Experiences on screening and management of gestational diabetes among women diagnosed with GDM

Abdulai Abubakari
University for Development Studies
Mohammed Bukari (mohammed.bukari@yahoo.com)
University for Development Studies
Hawa Malechi
Tamale Teaching Hospital
Humphery Garti
University for Development Studies
Faith Agbozo
University of Allied Health Sciences

Data Note

Keywords:

Posted Date: January 18th, 2023

DOI: https://doi.org/10.21203/rs.3.rs-2475524/v1

Version of Record: A version of this preprint was published at BMC Research Notes on September 29th, 2023. See the published version at https://doi.org/10.1186/s13104-023-06494-w.

Abstract

Introduction: Understanding the experiences of women diagnosed with GDM can improve GDM care. Therefore, this study aimed to investigate the perspectives of women in northern Ghana who had been diagnosed with GDM regarding screening and management.

Methods: This was a facility-based qualitative cross-sectional study among purposively sampled women diagnosed with GDM and were receiving care from healthcare providers. Women were asked about their reaction on being diagnosed with gestational diabetes, experience with care, training, self-monitoring, and challenges with management of gestational diabetes and data obtained were analysed using thematic content analysis

Results: Two major themes emerged on screening and management experience for women diagnosed with GDM; intense emotional experience relating to diagnosis and management and satisfactory experience on general GDM care. The intense emotional experience was characterised by feeling of sadness, fear, worry and confusion. The satisfactory experience was based on their thoughts on dietary advice they received during GDM care, the difficulties they experienced in getting information about diet from different health care professionals, feeling about getting information about diet from different health care professionals, perception about dietary and lifestyle approaches in the management of their condition and general thoughts or impressions on how GDM is managed.

Conclusion: Two major themes emerged on screening and management experience for women diagnosed with GDM; intense emotional experience relating to diagnosis and management and satisfactory experience on general GDM care.

Introduction

According to Rumbold and Crowther, women's perceptions of their own health are negatively impacted by GDM screening. When compared to women who tested negative, those who tested positive for cancer had much worse health views and rated their health as worse than in previous years[1]. A study by Han et al (2015), demonstrated that despite the fact that the majority of affected women viewed lifestyle control as crucial, GDM can nevertheless induce anxiety in certain women. The most essential enabler for women to make desired lifestyle changes, according to this study, is considering their own and their unborn child's health, while the biggest barrier is a lack of family support[2].

Previous studies investigating the experience of women with GDM found that negative feelings such as upset, fear, shock, or worries were more frequently mentioned [3–6]. Women encountered a number of obstacles in their attempt to self-manage their illness, according to a study that looked at the characteristics that helped or hindered GDM self-management among a sample of pregnant women receiving care in a low socioeconomic environment. This included having trouble grasping the necessity of quick diet control. The majority of women discussed the difficulty of executing a demanding schedule in laboratories and nutritional changes in a short amount of time while they were still processing the

diagnosis's shock. They came to the conclusion that GDM food and activity recommendations are frequently difficult for women from poor socioeconomic and immigrant backgrounds to understand and follow[7].

Parsons et al. (2014) found that women with GDM had feelings of shock, upset, denial, dread, and guilt, as well as a loss of normality and personal control, and that GDM presents a window of opportunity to intervene. Many women believed that GDM would pass, therefore they were uninformed of the risk of developing diabetes in the future[8]. In a study elsewhere, women were generally driven to control the sickness by adhering to dietary and exercise recommendations in order to reclaim control over their lives for the benefit of both themselves and their unborn child. The study came to the conclusion that health promotion materials that depict the varying experiences of GDM have the ability to better prepare women, particularly at the time of diagnosis, and to inform medical professionals on how to manage and control the disease [9]. In another qualitative study to explore the experiences of immigrant women who had been diagnosed with GDM in the broader context of their lives, women had a favorable experience receiving care, and the health education they got at the Diabetes in Pregnancy (DIP) clinic seemed to be successful in helping them realize the value of adopting a healthy diet and lifestyle adjustments for their long-term health[10].

