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PERCEPTIONS OF WOMEN DIAGNOSED WITH GESTATIONAL DIABETES MELLITUS ON THE MANAGEMENT OF GESTATIONAL DIABETES MELLITUS IN LIMPOPO PROVINCE: A QUALITATIVE STUDY

Ntshauba ET¹, Maimela E¹, Mamogobo MP², Mokoena OP³, Ntuli TS³¹ Department of Public Health, University of Limpopo, Polokwane, Limpopo Province, South Africa² Department of Nursing, University of Limpopo, Polokwane, Limpopo Province, South Africa³ Department of Statistical Sciences, Sefako Makgatho Health Sciences University, Pretoria, South Africa**Summary**

Objectives. Gestational diabetes mellitus remains a major public health challenge. This disease has serious adverse effects on the mother and pregnancy outcome. The objective of the study was to explore the perceptions of women diagnosed with gestational diabetes mellitus on how healthcare providers in the rural province of South Africa manage it.

Methods. This qualitative study is part of a larger mixed-method study conducted in the public healthcare facilities of the Mopani district, Limpopo Province, South Africa. Purposive sampling was used to recruit 17 eligible women diagnosed with gestational diabetes mellitus, and all of them agreed to participate. Data was analysed using a thematic analysis approach.

Results. Three main themes emerged from the findings: challenges in self-management of gestational diabetes mellitus; health systems support for gestational diabetes; and referral to a dietician.

Conclusion. In conclusion, dietary habits adjustment, self-management of prescribed medicines, and referral to a dietician for nutrition therapy remain a concern. It is recommended that counselling and educational programs be developed and urgently improve the dietician referral rate.

Keywords: Gestational diabetes mellitus, Limpopo Province, South Africa

Background

Globally, gestational diabetes mellitus (GDM) remains a major public health challenge that may have a negative effect on the pregnancy outcome. A literature review of studies on the prevalence of GDM conducted between January 1990 to December 2020 found the pooled global standardized prevalence of GDM at 14.0% and the regional standardized prevalence of GDM at 14.2% was found in Africa [1]. A systematic review of studies conducted in European countries found the GDM prevalence rate ranging from 0.4% to 78% [2], while in China, an investigation of the prevalence of GDM reported a rate between 2.3% and 24.24% [3].

In sub-Saharan African countries, studies on GDM prevalence found varied results with a prevalence rate of 4.3% in Tanzania [4], 20.5% in Cameroon [5], and 12.8% in Ethiopia [6] among pregnant women attending routine antenatal clinics. A cross-sectional screening study performed among pregnant women recruited from the Chris Hani Baragwanath Academic Hospital in Johannesburg, South Africa (SA) found that 9.1% of women were diagnosed with GDM [7]. In Limpopo, a rural province of SA, an earlier study conducted by Mamabolo and colleagues found the prevalence of GDM at 1.5% between May/August 1999 and February/April 2000 [8], which slightly increased to 1.9% in

2019 [9]. The discrepancy in the GDM prevalence observed in these studies may be due to the different screening and diagnostic criteria.

GDM may have serious adverse effects on the pregnancy outcome and is associated with obstetric and neonatal complications [10-12], and increased caesarean section rate [13]. In African countries, risk factors affecting GDM prevalence include advanced maternal age, being overweight or obese, past history of pre-term delivery, past history of stillbirths, history of macrosomia, alcohol consumption, family history of diabetes, low physical activity, inadequate dietary diversity, and antenatal depression and having a first-degree relative with diabetes mellitus [4-6]. In South Africa however, factors associated with GDM include advanced maternal age, overweight and obesity, family history of diabetes, previous history of GDM, and previous adverse pregnancy outcomes [9, 14].

Complications of pregnancy due to GDM can be reduced through health education and pharmacological intervention [15, 16]. Several authors have recommended a patient-centred approach for successful GDM control and management [17-19]. Understanding the perceptions of women diagnosed with GDM on the management of GDM might provide relevant information on how to manage GDM.

This will assist policymakers with developing strategies to reduce the risk of Type II diabetes. There is insufficient data on the perceptions of women diagnosed with GDM on the management of GDM by healthcare providers. Therefore, the purpose of this study was to explore the perceptions of women diagnosed with GDM on the management of GDM by healthcare providers in a rural province of South Africa.

