ORIGINAL ARTICLE

Self-management among pregnant women with gestational diabetes mellitus: a descriptive study from Liberia

Niveles de autocontrol de las embarazadas con diabetes mellitus gestacional: un estudio descriptivo de Liberia

Decontee Browne[1] ✉ and Dilek Sarpkaya Güder[1] ✉

[1]Near East University, Cyprus

ABSTRACT

The purpose of this study was to determine the self-management levels of pregnant women with GDM mellitus at a hospital in Liberia. A descriptive cross-sectional design was used. The sample of this study consisted 208 pregnant women with gestational diabetes mellitus (GDM) who attended antenatal care at the hospital from 2 August to 27 December 2023. Data were collected face-to-face using a Pregnancy Information Form and the Self-Management of Pregnant Women with GDM Scale. Data were analyzed using the SPSS 26 and descriptive statistics, and the Kruskal-Wallis and Mann-Whitney U tests were also used. The study finding showed that the majority of pregnant women had no basic or elementary education, almost half of them were unemployed, and they had a medium yearly income. The majority of pregnant women did not used insulin. The pregnant women in the research scored 75.24 ±18.97 points (min. 35; max. 140) on the Self-Management of Pregnant Women with GDM Scale. The self-management of pregnant women with GDM at the hospital in Liberia was at a low level. It is recommended that guidelines and policies be developed to improve the GDM self-management of pregnant women in the hospital.

Keywords: Gestational diabetes; pregnancy; self-care management.

RESUMEN

El propósito de este estudio fue determinar los niveles de autogestión de embarazadas con diabetes mellitus gestacional (DMG) en un hospital de Liberia. Se utilizó un diseño de investigación descriptivo y transversal. La muestra de este estudio consistió en 208 mujeres que asistieron a la atención prenatal en el hospital del 2 de agosto al 27 de diciembre de 2023. Los datos se recogieron cara a cara mediante un formulario de información sobre el embarazo y la escala de autocontrol de embarazadas con DMG. Se analizaron con el programa SPSS 26 y estadística descriptiva, y también se utilizaron las pruebas de Kruskal-Wallis y U de Mann-Whitney. Los resultados del estudio mostraron que la mayoría de las mujeres embarazadas no tenían estudios básicos o elementales, casi la mitad de ellas estaban desempleadas y tenían unos ingresos anuales medios. La mayoría de las embarazadas no utilizaba insulina. Las embarazadas de la investigación obtuvieron 75,24 ±18,97 puntos (mín. 35; máx. 140) en la Escala de Autocontrol de Embarazadas con DMG. El autocontrol de las embarazadas con DMG en el hospital de Liberia se situó en un nivel bajo. Se recomienda elaborar directrices y políticas para mejorar el autocontrol de la DMG de las embarazadas en el hospital.

Palabras clave: diabetes gestacional; embarazo; autogestión de la salud.

INTRODUCTION

As defined by the World Health Organization (WHO, 2022), gestational diabetes mellitus (GDM) encompasses any degree of glucose intolerance that originates or is first detected during pregnancy. Impairment of the compensatory increase in insulin production during pregnancy and a rise in insulin resistance are responsible for GDM. Estimates of its worldwide prevalence range from 1% to 28%, and all women who do not currently have diabetes are at risk for developing GDM. Approximately 2-10% of all pregnancies that take place in the United States each year are affected by GDM (Center for Disease Control [CDC], 2022). The vast majority of cases occur in poor and middle-income nations, where obstetric care is scarce (World Diabetes Federation, 2022).

Women diagnosed with GDM often have a limited understanding of the disease, its treatment and the importance of self-care. Effective management of diabetes requires good self-care by the GDM patient (Dhyani et al., 2018). "Self-management" means the ability to deal with the physical and mental impacts, including symptoms, treatments, and lifestyle adjustments, that accompany a chronic disease. Key components of self-management include increasing physical activity, changing one's diet, and monitoring one's blood glucose levels (Mensah et al., 2020). It is essential that expectant mothers can manage their condition and take responsibility for their GDM (Kuang et al., 2022). Diabetes must be controlled through self-management, and patient motivation and practicality are key factors in determining the efficacy and viability of this capacity for GDM (Lambrinou et al., 2019).

