

RESEARCH ARTICLE

Self-management experience of first-time diagnosed gestational diabetes mellitus: A focus group interview

Mei-Chen Su¹ | Min-Yu Chang² | Jui-Chiung Sun³ 

¹School of Nursing, National Taipei University of Nursing and Health Sciences, Taipei, Taiwan

²Department of Nursing, New Taipei Municipal TuCheng Hospital (Built and Operated by Chang Gung Medical Foundation), New Taipei, Taiwan

³Department of Nursing, Chang Gung University of Science and Technology, Taoyuan, Taiwan

Correspondence

Jui-Chiung Sun, Department of Nursing, Chang Gung University of Science and Technology, No.261, Wenhua 1st Road, Guishan Dist., Taoyuan City 33303, Taiwan, ROC.

Email: 90006@mail.cgu.edu.tw

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Abstract

Aim: Gestational diabetes mellitus (GDM) has become the most common complication in women during pregnancy in Taiwan. Since several clinical trials have demonstrated benefits of aggressive treatment, which rely heavily on self-management. The present study was conducted to explore the self-management experience of women with first-time diagnosed GDM.

Design: A qualitative descriptive approach was applied to conduct this study.

Methods: Purposive sampling was used to recruit patients with first-time diagnosed GDM from the maternity outpatient clinics of medical centre in Taiwan. A total of three focus groups interviews with 22 women were conducted to collect the data. Content analysis was applied to analyse the data.

Results: Four themes were identified: (1) unexpectedly having a high-risk pregnancy, (2) different perceptions for self-management, (3) implementation predicament of self-management and (4) maternal duty to ensure the safety of mother and child.

KEYWORDS

experience, focus group, gestational diabetes mellitus, self-management

1 | INTRODUCTION

Gestational diabetes mellitus (GDM) is one of the major public health issues in Asia (Lee et al., 2018). GDM is one of the leading causes of maternal and infant death and morbidity worldwide (Starikov et al., 2015). Mothers with GDM are at risk for pregnancy-induced hypertension, pre-eclampsia and caesarean section (Lee et al., 2018). In addition, women with a history of GDM are at statistically significantly increased risk of developing type II diabetes mellitus (T2DM) and cardiovascular disease (Rayanagoudar et al., 2016). Infants born from women with GDM are at risk of being macrosomic, may suffer from more congenital abnormalities and have a greater propensity of developing neonatal hypoglycaemia and T2DM later in life

(Dennison et al., 2019). To prevent these complications, growing evidence suggests a patient-centred approach is more effective in facilitating self-management than a professional-centred one (Dennison et al., 2019; Olesen et al., 2020).

2 | BACKGROUND

Approximately 7% of all pregnancies are complicated by GDM, resulting in more than 200,000 cases annually (Sue Kirkman & Schaffner, 2012). The prevalence may range from 1 to 14% of all pregnancies, depending on the population studied and the diagnostic tests employed (Rayanagoudar et al., 2016). Lee et al. (2018)

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retrospective analysis of 84 studies including 20 Asian countries from 1988 to 2017 ($n = 2,314,763$) found that the prevalence of GDM was approximately 11.5% (95% CI = 10.9–12.1), with the highest rate in Taiwan (38.6), followed by Hong Kong (32.5%), Saudi Arabia (22.9%), Yemen (5.1%), Japan (2.8%) and the lowest rate in Nepal (1.5%). This may be associated with higher insulin resistance, genetic predisposition and higher body mass index (BMI) before pregnancy in Asians (Lee et al., 2018). GDM has become the most common complication in women during pregnancy in Taiwan (Diabetes Association Of The Republic Of China, 2020). Since several clinical trials have demonstrated benefits of aggressive treatment (Dailey, 2011; Gaede et al., 2008), which rely heavily on self-management (Smith et al., 2020), the development of more effective behavioural strategies to achieve the maximum benefit is needed.

