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Research Article

Factors Associated with the Need for Breastfeeding Information Among Women with Gestational Diabetes Mellitus: A Cross-sectional Study

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ABSTRACT

Purpose: Analyzing information based on individual needs can maximize the effectiveness of education, leading to changes in personal health behaviors. This cross-sectional descriptive survey study aimed to identify the characteristics of mothers who experienced gestational diabetes mellitus and correlate the factors associated with their information needs.
Methods: The participants were 298 women between the ages of 20 and 49 years who were pregnant and diagnosed with gestational diabetes at the time of the study, or who were diagnosed with gestational diabetes mellitus within five years after delivery. The average age of the participants was 34.28 years. After comparing participants' demographics, diabetes, and breastfeeding-related characteristics according to their need for information on breastfeeding, a multiple logistic regression analysis was performed.
Results: Factors associated with participants' need for information on breastfeeding were economic conditions, usual body mass index, current pregnancy, and experience of breastfeeding.
Conclusion: The findings can be used to implement programs that meet the needs of these women and help improve maternal and pediatric health and quality of life.

Introduction

In 2019, the International Diabetes Federation (IDF) estimated that 20.4 million pregnant women had hyperglycemia. In 83.6% of these cases, the underlying reason was gestational diabetes mellitus (GDM). The prevalence of GDM increases with age, resulting in a 37% occurrence in the 45–49 age group and a 50.1% occurrence in women under the age of 30 years [1]. In the 1990s, the prevalence of GDM in Korea ranged from 1.7% to 3.9%; however, a systematic review from 2000 to 2016 revealed that its prevalence in Korea increased to approximately 7.2% [2,3].

The risk of type 2 diabetes and obesity in both mothers and newborns increases if pregnant women with GDM do not receive timely treatment; thus, diabetes-related knowledge and management skills are essential for this population [4]. Of the various methods to decrease the risk of diabetes, breastfeeding has been found to be one of the most beneficial since it can also reduce the incidence of other diseases and improve women's health [5–7]. Being breastfed as a newborn also plays a role in adult life. Specifically, in a population-based birth cohort study of 3493 newborns in Pelotas, Brazil in 1982, breastfeeding was linked to an increase in intelligence quotient 30 years later, which helped influence educational performance and income growth during adulthood [8].

However, there are a number of factors that lead to early breastfeeding cessation, including problems with breastfeeding at home, early return to work after childbirth (i.e., within three months), inadequate breastfeeding support, cesarean section

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delivery, low socioeconomic status, and increased body mass index (BMI) [9]. Only a few studies have investigated the need for information on breastfeeding or beliefs related to it among women with GDM, which is important since some diabetes medications taken by mothers can affect the children being breastfed [10]. Technological advancements, the abundance of available resources (i.e., information overload), and information targeting pregnant women do not always accurately reflect the needs of those with GDM [9]. Furthermore, anecdotal information by grandmothers has been found to negatively affect proper breastfeeding [11].

Knowledge, attitudes, and interest can influence the duration a mother breastfeeds; thus, education regarding the benefits and methods of breastfeeding is not only helpful but imperative [12,13]. Information based on an individual's needs that is provided in a timely manner can lead to changes in personal health behaviors [14]. The present study, therefore, aimed to identify the characteristics of mothers who experienced GDM and correlate their information needs. This information will serve as the basis for programs that can be potentially effective and aid mothers with GDM and their children lead healthy lives.

Materials and methods

Participants

Potential participants were recruited through an online forum for pregnant women with diabetes in May 2020 and were required to provide information regarding their GDM diagnosis in the form. Participants were then selected based on their self-reports. The inclusion criteria were: (1) women aged 20–49 years who were (2) currently pregnant and diagnosed with GDM or (3) diagnosed with GDM within five years after delivery. Women who were diagnosed with GDM and had type 2 diabetes after delivery were excluded. The data were collected anonymously, and the questionnaire was identified by a serial number, placed in an anonymous envelope, and delivered to individual participants.

The sample size for logistic regression was calculated using G* Power, version 3.14. We considered an odds ratio (OR) of 1.62, Pr of 0.43, significance level of 0.05, alpha of 5%, and two-tailed test with 95% confidence interval (CI) based on self-efficacy. The minimum sample size was determined to be 248; accounting for a potential dropout rate of 20%, a total of 298 women were surveyed.

Variables

Need for breastfeeding information

The need for breastfeeding information was assessed by one question: “Do you want to receive information about a breastfeeding program for mothers with GDM?” Participants were then divided into two groups based on their responses (yes or no).