Additionally, Parsons and colleagues explained how help from close relatives and health care professionals was essential for balancing and managing daily life [8]. Contrarily, stress and inadequate support made the adaption process more difficult [11]. An integrative review related to education and intervention programs for GDM management conducted by Carolan-Olah also indicated that interventions such as eating a low-glycaemic-index diet and exercising seem to be effective at lowering maternal blood glucose levels and lowering insulin needs during pregnancy, which in turn was linked to a decrease in macrosomia and maternal weight increase[12]. Understanding the experiences of women diagnosed with GDM would be essential for improving screening and management services given to women with GDM. Yet, studies on experiences of women in northern Ghana on their experiences with being diagnosed with GDM are limited. Therefore, this study aimed to investigate the perspectives of women in northern Ghana who had been diagnosed with GDM regarding screening and management.

Methods

Study Area

Tamale, the capital of the Northern region of Ghana, served as the study's location. Tamale has a population of 2,479,461 according to the 2020 population and housing census. Four of the region’s largest hospitals were chosen for the study Tamale Teaching Hospital (TTH), Tamale Central Hospital (TCH), Tamale West Hospital (TWH), and SDA Hospital. The Tamale metropolis' total fertility rate is 2.8, its crude birth rate is 21.2/1000, and among women aged 15 to 49, the general fertility rate is 79.9/1000, according to the 2010 population census [13].

Study Population

The study population were pregnant women who had been diagnosed to have gestational diabetes and being managed by healthcare providers.

Study design

The study was a facility-based qualitative cross-sectional study design to explore the experiences of women diagnosed with GDM on screening and management of GDM in northern Ghana.

Sampling and sampling techniques

Study participants (diagnosed to have GDM) were selected using purposive sampling until data saturation was achieved. Only pregnant women diagnosed with a gestational diabetes and being managed by healthcare professionals were

Data collection

Data were obtained through five in-depth interviews with women diagnosed with gestational diabetes. Interview guides were designed to elicit information on experiences on screening and management of gestational diabetes. Experience on being diagnosed with gestational diabetes and GDM care; pregnant women were asked about their reaction on being diagnosed with gestational diabetes, experience with care, training, self-monitoring, and challenges with management of gestational diabetes [13].

Data analysis

After key informant and in-depth interviews were verbatim transcribed, the data was analyzed at the semantic level using Braun and Clarke's six steps for thematic analysis. We repeatedly went over the data to become familiar with it, then generated initial codes for the data and went ahead to identify themes, which were then reviewed and further explained [14]. Table 1 shows a summary of responses and themes from interview guide for women diagnosed with GDM

Table 1: Summary of responses and themes from interview guide for women diagnosed with GDM

Themes from interview guide	Summary of responses
Prior information on gestational diabetes before being diagnosed	• Inability of body to control blood sugar which may or may not go after pregnancy • Caused by foods from pregnancy cravings
Feeling about the diagnosis	• Fear (scared and frightened) • Worried • Confused • Sad
Thoughts on dietary advice they received during GDM care	• Satisfied • Dietary advice difficult to follow because of cravings
Most important source for advice about a healthy diet	• Women support group • Obstetrician • Dietician or Nutritionist • Husbands • Internet
Feeling about getting information about diet from different health care professionals	• Happy
Difficulties in getting information about diet from different health care professionals	• No difficulty
Alternative treatments that women patronize (herbs/ special foods)	• Concoctions
Difficulties following dietary and lifestyle guidelines	• Pregnancy cravings • Reluctance to walk • Scarcity of fruits and vegetables • Workload
Perception about dietary and lifestyle approaches in the management of your condition	• Effective
Thoughts on getting to know they had to measure their blood glucose	• Feeling of uneasiness • Happiness
Training on self-monitoring of blood glucose	• Doctor • Husband
Feeling about the self-monitoring of blood glucose	• Expensive

	• Pain of pricking finger • Satisfied
General thoughts or impressions on how GDM is managed	• Satisfied • Innovations should be considered to improve compliance

Results

Profiles of women diagnosed with GDM

Five women with a diagnosis of GDM were interviewed using an in-depth interview guide, the lowest age of the study participants was 32 years old and the highest age was 45 years old. All of them were married and mainly Christian with at least a tertiary degree as well as being gainfully employed (Table 2).

