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Effect of Gestational Diabetes Clinical Pathway Application on Women's Satisfaction

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Abstract: **Background**: A clinical pathway is an integrated care plan designed with the required and time-bound care by the multidisciplinary team to enhance patient outcomes and degree of satisfaction. The purpose was to assess the effect of gestational diabetes clinical pathway application on women's satisfaction. **Design**: The study was conducted using a quasi-experimental research design. **Settings**: This study was conducted at MCH Centers in Shebin EL-Kom and Tala City, Menoufia Governorate. Sampling: This study involved a purposive sample of 60 gestational diabetic women. **Instruments**: Characteristics of women interview questionnaire and a satisfaction questionnaire. **Results**: The gestational diabetic women's satisfaction has improved in the study group (100%) compared to the control group. **Conclusion**: Using clinical pathways had a positive impact on the satisfaction of women who had gestational diabetes compared to the control group. **Recommendations:** A gestational diabetic care training program for maternity nurses is recommended to enhance nurses' performance based on the clinical pathway application.

Keywords: *Clinical pathway application, gestational diabetic women, women's satisfaction.*

Thanawala (2021), in his study about "Negotiating gestational diabetes mellitus" in India, stated that the development of glucose intolerance is one common physiological change that can occur during pregnancy, causing hyperglycemia and gestational diabetes mellitus (GDM). Also, he revealed that it is estimated that one in every six pregnancies worldwide is associated with hyperglycemia, 84% of which are classified as GDM. Similarly, Ferrocino (2019), in his study about "Changes in the gut microbiota composition during pregnancy in patients with gestational diabetes mellitus" in the UK and Europe, added that GDM is an important determinant of the development of T2D in both mothers and their fetuses.

According to AGanapathy (2021), in his study about "Determinants of gestational diabetes mellitus: a hospital-based case–control" in coastal South India, GDM is a type of diabetes diagnosed in the second or third trimester of pregnancy that was not clearly overt diabetes prior to gestation. Meanwhile, Tandon et al. (2019), in their study about "Postpartum screening after gestational diabetes mellitus: aiming for universal coverage" in Indian, emphasized that GDM is one of the most frequent metabolic diseases during pregnancy and affects approximately 7% of all pregnancies. Likewise, he added that this clinical condition potentially affects not only negative medical outcomes but also mental health status, with additional adverse consequences for psychological well-being and quality of life (QoL).

Subsequently, Schneider (2020), in his study about "The prevalence of gestational diabetes in advanced" in Australia, added that GDM, defined as glucose intolerance with onset or first recognition during pregnancy, is a common antepartum condition impacting about 9–25% of pregnancies worldwide, with rates fluctuating depending on study populations and diagnostic criteria.

According to the American Diabetes Association Professional Practice Committee (2022), gestational diabetes does not usually cause any symptoms. Also, it was reported that most cases are only discovered when the blood sugar levels are tested during screening for gestational diabetes. Correspondingly, he reported that some women may develop symptoms if their blood sugar levels get too high, such as increased thirst, frequent urination, a dry mouth, tiredness, blurred eyesight, and genital itching.

Likewise, Tastan et al. (2018), in their study about "Treatments for women with gestational diabetes mellitus: an overview of Cochrane systematic reviews," proved that the benefits of the clinical pathway were emphasized as improvement of patient and family satisfaction with care by providing information on the treatment process, which enhances collaboration; promotion of job performance and the satisfaction of care team members via multidisciplinary communication and teamwork; reduction of hospital stays and costs by focusing on continuity of care and systematic and qualified patient care; and estimation of treatment costs.

Clinical pathways are increasing women's satisfaction with intrapartum care, which is critical to improve labor care quality and rates of health-seeking behaviors among women (Lockhart, 2019). Furthermore, Lewis et al. (2019), in their study about "Effect of dietary and lifestyle factors on the risk of gestational diabetes" in China, added that women's satisfaction with GDM clinical pathways measures the ability of services to meet women's expectations, and it is an important determinant of the choice of health facility and its future utilization.

