zoorob, R. J., & Salihu, H. M. (2015). Additive effects of pre-pregnancy body mass index and gestational diabetes on health outcomes and costs. *Obesity, 23*(11), 2299-2308. doi: https:doi.org/10.1002/oby.21222

Wong, V. W., Chong, S., Astorga, C., & Jalaludin, B. (2013). Gestational diabetes mellitus: a study of women who fail to attend appointments. *Diabetes Spectrum, 26*(4), 267-271. doi: https:doi.org/10.2337/diaspect.26.4.267

Young, B., Drew, S., Ibikunle, C., & Sanni, A. (2018). Maternal and fetal delivery outcomes in pregnancies following bariatric surgery: a meta-analysis of the literature. *Mini-invasive Surgery, 2*, 16. doi: https:doi.org/10.20517/2574-1225.2017.50

CHAPTER 5: CONCLUSION

This chapter will present the conclusions of the work-based project. First, it will consider whether the research questions were answered followed by a discussion of the findings and their relevance to the workplace. The limitations of the research project will then be addressed, followed by a discussion of the learning objectives of the researcher, and finally how the work-based study has benefited the Ipswich Hospital Nutrition and Foodservices department.

The goal of this work-based research project was to determine high-risk antenatal women's attitudes and perceptions of dietitian appointments, with an aim to improve engagement with the service. Currently 50% of these women FTA a dietitian appointment. It is acknowledged that the design of this project has answered the first aspect of the goal: to determine women's attitudes and perceptions of dietitian appointments. It has also identified potential barriers to attendance and preferred delivery of care. The engagement rate in this population will not improve, however, until some or all the recommendations from this research are implemented.

This project has answered the research questions, although to varying degrees and this is demonstrated below.

Research Question 1. Compare the attributes of women with a high-risk pregnancy who engaged vs those who did not engage with the dietitian during the six-month period?

This question was answered by completing the quantitative analysis. These results were consistent with the existing literature as those of increasing gravidity and parity are linked to non-attendance. It was also identified that referral under the obesity protocol was linked to non-attendance, whereas

referral for past gastric sleeve or underweight diagnoses were not. This result informs the dietetics department at WMHHS that focusing on those women referred for overweight or obesity is needed to improve attendance and engagement.

To gain a thorough understanding of attributes related to non-attendance, future research should assess links between attendance and cultural background, socioeconomic status, income, and education. These attributes were identified in the literature review as related to non-attendance but were beyond the scope of this study to investigate. The WMHHS population is multicultural, therefore this needs to be considered to gain a more complete picture of this research question.

Research Question 2. What are the knowledge and attitudes of women with a high-risk pregnancy concerning dietitian information, services, and appointments?

Thematic analysis provided an in-depth understanding of seven women's perceptions regarding dietitian services. All women saw dietitians as the experts in nutrition, however all women who were interviewed had attended at least one dietitian appointment already. Those who had not seen a dietitian previously did not know what a dietitian did prior to their appointment, therefore it is likely this belief was established after their appointment.

The interviewed women report that if the midwife was not understanding during the referral process, then not knowing what will happen at the appointment would strengthen their reasons not to attend. All reported that this appointment was beneficial, however during the referral process this is an unknown for many women. This highlights the importance of speaking to and

interviewing women who are not engaging with the service. By speaking to these women, it would enable one to determine whether the attitudes towards dietitian information and appointments among non-attenders is different to the attenders.

Research Question 3. What are the potential barriers women with a high-risk pregnancy experienced to attend their dietitian appointment during this time-period?

Of all the research questions, question 3 had the fewest answers because those women who did not attend an appointment could not be interviewed. The initial project proposal intended to interview women who had not attended an appointment; however, this was not approved by ethics. Therefore, the study was changed to interview women who had attended an appointment. Due to this change in study protocol, only assumptions could be made regarding this research question as the perceptions are of those who have attended. Interviewed women felt that the unknowns around what happens at a dietitian appointment would be a big deterrent but felt that distance to clinic, and work were not a factor for them. The only definitive answer to this research question was that the clinic location is difficult to find and is likely a barrier to attending an appointment.

Research Question 4. How would women with a high-risk pregnancy prefer to receive their dietitian information, services and appointments?

Interestingly, women's perceptions regarding delivery of care were overwhelmingly in favour of one-on-one appointments that could be provided in person or via telehealth. Women did not want to attend group programs. This

finding supports maintaining existing delivery of care for high-risk antenatal women.

This work-based study has found several areas that the dietitian service at WMHHS can adjust to move towards improved attendance and engagement. First, developing a handout to send to women with their appointment letter that explains the clinic location and parking options, considering all interviewed women who attended clinic had difficulty locating it. The dietetics department also needs to collaborate with the midwifery department of WMHHS to ensure that the services are not viewed separately. Professional development training is recommended to educate midwives on sensitive referral processes when discussing BMI with women and provide midwives with information to explain to women what will happen at their dietitian appointment.