Methods

Study design

This qualitative descriptive study is part of a large study that aimed to develop evidence-based management model for the mitigation of risk factors and improve maternal and infant health outcomes associated with GDM in Mopani District of Limpopo province, South Africa. The study was conducted from January to March 2023.

Study Setting

The Mopani District in one of the five districts of Limpopo Province, located within the north-eastern part of the province and bordered in the north by Zimbabwe and in the east by Mozambique. According to the Statistics South Africa, the population of the district has increased from 1 092 507 (Stats SA Census 2011) to 1 372 873 (Stats SA Census 2022). The predominant population group were Blacks (96.8%), more than half (53.2%) were females and >80% reside in rural areas. The district is subdivided into five sub-districts and has one (1) regional hospital; six (6) district hospitals, eight (8) community health centers, and more than 100 primary healthcare clinics evenly distributed throughout the district.

Recruitment

Participants were recruited from two public hospitals (i.e. regional and district hospital) of the Mopani district in the Limpopo Province, South Africa. Purposive sampling technique was used to select the two public hospitals, as a high proportion of women diagnosed with GDM present for antenatal care at these facilities.

The inclusion criteria were pregnant women aged 18 years and older, diagnosed with GDM irrespective of gestational age, and able to consent. The exclusion criteria were pregnant women less than 18 year, not willing to participate in the study and with severe pregnancy complication, as they could not withstand interviews because of their condition. Those who refused to participate were allowed to proceed with routine antenatal care visits. Purposive sampling technique was used to select the study participants. The first author identified eligible participants during their routine antenatal care visit and made appointments to interview them at a convenient time and venue.

Data Collection

The first author using a semi-structured interview guide developed in English and translated into Xitsonga, which is the most spoken local language in the area, conducted individual, face-to-face interviews. The interview guide comprised of socio-demographic characteristics such as

age, ethnicity, marital status, level of education, employment status, height and weight, parity, and open-ended questions that explored the perceptions of pregnant women diagnosed with GDM on the management of GDM by healthcare providers including several follow up questions.

All the interviews were audio recorded after explaining the objectives of the study, the interview procedures and obtaining written informed consent from participants. The duration of the interviews was between 30 minutes to 60 minutes.

Data Analysis

The audio recordings were transcribed verbatim and translated into English. The process involved a repeated listening to the recordings to ensure that what was transcribed was what participants said.

Data were analysed by the first and second authors. The thematic analysis [20] was used for the identification and construction of themes, and subthemes that emerged from the data. Table 1 illustrates the method of thematic analysis adopted which involves six steps: 1) familiarising with data, 2) generating initial codes, 3) searching for themes, 4) reviewing the themes, 5) defining and naming themes, and 6) producing the report.

Table 1
Framework for doing a thematic analysis

Phase	Process Description
Familiarising with data	Reading and rereading the transcripts, noting down initial ideas
Generating initial codes	Organise data in a meaningful and systematic way
Searching for themes	Examined the codes and identify preliminary themes
Reviewing themes	Review, modify and develop the identified preliminary themes
Defining and naming themes	Refinement themes to identify the 'essence' of what each theme is about.
Producing the report	This is a final analysis of selected extracts that link back to the research question and literature, and writing a report of the analysis

Source: Braun and Clarke's (2006)

Ethical Considerations

The ethics approval for this study was obtained from the University of Limpopo Research Ethics Committee (Ref: TREC/04/2022: PG). Permission to conduct the study was sought from the Provincial Department of Health (Ref: LP_2022-03-001) and the Mopani District Health Office. Names of health facilities and participant's identities are not mentioned to ensure privacy, anonymity, and confidentiality of participants and health facilities. The researcher gave all participants detailed information about the study objectives to get their informed consent. Furthermore, the participants were also informed that their participation was entirely

voluntary and that they could withdraw their consent at any time without consequences.

To ensure the trustworthiness, credibility, dependability, transferability, and confirmability were maintained throughout the study. We ensured credibility by peer debriefing, reading, and re-reading transcripts many times to verify that the derived themes were representations of the pregnant women's perceptions [21]. Verbatim quotes from the participants were used to establish a thick description of their perceptions to make possible transferability [22]. The research method process was detailed and thoroughly followed to ensure dependability [23], and the audit trail was maintained by keeping copies of all transcripts to establish confirmability [22, 23].