Demographic characteristics

Demographic characteristics included age (26–30 years, 31–35 years, 36–40 years, and ≥41 years), educational level (high school or college/university and above), economic condition (low or above medium), employment status (employed or unemployed), weight (in kg), and height (in cm). Weight and height were used to calculate BMI, which was included in the final analysis. Current pregnancy was classified as “yes” if they were pregnant at the time of the survey and were diagnosed with GDM.

Diabetes-related and breastfeeding experience characteristics

For diabetes-related characteristics, participants provided information on previous illnesses other than diabetes (if any, the number of such diseases), current diabetes medication/s (if any, medication name/s, and type of management), and diabetes duration. The instrument used to assess GDM-related knowledge was developed based on the “Knowledge and Health Beliefs about Gestational Diabetes and Healthy Pregnancy's Breastfeeding Intention” [13]. This tool comprised 15 questions: four on GDM's definition, signs, and symptoms; four on GDM management; five on the adverse outcomes of GDM; and two concerning breastfeeding. The content validity was confirmed by two obstetric-gynecologists and two maternity nursing professors. Fifteen items with a content validity index of 0.8 or higher were extracted, and in a previous study, Kuder-Richardson 20 ranged from .75 to .77 [13,15]. Each question was answered as “Yes,” “No,” or “Don't know”; correct answers received 1 point while wrong answers or “Don't know” responses earned 0 points. The knowledge score was converted to a percentile correct answer rate (%), with higher scores indicating greater knowledge. The Kuder-Richardson Formula 20 was .607. The breastfeeding experience was divided into full breastfeeding, mixed breastfeeding, and artificial breastfeeding.

Data analysis

Survey data were processed with SPSS, version 24.0 (IBM Corp., Armonk, NY, USA). The differences in demographics, diabetes-related characteristics, and breastfeeding-related characteristics were analyzed using t-tests and chi-square tests. The correlates of breastfeeding information needs were analyzed through multiple logistic regression.

Ethical considerations

The participants understood the study's purpose, that participation was voluntary, and that the collected data would be used only for research purposes. All participants provided written informed consent. The study was approved by the concerned institutional review board (KBUIRB-202004-SB-003-01).

Results

Demographic characteristics

The data of 298 women with GDM were analyzed. Among them, 123 (41%) had information needs, and there was no significant age difference between the groups with and without information needs (mean = 34.28 years). The difference between the two groups concerned economic condition; when the economic level was low, information needs were about 10% higher ($\chi^2 = 4.42$, $p = .036$). Furthermore, the usual BMI in the group with information needs was 25.30 kg/m^2, indicating greater obesity (about 2 kg/m^2) compared to the group without information needs ($t = -4.20$, $p < .001$). In those with information needs, there were approximately 15% more women who were currently pregnant than in the group without ($\chi^2 = 12.79$, $p < .001$). However, there was no significant difference between the groups in terms of educational level and employment status (Table 1).

Diabetes-related and breastfeeding experience characteristics

Table 2 presents the characteristics of diabetes and other diseases in terms of participants' information needs. The group with information needs had an average of 0.40 diseases other than diabetes, which was statistically higher than those without information needs, with an average of 0.26 ($t = 7.23$, $p = .007$). In other words, 36.6% of the participants with information needs had more than one disease, apart from diabetes. In the groups with and without information needs, the prevalence of use of diabetes

Table 1 *Demographic Characteristics of Women with Gestational Diabetes Mellitus.*

Variables	Total	Need for information		Difference
	(N = 298)	Yes (n = 123)	No (n = 175)	
	n (%)/M±SD	n (%)/M±SD	n (%)/M±SD	χ^2 or t (p)
Age (years)	34.28 ± 3.73	34.17 ± 3.62	34.35 ± 23.37	0.40 (.686)
26–30	54 (18.1)	22 (17.9)	32 (18.3)	
31–35	136 (45.6)	60 (48.8)	76 (43.4)	
36–40	93 (31.2)	37 (30.1)	56 (32.0)	
≥41	15 (5.1)	4 (3.2)	11 (6.3)	
Educational level				2.61 (.106)
High school	65 (21.8)	33 (26.8)	32 (18.3)	
≥College/university	233 (78.2)	90 (73.2)	143 (81.7)	
Economic condition				4.42 (.036)
Low	44 (14.8)	25 (20.3)	19 (10.9)	
≥Medium	254 (85.2)	98 (79.7)	156 (89.1)	
Employment status				1.12 (.735)
Employed	131 (44.0)	56 (45.5)	75 (42.9)	
Unemployed	167 (56.0)	67 (54.5)	100 (57.1)	
Usual BMI (kg/m^2)	24.19 ± 3.96	25.32 ± 3.89	23.37 ± 3.82	−4.20 (<.001)
Current pregnancy				12.79 (<.001)
Yes	53 (17.8)	34 (27.6)	19 (10.9)	
No	245 (82.2)	89 (72.4)	156 (89.1)	

Note. BMI = body mass index; M = mean; SD = standard deviation.

medications was 30.1% and 26.3%, respectively, with insulin being the most commonly used drug (24.4% and 13.7%, respectively). However, differences between the groups in use of diabetes medication, duration of diabetes, GDM-related knowledge, and breastfeeding experience were not statistically significant (Table 2).