On a larger health service level, it is recommended that the origins of the obesity protocol are investigated, and whether there is a possibility to rename the protocol to something less offensive.

The Ipswich Hospital Nutrition and Foodservice department should consider finding strategies, in conjunction with the ethics department, to speak with women who do not engage with the service. To better determine reasons for non-attendance, it is imperative to speak to these women.

Continuing to offer telehealth services to this patient group is needed as it appears to reduce the risk of non-engagement due to distance from clinic. Further research to confirm this phenomenon are warranted.

This study has provided important information to the WMHHS, to improve dietetics services to high-risk antenatal patients which when implemented will hopefully lead to improved attendance and engagement. These

findings could be reviewed and utilised by similar services who are trying to improve engagement in weight management services for antenatal women.

All dietitians should consider the findings of this study, particularly if their service has high FTA levels. All women who were interviewed and not previously seen a dietitian did not know what to expect at their dietitian appointment. They also reported this lack of understanding could contribute to them not attending an appointment, particularly if the referrer was not sensitive to their needs. It is unlikely this phenomenon only exists among antenatal women.

At a state-wide level, there should be an ongoing review of the evidence to support dietitian appointments for limiting GWG in pregnancy. Recent evidence suggests that interventions to limit GWG in pregnancy are not effective. Healthcare providers may need to consider whether this service should be offered privately via Medicare funded care plans to ensure women are receiving this advice early in their pregnancy rather than in their 2nd and 3rd trimester. Public health strategies should perhaps also consider promoting healthy lifestyle and weight management in women of child-bearing age.

The limitations for Phase 1 of this research project include the use of a secondary data source. Because data are entered in the Queensland Health smart referrals program and medical records program by administration officers, the researcher had no control over the accuracy of this information. If there are errors in data entry these will contribute to an incomplete or inaccurate dataset.

The midwives' initial consultation data were also used to complete the dataset for Phase 1. If this data were entered incorrectly or not at all this also creates a limitation for this phase. During the consultations with the women,

many reported that their weight and height data were not physically measured (due to telephone assessments) and therefore data entered were often a guess that women had reported to their midwife. Many women were unable to recall their pre-pregnant weight, therefore the BMI data recorded in the system are likely to be inaccurate. This research project found that increasing BMI is not related to attendance, which is contraindicated in the literature. This is also surprising, considering obesity referrals are related to non-attendance.

Due to ethics constraints, contact with antenatal women was only permitted once they had engaged with the dietetics service and received the clinical service they required. The data from Phase 2 therefore represent the perceptions of women who have attended an appointment and is therefore not representative of women who do not attend appointments, as per the initial aim of the project. A further limitation of this study is that the researcher was also the interviewer. This could potentially be seen as a bias due to the researcher having a vested interest in the outcome. This potential bias was minimalised by following set questions for the semi-structured in interviews and following the Braun and Clarke (2019) process for thematic analysis.

Considering this was a work-based research project, it also needs to be addressed whether the researcher's personal objectives have been achieved. These objectives are listed below along with a discussion about whether they were achieved.

1. I will improve my work methods/process logic to ensure that I include other disciplines views/perspective in my study for a truly collaborative outcome. This objective was achieved by consulting with the Nurse Unit Manager of the antenatal department. The manager agreed to handout the flyers to assist

with recruitment of participants. The outcomes of the project also refer to the importance of collaboration between the antenatal and Ipswich Hospital Nutrition and Foodservice department which recognises the importance of this objective.

2. Continue to work on organisational skills to ensure I can complete my research project, work in my job and be present for my family.

   The balance I have achieved over the last two years has been ideal. I have worked my job, attended all family events and commitments, and met all deadlines associated with my project. Allocating time to each of these tasks assisted with meeting this objective.

3. I will improve my analytical skills by progressing from completing quality activities based on assumptions to conducting an unbiased research project to determine the answers to my workplace questions.

   This project enabled me to answer all my research questions, although to varying degrees as illustrated earlier. I now realise why many of my quality projects did not have the expected outcomes as one factor they did not consider, is the opinions of the patient group in question. Moving forward, I will always ensure that projects involving patient service delivery include a component to consider the opinions of the relevant group.

4. To be able to conduct a search of the available evidence, critically judge the evidence and make a valid assessment.

   My literature review as demonstrated in chapter three is an example of how I have developed the ability to meet this learning objective.

5. To become competent in the use of zoom case conferencing, telehealth, statistical analysis programs and EndNote to bring my computer/technology skills in line with latest technology.

   I have become competent in the use of zoom case conferencing and telehealth. With regards to EndNote, I can use this program effectively. My supervisors assisted with the use of statistical analysis programs, so I have had exposure to the use of these, however, am not competent in their use.