Self-management is an indispensable part of GDM care. It involves reducing energy intake by replacing high-calorie food with healthy dietary choices, encouraging more exercise to improve metabolism, and regular blood sugar monitoring (Rasmussen et al., 2020). The goal of treatment is to maintain the blood sugar in the recommended range (Diabetes Association Of The Republic Of China, 2020). The diet and exercise modification approach are applicable to approximately 65–90% of women diagnosed with GDM (Crowther et al., 2005). In contrast, women with severe hyperglycaemia and those who are unable to achieve their glycaemic goals through diet and exercise require insulin to control GDM (Diabetes Association Of The Republic Of China, 2020). If self-management is not handled properly, GDM can cause morbidity in women and infants to be 2–3 times higher, but when GDM is properly managed, these risks are greatly reduced (Lee-Parritz, 2011). In light of these serious implications, for morbidity among both mothers and infants, it is critical that women with GDM are supported to take on the tasks of self-management (Carolan et al., 2012).

Self-management is necessary to enable pregnant women managing their own GDM. Generally, the self-management scale is used for patients with general chronic diabetes for example Summary of Diabetes Self-Care Activities measure (SDSCA) (Toobert et al., 2000) and The Diabetes Management Self-Efficacy Scale (DMSES) (Sturt et al., 2010), not for pregnant woman with gestational diabetes mellitus (Gharaibeh et al., 2017; Schmitt et al., 2013; Sousa et al., 2009). Currently, effective management of GDM is most often measured in terms of blood glucose levels, maternal weight gain and infant birthweight (Crowther et al., 2005). The Self-management development was part of the process when people integrated diabetes into their lives (Hörnsten et al., 2011). The quantitative approach used in previous reports makes it difficult to fully understand the Self-management experience of first-time diagnosed GDM. Therefore, the research question of this study, what is the self-management experience of a first-diagnosed GDM, mainly to explore the GDM self-management experience of women. Data were collected in focus groups, the group interaction enables members to express views that might not be disclosed in an individual interview and to understand how the members feel and what they think about an issue (Krueger, 2014). The bring a rich source of data in participants' own words and develop deeper insights. Such understanding

enables the design of more suitable strategies can support GDM self-management, so that the affected individuals can effectively control and coexist with the disease in pregnancy.

3 | METHODS

3.1 | Aim

The aim of this study explored the self-management experience of first-time diagnosed GDM.

3.2 | Design

A qualitative descriptive study was chosen to describe the self-management experience of first-time diagnosed gestational diabetes mellitus. The self-management development was part of the process when people integrated diabetes into their lives (Hörnsten et al., 2011). We applied a qualitative descriptive study design, not only was to obtain a straight description of the life's phenomena, but also describing how it was experienced and understood by the participant from his or her point of view of the self-management, in order to provide information about participants' lives and reveal the shared practices of the lived experience (Doyle et al., 2020). Therefore, this study seeks to understand the self-management experience of first-time diagnosed gestational diabetes mellitus.

3.3 | Setting

In this study, three focus group interviews were conducted between October 2017 and July 2018. Purposive sampling was used to recruit patients with first-time diagnosed GDM from the maternity outpatient clinics of medical centres in Taiwan. Venue of the focus group interview were conducted in isolated, quiet, comfortable in an education room distant from the clinical areas and circular seating as it allows everyone to see, to listen to and to engage with one another during the discussions to facilitate participants fully expressing their opinions without interruptions.

3.4 | Participants and recruitment

The eligibility criteria were as follows: (a) 18 years of age or older, (b) At least 24 weeks pregnant and first-time diagnosed GDM, (c) willing to openly share their experiences with the investigator and engage in a dialogue, (d) willing to be audio-recorded and (e) women must be able to communicate in Mandarin or Taiwanese. A total 22 women were enrolled in the study. Participants were enrolled after they responded to recruitment posters and flyers or through the maternity outpatient clinics of medical centre referral. Each participant received an information sheet, which explained the purpose of the

research, potential risks and benefits, issues of confidentiality and informed consent form. Researchers clearly explained the purpose and process of the study to the participants. Any participant was allowed to withdraw from the study at any time. Informed consent was obtained from all of the participants.

3.5 | Data collection

A focus group, also termed group interviewing, is several interacting individuals discussing common interests in the presence of a moderator (Webb & Kevern, 2001). We employed focus groups because group exchange facilitates discussion on barriers to and facilitators of self-management when living with GDM (Polit & Beck, 2017). Group dynamics generally produce valid ideas because interaction between group members stimulates the verbalization of a wide range of thoughts and feelings (Webb & Kevern, 2001).

