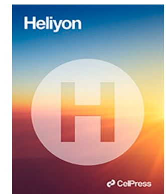
Heliyon 9 (2023) e18106

Contents lists available at ScienceDirect

Heliyon

journal homepage: www.cell.com/heliyon



High-risk antenatal women's perceptions of dietitian appointments and information

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ARTICLE INFO

Keywords:
Nutritionists
Antenatal care
Overweight
Obese
Midwife

ABSTRACT

Problem: The 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, multivariate analyses of variance MANOVA. 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.

1. Introduction

Overweight and obesity are an increasing health issue in Australia [1]. The definition of overweight is a Body Mass Index (BMI) of

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https://doi.org/10.1016/j.heliyon.2023.e18106
Received 20 October 2022; Received in revised form 6 July 2023; Accepted 7 July 2023
Available online 7 August 2023
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>25 kgm^2 and obesity is a BMI >30 kgm^2 [2]. When combined with pregnancy, overweight/obesity increases the risks to both mother and baby and costs the health system 23–37% more [3,4] 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 [5]. The Clinical Practice Guidelines: Pregnancy Care [5] 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 [5].

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 [5]. Although many of the risks associated with obesity and pregnancy are improved after gastric surgery [6,7] there are still some risks with these pregnancies including monitoring of micronutrient and vitamin supplementation [8], nutritional deficiencies [9], and intrauterine growth restriction [6,7].

Weight gain should be managed, as per the Institute of Medicine [10] 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 [5,11] 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 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 [12,13]. The available systematic reviews 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 [12–18].

Engagement in services aimed at weight management in pregnancy is poor with rates reported in the range of 0–50% [19–21]. There are few studies that consider dietitian services specifically, however two have reported an engagement rate of 10% [22,23]. 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 [24]. 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 [25–27].

Parallel to this, obtaining the thoughts of service users is imperative when reviewing healthcare services to ensure that women's needs are being met [28]. 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.

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 [22,29,30].

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 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 [31–34] and the limited amount of time they have in appointments to discuss numerous issues also presents as a barrier [29,32–34]. Midwives have reported not offering referrals when receiving negative responses form women when bringing up the topic of weight [33].

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 was 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 versus 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 – X Human Research Ethics Committee (CODE) and the nominated Health Service Human Research Ethics Committee (CODE). 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 in a health service district, in Queensland, Australia. It involved descriptive, correlational and MANOVA of a secondary database to compare the attributes of women who engaged with the 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 health service dietitian 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 to 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 health service dietitian are entered into an electronic referral program. Filters were utilised to export the following data for all antenatal women referred to the dietitian within the study timeframe, March 2021 to August 2021: date of referral; reason for referral; Unit Record Number; full name; date of birth; age; occupation; cultural background; marital status; smoker; alcohol use; suburb lived; distance from clinic; gravidity; parity; BMI; and attended 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

In addition to standard descriptive statistics, multivariate analyses of variance (MANOVA) were used to test difference on all variables between attendance and non-attendance using Jamovi version 1.6 [35]. Pearson product moment coefficients were computed for correlational analysis. Nominal dependent variables were smoker, alcohol intake, marital status, obesity referral, gastric sleeve referral, and underweight referral; Interval variables were distance from clinic, gravidity, parity, and BMI.

2.3. Phase 2

Individual semi-structured interviews were conducted with women 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. 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 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. Three interviews were conducted in person at the 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. The woman was provided with the participant information sheet, and consent form, including a personalised explanation of the project and the interview process. 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.

The first author conducted all interviews using the same questions, however the semi-structured nature meant that different issues were discussed in all interviews. Interviews were conducted until data saturation was achieved. As described by Morse [36] saturation can be achieved with various sample sizes (5–50 interviews) depending on quality of the data, amount of information obtained from each participant and study design used. All interviews were recorded, and transcribed verbatim 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 [37] 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

The findings of the quantitative analysis, including demographic details for participants, Phase 1, were presented first, 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 3.23 compared to 1.44 and parity 2.33 versus 0.78. 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.

When used as an independent grouping variable, attendance or non-attendance at the dietitian appointment was statistically significant for 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 MANOVA results.

3.2. Phase 2

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

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.

3.2.1.1. 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

Table 1
Descriptive statistics for all participants (N = 103) in Phase 1 of the study.