6. To keep an open mind and be adaptable if things aren't going the way I expect.

   Many aspects of this research project have not gone to plan, and I have exhibited adaptability through this process. One such example is when my project plan to interview women who did not attend their appointments was rejected by the WMHHS ethics committee. To have my project accepted by the ethics committee, I had to be adaptable and change my project plan including reviewing the research questions.

The goal of this work-based research project was to determine high-risk antenatal women's attitudes and perceptions of dietitian appointments, with an aim to improve engagement with the service. Currently 50% of these women do not engage in a dietitian appointment.

This research project found several areas that the dietitian service can adjust service delivery to move towards improved engagement which were discussed earlier in the section.

To conclude, this research project has demonstrated the benefits of professional studies to the workplace. The benefits for WMHHS include recommendations to improve service delivery for antenatal women which may

lead to improved attendance. The researcher has gained new skills which can be shared in the workplace and met learning objectives and the broader dietetic and midwife communities could benefit from considering the findings in this study to their local services.

REFERENCES

Ali, S. A., Dero, A. A., Ali, S., & Ali, G. (2018). Factors affecting the utilization of antenatal care among pregnant women: a literature review. *J Preg Neonatal Med, 2*(2). doi: https:doi.org/10.35841/neonatal-medicine.2.2.41-45

Armsby, P. (2000). Methodologies of work based learning.

Atkinson, L., French, D. P., Ménage, D., & Olander, E. K. (2017). Midwives' experiences of referring obese women to either a community or home-based antenatal weight management service: Implications for service providers and midwifery practice. *Midwifery, 49*, 102-109. doi: https:doi.org/10.1016/j.midw.2016.10.006

Atkinson, L., Olander, E. K., & French, D. P. (2013). Why don't many obese pregnant and post-natal women engage with a weight management service? *Journal of Reproductive and Infant Psychology, 31*(3), 245-256. doi: https:doi.org/10.1080/02646838.2013.809518

Australian Institute of Health and Welfare. (2020). *Australia's Health 2020*. Retrieved from Canberra: https://www.aihw.gov.au/reports-data/australias-health

Begley, A. (2002). Barriers to good nutrient intakes during pregnancy: a qualitative analysis. *Nutrition and dietetics, 59*(3), 175-180.

Bennett, C. J., Walker, R. E., Blumfield, M. L., Gwini, S.-M., Ma, J., Wang, F., . . . Truby, H. (2018). Interventions designed to reduce excessive gestational weight gain can reduce the incidence of gestational diabetes mellitus: A systematic review and meta-analysis of randomised controlled trials. *Diabetes research and clinical practice, 141*, 69-79. doi: https:doi.org/10.1016/j.diabres.2018.04.010

Berge, J., Smith, C., Trudeau, S., Trump, L., Walsh, C., Gilbertson, B., . . . Westby, A. (2020). Using an interprofessional prenatal group care model to address

disparities in pregnancy-related outcomes in a high risk population in a family medicine residency clinic. *Journal of Interprofessional Education & Practice, 18*, 100300. doi:https://doi.org/10.1016/j.xjep.2019.100300

Bergerum, C., Engström, A. K., Thor, J., & Wolmesjö, M. (2020). Patient involvement in quality improvement – a 'tug of war' or a dialogue in a learning process to improve healthcare? *BMC Health Services Research, 20*(1), 1115. doi: https:doi.org/10.1186/s12913-020-05970-4

Bezanson, L. (2013). Connecting Career Development and Lifelong Learning: A background paper on the Contribution of career development to a Productive and Learning Workforce. *Canadian career development foundation*(4).

Bookari, K., Yeatman, H., & Williamson, M. (2017). Informing Nutrition Care in the Antenatal Period: Pregnant Women's Experiences and Need for Support. *BioMed research international, 2017*, 4856527-4856516. doi: https:doi.org/10.1155/2017/4856527

Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qualitative research in sport, exercise and health, 11*(4), 589-597. doi: https:doi.org/10.1080/2159676X.2019.1628806

Buckingham-Schutt, L. M., Ellingson, L. D., Vazou, S., & Campbell, C. G. (2019). The Behavioral Wellness in Pregnancy study: a randomized controlled trial of a multi-component intervention to promote appropriate weight gain. *The American Journal of Clinical Nutrition, 109*(4), 1071-1079. doi: https:doi.org/10.1093/ajcn/nqy359

Bull, E. R., Clayton, H., & Hendry, T. (2017). Bump Start: developing and piloting a healthy living group intervention for obese pregnant women. *British Journal of Midwifery, 25*(6), 386-395. doi: https:doi.org/10.12968/bjom.2017.25.6.386

Campbell, F., Johnson, M., Messina, J., Guillaume, L., & Goyder, E. (2011). Behavioural interventions for weight management in pregnancy: A systematic review of quantitative and qualitative data. *BMC Public Health, 11*(1), 491. doi: https:doi.org/10.1186/1471-2458-11-491

Catalyst, N. (2018). What is telehealth? *NEJM Catalyst, 4*(1).

