Case study

Barriers and coping strategies of women with gestational diabetes to follow dietary advice

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ABSTRACT

Objective: To understand barriers and coping strategies of women with gestational diabetes (GDM) to follow dietary advice.

Design: Qualitative study.

Participants: Thirty women with GDM from the Winnipeg area participated. Each participant completed a Food Choice Map (FCM) semi-structured interview and a demographic questionnaire.

Major outcome measures: Underlying beliefs of women with GDM and factors that hinder following dietary advice.

Analysis: Qualitative data analyzed using constant comparative method to identify emergent themes of factors and beliefs that affected following dietary advice. Themes were categorized within the Integrative Model of Behavioral Prediction.

Results: GDM women faced challenges and barriers when (1) personal food preference conflicted with dietary advice; (2) eating in different social environments where food choice and portions were out of control and food choice decisions were affected by social norms; (3) lack of knowledge and skills in dietary management and lack of a tailored dietary plan.

Conclusions and implications: Quick adaptation to dietary management in a short time period created challenges for women with GDM. Stress and anxiety were reported when women talked about following dietary advice. Tailored educational and mental health consultation with consideration of the barriers may promote dietary compliance and overall better health.

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1. Introduction

Gestational diabetes mellitus (GDM) is defined as glucose intolerance with onset or first recognition during pregnancy. In Canada, the prevalence of GDM varies from a range of 3.5–3.8% in the non-Aboriginal population to a range of 8–18% in Aboriginal populations. Treatment of GDM has shown to improve maternal and neonatal outcomes. Risk reduction requires extensive behavioral and self-care modifications, which can include strict dietary regulations, possible insulin injections, frequent blood glucose monitoring, and increased visits to healthcare providers for maternal and fetal surveillance. Treatment of GDM must begin immediately after the diagnosis. It is recommended that women with a diagnosis of GDM be referred to a registered dietitian for individual nutrition consultation. However, managing diabetes in pregnancy can be challenging, especially for women with no previous experience with diabetes but need to meet the blood glucose target within a limited period of time. Previous studies have reported that women with diabetes during pregnancy felt a sense of decreased control and frustration about their condition. Following dietary advice has been considered a major challenge in GDM management. However, there still are research gaps on: (1) what specific barriers are related to dietary management in women with first time diagnoses of GDM; (2) what beliefs and factors caused these barriers; and (3) how do women cope when they encounter barriers in dietary management.

This study was intended to address the above questions. The results will provide a better understanding of the barriers to following dietary advice that women with GDM might encounter, and how they coped when presented with dietary challenges. This may enhance our understanding of the target population so that

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dietary management education would be meaningful and client-centered.

2. Methods

2.1. Study design

This study used a qualitative approach. In-depth interviews provide the means for the participants to freely express their experiences and ideas in their own words. It is an effective way to identify factors that are relevant to a particular health behavior in a population under investigation. An in-depth interview that could both record a complete eating pattern and also provide opportunities to explore reasons for food decision making was favored in obtaining the data for this study. The Food Choice Map (FCM) is a semi-structured in-depth interview method that was used to understand a participant’s weekly eating pattern and meanings of the eating pattern. It uses food to start the conversation and it helps the researcher to explore meanings behind eating behaviors.

The FCM interview tool consists of a board to record food frequency and meal/snack time in a regular week, and food picture stickers from common food groups that could represent 910 different foods. The participant placed the food pictures that represent the foods consumed in a week on the food map board. The dynamic of building this weekly food pattern allows opportunities to explore hidden reasons behind food behaviors. The advantage of using the FCM interview is that it collects a whole week eating pattern. It provides the opportunity for the woman to discuss any food that was important to her in the context of dietary management without forgetting any food by chance. This kind of data collection has been validated to collect accurate, reliable, and rich qualitative data when collecting information on eating behaviors.

A semi-structured interview guide (Appendix 1) was developed by the first author with probes on reasons for food decision making in following dietary advice. Through the FCM interview, a woman’s experience on dietary management was explored by discussing reasons of her food decisions. Any encountered barriers during dietary management were explored spontaneously.