Table 2: Participant profiles of women diagnosed with GDM

Participant ID	004	005	001	002	003
Age	35	32	35	36	45
Marital status	Married	Married	Married	Married	Married
Ethnicity	Gonja	Frafra	Kasena	Frafra	Kasena
Religion	Muslim	Christian	Christian	Christian	Christian
Education	Primary	Degree	Masters' degree	Degree	Degree
Occupation	Trader	Nurse	Teacher	Teacher	Civil servant

Prior information on gestational diabetes before being diagnosed

Five of the women had heard about gestational diabetes before they were diagnosed and went further to explain that it occurs when the body is not able to control sugar in pregnancy and may or may not go after pregnancy. One of them added that it's due to the food they eat as due cravings during pregnancy, another added that family history is a risk factor. One of them indicated she had never heard of GDM until she was diagnosed of it, she said "This *is the first time I heard about it here at TTH.*" (Participant # 1)

"Yes, I have heard about it. It mostly happens to pregnant women. Family history is a risk factor of GDM. It sometimes goes after pregnancy but other times too it does not." (Participant # 2)

Feeling about the diagnosis

When asked about how they felt about the diagnosis, they were all disturbed as some were scared, worried, frightened or even confused and sad.

One of them said “Been diagnosed with GDM got me scared for some days. But I believe that if managed properly I will be fine.”

Another revealed *“I got frightened and felt strange. I even cried a lot after diagnosis.”* (Participant # 1)

Another confessed “*I became a little scared after diagnosis. Nobody wants to hear bad news more especially during pregnancy but knowing my condition has indeed helped a lot.”* (Participant # 3)

General experiences with follow up of gestational diabetes

All the women agreed that healthcare providers follow up on them, however, only one of them disclosed on been referred to a dietician after diagnosis.

One of them said “*I lost my baby during my first pregnancy. For this present pregnancy the doctor checks my blood sugar routinely.”* (Participant # 4)

And another confirmed *“Yes, I was followed up every two weeks.”* (Participant # 1)

Thoughts on dietary advice they received during GDM care

Four of the women were satisfied with the dietary advice they received during GDM care with one saying the advice was difficult to follow due to pregnancy cravings. Some of their responses have been captured below;

“It was difficult to follow the advice due to cravings for carbohydrates foods.” (Participant # 3)

“I am satisfied with the dietary advice. I was advised to consume wheat and foods rich in fiber. Also, to drink water every 30 minutes per day. I did not face any challenge in adhering to the advice.” (Participant # 4)

“I can feel that there is improvement in my condition after the dietary advice. I complied with the consumption of green leafy vegetables, minimized my sugar intake, drank a lot of water and also had a walk sometimes.” (Participant # 1)

Most important source for advice about a healthy diet

On the most important source for advice about a healthy diet, one mentioned a women support group, two of them mentioned their obstetrician, two also mentioned their husbands, two also mentioned the dietician or nutritionist and three mentioned the internet as the most important resource for advice on healthy diet.

"My husband mostly reminds me about taking healthy diets and I sometimes use the internet to confirm my knowledge on a healthy diet." (Participant # 1)

Feeling about getting information about diet from different health care professionals

On how they felt about getting information about diet from different sources, four of them said they were happy about it while one of them indicated that she did not use other sources aside the obstetrician.

"*I did not seek information from other people apart from visiting the gynecologist*" (Participant # 2)

"It was helpful especially with Dr. [name withheld]. She asked meaningful questions. Also experiences from support groups enhanced my confidence to follow the guidelines" (Participant # 3)

Difficulties in getting information about diet from different health care professionals

All the women said they did not experience any difficulty in receiving information from different sources.