Dadouch, R., Hall, C., Du Mont, J., & D'Souza, R. (2020). Obesity in Pregnancy – Patient-Reported Outcomes in Qualitative Research: A Systematic Review. *Journal of Obstetrics and Gynaecology Canada, 42*(8), 1001-1011. doi: https:doi.org/10.1016/j.jogc.2019.09.011

Dantas, L. F., Fleck, J. L., Oliveira, F. L. C., & Hamacher, S. (2018). No-shows in appointment scheduling–a systematic literature review. *Health Policy, 122*(4), 412-421. doi: https:doi.org/10.1016/j.healthpol.2018.02.002

Davis, D. L., Raymond, J. E., Clements, V., Adams, C., Mollart, L. J., Teate, A. J., & Foureur, M. J. (2012). Addressing obesity in pregnancy: the design and feasibility of an innovative intervention in NSW, Australia. *Women and Birth, 25*(4), 174-180. doi: https:doi.org/10.1016/j.wombi.2011.08.008

de Jersey, S. J., Ross, L. J., Himstedt, K., McIntyre, H. D., Callaway, L. K., & Group, B. S. (2011). Weight gain and nutritional intake in obese pregnant women: some clues for intervention. *Nutrition & Dietetics, 68*(1), 53-59. doi: https:doi.org/10.1111/j.1747-0080.2010.01470.x

Department of Health. (2019). *Clinical Practice Guidelines: Pregnancy Care*. Retrieved from Canberra: https://www.health.gov.au/resources/pregnancy-care-guidelines

Dietitians Australia. (2020). Dietitian scope of practice. Retrieved from https://dietitiansaustralia.org.au/maintaining-professional-standards/dietitian-scope-of-practice/

Elkjaer, B. (2009). Pragmatism: A learning theory for the future. In *Contemporary theories of learning* (pp. 82-97): Routledge. doi: https:doi.org/10.4324/9780203870426

Fergusson, L., Allred, T., & Dux, T. (2018). Work-based learning and research for mid-career professionals: Professional studies in Australia. *Interdisciplinary Journal of e-skills and lifelong learning*, *14*, 1-17.

Fergusson, L., Brömdal, A., Gough, M., & Mears, S. (2020). Competency, Capability and Professional Identity: The Case for Advanced Practice. *Work Based Learning e-Journal International*, *9*(1), 95-131.

Fergusson, L., Shallies, B., & Meijer, G. (2019). The scientific nature of work-based learning and research: An introduction to first principles. *Higher Education, Skills and Work-Based Learning*. doi: https:doi.org/10.1108/HESWBL-05-2019-0060

Fergusson, L., van der Laan, L., & Baker, S. (2019). Reflective practice and work-based research: a description of micro-and macro-reflective cycles. *Reflective Practice*, *20*(2), 289-303. doi: https:doi.org/10.1080/14623943.2019.1591945

Flynn, A. C., Dalrymple, K., Barr, S., Poston, L., Goff, L. M., Rogozińska, E., . . . Group, f. t. i.-W. C. (2016). Dietary interventions in overweight and obese pregnant women: a systematic review of the content, delivery, and outcomes of randomized controlled trials. *Nutrition Reviews*, *74*(5), 312-328. doi: https:doi.org/10.1093/nutrit/nuw005

Furness, P. J., McSeveny, K., Arden, M. A., Garland, C., Dearden, A. M., & Soltani, H. (2011). Maternal obesity support services: a qualitative study of the perspectives of women and midwives. *BMC Pregnancy and Childbirth, 11*(1), 69. doi: https:doi.org/10.1186/1471-2393-11-69

Gardner, B., Wardle, J., Poston, L., & Croker, H. (2011). Changing diet and physical activity to reduce gestational weight gain: a meta-analysis. *Obesity reviews, 12*(7), e602-e620. doi: https:doi.org/10.1111/j.1467-789X.2011.00884.x

Gregory, M. (1994). Accrediting work-based learning: action learning–a model for empowerment. *Journal of Management Development*. doi: https:doi.org/10.1108/02621719410057069

Guthrie, T. M., de Jersey, S. J., New, K., & Gallegos, D. (2020). Midwife readiness to provide woman-centred weight gain support: Exploring perspectives across models of care. *Women and Birth*. doi: https:doi.org/10.1016/j.wombi.2020.01.005

Haseeb, Y. A. (2019). A Review of Obstetrical Outcomes and Complications in Pregnant Women after Bariatric Surgery. *Sultan Qaboos University medical journal, 19*(4), e284-e290. doi: https:doi.org/10.18295/squmj.2019.19.04.003