Focus group sessions were conducted every 4 weeks, each focus group interview included one moderator (M.C.S) and one assistant moderator (J.C.S), no one else was present except the participants and researchers. The researcher conducted separate interviews with the three focus groups and the interviews is the same group, each group with 7–8 women, comprising a total of 22 women. Each group included two sessions and each session lasting 60–90 min.

First author (M.C.S) and correspond author (J.C.S) PhD course who are trained experienced with qualitative research and are used the focus groups for clinical nursing and health related programs. All author in the present study developed a questioning route, focusing on self-management experience of first-time diagnosed gestational diabetes mellitus, see Table 1. The questioning route was pilot tested by presenting and discussing the questions at a seminar

with GDM patient support group. Minor revisions were made in the wording of the questionnaire. The questioning route was also tested in the first focus group interview in the present study. However, no changes were made, and the data were included in the analysis. The focus group interviews were held by a moderator whose role was to facilitate the group discussions by asking the questions detailed and follow-up with probing questions when appropriate. All participants were encouraged to talk freely and to be involved in the dialogue. All questions from the questioning route were discussed in the focus groups interviews. An assistant moderator observed the group interaction, took field notes and summarized the discussion towards the end of the interview. The assistant moderator checked that all relevant issues were covered and asked the moderator and participants whether the summary accurately reflected their discussions; lastly, the moderator asked whether the participants had anything further to add. After each interview, the field notes were discussed between the moderator and assistant moderator.

The topics and activity content were determined in advance. Initially, moderator explained the purposes and procedures of the group activity to the participants. In addition, we informed the participants that the entire group session was being audio-recorded and that observations were being noted to ensure that complete information was being obtained. During the group activity, the assistant moderator and observers monitored and recorded the facial expressions, movements and intonation of the participants. The group activity ended when the participants indicated that they had expressed all that they intended to say. A review meeting was held immediately after a group activity ended; the results of this review served as a reference for the next group activity. We also discussed the responses of the participants, and these results provided a reference for data analysis.

Question	Probing question
First Session	
Opening question	Please tell us your first name and talk about your feelings about this pregnancy?
Main question	Can you tell me about feel when you learned that you have GDM? What are your thoughts about yourself and your child? Can you tell me about impact has GDM had on you? How do you deal with it?
Ending question	Is there anything else that anyone feels that we should have talked about but did not?
Second session	
Opening question	Please tell us your first name and how have you been doing since we last met?
Main question	What you have heard about the term "self-management" before? Tell me about the relationship between gestational diabetes and self-management? Tell me about the kinds of things you already do as part of self-management?
Ending question	Have you had any particular experience with these things? Is there anything else that anyone feels that we should have talked about but did not?

TABLE 1 Questioning route

3.6 | Data analysis

The focus of the study was to elucidate participant experience rather than to investigate any deeper meaning of the phenomenon in question. Therefore, focus groups interview material was analysed using content analysis, as described by Hsieh and Shannon (Hsieh & Shannon, 2005). The data processing and content analysis steps were as follows: (1) The observation records, reflective dialogues and focus group sessions audio recording were initially transcribed verbatim in Mandarin Languages, and later translated to English language. The translations were done by Ph.D. students in the Department of Foreign Languages and Literatures in National Taiwan University. The moderator, the assistant moderator and the interpreter checked the transcripts to make sure that they matched the recordings. (2) Qualitative data from the three sources (transcripts, observation records and reflective dialogues), the transcripts were read and analysed repeatedly to gain a holistic understanding and to identify the meaningful units consisting of words, phrases and sentences. (3) The words, phrases and sentences were concentrated with meaningful units in order to shorten the text without losing its meaning. (4) The meaningful units were extracted and coded. (5) The codes were compared, linked and differentiated according to their differences and similarities and formed sub-themes according to their relevance. (6) Sub-themes of the same nature or similar concepts were grouped together to form a theme (Liang et al., 2012).

