

## SELF-MANAGEMENT ON GESTATIONAL DIABETES MELLITUS: A SYSTEMATIC LITERATURE REVIEW

Claudia Subarto<sup>1\*</sup>, Indriani<sup>2</sup>, Sulistyaningsih<sup>3</sup>

<sup>1</sup>Student of Magister Midwifery, 'Aisyiyah University Yogyakarta.

<sup>2</sup>Lecturer of Health Service Faculty, 'Aisyiyah University Yogyakarta.

<sup>3</sup>Lecturer of Health Service Faculty, 'Aisyiyah University Yogyakarta.

\*corresponding author: [celaudia99@gmail.com](mailto:celaudia99@gmail.com)

### Abstract

Gestational Diabetes Mellitus (GDM) is one of the complications during pregnancy and characterized by glucose intolerance. GDM has an increased risk of preeclampsia, SC labor and can result in type 2 diabetes mellitus within 10 years after pregnancy. Self-management behavior in GDM women can involve a number of obstacles. The aim of this study was to determine the self-management behavior of women with GDM, to understand the barriers of women with GDM in self-management and to analyze the needs of women with GDM. This Systematic Literature Review used the PubMed database with a period of 2008-2018. Of the 586 initial articles identified, this study analyzed 7 articles that met the inclusion criteria. Acceptance of a diagnosis of GDM is considered difficult because sadness, shock, stress and feeling guilty. One way to react was to learn new strategies for a healthier lifestyle. Family support was very effective in helping GDM women to choose a healthier lifestyle. The need for family support and health workers is able to change and improve the lifestyle of people with GDM and help to reduce the psychological burden. Diabetes counselors were needed to understand the principle of self-management and the need for their health conditions.

**Keywords: Barriers, Gestational Diabetes, Needs, Pregnancy, Self-management**

### 1. INTRODUCTION

Gestational Diabetes Mellitus (DMG) is glucose intolerance or hyperglycemia during pregnancy [1] [2] [3] [4], the situation in which pregnant women who have never been diagnosed with diabetes then show high glucose levels during pregnancy [5]. DMG can affect between 1.4% and 12.3% of pregnancies [6]. The prevalence of DMG in each country varies from 1% -14%. Nearly 80% of people with diabetes are in low and middle income countries [7]. This difference is due to the degree of heterogeneity, geographical differences, race, ethnicity, use of health services, screening strategies and diagnostic criteria set [8] [9] [10]. DMG develops in European countries 5.4%, African countries 14%, Asian countries range from 1% -20%, while DMG prevalence in Indonesia is 1.9% - 3.6% [11].

Risk factors for DMG are age > 25 years, overweight/obesity before pregnancy, family history of diabetes, previous history of DMG, history of recurrent abortion, large infant/ macrosomia delivery history, ethnic background, low education [12] [13]. Having DMG during pregnancy has an increased risk of preeclampsia, cesarean delivery and premature birth [14]. The impact of DMG can result in type 2 Diabetes within 10 years of pregnancy [15] [16] and this is related to heart disease [17]. For babies born to DMG mothers at risk of macrosomia, shoulder dystocia or birth injury, neonatal hypoglycemia, jaundice, perinatal morbidity and neonatal intensive care [18],19). When children and adolescents move they are at risk of being obese or having type 2 diabetes [20] [21]. Efforts to reduce the risk of complications are effective self-management by diet, physical activity, monitoring blood sugar and using the right medication [20] [22]. The main approach for DMG is a diet with *Self-Monitoring of Blood Glucose (SBMG)*. It is estimated that the diet helps 70% -85% of women with DMG to get optimal glycemic control [23]. SBMG is recommended as a key component in the management of diabetes therapy in pregnancy [24]. According to *American College of Obstetricians*

and Gynecologists (ACOG), physical activity in pregnancy has benefits and minimal risk, although some adaptations are needed because of the anatomical and physiological changes in pregnancy [25]. Women with hyperglycemia who are heavier and cannot achieve glycemic goals with diet and exercise need insulin to control their DMG [26]. About 15-35% of women with DMG require insulin therapy. But high levels of insulin administration are a concern, because women who need insulin to control DMG are considered a higher risk of developing type 2 diabetes in the future [27].