Heslehurst, N., Dinsdale, S., Brandon, H., Johnston, C., Summerbell, C., & Rankin, J. (2017). Lived experiences of routine antenatal dietetic services among women with obesity: A qualitative phenomenological study. *Midwifery, 49*, 47-53. doi: https:doi.org/10.1016/j.midw.2016.11.001

Heslehurst, N., Dinsdale, S., Sedgewick, G., Simpson, H., Sen, S., Summerbell, C. D., & Rankin, J. (2015). An evaluation of the implementation of maternal obesity pathways of care: a mixed methods study with data integration. *PloS one, 10*(5), e0127122. doi: https:doi.org/10.1371/journal.pone.0127122

Heslehurst, N., Russell, S., Brandon, H., Johnston, C., Summerbell, C., & Rankin, J. (2015a). Women's perspectives are required to inform the development of maternal obesity services: a qualitative study of obese pregnant women's experiences. *Health Expectations, 18*(5), 969-981. doi: https:doi.org/10.1111/hex.12070

Heslehurst, N., Russell, S., Brandon, H., Johnston, C., Summerbell, C., & Rankin, J. (2015b). Women's perspectives are required to inform the development of maternal obesity services: A qualitative study of obese pregnant women's experiences. *Health Expectations: An International Journal of Public Participation in Health Care & Health Policy, 18*(5), 969-981. doi: https:doi.org/10.1111/hex.12070

Hill, B., Skouteris, H., & Fuller-Tyszkiewicz, M. (2013). Interventions designed to limit gestational weight gain: a systematic review of theory and meta-analysis of intervention components. *Obesity reviews, 14*(6), 435-450. doi: https:doi.org/10.1111/obr.12022

Holton, S., East, C., & Fisher, J. (2017). Weight management during pregnancy: a qualitative study of women's and care providers' experiences and perspectives. *BMC Pregnancy and Childbirth, 17*(1), 351. doi: https:doi.org/10.1186/s12884-017-1538-7

Institute of Medicine. (2009). Weight gain during Pregnancy: Reexamining the guidelines. *Washington DC: National Academy of Sciences*.

Jarman, M., Adam, L., Lawrence, W., Barker, M., & Bell, R. C. (2019). Healthy conversation skills as an intervention to support healthy gestational weight gain: Experience and perceptions from intervention deliverers and participants. *Patient*

Education and Counseling, 102(5), 924-931. doi:https://doi.org/10.1016/j.pec.2018.12.024

Jennings, C. (2012). The Rise of Workplace Learning. *Global Focus Magazine: The EMFD Business Magazine, 6*(1), 1-2.

Jongen, C., McCalman, J., & Bainbridge, R. (2018). Health workforce cultural competency interventions: a systematic scoping review. *BMC Health Services Research, 18*(1), 1-15. doi: https:doi.org/10.1186/s12913-018-3001-5

Knight-Agarwal, C. R., Cubbage, R., Sesleja, R., Hinder, M., & Mete, R. (2019). The nutrition-related information seeking behaviours and attitudes of pregnant women with a high BMI: A qualitative study. *Women and Birth*. doi:https://doi.org/10.1016/j.wombi.2019.03.005

Knight, B. A., & Wyatt, K. (2010). Barriers encountered when recruiting obese pregnant women to a dietary intervention. *Nursing times, 106*(32), 20-22.

Kupek, E., Petrou, S., Vause, S., & Maresh, M. (2002). Clinical, provider and sociodemographic predictors of late initiation of antenatal care in England and Wales. *BJOG : an international journal of obstetrics and gynaecology, 109*(3), 265-273. doi: https:doi.org/10.1111/j.1471-0528.2002.00524.x

Lavender, T., & Smith, D. M. (2016). Seeing it through their eyes: A qualitative study of the pregnancy experiences of women with a body mass index of 30 or more. *Health Expectations: An International Journal of Public Participation in Health Care & Health Policy, 19*(2), 222-233. doi: https:doi.org/10.1111/hex.12339

Leslie, W., Gibson, A., & Hankey, C. (2013). Prevention and management of excessive gestational weight gain: a survey of overweight and obese pregnant women. *BMC Pregnancy and Childbirth, 13*(1), 10. doi: https:doi.org/10.1186/1471-2393-13-10

Mackeen, A. D., Young, A. J., Lutcher, S., Hetherington, V., Mowery, J. W., Savage, J. S., . . . Bailey-Davis, L. (2021). Encouraging appropriate gestational weight gain in high-risk gravida: A randomized controlled trial. *Obesity Science & Practice*. doi: https:doi.org/10.1002/osp4.565

Marmot, M. P., Friel, S. P., Bell, R. P., Houweling, T. A. J. P., & Taylor, S. P. (2008). Closing the gap in a generation: health equity through action on the social determinants of health. *The Lancet (British edition), 372*(9650), 1661-1669. doi: https:doi.org/10.1016/S0140-6736(08)61690-6