One said *"No, it was easier getting the information from my husband and I am able to abide by the guidelines due to self-discipline*." (Participant # 2)

Alternative treatments that women patronize (herbs/ special foods)

Four of the women said they were not using alternative treatments other than the hospital treatments and the last person said "I drink boiled "langrindoo/ pringa" leaves and lemon." (Participant # 1).

Difficulties following dietary and lifestyle guidelines

All the women expressed some level of difficulty in following dietary and lifestyle guidelines with pregnancy cravings being a barrier. Their various responses have been captured below.

"Following the dietary advice is difficult but I always strive to do my best to follow them." (Participant # 2)

"It is challenging due to pregnancy craving but I am able to manage my way through." (Participant # 3)

"I find it difficult to follow the dietary guidelines and also it is difficult to walk" (Participant # 4)

"Following the guidelines is not difficult. I was even asked to take red millet. But sometimes it difficult to get fruits such watermelon and vegetables. The main issue is the affordability and the accessibility of the fruits and vegetables." (Participant # 1)

"I do face some difficulties following dietary and lifestyle guidelines. This includes challenges in following the eating timeline due to work. Also, pregnancy cravings were also a problem." (Participant # 5)

Perception about dietary and lifestyle approaches in the management of your condition

All the women perceived the dietary and lifestyle approaches to be effective in the management of their conditions.

"Yes, it is very effective. I observed that my blood sugar reading was very high in the first week. But after following the guidelines for some days it went down completely." (Participant # 2)

"Yes, I think they are effective and I have seen improvement after following the guidelines." (Participant # 3)

"Yes, I do perceive them to be helpful and effective. I felt an improvement after following the dietary and lifestyle guidelines." (Participant # 1)

Religious or spiritual reasons/ factors that should be catered for in the management of gestational diabetes

Only one of them felt religious or spiritual reasons/ factors that should be catered for in the management of gestational diabetes and the other four thought otherwise.

"Yes, religious reasons should be catered for and encouraged to be part." (Participant #5)

Thoughts on getting to know they had to measure their blood glucose

On how they when they got to know that they had to measure their own blood glucose, two of them expressed uneasiness, two did not have the devices at home and relied on health facilities and one of them was happy about.

"It is not easy to be pricking my finger anytime I want to check my blood sugar level."

"I was worried and anxious." (Participant # 5)

Training on self-monitoring of blood glucose and the experience

On how they became proficient in self-monitoring of blood glucose and how they found the training, they said they were trained by either their doctor or by their husband.

"My husband read the manual and later got training from a health care provider. It then became easier for my husband to train me." (Participant # 1)

Feeling about the self-monitoring of blood glucose

The three women were able to self-monitor their blood glucose expressed varied feeling about how it is working for them, as one suggested that it can be expensive, another expressed concern on the pain of having to prick herself and another expressed satisfaction of it helping to monitor blood sugar.

"It is very helpful, because it helps you to monitor your blood sugar levels." (Participant # 1)

"It is challenging, because it demands self-discipline and can be expensive as well." (Participant # 5)

When asked on what they thought healthcare providers could in best way adapt information about diet and self-monitoring blood glucose to them, they suggested that information about GDM should be put on flyers in the form of pictures for easier communication among pregnant women who come to the facilities, diet plan should include local foods and that they should be given more education on GDM.

On their experiences of care-coordination and collaboration of different health care professionals involved in GDM care, they had varied impressions with one of them stating that she observed no care and coordination at public facilities while the others were satisfied with it.

"The coordination of the doctor and dietician care was okay. The midwives were involved in taking and monitoring vitals." (Participant # 5)

General thoughts or impressions on how GDM is managed

All of them were satisfied with how their GDM were managed and one even expressed a feeling of happiness for the early diagnosis. They suggested that in other to improve the quality of service given to you in the management of GDM, blood sugar should be checked for early detection and treatment/management, innovative ways should be employed to improve compliance to dietary and lifestyle approaches and that preventive measures for preventing GDM should be given at ANC.