The process of self-management can be a challenge for mothers who undergo it because it requires learning and the application of self-management skills in a short time [28] [29]. The serious impact of maternal and neonatal morbidity in the short and long term [30], it is important for DMG mothers to get attention in performing optimal self-management. The purpose of this study was to determine the self-management behavior of mothers with gestational diabetes mellitus.

## 2. MATERIALS AND METHODS

The method used in this study is Systematic Literature Review (SLR). SLR is defined as a way of identifying, assessing and synthesizing all empirical evidence that meets predetermined eligibility criteria to answer a given research question [31]. There are 5 steps in this method, which are determining research questions, searching literature, conducting critical appraisal, extracting data and mapping articles.

### a. Research Question

This research question is based on the PEOS framework. The population in this study was mothers with DMG experience. The exposures are Gestational Diabetes Mellitus. The outcome is experience and perspective. The study design is all research that is relevant to the experience of mothers with Gestational Diabetes Mellitus. The research questions formed in this study are:

- 1) What is the behavior of self-management mothers with gestational diabetes mellitus?
- 2) What are the barriers for women with gestational mellitus in doing DMG self-management behavior?
- 3) What are the needs of women with gestational diabetes mellitus?

### b. Literature Searching

The literature search method in this study uses PubMed database and manual searching. Strategies in conducting searches are built through determining keywords and synonyms from the focus of the research. Keywords and synonyms can be connected to logical connector OR and AND as follows ((*pregnant*) OR *pregnancy* OR "*pregnant women*") AND (*diabetes* OR "*gestational diabetes*") OR "*gestational diabetes pregnancy*") AND (*self-management* OR *self-monitoring* OR *perspective* OR *experiences* OR *barrier* OR *needs*)). The inclusion and exclusion criteria are applied in searching articles so that the articles are in accordance with the research objectives. This study took articles published in the period 2008-2018, presented in English and explaining the experiences of mothers with gestational diabetes mellitus. Articles presented in the form of quantitative reviews or methods are not included in the process of a systematic literature review.