McCaw-Binns, A., La Grenade, J., & Ashley, D. (1995). Under-users of antenatal care: a comparison of non-attenders and late attenders for antenatal care, with early attenders. *Social science & medicine, 40*(7), 1003-1012. doi: https:doi.org/10.1016/0277-9536(94)00175-S

Merriam, S. B. (2008). Adult learning theory for the twenty-first century. *New directions for adult and continuing education, 2008*(119), 93-98. doi: https:doi.org/10.1002/ace.309

Minschart, C., Amuli, K., Delameillieure, A., Calewaert, P., Mathieu, C., & Benhalima, K. (2020). Multidisciplinary Group Education for Gestational Diabetes Mellitus: A Prospective Observational Cohort Study. *Journal of clinical medicine, 9*(2), 509. doi: https:doi.org/10.3390/jcm9020509

Morgan, K. L., Rahman, M. A., Macey, S., Atkinson, M. D., Hill, R. A., Khanom, A., . . . Brophy, S. T. (2014). Obesity in pregnancy: a retrospective prevalence-based study on health service utilisation and costs on the NHS. *BMJ Open, 4*(2), e003983. doi: https:doi.org/10.1136/bmjopen-2013-003983

Nagpal, T. S., Liu, R. H., Gaudet, L., Cook, J. L., & Adamo, K. B. (2020). Summarizing recommendations to eliminate weight stigma in prenatal health

care settings: A scoping review. *Patient Education and Counseling, 103*(11), 2214-2223. doi: https:doi.org/10.1016/j.pec.2020.06.017

Nesbit, P. L. (2012). The role of self-reflection, emotional management of feedback, and self-regulation processes in self-directed leadership development. *Human Resource Development Review, 11*, 203-226. doi: https:doi.org/10.1177/1534484312439196

Olander, E. K., & Atkinson, L. (2013). Obese women's reasons for not attending a weight management service during pregnancy. *Acta obstetricia et gynecologica Scandinavica, 92*(10), 1227-1230. doi: https:doi.org/10.1111/aogs.12195

Opie, R. S., Neff, M., & Tierney, A. C. (2016). A behavioural nutrition intervention for obese pregnant women: Effects on diet quality, weight gain and the incidence of gestational diabetes. *Aust N Z J Obstet Gynaecol, 56*(4), 364-373. doi: https:doi.org/10.1111/ajo.12474

Oteng-Ntim, E., Varma, R., Croker, H., Poston, L., & Doyle, P. (2012). Lifestyle interventions for overweight and obese pregnant women to improve pregnancy outcome: Systematic review and meta-analysis. *BMC Medicine, 10*(1), 47-47. doi: https:doi.org/10.1186/1741-7015-10-47

Pari-Keener, M., Gallo, S., Stahnke, B., McDermid, J. M., Al-Nimr, R. I., Moreschi, J. M., . . . Cheng, F. W. (2020). Maternal and Infant Health Outcomes Associated with Medical Nutrition Therapy by Registered Dietitian Nutritionists in Pregnant Women with Malnutrition: An Evidence Analysis Center Systematic Review. *Journal of the Academy of Nutrition and Dietetics*. doi:https://doi.org/10.1016/j.jand.2019.10.024

Parker, M. H., Berghella, V., & Nijjar, J. B. (2016). Bariatric surgery and associated adverse pregnancy outcomes among obese women. *The Journal of Maternal-*

Fetal & Neonatal Medicine, 29(11), 1747-1750. doi: https:doi.org/10.3109/14767058.2015.1060214

Phelan, S. (2010). Pregnancy: a "teachable moment" for weight control and obesity prevention. *American Journal of Obstetrics and Gynecology, 202*(2), 135.e131-135.e138. doi: https:doi.org/10.1016/j.ajog.2009.06.008

Phelan, S., Phipps, M. G., Abrams, B., Darroch, F., Schaffner, A., & Wing, R. R. (2011). Randomized trial of a behavioral intervention to prevent excessive gestational weight gain: the Fit for Delivery Study. *The American Journal of Clinical Nutrition, 93*(4), 772-779. doi: https:doi.org/10.3945/ajcn.110.005306

Porteous, H., de Jersey, S., & Palmer, M. (2020). Attendance rates and characteristics of women with obesity referred to the dietitian for individual weight management advice during pregnancy. *The Australian & New Zealand journal of obstetrics & gynaecology*. doi: https:doi.org/10.1111/ajo.13128

Porter, J., & Collins, J. (2021). Do images of dietitians on the Internet reflect the profession? *Journal of human nutrition and dietetics, 34*(1), 106-114. doi: https:doi.org/10.1111/jhn.12793