Some studies have shown that the ability to self-regulate diabetes in women with GDM is not adequate (Gupta et al., 2024; He et al., 2021; Karavasileiadou et al., 2022; Kordi et al., 2016; Staynova et al., 2018). However, other studies have shown that women with GDM have moderate or good diabetes self-management (Elsaba et al., 2020; Dissassa et al., 2023, Prabhu et al., 2021; Sushko et al., 2024).

Obtaining knowledge about the capacity for self-care is crucial for creating efficient methods of self-management. To effectively address the problem regarding pregnant women diagnosed with GDM, this study focused on the promotion of this health-related autonomyin a hospital environment. The findings of this research will be crucial in guiding health policy and will help guide Liberian health authorities in the planning and provision of health services.

By improving the understanding of GDM management, the study seeks to enhance the overall quality of healthcare services offered to pregnant women, thus contributing to improved maternal and fetal health outcomes in Liberian hospitals. The findings of this study may also help future researchers who are interested in investigating self-management among pregnant women with GDM mellitus.

This study aimed to assess the self-management levels of pregnant women diagnosed with gestational diabetes mellitus (GDM) using a standardized GDM self-management scale within a healthcare facility in Liberia. The central research question guiding this study was: What are the self-management levels of pregnant women with GDM receiving care in a Liberian hospital?

METHODOLOGY

Design
A descriptive, cross-sectional quantitative design was used in this study.

Population/Sample
All pregnant women with GDM attending prenatal care at Liberia's Everlasting Love Winning African (ELWA) Hospital between 2 August and 27 December 2023 were included in the study. Using the G*Power statistical software, the smallest sample size calculated as necessary for a Mann-Whitney U Test and One-Way Analysis of Variance (ANOVA) for 80% Power, medium effect size, 95% confidence level and 5% margin of errors was 200. The sample thus consisted of a total of 208 pregnant women.

The inclusion criteria were being in the second trimester, having been diagnosed with GDM by a doctor, not having any hypertension, and being able to speak and understand English.

Instruments
The Pregnancy Information Form and the Self–Management of Pregnant Women with GDM Scale were used as the data collection tools. The opinions of two experts regarding the Pregnancy Information Form were obtained and two questions were added as a result.

The Pregnancy Information Form was made up of eight individual questions, including questions about the women's age, educational level, occupational status, family income, place of residence, previous pregnancies and children, and insulin usage (Kim et al., 2019; Kuang et al., 2022; Mdoe et al., 2021; Tang et al., 2023; Zandinava et al., 2017).

The Self-Management of Pregnant Women with GDM Scale was developed in 2022 by Guofang Kuang, Xin Meng, Yiqian Wang, Ru Xu, and Meng Zhang in the English language. The scale refers to any system or approach that involves individuals taking responsibility for managing their own GDM. It consists of 35 items that are categorized into four factors: blood glucose control (15 items), self-management awareness (eight items), pregnancy management (seven items), and resource usage (five items). All the items are evaluated using a five-point Likert scale: 1 = "strongly disagree", 2 = "disagree", 3 = "neutral", 4 = "agree", and 5 = "strongly agree". The scale is assessed by calculating the average. Poor self-management ability is defined as a score of 60 or below, moderate self-management ability as a score between 60 and 80, and excellent self-management ability as a score of 80 or above (Kuang et al., 2022).

The authors who conducted the validity and reliability study of the scale found the Cronbach's alpha value of the study to be 0.95 for the whole scale, with a total of 35 items (Kuang et al., 2022). In this research, Cronbach's alpha value was determined to be 0.87.

Data Collection

The data collection tools were filled in by the nurses between 2 August and December 27, 2023. Data was gathered between Monday and Friday, between the hours of 10:00 am and 4:30 pm.

Statistical Analysis

The data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 26.0. Descriptive statistics, including the mean, standard deviation, minimum, and maximum, were calculated to determine the degree of self-care management in individuals with GDM. The data were assessed for parametric assumptions, including normality, utilizing methods such as the histogram, the Kolmogorov–Smirnov test, and the Shapiro-Wilk test. Due to the lack of normal distribution in the data, the research used the Mann-Whitney U test and Kruskal-Wallis test to determine the relationship between the demographic variables and the self-care management of GDM. The Dunnett T3 test was used as the post hoc test due to its classification as one of the non-parametric post hoc tests.

Ethical Considerations

Before data collection commenced, the study (project no: NEU/2023/115-1752) was authorized by the ethical committee of the Near East University. Approval for the study was granted by the administration of ELWA Hospital after the researcher explained the objective of the research. To prevent any ethical impropriety, the creators of the scale used in this study have been acknowledged. The study was conducted in accordance with the Helsinki Declaration, which requires individuals conducting medical research to protect the well-being, rights, and privacy of research participants.