Three focus group (each group included two sessions) transcripts were independently coded by first author (M.C.S), co-author (M.Y.C) and correspond author (J.C.S). After preliminary concepts were identified, all authors discussed the suitability of the analysis results based on their observation records and reflective dialogues verbatim. The research team to meet periodically to resolve coding discrepancies (through consensus), address coding questions and further refine code definitions as needed. The coded transcripts were then entered into NVIVO 12 for analysis. The analysis process continued until saturation was reached; that is, there were no relevant new codes were found in data. Table 2 presents examples of the codes and meaning units obtained from the transcribed data.

3.7 | Ethics

The present study was approved by the Ethics Review Board of the medical centre located in Northern Taiwan (IRB: REDACTED). Informed consent for the use of anonymous direct quotes in reports was obtained from all participants.

3.8 | Rigour

The rigour of this study was examined using four criteria proposed in previous studies (Lincoln et al., 1985; Sandelowski, 1993), including 1. True value: The data were analysed by all researchers and peer

debriefing and member checking with data transcripts are returned to six participants (three focus group, each group with 2 women) to check for accuracy and resonance with their experiences were also used to increase the true value. 2. Applicability: The researchers began building trust with the participants during recruitment and assured the participants that all opinions expressed by the participants during the interview were strictly confidential. This ensured that the participants were able to freely express their experiences in a comfortable and trusting environment and allowed the researchers to collect thick descriptions from the participants. 3. Consistency: Every interview was conducted, and all data were collected by the same researchers (M.C.S and J.C.S) to prevent bias in data collection due to different researchers. 4. Neutrality: The recordings, transcripts, observation records, analytic steps and reflective dialogues have all been preserved. The research process was documented in detail to create an audit trail and to serve as a reference for future studies or to confirm the research.

4 | RESULTS

A total of 25 employees were invited to participate in a focus group, of these, 22 participated in the focus group events, For the 3 participants declining focus group, 2 (9%) were too busy and 1 (4.5%) did not give a specific reason. The characteristics of the participants are provided in Table 3. The themes and their related subthemes are presented in Table 4.

4.1 | Unexpectedly having a high-risk pregnancy

No history of diabetes women did not expect to be diagnosed with GDM and have a high-risk pregnancy. During group interactions, participant shared determining the cause of the illness and concerned about the impact of GDM on the foetus and themselves.

4.1.1 | Unexpected diagnosis of GDM

Almost all participants did not have diabetes, they did not have any symptoms of diabetes during this pregnancy, the blood test helped to find out about GDM and most diagnosis of GDM was unexpected.

"I was surprised and asked the doctor: I don't have diabetes; how could I get GDM?... I would never have known without blood test" (in raised voices)

(Participant O)

There was no discomfort and no symptoms of diabetes during this pregnancy. Woman wonder why this is considered GDM:

I don't have any physical discomfort... If it is GDM, there should be uncomfortable symptoms...

(Participant D)

TABLE 2 Example of the coding of transcribed data from meaning units

Meaning unit	Codes	Subtheme
"Mother-in-law warned me not to move anything during pregnancy because exercise may cause preterm labour symptoms, and the child will be born prematurely or something else."	Mother-in-law warned exercise may cause preterm labour	Concerns about whether exercise will cause preterm labour

TABLE 3 Characteristics of the participants (N = 22)

Characteristic	Mean(rang) (years)	Number	%
Age (years)	35.91 (28–45)		
Parity			
Nulliparous		10	45.5
Multiparous		12	54.5
Pre-pregnancy BMI			
BMI > 24 Kg/m ²		15	68.2
BMI < 24 Kg/m ²		7	31.8
Family history of diabetes			
Yes		12	54.5
No		10	45.5
Educational level			
Senior high school education (12 years)		6	27.3
College or university education (13–16 years)		3	13.6
> College or university education (≥17 years)		13	59.1
Married status			
Married		21	95.5
Unmarried		1	4.5
Employment status			
Yes		20	90.9
No		2	9.1
Present treatment for GDM			
Diet		20	90.9
Diet and exercise		2	9.1

4.1.2 | Looking for the cause of GDM

Many participants tried to determine the cause of GDM by looking back over the pre-pregnancy period and the pregnancy itself clarified the relationship between events experienced during pregnancy and GDM.

I knew I was 90 kg when I was pregnant.... Is it being overweight that made me get diabetes?

(Participant S)

Some participants shared were obese before pregnancy, and wondered the reason why they had GDM.