Poston, L., & Patel, N. (2014). Dietary recommendations for obese pregnant women: current questions and controversies. *Acta obstetricia et gynecologica Scandinavica, 93*(11), 1081-1084. doi: https:doi.org/10.1111/aogs.12507

Queensland Clinical Guidelines. (2021). *Obesity and pregnancy (including post bariatric surgery)* (5). Retrieved from Brisbane: https://www.health.qld.gov.au/__data/assets/pdf_file/0019/142309/g-obesity.pdf

Queensland Health. (2018). *The Health of Queenslanders 2018. Report of the Chief Health Officer Queensland.* Retrieved from Brisbane:

https://www.health.qld.gov.au/__data/assets/pdf_file/0032/732794/cho-report-2018-full.pdf

Raatikainen, K., Heiskanen, N., & Heinonen, S. (2007). Under-attending free antenatal care is associated with adverse pregnancy outcomes. *BMC Public Health, 7*(1), 1-8. doi: https:doi.org/10.1186/1471-2458-7-268

Rottenstreich, A., Elazary, R., Goldenshluger, A., Pikarsky, A. J., Elchalal, U., & Ben-Porat, T. (2019). Maternal nutritional status and related pregnancy outcomes following bariatric surgery: A systematic review. *Surgery for obesity and related diseases, 15*(2), 324-332. doi: https:doi.org/10.1016/j.soard.2018.11.018

Różańska-Walędziak, A., Bartnik, P., Kacperczyk-Bartnik, J., Czajkowski, K., Walędziak, M., & Kwiatkowski, A. (2021). Pregnancy after bariatric surgery–a narrative literature review. *Videosurgery and Other Miniinvasive Techniques, 16*(1), 30. doi: https:doi.org/10.5114/WIITM.2020.99281

Sagi-Dain, L., Echar, M., & Paska-Davis, N. (2022). Experiences of weight stigmatization in the Israeli healthcare system among overweight and obese individuals. *Israel journal of health policy research, 11*(1), 1-8. doi: https:doi.org/10.1186/s13584-022-00518-9

Schulte, R., Monaghan, A., & Rane, V. (2021). Obesity, Pregnancy and Lifestyle Clinic: Evaluation and Outcomes.

Swift, J. A., Pearce, J., Jethwa, P., Taylor, M. A., Avery, A., Ellis, S., . . . McMullen, S. (2016). Antenatal weight management: women's experiences, behaviours, and expectations of weighing in early pregnancy. *Journal of pregnancy, 2016*. doi: https:doi.org/10.1155/2016/8454759

Tanentsapf, I., Heitmann, B., & Adegboye, A. (2011). a (2011) Systematic review of clinical trials on dietary interventions to prevent excessive weight gain during

pregnancy among normal weight, overweight and obese women. *BMC Pregnancy Childbirth, 11*(81), 10.1186. doi: https:doi.org/10.1186/1471-2393-11-81

Thangaratinam, S., Rogozińska, E., Jolly, K., Glinkowski, S., Roseboom, T., Tomlinson, J. W., . . . Khan, K. S. (2012). Effects of interventions in pregnancy on maternal weight and obstetric outcomes: meta-analysis of randomised evidence. *BMJ : British Medical Journal, 344*(7858), 14-14. doi: https:doi.org/10.1136/bmj.e2088

The jamovi project. (2021). jamovi (version 1.6) [computer software]. Retrieved from https://www.jamovi.org.

Trivedi, A. N., Grebla, R. C., Wright, S. M., & Washington, D. L. (2011). Despite improved quality of care in the Veterans Affairs health system, racial disparity persists for important clinical outcomes. *Health affairs, 30*(4), 707-715. doi: https:doi.org/10.1377/hlthaff.2011.0074

Walker, R., Bennett, C., Blumfield, M., Gwini, S., Ma, J., Wang, F., . . . Truby, H. (2018). Attenuating pregnancy weight gain—what works and why: a systematic review and meta-analysis. *Nutrients, 10*(7), 944. doi: https:doi.org/10.3390/nu10070944

Walker, R., Choi, T. S. T., Quong, S., Hodges, R., Truby, H., & Kumar, A. (2019). “It’s not easy” — A qualitative study of lifestyle change during pregnancy. *Women and Birth*. doi:https://doi.org/10.1016/j.wombi.2019.09.003

Wasserman, J., Palmer, R. C., Gomez, M. M., Berzon, R., Ibrahim, S. A., & Ayanian, J. Z. (2019). Advancing health services research to eliminate health care disparities. *American journal of public health, 109*(S1), S64-S69. doi: https:doi.org/10.2105/AJPH.2018.304922

Watson, M., Howell, S., Johnston, T., Callaway, L., Khor, S.-L., & Cornes, S. (2013). Pre-pregnancy BMI: Costs associated with maternal underweight and obesity in Queensland. *Australian and New Zealand Journal of Obstetrics and Gynaecology, 53*(3), 243-249. doi: https:doi.org/10.1111/ajo.12031

West, C. (2010). Developing a support service for overweight women. *The Practising Midwife, 13*(10), 19-21.