Significance of Study

According to Leila et al. (2018), GDM represents the most common metabolic complication during pregnancy. Furthermore, they added that it is associated with maternal and fetal

complications. Despite this, they demonstrated that approximately 7% of all pregnancies are affected by GDM, resulting in more than 200,000 cases worldwide annually, and the prevalence may vary from 1% to 14% among all pregnancies.

Likewise, Abd El-Hay (2019) confirmed that the best strategies for organizing and carrying out nursing care for GDM are through clinical pathways. Furthermore, Morris et al. (2019) mentioned that women's satisfaction is the level of difference between their expectations of ideal care and their perception of real care. Moreover, they stated that it is an important indicator of the quality of healthcare.

Purpose of the Study

To assess the effect of gestational diabetes clinical pathway application on women's satisfaction.

Study Hypotheses

- Gestational diabetic women who receive gestational diabetes care based on the clinical pathway are expected to have a higher satisfaction level than those who do not receive it.

Method

Study Design:

The study was conducted using a quasi-experimental design with one group (study/control for gestational diabetic women).

Study Settings:

This study was conducted at MCH Centers in Shebin EL-Kom and Tala City in Menoufia Governorate.

Sample type and size:

A purposive sample of 60 gestational diabetic women was used. One group (the study group) will get gestational diabetic women clinical pathway care (30 gestational diabetic women, 15 from MCH Centers in Shebin EL-Kom and 15 from MCH Centers in Tala City), while the other (the control group) will merely receive conventional antenatal care for GDM (30 gestational diabetic women, 15 from MCH Centers in Shebin EL-Kom and 15 from MCH Centers in Tala City).

Data collection instruments:

The data was collected using the following instruments:

Instrument (I): Women's satisfaction with the gestational diabetes clinical pathway questionnaire.

It included three parts:

- **Part (a):** Socio-demographic data of gestational diabetic women, such as age, education, occupation, marital status, and income.
- **Part (b):** Obstetric history of gestational diabetic women, such as parity, abortions, number of living children, and attending or not attending antenatal visits.
- **Part (c):** Oxford Maternity Diabetes Treatment Satisfaction Questionnaire (OMDTSQ): This scale was adopted from the Oxford University Hospitals Report (2008). To measure the women's satisfaction with applying the gestational diabetes clinical pathway. This was comprised of nine questions designed to assess the

general satisfaction with gestational diabetes care, the acceptability and reliability of the technology, and the perceived relationship with the diabetes care team. The OMDTSQ is worded in English and will be translated into Arabic. At the end of the questions, the women will be encouraged to write free text responses to provide any other feedback or suggestions.

Satisfaction's Scoring System

The satisfaction level will be assessed and coded accordingly. Each item was judged according to a three-point Likert scale continuum from agree (2) to neutral (1) to disagree (0). These scores were converted into percentage scores. The higher scores reflected a higher level of satisfaction.

The total score of satisfaction was classified as follows (the Oxford University Hospitals Report, 2008):

- Low satisfaction: ≤ 50% of the total satisfaction score
- Moderate satisfaction 51- 75% of the total satisfaction score
- Highly satisfaction: ≥ 76 % of the total satisfaction score

Validity of Instrument:

Three qualified experts revised the validity of this instrument (two experts from the Maternal and Newborn Health Nursing Department at the Faculty of Nursing and one expert from the Obstetrics and Gynecology Department at the Faculty of Medicine). Also, they were asked to judge the items for their completeness and clarity. The suggestions were incorporated into the instrument, and the modifications were made. The modifications included adding one item (feel the equipment I use to check my blood sugars is reliable) in part III of instrument I.

Reliability of the instrument:

The researcher used test-retest reliability to examine internal consistency by administering the same instruments to the same individuals under identical conditions on two or more occasions.

Pilot Study:

A pilot study was implemented to test the applicability of the instruments, the feasibility of the study, and to estimate the time needed for data collection. It was performed on 10% of the total participants, which is equal to 6 gestational diabetic women. The sample of the pilot study was not included in the total study sample.