Factors affecting information needs in participants

To identify the factors influencing information needs in the participants, a logistic regression analysis was performed using demographic, diabetes-related, and pregnancy and breastfeeding experience characteristics as independent variables. The predictors were economic condition (OR = 2.60, 95% CI = 1.14–5.92), usual BMI (OR = 1.11, 95% CI = 1.03–1.20), current pregnancy (OR = 3.57, 95% CI = 1.14–11.11), and breastfeeding experience (OR = 2.38, 95% CI = 1.04–5.45). Thus, the group with a low economic level had 2.60 times higher information needs than the groups with middle or high economic levels; additionally, the higher the usual BMI, the greater the need for information (by 1.11 times). Furthermore, women who were pregnant at the time of the study had a 3.60 times greater need for breastfeeding information than those who were not. The need for breastfeeding information was 2.38 times greater among women who experienced mixed breastfeeding than among those who did not (Table 3).

Discussion

This study aimed to identify factors associated with breastfeeding information needs among pregnant women with GDM. In this study, about 41% of participants had information needs. This result is difficult to collate accurately due to a lack of prior studies on the information needs of mothers with GDM; however, in a previous study of 21 patients who experienced psychological impairment after ICU treatment, 75% of patients had information needs [16]. Among these ICU survivors, only 33% were satisfied with the information provided by the hospital; thus, it can be

Table 2 *Diabetes-Related and Breastfeeding Experience Characteristics of Women with Gestational Diabetes Mellitus.*

Variables	Total	Need for information		Difference
	(N = 298)	Yes (n = 123)	No (n = 175)	
	n (%)/M±SD	n (%)/M±SD	n (%)/M±SD	χ^2 or t (p)
Previous illness (except DM)	0.32 ± 0.54	0.40 ± 0.55	0.26 ± 0.52	7.23 (.007)
No	215 (72.1)	78 (63.4)	137 (78.3)	
Yes	83 (27.9)	45 (36.6)	38 (21.7)	
1	72 (24.2)	41 (33.3)	31 (17.7)	
≥2	11 (3.7)	4 (3.3)	7 (4.0)	
Diabetes medication				0.35 (.556)
No	215 (72.1)	86 (69.9)	129 (73.7)	
Diet and exercise	213 (71.5)	85 (69.1)	128 (73.1)	
Observation	2 (0.6)	1 (0.8)	1 (0.6)	
Yes	83 (27.9)	37 (30.1)	46 (26.3)	
Insulin + OHA	12 (4.1)	2 (1.6)	10 (5.7)	
Insulin only	17 (5.7)	30 (24.4)	24 (13.7)	
OHA only	54 (18.1)	5 (4.1)	12 (6.9)	
Disease period (months)	28.13 ± 21.96	27.67 ± 25.61	28.47 ± 19.03	0.31 (.758)
GDM-related knowledge	11.38 ± 2.51	11.28 ± 2.20	11.44 ± 2.72	0.55 (.586)
Experience of breastfeeding (n = 254)*				2.20 (.333)
Artificial feeding	44 (14.8)	14 (11.4)	30 (17.1)	
Mixed breastfeeding	145 (48.7)	63 (51.2)	82 (46.9)	
Complete breastfeeding	65 (21.8)	24 (19.5)	41 (23.4)	

Note. M = mean; SD = standard deviation; DM = diabetes mellitus; OHA = oral hypoglycemic agents; GDM = gestational diabetes mellitus.
* n = 44: No delivery experience.

Table 3 *Factors Associated with Information Needs in Women with Gestational Diabetes Mellitus.*

Variable	Odds ratio	95% CI	p-value
Age (years) (ref: 26–30)			
31–35	1.12	0.48–2.64	.790
36–40	0.87	0.35–2.15	.762
≥41	0.44	0.10–1.99	.287
Educational level (Ref: ≥College/University)			
High school	1.20	0.56–2.57	.633
Economic condition (Ref: ≥Medium)			
Low	2.60	1.14–5.92	.023
Employment status (Ref: Unemployed)			
Yes	1.18	0.67–2.08	.578
Usual BMI	1.11	1.03–1.20	.007
Previous illness (Ref: No)			
1	1.70	0.88–3.30	.115
≥2	0.64	0.13–3.25	.591
Diabetes medication (Ref: No)			
Yes	1.15	0.61–2.17	.671
Disease period (Months)	1.00	0.99–1.01	.976
GDM-related knowledge	0.99	0.88–1.11	.811
Current pregnancy (Ref: No)			
Yes	3.57	1.14–11.11	.028
Experience of breastfeeding (Ref: Artificial)			
Mixed	2.38	1.04–5.45	.041
Complete	1.80	0.70–4.58	.222