West Moreton Health. (2020). *West Moreton Health Strategic Plan 2017-2021*. Retrieved from https://www.westmoreton.health.qld.gov.au/sites/default/files/inline-files/2020134%20WMH%20Strategic%20Plan%20Refresh%202020.pdf

Whiteman, V. E., Salemi, J. L., Mejia De Grubb, M. C., Ashley Cain, M., Mogos, M. F., Zoorob, R. J., & Salihu, H. M. (2015). Additive effects of pre-pregnancy body mass index and gestational diabetes on health outcomes and costs. *Obesity, 23*(11), 2299-2308. doi: https:doi.org/10.1002/oby.21222

Wong, V. W., Chong, S., Astorga, C., & Jalaludin, B. (2013). Gestational diabetes mellitus: a study of women who fail to attend appointments. *Diabetes Spectrum, 26*(4), 267-271. doi: https:doi.org/10.2337/diaspect.26.4.267

Wotherspoon, C., & Williams, C. M. (2018). Exploring the experiences of Aboriginal and Torres Strait Islander patients admitted to a metropolitan health service. *Australian Health Review, 43*(2), 217-223. doi: https:doi.org/10.1071/AH17096

Yang, Z., Phung, H., Freebairn, L., Sexton, R., Raulli, A., & Kelly, P. (2019). Contribution of maternal overweight and obesity to the occurrence of adverse pregnancy outcomes. *Australian and New Zealand Journal of Obstetrics and Gynaecology, 59*(3), 367-374. doi: https:doi.org/10.1111/ajo.12866

Young, B., Drew, S., Ibikunle, C., & Sanni, A. (2018). Maternal and fetal delivery outcomes in pregnancies following bariatric surgery: a meta-analysis of the literature. *Mini-invasive Surgery, 2*, 16. doi: https:doi.org/10.20517/2574-1225.2017.50

APPENDIX 1

High-risk antenatal women's perceptions of dietitian appointments with the aim of reducing the fail to attend rate: a work-based study in West Moreton Hospital Health Service

Interview Questions (Phase 2).

I understand that you've already had an appointment, so you can use this experience to answer the first few questions.

1. What do you think a Dietitian does?
2. How do you think a Dietitian can help women who are pregnant?
3. Can you describe to what extent this would benefit you and why?

Prompts: knowledge re: diet in pregnancy affecting babies long term health / importance of healthy eating / education / monitoring / goal setting / information providing / weight monitoring

4. Can you explore with me your opinions around whether women who are pregnant should be referred to a dietitian? Why / why not?

Does it need to be a dietitian? Midwife? Is pregnancy the right time to target women

5. Have you seen a dietitian in the past, prior to your appointment with me?

a. If yes, Can you tell me about your experience with seeing the dietitian in the past.

b. How did this experience make you feel about this appointment?

c. If no, how did you feel about seeing a dietitian for the first time?

d. What were your expectations prior to seeing a dietitian?

6. How do you currently access nutrition information? Where?

7. Can you explain how confident you are at using the information you access?

Do you understand the information? Is there enough detail? Can you change your lifestyle with the information you access?

8. When you attended your first antenatal appointment with the midwife, was a referral to the dietitian discussed? (NOTE: all referrals to the dietitian are initiated by midwives)

a. If yes, can you tell me the reasons the midwife gave you for sending the referral?

b. Can you explain how you felt when the midwife discussed this with you? (prompts: judged, supported, uncomfortable, happy issue was brought up)

c. If no, why do you think you've been referred to the dietitian during your pregnancy?

d. How did you feel when you were unexpectedly contacted about a dietitian appointment?

9. If you could choose how to receive dietary information during your pregnancy (if at all), what would be your preference/s?

a. Dietitian involved?

b. Groups (online vs face to face?)

c. Written information only

d. Individual appointment (clinic vs telehealth vs location)

e. Specific program

f. Would prefer to not get dietary information during pregnancy

g. Others – patient to suggest another way

10. Why are these your preferences?

Interviewer to explain current provision of care for antenatal patients referred to the dietitian: individual appointment at Ipswich Health Plaza or telehealth.

11. What are the main barriers to attending a dietitian appointment in West Moreton and why?

a. Caring for other children / family

b. Don't want to see a dietitian or focus on weight in pregnancy/lack of motivation/ reluctance to discuss weight

c. No transport

d. Distance to clinic

e. Don't have time to attend

f. Work commitments

g. Unwell due to pregnancy

h. Cultural and linguistic diversity

12. Do you have any suggestions for how WM can overcome these barriers?