RESULTS

The average age of the participants was 30.91(s± 9.18) years. It was found that a plurality of the pregnant women (34.7%) had no basic or elementary education, 67.3% of them lived in urban areas, more than half of them were unemployed (52.4%), while almost half of them had a medium yearly income (48.1%). When the participants' numbers of pregnancies were examined, 42.8% of them had had three or more pregnancies, 31.7% had had two pregnancies and 25.5% had had one pregnancy. When the participants' numbers of children were examined, a plurality of them had one child (38.5%), followed by those with three or more children (32.2%), and then those with two children (29.3%). The majority of the participants (77.0%) did not use insulin.

Table 1 presents the descriptive statistics of the pregnant women's scores on the Self-Management of Pregnant Women with GDM Scale. The pregnant women in the research scored 75.24 ±18.97 points (min. 35; max. 140) for the scale. As a percentage the total score was 49.13%, which shows that the self–management of GDM was at a low level (range: 35 - 175 points).

Table 1. *Descriptive Statistics of the Pregnant Women's Scores on the Self-Management of Pregnant Women with GDM Scale (n=208).*

	$\overline{x}$	s	Min.	Max.
Total Self-Management of Pregnant Women with GDM Scale (range: 35 - 175 points)	75.24	18.97	35.00	140.00
Blood glucose management subscale (range: 15 - 75 points)	29.48	9.42	15.00	60.00
Self-management consciousness subscale (range: 8 - 40 points)	16.86	5.25	8.00	32.00
Pregnancy management subscale (range: 7 - 35 points)	16.72	5.60	7.00	28.00
Resource utilization subscale (range: 5 - 25 points)	12.17	4.69	5.00	20.00

$\overline{x}$

Note. mean, s= Standard Deviation, Min.= Minimum, Max. = Maximum.

The pregnant women scored 29.48 ±9.42 points (min. 15; max. 60) for the blood glucose management subscale. As a percentage, the subscale score was 49.13% indicating a low level of blood glucose management of GDM. The pregnant women scored 16.86±5.25 points (min. 8; max. 32) for the self-management consciousness subscale. As a percentage, the subscale score was 59.71%, indicating a moderate level of self-management consciousness of GDM. The pregnant women scored 16.72±5.60 points (min. 7; max. 28) for the pregnancy management subscale. As a percentage, the subscale score was 59.71%, indicating a moderate level of pregnancy management of GDM. The pregnant women scored 12.17±4.69 points (min. 5, max. 20) for the resource utilization subscale. As a percentage, the subscale score was 60.85%, indicating a moderate level of resource utilization for GDM.

The subscale for which the women achieved the highest score was the resource utilization subscale, with 12.17±4.69 (60.85%), while subscale with the least points was the blood glucose management, with 29.48 ±9.42 (49.13%).

No statistically significant differences were found between age, educational level, annual family income, number of pregnancies, or number of children and the total score of the Self-Management of Pregnant Women with GDM Scale, as well as its subscales: blood glucose management, self-management consciousness, pregnancy management, and resource utilization ($p > 0.05$). Similarly, occupational status showed no significant association with the total scale score or with the blood glucose management, self-management consciousness, and pregnancy management subscales ($p > 0.05$). However, a statistically significant difference was observed between occupational status and the resource utilization subscale ($p < 0.05$).

Table 2 shows the comparison of scores for the Self-Management of Pregnant Women with GDM Scale with the use of insulin. A statistically significant difference was found between using insulin and the scores for the total scale and the blood glucose management, self-management consciousness, pregnancy management and resource utilization subscales ($p < 0.01$). The women who used insulin had higher median scores than those who did not use insulin.