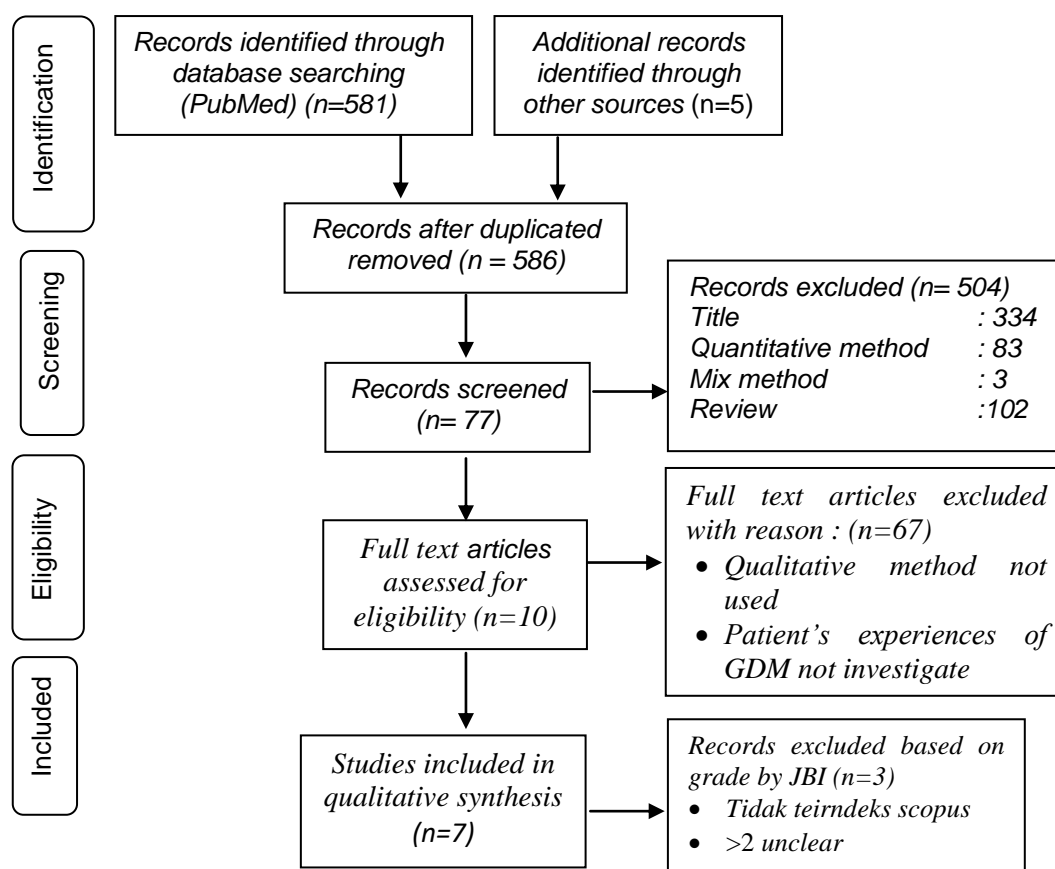


Figure 1: PRISMA Flow Chart

### a. Critical Appraisal

Critical appraisal is a systematic evaluation of articles to find out about the truth and accuracy of the methods used [32]. This research conducts critical appraisal by using *The Joanna Briggs Institute* (JBI). Ten articles that are critical appraisal are carried out. Three articles have more than two assessments that are unclear and not indexed by Scopus so that they are entitled to be excluded in the article selection process because they are included in the exclusion criteria.

### b. Extraction Data

Seven articles extracted data by including the characteristics of each article, namely the article title, country, author, year, research design, research objectives, data collection, participants, research themes and results. The following is the extraction of data in this study

**Table 1. Extraction Data**

<b>Title/Country/ Author/Year</b>	<b>Type of Research</b>	<b>Main Objective of Study</b>	<b>Data Collection</b>	<b>Participants</b>	<b>Themes</b>	<b>Results</b>
<p><i>Experiences of Gestational diabetes and gestational diabetes care: a focus group and interview study</i></p> <p>a. Country: United Kingdom b. Author/Year: [33]</p>	Qualitative	Exploring the experience of GDM and GDM services to improve service	Purposive sampling and data collection strategies with in-depth personal interviews and focus groups	50 participants (15 participants were interviewed and 35 participants were included in the Focus Group Discussion. Participants represented the population studied in terms of ethnicity, age and body mass index	<p>a. The disrupted pregnancy</p> <p>b. Projected anxiety</p> <p>c. <i>Reproductive asceticism</i></p> <p>d. <i>Women as baby machines</i></p> <p>e. Perceived stigma</p> <p>f. Lack of shared understanding</p> <p>g. Postpartum abundant</p>	Women feel they fail when they do not comply with the advice of health care providers to achieve normal blood sugar control.
<p><i>Women's views on other diagnosis and management for borderline gestational diabetes mellitus.</i></p> <p>a. Country: Australia a b. Author/Year: [17]</p>	Qualitative	Exploring mother's experience after being diagnosed with GDM, her behavior towards care and important factors in achieving changes in her lifestyle	Purposive sampling and data collection strategies with semistructured interview	22 participants. 11 (50%) women between 31 and 38 weeks' gestation and 11 (50%) other women between four and seven months postpartum.	<p>a. Mother's reaction when diagnosed with GDM</p> <p>b. Mother's behavior in managing GDM</p> <p>c. Search information and plans for diet and physical exercise</p> <p>d. Effect of family history of diabetes</p> <p>e. Barriers for mothers to achieve diet and changes in physical exercise</p> <p>f. Mother's needs in</p>	Concerns about infant health are used as the main motivation for mothers in carrying out GDM management