During this pregnancy, I like to eat sweets, juice.... I do not know if it is this change in tastes and preference for sweet tastes that make me have GDM....

(Participant N)

4.1.3 | Hidden worries about the adverse effects of GDM

Several participants described that once they knew that they had GDM, they began to worry about the impact of the disease on the foetus and themselves.

The issue that I worry about the most is the potential effect on the baby and whether it will be passed on to the baby and the baby will have diabetes later...

(Participant O)

They worried not only about the foetus, but also about the impact of the disease on themselves.

I worried about GDM and its complications during pregnancy, whether I will be diabetic after giving birth, and whether diabetes will always follow me and will not disappear... (choking)

(Participant J)

4.2 | Different perceptions for self-management

Self-management carried different perceptions in group interactions and conversations that included diet, exercise and role changes in the family. Focus group members used their own words to express the contexts and further develop insights into different experiences.

4.2.1 | Worrying about negative effects of diet control on foetal development

Pregnant women worry that GDM requires diet control will affect foetal development.

During pregnancy, I am 'eating for two.' I tend to eat more and have a good appetite because the baby

TABLE 4 Themes and subthemes resulting from the research

Themes	Subthemes
Unexpectedly having a high-risk pregnancy	Unexpected diagnosis of GDM Looking for the cause of GDM Hidden worries about the adverse effects of GDM
Different perceptions for self-management	Worrying about negative effects of diet control on fetal development Concerns about whether exercise will cause preterm labour Caregivers' attitudes and behaviour changes
Implementation predicament of self-management	Diet challenges during social gatherings "To know is easier than to do" in exercise implementation Psychological burden of living with GDM
Maternal duty to ensure the safety of mother and child	Change attitudes and behaviours towards health Increased caution about health during pregnancy Adjusting lifestyles

absorbs quickly. Getting the desire to eat sweets is a common situation. If I eat with restrictions, will it affect the baby?

(Participant E)

More than half of our participants asserted that the source of information for GDM self-management is from the Internet. The members in the group shared different information according to their own experiences.

According to the information from the Internet, diabetes during pregnancy is called gestational diabetes, which is caused by eating too much sugar. As long as I don't eat any sugar and control the sugar intake, it should be fine and it will not affect the baby. I'm not sure if that's correct...

(Participant N)

4.2.2 | Concerns about whether exercise will cause preterm labour

Exercise plays a very important role in the control of blood glucose in GDM. For all participants, according to traditional Chinese concepts, pregnant women face many taboos during pregnancy. If these taboos are violated, preterm labour symptoms will cause premature birth or disaster.

Mother-in-law warned me not to move anything during pregnancy because exercise may cause preterm labour symptoms, and the child will be born prematurely or something else...

(Participant R)

The members in the group shared different opinions according to their own experiences.

It's very important to take exercise, which consumes glucose and is vital to the control of blood glucose. I

will stroll for half an hour after meals. I stroll every day, and my blood glucose level becomes more normal as well, my blood glucose is stable, and the baby will be stable....

(Participant V)

4.2.3 | Caregivers' attitudes and behaviour changes

The medical treatment emphasizes diet control as a means of self-management of GDM, and deepens the distinction between normal and abnormal with "eating." Gestational "diabetes" makes the women's role in the family change from caregivers to care recipients, who become the centre of attention in the family. Several participants described that the caregivers' attitudes also directly affect pregnant women.

After realizing I had diabetes, my husband started to prepare breakfast for me, including eggs, milk, fruit, and often remind me not to drink any sugared beverage

(Participant G)

When my mother-in-law prepares dinner for me and she would prepare two extra dishes for me. When I am having the meal, she would kindly remind me to eat more vegetables and eat less rice

(Participant B)

Participants shared that when they compared with other pregnant women, they wonder whether pregnant women with "GDM" are normal people or patients.

Other people are allowed to eat without restrictions during pregnancy. I have to limit what I want to eat, so it makes me think whether "GDM" is normal or not?

(Participant R)

The members in the group shared different opinions according to their own experiences.

In order to become healthy, regardless of the diagnosis of GDM, we have to implement diet control. GDM can still enjoy delicious food freely, but they have to pay attention to a balanced diet....