Main themes on screening and management for women diagnosed with GDM

When summary of responses based on themes from interview guide (See Table 1) were reanalyzed, two major themes emerged; intense emotional experience relating to diagnosis and management and satisfactory experience on general GDM care. The intense emotional experience was characterised by feeling of sadness, fear, worry, confusion and a few cases of happiness. The satisfactory experience was based on their thoughts on dietary advice they received during GDM care, the difficulties they experienced in getting information about diet from different health care professionals, feeling about getting information about diet from different health care professionals, perception about dietary and lifestyle approaches in the management of your condition and general thoughts or impressions on how GDM is managed.

Discussion

This study sort to investigate the perspectives of women in northern Ghana who had been diagnosed to have GDM on its screening and management. The experiences of women diagnosed with GDM on its screening and management revealed two main themes: intense emotional experience and satisfactory experience. The study found that most women are usually disturbed when they are diagnosed to have GDM, the most important source of information on GDM are usually the HCPs specifically obstetricians and dieticians or nutritionist, husband, support groups and the internet. Women are generally satisfied with GDM management, particularly dietary advice and receiving information from different sources even

though some express difficulty in compliance as a result of food cravings and food unavailability. On the feeling on self-monitoring of blood glucose, they expressed concerns such as it been expensive and the pain associated with having to prick their fingers. Nonetheless, they found the dietary and lifestyle approaches for managing GDM to be effective.

One of the themes identified on screening and management experience of women diagnosed with GDM was intense emotional experience, this current study showed that women are usually disturbed when they find out about their diagnosis of GDM, as they express emotions of fear, sadness, confusion and worry. A study by Helmerson and co. also reported that women were shocked, worried or even blamed themselves when they were diagnosed with GDM [13]. In addition, previous studies investigating the experience of women with GDM reported that negative feelings such as being upset, fear, shock, or worries were more frequently mentioned [3–6]. In the ANC setups in the study area, women are usually given health talks especially on non-communicable diseases, so it may make sense that women may be disturbed upon realization of diagnosis if they have learnt about some of the consequences of GDM even if they are given information how to manage it.

In the current study, the most important source of information for women on GDM included obstetricians, dieticians or nutritionist, husbands, support groups and the internet. It is interesting to note that another study reported that women expected their general practitioners to be the best sources of information while also citing the internet and support groups as other ideal sources for information on GDM [15]. It is therefore not surprising that women were satisfied with receiving information from different sources. A study by Edwards and collegues also reported women using social media to meet their information needs, which is in line with the findings of the current study where some mentioned the internet as an important source of information [16].

The other theme identified for women diagnosed with GDM was satisfactory experience, women were generally satisfied with GDM care, as they expressed satisfaction with dietary and lifestyle approaches and receiving such information from different sources. Similarly, a study reported that majority of patients were satisfied with GDM treatment. Sayakhot and colleague, also reported that women were satisfied with how they were informed with their GDM diagnosis [15]. All the study participants were satisfied with how GDM was managed but suggested that other innovative approaches should be considered to enhance compliance to dietary and lifestyle regimen.

Aside women reporting feeling of satisfaction with GDM care, they also perceived the dietary and lifestyle approaches for reducing GDM to be effective. One of the dietary regimen used in the management of GDM as reported in the current study is the DASH diet, this dietary regimen has been reported to be effective for improving maternal outcomes and glycaemia control [17–19]. A Cochrane review in 2017 concluded that moderate quality evidence have reported reduced risk of GDM with a combined intervention of diet and exercise as compared to standard care [20]. The Norwegian Directorate of Health has recommended that women should be given dietary advice and trained on self-monitoring of blood glucose [21]. While they are no national guidelines for managing GDM in Ghana, HCPs use other

guidelines with adaptations to the Ghanaian context, which are not very different from the practice recommended by the Norwegian guidelines. For instance while giving women dietary and lifestyle advice, those who can afford glucometers are also trained on self-monitoring of blood glucose. This is an indication that financial constraints remains a major obstacle in effect treatment or management of GDM. Moreover, when asked how self-monitoring of blood glucose was going, some of the study participants in the current study stated that self-monitoring of blood glucose could be expensive.