Results

Seventeen pregnant women diagnosed with GDM were recruited from each hospital to participate in the study and all of the consented and agreed to participate. The reasons for the three pregnant women reluctance to be interviewed include not wanting to miss their turn to enter the consultation room, fatigue as most reported that they had been in the queue for a long time, not comfortable with the recording of the interview, and not understanding the GDM condition. The detailed description of the study participants is shown in Table 2.

Table 2
Demographic characteristics of study participants

	Number of participants
Age (years)	
<30	4
≥30	13
Marital status	
Unmarried	5
Married	12
Level of education	
Primary	1
Secondary	12
Tertiary	4
Employment Status	
Employed	6
Unemployed	11
Body Mass Index	
Underweight (<18.5 kg/m ²)	2
Normal (18.5-24.9 kg/m ²)	2
Overweight (25-29.9 kg/m ²)	4
Obese (>30kg/m ²)	9

Three major themes emerged from the analysis (Table 3): Challenges in self-management of gestational diabetes; Health systems support for gestational diabetes; and referral to the dietician.

Thematic analysis – Themes and sub-themes generated from pregnant women diagnosed with GDM on their perception on treatment. In this study, three main themes and five sub-themes were generated.

Theme 1: Challenges in self-management of gestational diabetes mellitus

This theme was derived from two subthemes: (1) diet adaptation and (2) self-management of prescribed medicines. The study findings revealed that pregnant women had to change their dietary lifestyles after being diagnosed with GDM and have found ways to manage their condition after receiving health education from their respective healthcare professionals. Moreover, health education provided by healthcare professionals assisted women in administering medicines appropriately and safely.

Table 3
Perception of pregnant women with gestational diabetes on the management of GDM

Main Themes	Sub-themes
1. Challenges in self-management of GDM	1.1. Diet adaptation
	1.2. Self-management of prescribed medicines
	2.1. Diet and Exercise
2. Health systems support for GDM	2.2. Treatment and Monitoring of blood glucose
3. Referral to dietician	3.1. Decision support for gestational diabetes.

Subtheme 1.1: Diet Adaptation

Pregnant women face many challenges immediately after their GDM diagnosis, but they have to accept the condition and try to adjust their dietary habits.

Participant 1 said: "This condition has just been discovered recently when I was 28 weeks pregnant. At first, it was difficult for me because I haven't adjusted to the fact that I have diabetes and I have to eat like this." Another pregnant woman (i.e. participant 3) who experienced the same challenge mentioned that: "It's not easy but I have to tell myself that for me and my babies to be safe, I have to do what I'm being told. It's not easy to get some of the food I'm supposed to eat but I do try".

Subtheme 1.2: Self-management of prescribed medicines

The GDM-diagnosed pregnant women often have to manage their medicines at home without the assistance of healthcare professionals. Most pregnant women expressed that they had not experienced any challenges when they managed GDM at home, as they followed the health education provided whilst attending ANC (Antenatal care) visits, however, some, were recently diagnosed, and drugs were not prescribed yet. Participant 4 said: "So far nothing, as the medication I'm taking is treating me well".

Theme 2: Health System Support for Gestational Diabetes Mellitus

This theme was also achieved from two subthemes: (1) Self-management support for diet and exercise and (2) self-management support for treatment and monitoring blood glucose. An unhealthy diet and physical inactivity or a sedentary lifestyle are some of the modifiable risk factors for GDM. As part of self-care management, it is recommended that healthcare professionals should provide health education related to diet and exercise to women to reduce the incidence of GDM in pregnancy.

Subtheme 2.1: Self-management support - diet and exercise

Although diet and exercise are essential and encouraged for the management of GDM. However, some of the pregnant women in the present study expressed concern that they were not provided with any form of health education relating to dietary habits and physical activity after being diagnosed with GDM, while others received health education in this regard.

This was supported by participant 2 who said: "I was told to change diet and exercise". Participant 5 mentioned: "The dietician told me I must eat a meal like pap, it shouldn't exceed the size of my hand. I must eat less salt, and less sugar in everything. But if I am hungry maybe an hour or 2 hours before my meal, I must have a snack to avoid my sugar level from dropping down to a level wherein it can hurt me".

Contrary, participant 7 said she did not receive any health education and she said: "I was not told anything. I eat the way I used to eat before I got pregnant."