Note. CI = confidence interval; BMI = body mass index; GDM = gestational diabetes mellitus.

assumed that 42% still required more information. In another study, a Swedish survey of 542 patients with chronic obstructive pulmonary disease requiring ongoing self-care, reported that further information on self-care and diet was needed in 68% of moderate and 32% of severe grade patients [17]. Another study involving 458 patients diagnosed with hematologic cancer reported a perceived need for information among 40–70% of the patients [18]. As compared to these studies, the participants in the current study had lower medical severity, but similar information needs. However, although the present study investigated the specific information needs of mothers with GDM, follow-up studies are needed to corroborate the information needs among this target population.

Factors associated with the need for breastfeeding information were low economic levels, increased BMI, current pregnancy status, and mixed breastfeeding experiences. Unlike in previous studies [3,8], GDM-related knowledge, complications, and diabetes drug use levels were not correlated with the need for breastfeeding information in the current study. Demographic data, pregnancy status, and breastfeeding experience were found to be more important than diabetes-related characteristics. Low economic levels and increased BMI have previously been known to influence early breastfeeding cessation in mothers with GDM [9]. Therefore, providing adequate breastfeeding information to mothers with GDM, especially among those with the aforementioned risk factors, can help prevent early breastfeeding cessation.

According to the 2018 National Health and Nutrition Survey, approximately 55% of women had breastfeeding experience of over one month; the average breastfeeding duration was about 17 months [19]. The present results indicate that 70.5% of the women who engaged in mixed and complete breastfeeding had a better breastfeeding experience than the domestic average. Furthermore, the group that engaged in mixed breastfeeding had higher information needs than the group that engaged exclusively in artificial feeding.

The first possible reason for these findings is that the participants may have had experiences with GDM and failed to complete breastfeeding for a previous child. In a study among 1323 healthy mothers investigating the reasons for the cessation of breastfeeding within one year, three main factors were found: that the baby began to bite, the baby lost interest in breast milk, and the mother was unable to produce enough milk [20]. To date, few studies have investigated whether there is a difference between breast milk in healthy women and in women with GDM; however, some research indicates that GDM causes elevated sodium levels in breast milk [21], which are associated with insufficient milk supply and malnutrition in infants [22]. Therefore, the possibility that GDM influences breastfeeding cannot be excluded. Moreover, insufficient breast milk production is a concern not only for the mother but also for healthcare providers [23,24]. Hence, prenatal education on topics such as breast massage and maternal health status is necessary to increase breast milk production.

The second possible reason for the findings is that mothers who already have GDM are aware that breastfeeding has many benefits, but the information given to them while they breastfeed may not be what they need or want. Many studies have focused on motivating breastfeeding mothers by investigating the factors that affect the presence or absence of breastfeeding [9,25]. However, there is a lack of research on breastfeeding-related problems among mothers with GDM and their solutions. Throughout the breastfeeding period, it is necessary to ensure that mothers with GDM can have their doubts clarified by experts, receive corrective feedback, and benefit from supportive programs.

In 2015, a qualitative study of 14 African American mothers found that most were using at least one mobile application to obtain breastfeeding information through social media [26], confirming that pregnant women have a high need for information. Therefore, providing information using social media or mobile applications can help those who are currently pregnant and who will be breastfeeding in the near future, to communicate with experts on related topics.

Despite its strengths, this study has the following limitations. First, although social support, such as support from family members, is very important for continued breastfeeding [9,12], this study did not confirm whether it is associated with information needs. Second, in conducting an online survey, we did not consider potential differences in the information needs of mothers with GDM who do not have access to the internet. Third, interactions between variables, such as economic level and BMI, were not confirmed. Finally, research on the information needs of women with GDM is currently limited. Therefore, knowledge on women

who refuse to receive breastfeeding information is scarce. This study also did not investigate why these women did not want to receive this information. Further, a qualitative study on the experience of breastfeeding preparation in women with GDM is necessary. In addition, according to previous studies, mothers with GDM who have high self-efficacy are more likely to breastfeed [15]. Therefore, it would be helpful for health care providers to offer information programs to increase self-efficacy.

Conclusions

We identified the correlates of breastfeeding information needs among women with GDM. Healthcare providers should offer information needs–based programs to increase breastfeeding self-efficacy among women with GDM.

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Conflict of interest

The authors declare that they have no competing interests.

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S. P., I. S., and D. M. conceived and designed the study, performed the data analysis, and wrote the manuscript. All authors have read and approved the final manuscript.

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