Despite women perceiving dietary and lifestyle approaches to be effective in managing GDM, they admitted some difficulties in adhering to dietary and lifestyle guidelines. Some of the challenges they mentioned were pregnancy cravings, reluctance to walk, scarcity of fruits and vegetables and workload. It has been reported that appetite and perceived ability to control cravings may have an effect on GWG [22], which has been reported in several studies to be associated with GDM.

The strength of this study is that it provides perspectives on women in northern Ghana who had been diagnosed with GDM on its screening and management in the northern Ghana. This study had some limitations as well, Ghana runs a three-tiered health system and participants were selected from secondary and tertiary level health facilities and hence the findings of this study may not be representative of the views of those who use primary level care facilities. However, it is worth noting that diagnosis of GDM is mainly at the secondary and tertiary level health facilities, as all suspected cases at the primary care levels are usually referred to them. Hence, we are confident that the views from the current study may reflect the views of majority of women in northern Ghana. Also, researcher bias during analysis and interpretation of findings could have affected the findings, to address this, other authors took part in the analysis and interpretation to preclude any researcher bias.

Conclusion

This study sort to explore to investigate the perspectives of women in northern Ghana who had been diagnosed with GDM on its screening and management. Two major themes emerged on screening and management experience for women diagnosed with GDM; intense emotional experience relating to diagnosis and management and satisfactory experience on general GDM care.

Abbreviations

HCPs: Healthcare providers; GDM: Gestational diabetes mellitus; ANC: Antenatal care

Declarations

Acknowledgement

We are grateful to Tamale Teaching Hospital, Northern Regional and Municipal Health Directorates for giving us permission to conduct the study. We thank the staff of all the health facilities in the various

facilities for their assistance in our data collection, particularly the research and development unit of SDA hospital, Tamale West Hospital and RCH.

Funding

We did not receive funding for this study.

Availability of data

The dataset supporting the findings of this study could be obtained from the corresponding author upon reasonable request

Authors' contributions

AA, MB, and FA conceptualized the study. AA and FA supervised the study. MB, HW took part in the data acquisition. AA and MB took part in analyzing and interpreting the data. AA, FA, HW and HG reviewed it critically for important intellectual content. AA and MB wrote first draft of manuscript. MB was deeply involved in revising it for critical content. All authors read and approved the final manuscript.

Ethical approval and consent to participate

The School Public Health, the Tamale Metro Health Directorate, the Northern Region Health Directorate, as well as the healthcare facilities where the study was carried out, all granted permission for the study to be carried out. The App/Hyp-Preg/04/2022 protocol received ethical approval from the Navorongo Health Research Centre Institutional Review Board (NHRCIRB). After signing an informed consent form, participants were recruited. This study was conducted in line with the Helsinki Declaration.

Consent for publication

Not applicable

Competing interests

The authors declare they have no competing interest.

References

1. Rumbold, A.R. and C.A. Crowther, *Women's experiences of being screened for gestational diabetes mellitus.* Australian and New Zealand Journal of Obstetrics and Gynaecology, 2002. **42**(2): p. 131-137.
2. Han, S., et al., *Women's views on their diagnosis and management for borderline gestational diabetes mellitus.* Journal of diabetes research, 2015. **2015**.
3. Bandyopadhyay, M., et al., *Lived experience of gestational diabetes mellitus among immigrant South Asian women in Australia.* Australian and New Zealand Journal of Obstetrics and Gynaecology,

2011. **51**(4): p. 360-364.