(Participant H)

In group interactions, women learned about the GDM diet. They are naturally not prohibited from eating, but they have to control what they eat.

I tend to gorge on rice ... my blood glucose level rose to 200.... I thought that I could not eat rice.... After sharing this experience with the group members, I found that patients with diabetes actually can eat anything, but have to properly control the amount of food.

(Participant E)

4.3 | Implementation predicament of self-management

The implementation process of self-management in real life presents dilemmas, including challenges with diet during social gatherings, "To know is easier than to do" in exercise, and the psychological burden of living with GDM.

4.3.1 | Diet challenges during social gatherings

During social gatherings, eating issues become the focus of the family's attention. Half of the participants remarked that when they stop restricting themselves and lose control, guilt usually followed, causing tension between control and loss of control.

Everyone's eyes look at every bite of food I eat. As long as there are sweets, they will say, 'Don't eat this..., eat less....' I can't eat what I want, so I can't eat enough... I still eat what I want in the end.... I feel very sinful after eating...

(Participant K)

4.3.2 | "To know is easier than to do" in exercise implementation

For all participants, although pregnant women know that exercise is critical, they usually cannot put it into practice.

When walking and exercising, my belly keeps falling down. It is really difficult to do it.... I know that diet control alone is not enough without exercise, and my blood glucose control is not good.... But it's really difficult to exercise....

(Participant R)

4.3.3 | Psychological burden of living with GDM

Several participants described lived with GDM, it is necessary for women to change their original living habits, including their daily diet and exercise, and to perform regular blood glucose monitoring. In real life, these self-care rules must be implemented, and related restrictions must be accepted, which places a considerable psychological burden on pregnant women.

For three meals a day, you have to deal with 'What you can eat? Whenever I eat, I feel a lot of psychological pressure. I have to exercise again after meals. I am afraid that my blood glucose will be too high if I eat without exercising... It is very stressful.... (in raised voices)

(Participant D)

4.4 | Maternal duty to ensure the safety of mother and child

The goal of GDM is maternal and child health. Women are responsible for protecting their infants from harm. In group sharing, they told one another their changed attitudes towards health, adjust lifestyles and become cautious about their health during pregnancy to ensure the safety of themselves and their children.

4.4.1 | Change attitudes and behaviours towards health

For all participants, the women realized that if they did not care about their health, it will affect both themselves and their baby; they changed attitudes and behaviours towards health to ensure their own and baby's health.

I choose my food and will not consider junk food.... I eat healthy, and the baby can be healthy.

(Participant R)

In group sharing, the women paid attention to the ingredients of the food to ensure their health and that of their baby:

GDM affects my life and baby. Now I will definitely look at the label and content of food ingredients before making a choice. It's not just me who eats; the baby eats with me....

(Participant Q)

4.4.2 | Increased caution about health during pregnancy

Almost all participants described faced with an uncertain pregnancy and concerns about their health and that of their foetuses, pregnant

women pay attention to physiological changes, realize the importance of regular examination and take cautions about their health during pregnancy.

I will notice that if I am always hungry, thirsty, or go to the bathroom often, it may be due to high blood glucose.... After dinner, I will calculate the foetal movement and know about the baby's condition....

(Participant J)

Beside noticing the symptoms of high blood glucose and foetal movement, the women also paid attention to regular prenatal examination to understand their condition and that of their foetuses in group sharing:

Regular prenatal examination is very important. Urine glucose testing, weight, blood draws and ultrasounds at the prenatal examination can help to understand the condition of myself and the foetus and make me more at ease...

(Participant R)

4.4.3 | Adjusting lifestyles

The health of a pregnant woman has a direct impact on the development of the baby. Eleven participants described that the lifestyle adjustments are made in the areas of stress, mood and sleep to maintain stable blood glucose and ensure the health of mother and child.

The pressure of work makes the work and rest chaotic. After the eighth month of pregnancy is confirmed to have gestational diabetes, the work is changed to part of the working hours, so that the daily work and rest can be normal, and the blood sugar and the baby can be normal....

(Participant A)

Since the diagnosis of gestational diabetes mellitus, my emotions are often out of control. Now I listen to crystal music for 30 minutes after dinner every day, so that I can relax and be emotionally stable, and my blood sugar will be stable and the baby will be stable...."