Subtheme 2.2: Self-management support - treatment and monitoring of blood glucose

Pregnant women were provided with health education on the treatment and monitoring of blood glucose but were not informed about the side effects of the drugs. Our findings found that treatment is accessible and always available. However, blood glucose monitoring devices were only given to pregnant women who were on injectable treatment, while those who were not on injectable were not provided with blood glucose monitoring devices.

Participant 6 made a remarks by saying " (...) before breakfast, I need to check my sugar level and wait for 30 minutes before administering an injection (ucreapid and protaphane). I have to wait 30 minutes before I eat, and after 30 minutes I would eat and wait for 2 hours before checking my sugar level if it's back to its normality".

This was supported by participant 5 who said: "The nurses showed me how to test myself as well as inject myself when it is time to take treatment". Participant 10 mentioned: "I'm taking metformin. Initially, I was taking 850 mg, but when I came back, they changed it to 500 mg and I used to feel dizzy after taking it and when I complained about it, they changed it back to 850 mg". Interestingly, participant 8 speak briefly by saying: "The treatment is easily accessible and always available".

Theme 3: Decision Support for gestational diabetes mellitus

There was inconsistency in referring pregnant women diagnosed with GDM to a dietician for management. The

majority of participants stated that they are only being seen by nurses and medical doctors and not referred to a dietician. For those who were referred to a dietician, they were previously admitted to the hospitals at some point during their pregnancy.

This was supported by participant 3 who said: "I am only seeing the medical doctor and nurse. I have not been referred to any other practitioner". This was reinforced by participant 16 who said: "(...) I was referred before I was discharged. They told me to first go to a dietician to explain to me which diet plan I must follow". Participant 9 also mentioned that: "In Johannesburg where I was admitted, they referred me to a dietician, and they told me about the diet I must follow and gave me a pamphlet".

Discussion

This study explores the perceptions of pregnant women diagnosed with GDM on the management of GDM by healthcare providers in rural areas of South Africa. Our findings revealed that most of the pregnant women diagnosed with GDM reported that they changed their eating habits as part of managing this health condition, while some did not change due to insufficient knowledge. This finding is consistent with earlier studies conducted in Gauteng [24], and Western Cape provinces of South Africa [25], which found that pregnant women who had insufficient knowledge found it difficult to adjust to unhealthy eating behaviours. Similarly, a systematic review of studies conducted in urban areas of high-income countries found that pregnant women reported that inadequate information provided by healthcare workers was a major challenge for the self-management of GDM [26].

Studies have cited that dietary advice is a fundamental component of treatment for GDM [24, 26], however, women were found to be concerned about the effects of diet control on foetal development [27]. In the present study, a few of the participants had challenges related to diet, in which poor access to healthy food as prescribed by the dietician was found to be a problem because of being unemployed. In contrast, in a cohort study at Chris Hani Baragwanath Academic Hospital in Soweto, Johannesburg, South Africa, women also expressed concern that adapting to healthy eating habits was challenging but accepting the new eating plan assisted in the control of blood sugar levels [24]. A systematic literature review study of pregnant women diagnosed with GDM found that women who experienced the prescribed diet reported a negative experience toward diet change [26].

Generally, exercise during pregnancy has been shown to be an effective intervention for the control of GDM [28-31]. However, one study from Taiwan found that pregnant women with first-time diagnosed GDM were concerned about whether exercise will cause preterm labour. Interestingly, in our study, one participant said that the healthcare professional advised her to exercise to control and manage GDM. In terms of medication prescription, a systematic review that includes twenty-one studies that discussion about women's experiences of GDM medication found that most of these studies reported medication prescriptions as

being a negative experience [26]. The reason for this has been found that women had insufficient time to figure things out causing feelings of anxiety and failure. In contrast, in our study, most pregnant women had positive experiences with the medication prescribed, except only one woman who had a negative experience with the medication prescribed because of the side effects which led to her dosage having to be changed.

The finding of this study revealed that blood glucose monitoring devices were only provided to women on injectable treatment to monitor blood glucose levels before and after meals. Our findings also showed that women expressed positive experiences as health education was provided first on the utilization of the device by health professionals before being sent home. Contrarily, several studies reported negative experiences with monitoring with many participants citing reasons such as feeling over-scrutinized [22, 32]. In the present study, though women were provided with health education on self-treatment and monitoring of blood glucose, but some were not informed about the side effects of the medications. It is very important to inform pregnant women with side effects of blood glucose control medications [33-35], particularly Metformin which is commonly prescribed in our setting [36].