Ethical considerations:

A written approval was obtained from the Ethical and Research Committee of the Faculty of Nursing, Menoufia University. A written informed consent was obtained for each participant in the study after explaining the purpose of the study. All pregnant women were informed of the proposed benefits of this study in the form of a higher knowledge and performance score about the gestational diabetes clinical pathway, which contributed to improving a higher women's satisfaction score. They were also informed that there was no potential harm.

They will be assured of their confidentiality and their right to withdraw from study at any time. The use of secured sheets with the names of the pregnant women substituted for

numbers helped maintain confidentiality. All pregnant women were informed that the information they provided during the study was kept confidential and used only for statistical purposes. After finishing the study, the finding was presented as group data, with no personal women's information remaining. Each woman was informed that participation in the study will be voluntary, and they can withdraw from the study whenever they decide to do so. Also, each woman was allowed to ask any question about the study details.

Procedure:

Preparatory Phase:

- An extensive review related to the study area was done, including electronic dissertations, available books, articles, and periodicals. A review of the literature to formulate a knowledge base relevant to the study area was also done.
- Official permission to carry out the study was obtained from the director of each setting after submitting an official letter from the Dean of the Faculty of Nursing explaining the purpose of the study and the method of data collection.

Interviewing and assessment phase:

- This phase will encompass interviewing gestational diabetic women.
- At the beginning of the study, the researcher will introduce herself and explain the purpose and nature of the study to the participants. Then, all gestational diabetic women will sign the informed consent forms.
- Each woman will be assessed by determining her demographic data and obstetric history and measuring women's satisfaction with applying the gestational diabetes clinical pathway care using instrument I. This phase will take 30 minutes.
- The data that will be obtained during this phase will serve as the baseline for further comparisons to investigate the effect of GDM clinical pathway application.

Implementing Phase:

- The researchers provided two educational sessions about the gestational diabetes clinical pathway for gestational diabetic women using a booklet that includes the definition, importance, components, and the nurse's role.
- The researchers explained the GDM clinical pathway step-by-step to the gestational diabetic women. Each session included 30 gestational diabetic women.

Evaluation Phase:

- The studied women with gestational diabetes mellitus were evaluated immediately after the implementation of the gestational diabetes clinical pathway by trained nurses using instrument III.

STATISTICAL ANALYSIS

Data was entered and analyzed using SPSS (Statistical Package for Social Science) statistical package version 25. Graphics were done using the Excel program as well as the SPSS package. Quantitative data were presented by mean ($\bar{X}$) and standard deviation (SD). It was analyzed using the Pearson correlation (r) test for comparison

between two quantitative variables. Qualitative data was presented in the form of frequency distribution tables, numbers, and percentages. It was analyzed by the chi-square (χ^2) test. The significance level was set as a P value < 0.05 for all significant tests.

Results

Table 1 shows the sociodemographic data for women with gestational diabetes. It shows that 60.0% of the control group and 53.3% of the study group were between the ages of 20 and 34. Also, university education was present in 46.6% of the women with gestational diabetes. Furthermore, 60.0% of the control group and 66.7% of the study group are unemployed. In addition, 86.6% of the study group, compared to 93.3% of the control group, are married. Additionally, 73.3% of the study and control groups had enough income.

Table 2a shows the obstetric history of women with gestational diabetes. It reveals that there were no statistically significant differences between the study and control groups regarding the obstetric history of women with gestational diabetes, including age at first pregnancy, the gestational age of the current pregnancy, number of parties, number of abortions, number of living children, previous pregnancy complications, gestational age at first visit in weeks, and place of antenatal care ($p > 0.05$).

Table 3 shows the women's satisfaction with applying gestational diabetes clinical pathway care. It reveals that there were highly statistically significant differences between the study and control groups regarding the women's satisfaction with applying gestational diabetes clinical pathway care, including satisfaction with current treatment, convinced that the treatment I am receiving was best for them, satisfaction with an understanding of diabetes, I feel like my gestational diabetes team knows enough about my current level of diabetes control, satisfaction with gestational diabetes teams of diabetes, I feel like I have a good relationship with my gestational diabetes team, I find the equipment I use to check my blood sugar available, I feel the equipment I use to check my blood sugars is reliable and blood sugar monitoring fits in with my lifestyle ($p \leq 0.001$).