(Participant F)

The members in the group shared different opinions according to their own experiences.

Before, I went to bed after 12:00, my schedules were irregular, my blood glucose fluctuated high and low.... Not easy.... Now I go to bed at 22:00... The blood glucose will not fluctuate a lot... so it doesn't affect the baby....

(Participant O)

5 | DISCUSSION

The initial reaction of women diagnosed with GDM is "unexpectedly" (Carolan-Olah et al., 2017). In addition to wanting to know the cause of the illness, they also begin to worry about their health and that of their foetuses, fearing that it might change and cause potential issues for the foetuses. To ensure the health of themselves and the foetus, women will take appropriate actions to control GDM through diet and exercise (Craig et al., 2020). While previous studies have investigated women perceived inhibitors or facilitators gestational diabetes self-management (Carolan et al., 2012), this study further identified additional factors influencing women's diabetes self-management practices including culture, customs, family support, the role of family members and social interactions.

In terms of diet, the traditional Taiwanese custom assumes that pregnant women are "eating for two" during pregnancy (Wen et al., 2019). In this study, the participants believed that they tend to eat more and have a good appetite during pregnancy is because the baby have efficient absorption. They also believed change of appetite and craving for sweets and rice are common during pregnancy. However, these changes are rationalized and ignored as a possible warning sign of high blood sugar. As noted in previous literature, misconceptions and lack of knowledge about GDM self-management are likely to be associated with poor health outcomes (Patil et al., 2013). This study found that more than half of the participants (17/22) acquired the information of GDM self-management from the Internet. With the advent of the online era, the information from the Internet has its convenience, but the information from non-professional sources is not equal to knowledge. The accuracy and professionalism of the content confuses the participants. According to the information from the Internet, the most obvious reason for focusing GDM self-management on sugar control is related to the Chinese name of diabetes ("Tang Niao Bing" in Chinese, translated from "diabetes mellitus," means sugar-in-urine disorder). Thus, most participants believed that diabetes were often caused by excessive sugar intake, so they focused their treatment on "sugar control." According to current medical knowledge, sugar control is only one part of medical cares. Weight control during pregnancy, blood pressure control and regular prenatal check-ups are clearly important in the management of GDM (Diabetes Association Of The Republic Of China, 2020).

In terms of exercise, in Taiwanese traditional customs, people believe that there are gods in all things on earth. Pregnancy is the beginning of a new life, so there are gods specialized in pregnancy to protect the safety of the foetus in the mother's womb, and this god is the "foetus god" (Sung, 2000). The "foetus god" is the "god" that attaches to the fetus, connecting and communicating with the foetus soul. It is the "god" that controls and dominates the foetus (Sung, 2000). The foetus god is usually around the pregnant woman, in some fixed directions or attached to an object. People are not allowed to offend it; otherwise it would lead to abdominal pain, miscarriage, foetal deformity, or even foetal death of the pregnant woman. Any process that causes harm to the pregnant

woman or foetus by offending the foetus god is also commonly known as “the movement” or “foetus movement” in Taiwan (Sung, 2000). Therefore, during pregnancy, women should take rest and restrict from carrying heavy things, over exerting herself, and strenuous exercise to avoid “moving the foetus” or affecting the pregnancy (Chuang et al., 2014).

However, the main reasons for motivating or maintaining exercise in pregnant women are to reduce weight gain due to pregnancy, to improve mood, to increase physical strength and to help the smooth delivery (Makaruk et al., 2019). Systematic literature review studies pointed out that factors affecting exercise in pregnant women with GDM include bad weather, lack of time, taking care of other children at home, lack of motivation, high priority of housework to their own health, and psycho-social factors such as self-efficacy, support from husband, and support from health professionals (Buelo et al., 2019). However, this study revealed that in addition to the above factors affecting exercise in pregnant women with GDM, traditional pregnancy taboos were also found to influence exercise among those women. Even though we are now in the high-tech era, the local culture is still an important factor in influencing health beliefs and behaviours. In addition to actively seeking modern medical care, pregnant women still embrace the traditional customs associated with pregnancy to ensure that they and their baby can be safe, to successfully perform their maternal tasks during pregnancy.