					overcoming obstacles	
<i>Self-management of gestational diabetes among Chinese migrants: A qualitative study</i>	Qualitative	Exploring the understanding and experience of self-management in Chinese migrants who have gestational diabetes	Individual semistructured interview	18 pregnant women with DMG who are ethnic Chinese migrants living in Australia	a. Knowledges of GDM b. Self-management issues c. Soscial support d. Culture	Most participants do not understand the principle of service provider advice. Confusion in self-monitoring and lack of support is a challenge in self-management
a. Country:Australia a						
b. Author/Year: [20]						
<i>Women's experiences of gestational diabetes self-management</i>	Qualitative	Exploring mother's experience in managing gestational diabetes	Semi structured interview and focus group	15 participants representing ethnic groups from Victoria who were 23 to 40 years old	a. The shock of diagnosis b. <i>Coming to terms with GDM</i> c. Working it out/learning new strategies d. Looking in the future e. A supportive environment is important	Adaptation of GDM care is a challenge and demands of mothers to control blood sugar. Diet and physical exercise to increase the body's metabolism
a. Negara:Australia						
b. Author/Year: [34]						
<i>Food Peceptions and Concerns of Aboriginal Women Coping with</i>	Qualitative	Describes Aboriginal women in receiving the	Semi structured explanatory model interview	29 Aboriginal women who were diagnosed with DMG for a period	a. Fear and anxiety b. Confusion and frustration in receiving diet counseling	Feel socially isolated and have a bad self-image and

<i>Gestational Diabetes in Wnnipeg, Manitoba</i> a. Country:Canada b. Author/Year: [35]		GMD diet		of time in the last 5 years in Winnipeg, Manitoba		a sense of failure caused by ineffective GDM management
<i>Women's experiences of factors that facilitate or inhibit gestational diabetes self-management</i> a. Country:Australi a b. Author/Year: [27]	Qualitative	Exploring the factors that support and inhibit self-management in pregnant women with gestational diabetes	Semi structured interview and focus group discussion	15 pregnant women with DMG with 28-38 weeks' gestation	a. Time Pressure b. Physical constraints c. Social contarints d. Limited comprehension e. Insulin is easier	Factors that facilitate GDM's self-management include: thinking about baby and psychological support from spouse and family.
<i>Perceived needs in women with gestational diabetes: A qualitative study</i> a. Country: Iran b. Author/Year: [7]	Qualitative	Understand the experience of mothers with gestational diabetes and the perceived need to face a lifestyle	Purposive sampling strategy and data collection with in-dept interview	12 pregnant women with DMG with a gestational age of 24-36 weeks	a. Lack of knowledges b. Lack of support	Pregnant women with DMG have needs that are not met in terms of knowledge and support

**f. Mapping Literature**

Selected articles are published from several countries, United Kingdom (n = 1), Australia (n = 4), Canada (n = 1) and Iran (= 1). There are 3 literature, there are self-management behavior of mothers with DMG, barriers to mothers with DMG and the needs of mothers with DMG. This grouping is adjusted to the purpose of this study.

<p>Self-management behavior in pregnant women with GDM:</p> <ul style="list-style-type: none"> <li>a. Eat healthy food</li> <li>b. Skills in health coping</li> <li>c. Have good problem solving skills</li> <li>d. Physical activity</li> <li>e. Monitoring blood sugar</li> <li>f. Take medication regularly</li> </ul>	<p>Barriers to mothers with DMG in performing self-management behaviors:</p> <ul style="list-style-type: none"> <li>a. Lack of knowledge</li> <li>b. Insulin is an easy choice</li> <li>c. Physical health constraints</li> <li>d. Lack of support</li> <li>e. Cultural factors</li> </ul>	<p>Needs of mothers with DMG:</p> <ul style="list-style-type: none"> <li>a. Information / knowledge</li> <li>b. Support</li> </ul>
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**3. RESULTS AND DISCUSSIONS**

**a. Self-management behavior in pregnant women with GDM**

Carolan, *et.al* reported that women who experience DMG can adapt when they begin to make peace with the diagnosis because at first they have feelings of sadness, shock, stress and feeling guilty [34]. This can be clarified from Kubo's research, that women with pregnancy complications such as DMG tend to have higher psychological stress levels compared to women with healthy pregnancies [36], this is similar to Miller's research, shows that women with diabetes before pregnancy are more likely to experience postpartum depression than women without diabetes before pregnancy [37] [38]. The way to react is to learn new strategies for a healthier lifestyle, one of which is not to attend a food festival. Australian study by Carolan also reported that adopting one of the behavioral changes namely believing that rice is "bad" food, because it contains excess calories [27]. A study of Yuen, *et.al* explains that rice is used as a staple food in Southeast Asia [6], this is a big challenge for DMG women to reduce their rice intake in addition to the Wah research, explained that ethnic Chinese have a habit of consuming traditional foods such as rice and some still believe in traditional medicine, where this behavior needs to be changed according to the advice of health experts [20].