Table 4 shows the total women's satisfaction scores with applying gestational diabetes clinical pathway care. It reveals that the total satisfaction score was 3.46±3.72 in the control group and 17.73±0.82 in the study group.

Figure 1 shows the total women's satisfaction categories with applying gestational diabetes clinical pathway care. It shows that 90.0% of the maternity nurses have low satisfaction performance categories in the control group versus 100.0% of them having highly satisfied performance categories in the study group.

Table (1): Socio-demographic data for women with gestational diabetes (n=60)

Variables	The studied participants				χ^2	P –value
	Study group (n=30)		Control group (n=30)			
	No.	%	No.	%		
Women age						
< 20 yr	2	6.7%	4	13.3%	1.584ns	>0.05
20–34 yrs.	16	53.3%	18	60.0%		
≥ 35 yrs	12	40.0%	8	26.7%		
Educational level						
Primary education	8	26.7%	8	26.7%	0.000ns	>0.05
Secondary education	8	26.7%	8	26.7%		
University education	14	46.6%	14	46.6%		
Occupation						
Work	10	33.3%	12	40.0%	0.287ns	>0.05
Not work	20	66.7%	18	60.0%		
Marital status						
Married	26	86.6%	28	93.3%	2.074ns	>0.05
Divorced	2	6.7%	0	0.0%		
Widow	2	6.7%	2	6.7%		
Income						
Enough	22	73.3%	22	73.3%	0.000ns	>0.05
Not enough	8	26.7%	8	26.7%		

N.B. ns means non-statistically significant.

Table (2): Obstetric History of Women with Gestational Diabetes (n=60)

Variables	The studied participants				χ^2	P – value
	Study group (n=30)		Control group (n=30)			
	No.	%	No.	%		
Age at first pregnancy						
Less than 20 years	2	6.7%	4	13.3%	0.741ns	>0.05
Over 20 years	28	93.3%	26	86.7%		
The gestational age of the current pregnancy						
Less than 25 weeks	0	0.0%	2	6.7%	2.069ns	>0.05
More than 25 weeks	30	100.0%	28	93.3%		
Number of parities						
Nullipara	6	20.0%	6	20.0%	0.000ns	>0.05
One previous birth	10	33.3%	10	33.3%		
Two previous births	14	46.7%	14	46.7%		
Number of abortions						
None	20	66.7%	22	73.4%	0.495ns	>0.05
One	4	13.3%	4	13.3%		
Two	6	20.0%	4	13.3%		
Number of living children						
None	6	20.0%	6	20.0%	3.021ns	>0.05
One	14	46.7%	8	26.7%		
Two	10	33.3%	16	53.3%		
Previous pregnancy complications						
Yes	16	53.3%	24	80.0%	4.800ns	>0.05
No	14	46.7%	6	20.0%		

Gestational age at first visit in weeks						
Less than 20 weeks	26	86.7%	20	66.7%	3.354ns	>0.05
Over 20 weeks	4	13.3%	10	33.3%		
Place of antenatal care						
Governmental hospital	22	73.4 %	22	73.3%	1.067ns	>0.05
A private hospital or clinic	4	13.3%	2	6.7%		

N.B. ns means non-statistically significant.

Table (3): Women's satisfaction with applying gestational diabetes clinical pathway care (n=60)