	Mean	Standard deviation
Age (years)	28.1	5.51
Smoker	0.233	0.425
Alcohol	0.0874	0.284
Marital Status	0.641	0.482
Obesity referral	0.796	0.405
Gastric Sleeve referral	0.126	0.334
Underweight referral	0.0777	0.269
Distance from clinic (km)	15	11
Gravidity	2.79	1.82
Parity	1.12	1.32
BMI (kgm^2)	34.4	8.80
Attended DT appointment	0.495	0.502

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

	Mean		Standard Deviation		Skewness		Kurtosis	
	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2
Age (years)	27.8	28.4	5.52	5.54	−0.0554	0.451	−0.103	−0.426
Smoker	0.176	0.288	0.385	0.457	1.75	0.962	1.10	−1.12
Alcohol	0.0392	0.135	0.196	0.345	4.89	2.21	22.8	2.98
Marital Status	0.686	0.596	0.469	0.495	−0.827	−0.404	−1.37	−1.91
Obesity Referral	0.706	0.885	0.460	0.323	−0.931	−2.48	−1.18	4.31
Gastric Sleeve referral	0.157	0.0962	0.298	0.298	1.94	2.82	1.85	6.20
Underweight Referral	0.137	0.0192	0.348	0.139	2.17	7.21	2.83	52
Distance from Clinic (km)	15.9	14.2	11.8	10.1	1.04	1.40	0.52	2.38
Gravidity	2.33	3.23	1.37	2.09	0.880	1.00	−0.0794	0.645
Parity	0.784	1.44	0.966	1.53	1.15	1.44	1.03	2.42
BMI (kgm^2)	32.9	35.9	9.53	7.82	−0.0033	0.58	−0.158	0.0379

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).

3.2.1.2. 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).

3.2.1.3. 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).

3.2.1.4. 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).

3.2.1.5. 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.

3.2.2.1. 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

Table 3
Correlation data for patient attributes, tested at the two-tailed level; r-values included in table; p-values represented as: *p ≤ .05, **p ≤ .01, ***p ≤ .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)	1										
BMI	−0.02	1									
Age	0.05	0.10	1								
Smoker	−0.13	−0.01	−0.12	1							
Alcohol	−0.12	0.22*	−0.24*	0.23*	1						
Marital Status	0.11	−0.01	0.31**	−0.01	−0.12	1					
Obesity Referral	0.06	0.52***	−0.11	0.0	0.15	0.02	1				
Gastric Sleeve Referral	−0.10	−0.16	0.28**	0.06	−0.11	0.04	−0.75***	1			
Underweight Referral	0.03	−0.57***	−0.18	−0.07	−0.09	−0.08	−0.57***	−0.11	1		
Gravidity	0.0	0.11	0.30**	0.22*	0.30**	0.158	−0.020	0.077	−0.06	1	
Parity	0.01	0.26**	0.37***	0.074	0.23*	0.17	0.04	0.03	−0.10	0.82***	1
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*

Table 4
Multivariate analysis of variance with attendance at dietitian appointment the independent variable; p-value significance at * $p \leq .05$.

Sources	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

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
Midwifes hold the key	It's how they deliver the message that counts
	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

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).

3.2.2.2. 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).

3.2.2.3. 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).

3.2.2.4. 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).

3.2.2.5. 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.

3.2.3.1. 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).

3.2.3.2. 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.

3.2.4.1. 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).

3.2.4.2. 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.

3.2.5.1. 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).

3.2.5.2. 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).

3.2.5.3. 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.

3.2.6.1. 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 [26,38]. 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 at this service. This finding was confirmed during the qualitative phase as three of the women were adamant that if an individual wants the service and assistance with their diet they will find a way to attend, with some acknowledging the option of telehealth appointments is helpful. 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 [27] or engage in weight management programs particularly if they'd had no issues with previous pregnancies [25]. 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 [29,30,39], 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 [40,41], 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 [22,29,30].

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 [20] 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 [42]. The study reports that misconceptions of health professional images have an impact on public health seeking behaviours [42] 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 [21]. 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 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 [12,13]. Despite evidence supporting the use of group programs particularly in weight management [12,33] and gestational diabetes [43], 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-assessed 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 [20,27] 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.

The limitations of this study included small numbers of participants in Phase 2, although as previously reported lower numbers can be acceptable to reach saturation in a homogenous population with narrowly defined objectives. The women interviewed in Phase 2 were included in Phase 1 data, however on average had lower gravidity and parity than Phase 1 participants. Although a thorough literature review was completed to decide which variables to use in the analysis, it is acknowledged that there could be other variables not considered that affect attendance at dietitian appointments. There are also limitations associated with utilising a secondary data source in Phase 1, however data was checked by the lead author and three co-authors to minimise this impact.

Author contribution statement

Michelle Lang: Conceived and designed the experiments; Performed the experiments; Analysed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Hila Dafny, PhD; Lee Fergusson, PhD; Annette Bromdal, PhD: Conceived and designed the experiments; Analysed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Data availability statement

Data will be made available on request.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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