In Chinese society, family relationships are the primary interpersonal network. It is in the multiple envelopes of such relationships that convey the multiple meanings of diseases, being aggravated, alleviated disease control, hindered or enhanced self-management. If this phenomenon does not attract much attention, many disease symptoms and experiences will not be understood (Hsu et al., 2015). In Taiwanese families, women are often the primary caregiver. When diagnosed with GDM, the patients are usually protected and taken care of in Taiwanese families. Many original roles or family jobs are adjusted accordingly. Gestational “diabetes” allows the women to change the role of caregivers in the family from caregivers to care recipients, becoming the centre of attention in the family. The whole family would take care of and monitor the diet in various ways. Therefore, the interviews frequently appeared in the texts of “my husband reminds me,” “my mother-in-law helps me prepare,” and “my mother-in-law reminds me” and other texts about the changes of order in the family. The concept of “self-management” is limited in this culture, thus, healthcare providers need to shift the scope of women’s diabetes self-management from the individual to the family when dealing with women with GDM. In this way, the health management of GDM may be better implemented and taken root in Taiwan.

The self-management of GDM, especially in gatherings with relatives and friends, or attending wedding banquets, etc., is an important moment to test pregnant women. Eating is an important element of Chinese culture to establish interpersonal connections. Most social activities are related to having meals. When facing social activities, “no eating” highlights the difference between

oneself and the group, and can easily lead to separation from others. Thus, when facing with social gatherings, diet control for diabetes becomes a life deprivation and a social deprivation that isolates the individual from the community (Hsu et al., 2015). Such cultural traits need to be seen in the process of caring, and professionals should determine how to ensure that the cases do not suffer from diet control due to diet restrictions, and to reinforce the dietary skills and principles of special dietary situations such as eating out, family and friends’ gatherings, etc. With innovation from the standardized health education approaches, providing individualized guidance to help them change their disease perceptions would lead to good disease control.

The important task for women to face GDM in this study was maternal and child health. Pregnant women have the responsibility to protect their foetus from any harm. This finding of concern for the foetus is echoed in other research on women’s experiences of GDM (Wah et al., 2019). The concern for the foetus prompted participants to take on the task of GDM self-management. Although it is not easy for many women to change their attitudes towards health, to choose food carefully, and to adjust their lifestyles, they still take the safety of themselves and their children as a priority. In the literature, a desire to protect the foetus, or evidence of maternal-foetal attachment, is similarly associated with greater pregnancy investment and adoption of health promoting behaviours, such as healthy diet (Alhusen et al., 2012).

6 | STUDY LIMITATION

The limitations of this study are that it employed a purposive sampling method, and all the samples are from the one medical centre. Thus, the study results may not be extrapolated to other locales throughout Taiwan. To overcome the limitations, we recommend to conduct further systematic research at multiple sites among more diverse samples with diverse pregnant women may help us understand more the self-management experience of first-time diagnosed GDM.

7 | CONCLUSION

This study offers new insights into the experiences of women with first-time diagnosed GDM. Healthcare teams should be involved in the self-management education of GDM as early as possible to reduce their misconception and anxiety. In addition to considering their self-management, health professionals should pay more attention to how women can effectively control and living with GDM during pregnancy. We believe our results can help health professionals to develop family centred, culture competent nursing care. GDM support groups should be formed to encourage women to share their GDM experiences. Such an exchange of experiences helps women express their emotions, provides effective peer support, and educates.

AUTHORS' CONTRIBUTION

MCS, MYC and JCS involved in study conception and design, data analysis and interpretation, drafting of the article and critical revision of the article. MCS, JCS involved in data collection. All authors read and approved the final manuscript.

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CONFLICTS OF INTEREST

The authors declare that they have no competing interests.

DATA AVAILABILITY STATEMENT

Data analyses were performed with focus group interviews, which are not available to other researchers, due to ethics and confidentiality issues. The datasets used during the current study are available from the corresponding author on reasonable request.

ETHICS STATEMENT

The present study was approved by the Ethics Review Board of the medical centre located in Northern Taiwan (IRB: REDACTED). Informed consent for the use of anonymous direct quotes in reports was obtained from all participants.

ORCID

Jui-Chiung Sun  <https://orcid.org/0000-0002-3257-4223>

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