Table 2. *Comparison of Scores for the Self-Management of Pregnant Women with GDM Scale and Use of Insulin*

Variable	Insulin usage	n	Median	Mean rank	Mann-Whitney U Test	
					Z	p
Blood glucose management subscale	Yes	47	30.00	138.79	-4.536	.001*
	No	160	27.00	93.78		
Self-management consciousness subscale	Yes	47	20.00	146.90	-5.602	.001*
	No	160	15.00	91.40		
Pregnancy management subscale	Yes	47	21.00	132.97	-3.783	.001*
	No	160	15.00	95.49		
Resource utilization subscale	Yes	47	15.00	128.40	-3.197	.001*
	No	160	10.00	96.83		
Total Self-Management of Pregnant Women with GDM Scale	Yes	47	92.00	144.17	-5.231	.001*
	No	160	68.00	92.20		

Note. p≤0.01*

DISCUSSION

The pregnant women in the study scored 75.24 ±18.97 points (range: 35 - 175 points) for the total Self-Management of Pregnant Women with GDM Scale, which shows that the self–management of GDM was at a low level. The highest scores were obtained for the resource utilization subscale, while the lowest scores were for the blood glucose management subscale (Table 2). Liberia is one of the poorest countries in West Africa, with half of the population living below the poverty level (World Bank, 2024).

The country's healthcare infrastructure has many serious issues, including a lack of healthcare facilities, equipment, and qualified healthcare workers. This restricts the provision of GDM care services such as self-management education. For example, Liberia's limited financial resources mean that access to crucial supplies and drugs for controlling GDM is restricted. This may involve glucose monitoring devices, insulin, and other drugs required for regulating blood sugar levels during pregnancy (OPHI, 2022; Bleah et al., 2023; Stebbins et al., 2018).

The finding of low insulin usage in the women with GDM in this study may be related to this situation. Self-management is at a low level at the ELWA hospital because little emphasis is placed on diabetes education and the monitoring of patients who are diabetic is not adequate. As stated by Jakubowski et al. (2022), lack of knowledge and understanding often leads to low motivation to practice self-management.

Supporting this result, Dhyani et al. (2018) found that pregnant women (n=500) diagnosed with GDM had low levels of self-management knowledge. Similarly, a study by the Bangladesh Diabetes Association across 15 outpatient clinics (n=1374) reported insufficient knowledge related to GDM self-management (Bhowmik et al., 2018). These findings are consistent with more recent research indicating that, overall, women with GDM often lack adequate knowledge and self-management skills (Dhyani et al., 2018; Gupta et al., 2024; He et al., 2021; Jakubowski et al., 2022; Karavasileiadou et al., 2022; Kordi et al., 2016; Staynova et al., 2018).

On the other hand, some studies have shown that women with GDM have moderate or good diabetes self-management (Elsaba et al., 2020; Prabhu et al., 2021; Sushko et al., 2024; Wafa et al., 2023). The differences in these findings may be due to disparities in the socioeconomic levels of the pregnant women. The kinds of healthcare services provided in the hospitals may also lead to different study results.

This study found that a statistically significant difference existed between the scores for the Self-Management of Pregnant Women with GDM Scale according to the use of insulin (p < 0.01) (Table 2). The women who used insulin had higher median scores than those who did not use. Free access to treatment for pregnant women in need of insulin is considered important for women's self-management.

The use of insulin has the potential to influence several facets of self-management, including food selection, levels of physical activity, and frequency of glucose testing. Women who use insulin may pay more attention to their consumption of carbohydrates, meal times, and modifications to their insulin dosage. The provision of supplementary assistance and direction from healthcare practitioners has the potential to augment self-

management strategies among women who use insulin, in contrast to those who do not use insulin; this accounts for the difference in those who used and did not use insulin in the present study.

This study has some limitations. The research was limited only to gestational pregnant women who were attending antenatal care at the ELWA Hospital, which is located in Paynesville, just outside of Liberia's capital city, Monrovia. As such, the results may not apply to all settings and women with GDM. The sample size may be another limitation of the study. Since those with a diagnosis of GDM could not be clearly identified in the study, all those who reported being diagnosed with GDM by a doctor in their last pregnancy were included in the study.

CONCLUSIONS

The pregnant women with GDM in the study obtained low scores for the total Self-Management of Pregnant Women with GDM Scale. It is thus recommended that nurses organize comprehensive educational activities on GDM self-management for pregnant women attending the outpatient clinic. Guidelines and manuals on GDM should be developed in the hospital where the study was conducted. For future research, it is recommended that similar studies and qualitative studies be conducted with larger sample sizes examining GDM self-management and the experiences of pregnant women in Liberian hospitals.

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Conflicts of Interest:
The authors declare that they have no conflicts of interest.

Author Contributions:
Decontee Browne and Dilek Sarpkaya Güder: Conceptualization, data curation, formal analysis, investigation, methodology, supervision, validation, visualization, drafting the original manuscript and writing, review, and editing.