In SA, guidelines for screening and management of GDM have been introduced [25], but the implementation of these guidelines at local facilities remains a major challenge [37].

Moreover, pregnant women diagnosed with GDM, who are referred to tertiary hospitals for their pregnancy follow-up, only a few return for their postpartum assessment, and management [37]. In accordance with the results of other studies, pregnant women diagnosed with GDM were routinely seen by medical practitioners and nurses [38]. Again, though it is imperative that pregnant women diagnosed with GDM be provided with diet advice and nutrition counselling by a dietician, in our study only previously admitted pregnant women to the healthcare facility were referred to the dietician for individual dietary advice.

Conclusion

In conclusion, the findings of this study revealed that the perception of pregnant women diagnosed with GDM on the management of GDM by healthcare providers is experienced through challenges in self-management and health systems support for gestational diabetes and referral to a dietician. The subcategories of challenges in self-management of GDM include dietary habits adjustment and self-management of prescribed medicines. Health systems support for GDM is associated with positive and negative feelings about diet, exercise, treatment, and monitoring of blood glucose. Moreover, referred to a dietician for medical nutrition therapy. The results of this study could be used to develop a counselling, and educational program, and strategies to improve dietitian referral rate.

Bibliography

1. Wang H, Li N, Chivese T, et al. IDF Diabetes Atlas: Estimation of Global and Regional Gestational Diabetes Mellitus Prevalence for 2021 by International Association of Diabetes in Pregnancy Study Group's Criteria. *Diabetes Res Clin Pract.* 2022;183:109050. doi:10.1016/j.diabres.2021.109050
2. Paulo MS, Abdo NM, Bettencourt-Silva R, Al-Rifai RH. Gestational Diabetes Mellitus in Europe: A Systematic Review and Meta-Analysis of Prevalence Studies. *Front Endocrinol (Lausanne).* 2021;12:691033. Published 2021 Dec 9. doi:10.3389/fendo.2021.691033
3. Juan J, Yang H. Prevalence, Prevention, and Lifestyle Intervention of Gestational Diabetes Mellitus in China. *Int J Environ Res Public Health.* 2020;17(24):9517. Published 2020 Dec 18. doi:10.3390/ijerph17249517
4. Mghanga FP, Maduhu EA, Nyawale HA. Prevalence and associated factors of gestational diabetes mellitus among rural pregnant women in southern Tanzania. *Ghana Med J.* 2020;54(2):82-87. doi:10.4314/gmj.v54i2.5
5. Egbe TO, Tsaku ES, Tchounzou R, Ngowe MN. Prevalence and risk factors of gestational diabetes mellitus in a population of pregnant women attending three health facilities in Limbe, Cameroon: a cross-sectional study. *Pan Afr Med J.* 2018;31:195. Published 2018 Nov 20. doi:10.11604/pamj.2018.31.195.17177
6. Muche AA, Olayemi OO, Gete YK. Prevalence of gestational diabetes mellitus and associated factors among women attending antenatal care at Gondar town public health facilities, Northwest Ethiopia. *BMC Pregnancy Childbirth.* 2019;19(1):334. Published 2019 Sep 13. doi:10.1186/s12884-019-2492-3
7. Macaulay S, Ngobeni M, Dunger DB, Norris SA. The prevalence of gestational diabetes mellitus amongst black South African women is a public health concern. *Diabetes Res Clin Pract.* 2018;139:278-287. doi:10.1016/j.diabres.2018.03.012
8. Mamabolo RL, Alberts M, Levitt NS, Delemarre-van de Waal HA, Steyn NP. Prevalence of gestational diabetes mellitus and the effect of weight on measures of insulin secretion and insulin resistance in third-trimester pregnant rural women residing in the Central Region of Limpopo Province, South Africa. *Diabet Med.* 2007;24(3):233-239. doi:10.1111/j.1464-5491.2006.02073.x
9. Ntshauba E, Maimela E, Ntuli ST. Prevalence and Associated Risk Factors of Gestational Diabetes Mellitus in Limpopo Province, South Africa. *Africa Journal of Nursing and Midwifery.* 2022;24(2):14 pages. doi:10.25159/2520-5293/12158
10. Valadbeigi T, ArabAhmadi A, Dara N, et al. Evaluating the association between neonatal mortality and maternal high blood pressure, heart disease and gestational diabetes: A case control study. *J Res Med Sci.* 2020;25:23. Published 2020 Mar 18. doi:10.4103/jrms.JRMS_814_18
11. Rodolaki K, Pergialiotis V, Iakovidou N, Boutsikou T, Iliodromiti Z, Kanaka-Gantenbein C. The impact of maternal diabetes on the future health and neurodevelopment of the offspring: a review of the evidence. *Front Endocrinol (Lausanne).* 2023;14:1125628. Published 2023 Jul 3. doi:10.3389/fendo.2023.1125628
12. Aburezq M, AlAlban F, Alabdulrazzaq M, Badr H. Risk factors associated with gestational diabetes mellitus: The role of pregnancy-induced hypertension and physical inactivity. *Pregnancy Hypertens.* 2020;22:64-70. doi:10.1016/j.preghy.2020.07.010
13. Ye W, Luo C, Huang J, Li C, Liu Z, Liu F. Gestational diabetes mellitus and adverse pregnancy outcomes: systematic review and meta-analysis. *BMJ.* 2022;377:e067946. Published 2022 May 25. doi:10.1136/bmj-2021-067946