Environment (economic status and social pressure) is very influential in food selection [35]. A study by Wah, *et.al* shows that ethnic Chinese migrants living in Australia have a good understanding of their health conditions including knowing DMG management [20]. A good understanding makes them understand the purpose of the SBMG (Self-Monitoring Blood Glucose), proven that most of them walk for 30 minutes every day as a form of physical exercise. An addition, DMG sufferers who have a work shift, need to make a very strict monitoring system in the form of an alarm on their telephone to monitor the meal schedule or schedule of administration of insulin [39]. But in this study, the choice of insulin therapy was considered "easier" than controlling blood glucose through diet and exercise.

**b. Barriers to mothers with DMG in performing self-management behaviors**

A study of Parson, *et.al* shows that mothers with DMG get stigma from the community in the form of labeling that they fail in maintaining health [33]. DMG sufferers are required to adhere to recommended food guidelines, which require additional costs because food with DMG sufferers is different from those without diabetes. One of the main issues in Iran is the lack of knowledge about the illness, lack of self-care ability and no follow-up monitoring. This study explains that service providers are considered not to be empathetic and do not show psychological support, so mothers with DMG do not get complete information, which requires them to find other sources of information namely via the internet, books or asking friends [7].

Similar to the results of Parson's results di UK, that DMG mothers assume that healthcare providers do not fully empathize with their health conditions. However, after an in-depth interview, the cause is that there is still a feeling of shock towards the diagnosis that causes women not to be able to digest information well which results in confusion and feelings of uncontrollable [33]. Different from Wah's research, this study reported that although DMG sufferers had good understanding, there was still non-compliance in undergoing physical activity. in the aspect of food intake, they are aware of the importance of healthy eating, but "eating out" or eating with relatives is a dilemma for mothers who face because they cannot choose healthy foods that suit their needs. This study also shows that the use of insulin is a practical choice rather than having to diet and exercise. DMG mothers feel free after getting insulin because they feel their task is more easily achieved [20]

Different from Youngwanichsetha's study in Thailand, non-compliance with self-management can be linked to fear of insulin [40]. Thai women after being diagnosed with DMG, they worry about the effects of diabetes on children and their own health. Fear of having a blood test was also felt because it was a new procedure they had not known before, even study of Wah, *et.al* shows that some women claim to falsify glucose records in an effort to avoid prescribed insulin [20]. Women who use insulin feel more stressed in terms of diet management compared to women who get dietary intervention alone [41]

**c. Needs of mothers with DMG**

A study of Emmamgoli, *et.al* stated that the family member support is very effective in helping DMG women choose a healthier lifestyle. The existence of support causes women to believe that they are in a positive environment while inadequate support makes women feel more vulnerable because they judge that the environment has left them [7]. Similar was found in the Benavides's study, that the family can be a guard who has an alarm when DMG sufferers will commit violations in eating [42] [43]. With family support, DMG sufferers do more physical activities according to their recommendations, homework such as caring for children is left to the family [44]. A study of Vas explained that women's needs to deal with different problems [45]. Mothers who get maximum support from their families and health workers consider being able to change and improve their lifestyle and help reduce the psychological burden of DMG. The role of a diabetes counselor is very necessary to support self-management in DMG patients. A study of Soewondo *et, al* in Indonesia reported that most of the existence of diabetes educators in Indonesia were only available in hospitals. Uneven distribution of services and tend to favor urban areas rather than rural and remote areas [46].



#### 4. CONCLUSION

Self-management behavior for diabetics is healthy eating, physically active, monitoring blood sugar, adhering to drugs, good problem solving skills, healthy coping skills, and risk reduction behavior. The self-management process involves a number of challenges and demands such as lack of knowledge, physical health constraints, lack of support, and cultural factors. In an effort to improve the achievement of self-management, health workers can consider effective counseling for patients. Diabetes counselors are needed to help DMG mothers understand the principle of self-management and the need for their health conditions. The need for support from families and health workers is able to change and improve the lifestyle of people with DMG and help reduce the psychological burden

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