Variables	The studied participants				χ^2	P –value
	Control group (n=30)		Study group (n=30)			
	No.	%	No.	%		
I am satisfied with my current treatment.						
Agree	0	0.0%	30	100.0%	60.000**	≤0.001
Neutral	10	33.3%	0	0.0%		
Disagree	20	66.7%	0	0.0%		
Convinced that the treatment received is the best.						
Agree	0	0.0%	28	93.3%	54.000**	≤0.001
Neutral	6	20.0%	2	6.7%		
Disagree	24	80.0%	0	0.0%		
Satisfied with my understanding of diabetes.						
Agree	0	0.0%	28	93.3%	54.000**	≤0.001
Neutral	6	20.0%	2	6.7%		
Disagree	24	80.0%	0	0.0%		
I feel like my gestational diabetes team knows enough about my current level of diabetes control.						
Agree	10	33.4 %	30	100.0%	30.000**	≤0.001
Neutral	4	13.3%	0	0.0%		
Disagree	16	53.3%	0	0.0%		
I am satisfied with my gestational diabetes teams of diabetes.						
Agree	4	13.3%	29	96.7%	42.150**	≤0.001
Neutral	8	26.7%	0	0.0%		
Disagree	18	60.0%	1	3.3%		
I feel like I have a good relationship with my gestational diabetes team.						
Agree	8	26.7%	30	100.0%	34.737**	≤0.001
Neutral	2	6.7%	0	0.0%		
Disagree	20	66.6 %	0	0.0%		
The equipment I use to check my blood sugar is available.						
Agree	2	6.7%	30	100.0%	52.500**	≤0.001
Neutral	4	13.3%	0	0.0%		
Disagree	24	80.0%	0	0.0%		
I feel the equipment I use to check my blood sugar is reliable.						
Agree	2	6.7%	30	100.0%	52.500**	≤0.001
Neutral	4	13.3%	0	0.0%		
Disagree	24	80.0%	0	0.0%		
My blood sugar monitoring fits in with my lifestyle.						
Agree	0	0.0%	24	80.0%	47.200**	≤0.001
Neutral	2	6.7%	4	13.3%		
Disagree	28	93.3%	2	6.7%		

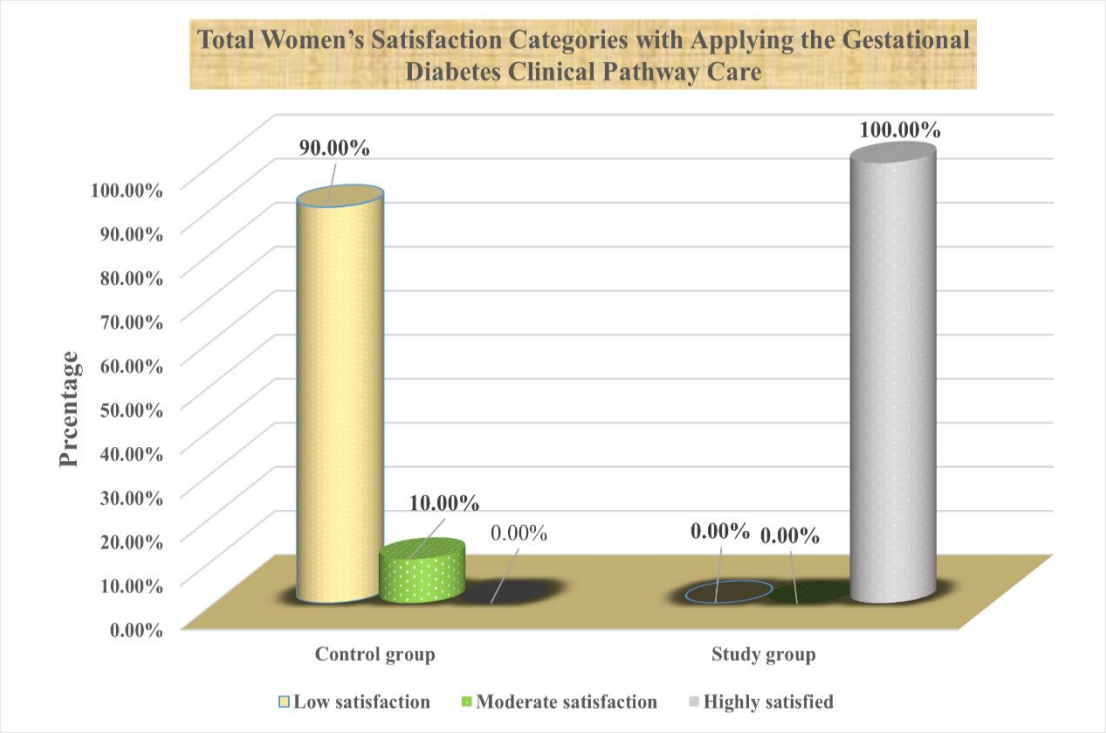
N.B. ** means highly statistically significant.