14. Dias S, Adam S, Rheeder P, Pheiffer C. Prevalence of and risk factors for gestational diabetes mellitus in South Africa. *SAMJ*. 2019;109(7):463-467. doi:10.7196/samj.2019.v109i7.14127
15. Rasmussen L, Poulsen CW, Kampmann U, Smedegaard SB, Ovesen PG, Fuglsang J. Diet and Healthy Lifestyle in the Management of Gestational Diabetes Mellitus. *Nutrients*. 2020;12(10):3050. Published 2020 Oct 6. doi:10.3390/nu12103050
16. Lende M, Rijhsinghani A. Gestational Diabetes: Overview with Emphasis on Medical Management. *Int J Environ Res Public Health*. 2020;17(24):9573. Published 2020 Dec 21. doi:10.3390/ijerph17249573
17. Dennison RA, Ward RJ, Griffin SJ, Usher-Smith JA. Women's views on lifestyle changes to reduce the risk of developing Type 2 diabetes after gestational diabetes: a systematic review, qualitative synthesis and recommendations for practice. *Diabet Med*. 2019;36(6):702-717. doi:10.1111/dme.13926
18. Olesen K, Folmann Hempler N, Drejer S, Valeur Baumgarten S, Stenov V. Impact of patient-centred diabetes self-management education targeting people with type 2 diabetes: an integrative review. *Diabet Med*. 2020;37(6):909-923. doi:10.1111/dme.14284
19. Karavasileiadou S, Almegwely W, Alanazi A, Alyami H, Chatzimichailidou S. Self-management and self-efficacy of women with gestational diabetes mellitus: a systematic review. *Glob Health Action*. 2022;15(1):2087298. doi:10.1080/16549716.2022.2087298
20. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol*. 2006 Jan;3(2):77-101. doi:10.1191/1478088706qp063oa
21. Amin MEK, Nørgaard LS, Cavaco AM, et al. Establishing trustworthiness and authenticity in qualitative pharmacy research. *Res Social Adm Pharm*. 2020;16(10):1472-1482. doi:10.1016/j.sapharm.2020.02.005
22. Nowell LS, Norris JM, White DE, Moules NJ. Thematic analysis: Striving to Meet the Trustworthiness Criteria. *Int. J. Qual. Methods*. 2017;16(1):1-13. doi:10.1177/1609406917733847.
23. Johnson JL, Adkins D, Chauvin S. A Review of the Quality Indicators of Rigor in Qualitative Research. *Am J Pharm Educ*. 2020;84(1):7120. doi:10.5688/ajpe7120
24. Norris SA, Dickson LM, Buchmann EJ. Women's accounts of the gestational diabetes experience—a South African perspective. *S Afr J Obstet Gynaecol*. 2020;26(1):22-28. doi:10.7196/SAJOG.2020.v26i1.1534
25. Muhwava LS, Murphy K, Zarowsky C, Levitt N. Perspectives on the psychological and emotional burden of having gestational diabetes amongst low-income women in Cape Town, South Africa. *BMC Womens Health*. 2020;20(1):231. Published 2020 Oct 12. doi:10.1186/s12905-020-01093-4
26. Pham S, Churruca K, Ellis LA, Braithwaite J. A scoping review of gestational diabetes mellitus healthcare: experiences of care reported by pregnant women internationally. *BMC Pregnancy Childbirth*. 2022;22(1):627. Published 2022 Aug 8. doi:10.1186/s12884-022-04931-5
27. Su MC, Chang MY, Sun JC. Self-management experience of first-time diagnosed gestational diabetes mellitus: A focus group interview. *Nurs Open*. 2023;10(3):1744-1754. doi:10.1002/nop2.1431