4. Carolan, M., *Women's experiences of gestational diabetes self-management: a qualitative study.* Midwifery, 2013. **29**(6): p. 637-645.
5. Hjelm, K., K. Bard, and J. Apelqvist, *Gestational diabetes: Prospective interview-study of the developing beliefs about health, illness and health care in migrant women.* Journal of clinical nursing, 2012. **21**(21-22): p. 3244-3256.
6. Trutnovsky, G., et al., *Gestational diabetes: women's concerns, mood state, quality of life and treatment satisfaction.* The Journal of Maternal-Fetal & Neonatal Medicine, 2012. **25**(11): p. 2464-2466.
7. Morrison, M.K., J.M. Lowe, and C.E. Collins, *Australian women's experiences of living with gestational diabetes.* Women and Birth, 2014. **27**(1): p. 52-57.
8. Parsons, J., et al., *Perceptions among women with gestational diabetes.* Qualitative health research, 2014. **24**(4): p. 575-585.
9. Jirojwong, S., et al., *Going up, going down: the experience, control and management of gestational diabetes mellitus among Southeast Asian migrant women living in urban Australia.* Health Promotion Journal of Australia, 2016. **28**(2): p. 123-131.
10. Siad, F.M., et al., *Understanding the experiences of East African immigrant women with gestational diabetes mellitus.* Canadian Journal of Diabetes, 2018. **42**(6): p. 632-638.
11. Persson, M., A. Winkvist, and I. Mogren, *'From stun to gradual balance'–women's experiences of living with gestational diabetes mellitus.* Scandinavian journal of caring sciences, 2010. **24**(3): p. 454-462.
12. Carolan-Olah, M.C., *Educational and intervention programmes for gestational diabetes mellitus (GDM) management: An integrative review.* Collegian, 2016. **23**(1): p. 103-114.
13. Helmersen, M., et al., *Women's experience with receiving advice on diet and Self-Monitoring of blood glucose for gestational diabetes mellitus: a qualitative study.* Scandinavian journal of primary health care, 2021. **39**(1): p. 44-50.
14. Braun, V. and V. Clarke, *Using thematic analysis in psychology.* Qualitative research in psychology, 2006. **3**(2): p. 77-101.
15. Sayakhot, P. and M. Carolan-Olah, *Sources of information on gestational diabetes mellitus, satisfaction with diagnostic process and information provision.* BMC Pregnancy and Childbirth, 2016. **16**(1): p. 1-9.
16. Edwards, K.J., et al., *How do women with a history of gestational diabetes mellitus use mHealth during and after pregnancy? Qualitative exploration of women's views and experiences.* Midwifery, 2021. **98**: p. 102995.
17. Izadi, V., et al., *Adherence to the DASH and Mediterranean diets is associated with decreased risk for gestational diabetes mellitus.* Nutrition, 2016. **32**(10): p. 1092-1096.

18. Li, S., et al., *Effects of the Dietary Approaches to Stop Hypertension (DASH) on pregnancy/neonatal outcomes and maternal glycemic control: a systematic review and meta-analysis of randomized clinical trials.* Complementary Therapies in Medicine, 2020. **54**: p. 102551.
19. Yao, J., et al., *Effect of dietary approaches to stop hypertension diet plan on pregnancy outcome patients with gestational diabetes mellitus.* ||| Bangladesh Journal of Pharmacology, 2015. **10**(4): p. 732-738.
20. Shepherd, E., et al., *Combined diet and exercise interventions for preventing gestational diabetes mellitus.* Cochrane Database of Systematic Reviews, 2017(11).
21. Health., N.D.o. *National guidelines for the care of women with gestational diabetes mellitus;. 2017 11/10/2022]; Available from: https://www.helsedirektoratet.no/produkter?tema=retningslinje.*
22. Groth, S.W., et al., *Influence of Appetite and Perceived Ability to Control Cravings on Excessive Gestational Weight Gain.* Journal of Obstetric, Gynecologic & Neonatal Nursing, 2021. **50**(6): p. 669-678.