Table (4): Total Women's Satisfaction Scores with Applying the Gestational Diabetes Clinical Pathway Care (n=60)

Variables	The studied participants		χ^2	P –value
	Control group (n=30)	Study group (n=30)		
Total satisfaction scores.				
$\bar{x} \pm SD$	3.46±3.72	17.73±0.82	20.452**	≤0.001

N.B. ** means highly statistically significant.

Figure (7): Total Women's Satisfaction categories with applying the Gestational Diabetes clinical pathway care.



Discussion

The results of the current study revealed that the higher percentages of women who applied the clinical pathway group were manifested by good knowledge regarding adequate diet during labor, pain relief measures, and activity compared to the group of women who received routine care, which indicated that education was effective on the promotion of women's levels of knowledge regarding gestational diabetes care. These study findings were in the same line with Abd-El-Rhman (2021), who studied "Designing a Clinical Pathway for the care management of patients with burns at King Fahad National Guard Hospital" in Riyad. He found an obvious improvement in the quality of care and patient knowledge level post-clinical pathway implementation. Furthermore, the educational booklet helps patients become aware of the expectations for their condition, thus reducing anxiety associated with illness.

Moreover, these findings were incongruent with Zachary et al.'s (2019) study, which was conducted on "Counseling about gestational weight

gain and healthy lifestyle during pregnancy" in Canada. They stated that pregnant women may lack information that contributes to a healthy pregnancy, such as counseling, physical activity, and nutrition during pregnancy.

Concerning maternal satisfaction towards gestational diabetes clinical pathway care, the results of the present study clarified that there were highly statistically significant differences between the study and control groups regarding the women's satisfaction with applying gestational diabetes clinical pathway care. It may be explained by the level of satisfaction that depends on the practice of care.

This study's findings agreed with the findings of Dayyani's (2022) study, which studied "A qualitative study about the experiences of ethnic minority pregnant women with gestational diabetes" in Denmark. They concluded that women were generally satisfied with the hospital-based information.

Similarly, the results of research conducted by Huang et al. (2018), who studied " Effects of clinical pathways in stroke management: a meta-analysis" in Asia. They showed that the clinical pathway implementation reduces the average length of stay and improves patient satisfaction. The current study findings were also supported by those studies conducted in other developing countries by Atiya (2019) in Sulaimani Teaching Hospital titled "Maternal Satisfaction Regarding the Quality of Nursing Care During Labor and Delivery," who found that mothers were satisfied with providers' care.

In addition, these study findings agree with Khammamy et al.'s study (2020), who studied "Delivery care satisfaction at government hospitals in Xiengkhuang Province under the maternal and child health strategy" in Lao. The findings of the current study supported the study hypotheses that there was a statistically significant improvement in nurses' knowledge and practice regarding all items for gestational diabetes clinical pathway care after the intervention. This improvement in care was reflected in gestational diabetic women's knowledge, practice, and satisfaction during pregnancy.

Conclusion

Based on the findings of the present study, it can be concluded that gestational diabetic women who received gestational diabetes care based on the clinical pathway had a higher satisfaction level in comparison to the control group, and there was a statistically significant difference regarding gestational diabetic women's satisfaction towards gestational diabetes care between the control group and clinical pathway group. This supported the third research hypothesis. Therefore, the findings of the current study supported the research hypothesis.

Recommendations

Based on current study findings, the following recommendations are proposed:

- Integration of the clinical pathway in the management of gestational diabetic women during pregnancy to improve their satisfaction and reduce complications for mothers and their fetuses.

Suggestions for future studies:

- Identify the barriers and facilitators to the gestational diabetes clinical pathway implementation.
- More research should be done on a wider population for the results to be generalized.

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