28. Ming WK, Ding W, Zhang CJP, et al. The effect of exercise during pregnancy on gestational diabetes mellitus in normal-weight women: a systematic review and meta-analysis. *BMC Pregnancy Childbirth*. 2018;18(1):440. Published 2018 Nov 12. doi:10.1186/s12884-018-2068-7
29. Laredo-Aguilera JA, Gallardo-Bravo M, Rabanales-Sotos JA, Cobo-Cuenca AI, Carmona-Torres JM. Physical Activity Programs during Pregnancy Are Effective for the Control of Gestational Diabetes Mellitus. *Int J Environ Res Public Health*. 2020;17(17):6151. Published 2020 Aug 24. doi:10.3390/ijerph17176151
30. Deng Y, Hou Y, Wu L, Liu Y, Ma L, Yao A. Effects of Diet and Exercise Interventions to Prevent Gestational Diabetes Mellitus in Pregnant Women With High-Risk Factors in China: A Randomized Controlled Study. *Clin Nurs Res*. 2022;31(5):836-847. doi:10.1177/10547738211055576
31. Martínez-Vizcaíno V, Sanabria-Martínez G, Fernández-Rodríguez R, et al. Exercise during pregnancy for preventing gestational diabetes mellitus and hypertensive disorders: An umbrella review of randomised controlled trials and an updated meta-analysis. *BJOG*. 2023;130(3):264-275. doi:10.1111/1471-0528.17304
32. Parsons J, Sparrow K, Ismail K, Hunt K, Rogers H, Forbes A. Experiences of gestational diabetes and gestational diabetes care: a focus group and interview study. *BMC Pregnancy Childbirth*. 2018;18(1):25. Published 2018 Jan 11. doi:10.1186/s12884-018-1657-9
33. Ahmed SM, Sundby J, Aragaw YA, Nordeng H. Medication-related problems among hospitalized pregnant women in a tertiary teaching hospital in Ethiopia: a prospective observational study. *BMC Pregnancy Childbirth*. 2020;20(1):737. Published 2020 Nov 26. doi:10.1186/s12884-020-03433-6
34. Goes AS, Oliveira AS, de Andrade TNG, et al. Influence of drug-related problems on length of hospital stay of women with a history of preeclampsia: A multicenter study. *Pregnancy Hypertens*. 2022;27:8-13. doi:10.1016/j.preghy.2021.11.005
35. Vale Bezerra PK, Chaves Cavalcanti JE, Carlete Filho SR, Medeiros SDV, Oliveira AG, Martins RR. Drug-related problems in hypertension and gestational diabetes mellitus: A hospital cohort. *PLoS One*. 2023;18(4):e0284053. Published 2023 Apr 7. doi:10.1371/journal.pone.0284053
36. Jorquera G, Echiburú B, Crisosto N, Sotomayor-Zárate R, Maliqueo M, Cruz G. Metformin during Pregnancy: Effects on Offspring Development and Metabolic Function. *Front Pharmacol*. 2020;11:653. Published 2020 Jun 17. doi:10.3389/fphar.2020.00653
37. Mutabazi JC, Bonong PRE, Trottier H, et al. Integrating Gestational Diabetes Screening and Care and Type 2 Diabetes Mellitus Prevention After GDM Into Community Based Primary Health Care in South Africa-Mixed Method Study. *Int J Integr Care*. 2022;22(3):20. Published 2022 Sep 21. doi:10.5334/ijic.5600
38. Helmersen M, Sørensen M, Lukasse M, Laine HK, Garnweidner-Holme L. Women's experience with receiving advice on diet and Self-Monitoring of blood glucose for gestational diabetes mellitus: a qualitative study. *Scand J Prim Health Care*. 2021;39(1):44-50. doi:10.1080/02813432.2021.1882077

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Corresponding author: Ntuli TS, e-mail: tsntuli@hotmail.com

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