The Integrative Model of Behavioral Prediction was used to guide the interpretation of the interview data. The Integrative Model of Behavioral Prediction has been used in qualitative research in the past to explore risk factors for excessive gestational weight gain in low-income women. This model suggests that an individual’s behavior change can be predicted by the intention for such a change, which could be influenced by a set of beliefs that the individual holds. These beliefs are: behavioral beliefs and outcome evaluations (what outcomes will come with the behavioral change), normative beliefs (the perception of how other people think of what the individual should or should not do) and efficacy beliefs (believe that one can perform a certain task (self-efficacy)). Skills and environmental constraints are two other important factors for a behavioral change to happen. A behavioral change is unlikely to happen if the person lacks skills or encounters environmental constraints, even if the person has intentions for the behavioral change.

2.2. Sample selection and recruitment

Thirty participants were purposively recruited from a general hospital outpatient endocrinology clinic that receives GDM referrals from all over Manitoba. The approval from the University Research Ethics Committee and the hospital research ethics review board, the researcher posted a recruitment flyer in the clinic. Respondents who were interested in the study contacted the researcher to set up an appointment and to complete the study consent form and a research interview. The inclusion criteria were: (1) lived in Winnipeg and surrounding communities but worked and did grocery shopping in Winnipeg; (2) attended at least one education session with a registered dietitian after diagnosis of GDM; (3) able to communicate in English and were not visually impaired (were able to complete the FCM, the consent, and the demographic questionnaire); and (4) had not been previously diagnosed with GDM.

Thirty women were recruited and interviewed by the first author at the participants’ homes during May 2011 to February 2012. These participants were diagnosed with GDM at 24–28 gestational weeks following the Canadian Diabetes Association Clinical Practice Guidelines (ref). All the participants received dietary consultation from a dietitian during their first visit to the endocrinology clinic. Dietary follow-ups varied from weekly to bi-weekly. All participants had received dietary consultation and were practicing dietary management at the time of interview. A Thank You card with a $20 grocery gift card was given to the participant after the interview.

2.3. Data analysis and interpretation

All the interviews were recorded using a digital recorder and were verbatim transcribed and imported into NVivo 9 qualitative data analysis software for thematic analysis by the first author. Important steps of the analysis were: (1) ongoing coding of all information in transcripts as recruitment and interview progressed; (2) revising codes and recoding previous data as analysis progressed; (3) discovering similarities and differences among the participants through constantly comparing and contrasting the data; and (4) categorizing codes into themes. Themes on barrier experiences of following dietary advice were identified. Underlying beliefs that affected following dietary advice were also identified and categorized within the Integrative Model of Behavioral Prediction.

Verbatim quotes that were selected for presentation are good illustrations of the identified themes. Steps were taken to corroborate study findings, a concept in qualitative research similar to reliability and validity in quantitative research. These included: (1) transcripts were reviewed by the participants to verify the interview conversation; (2) data transcription and data analysis occurred concurrently during data collection to ensure sample saturation; (3) use of an independent investigator outside the research study to code four transcripts to achieve high kappa scores (90–95% on code comparison), (4) systematic checking of themes against supporting quotations, and (5) independent review of transcripts, categories, frequency tables, and themes by the second and third author who had experiences in qualitative research. Any disagreements were discussed and data and analysis rechecked until agreement was achieved.

Demographic data collected from the questionnaire were used to describe the sample population.

3. Results

All participants were interviewed at 26–38 gestational weeks (median 36). Theoretical saturation was reached with this sample size. The majority of the women had an above normal pre-pregnancy weight (BMI ≥ 25, Table 1), were married and employed. Eighty percent of the participants had at least a college education. Fifty-three percent of the participants were Caucasian and the rest were Asian, African, and Aboriginal. All the participants were diagnosed with GDM for the first time. Forty-three percent of the participants received insulin treatment at the time of the interview. No participant used oral agents for GDM treatment.
Table 1
Demographic characteristics of participants (n = 30).

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (year) (range)</td>
<td>Median 29, Min–Max 20–42</td>
</tr>
<tr>
<td>Weight gain (kg) (range)</td>
<td>Median 11.90, Min–Max 0–28.18</td>
</tr>
<tr>
<td>Gestational weeks at interview (week) (range)</td>
<td>Median 36, Min–Max 26–38</td>
</tr>
<tr>
<td>Weeks after initial dietary session (week) (range)</td>
<td>Median 4.5, Min–Max 2–10</td>
</tr>
<tr>
<td>% of total participants</td>
<td>Participants/total participants</td>
</tr>
<tr>
<td>Pre-pregnancy BMI</td>
<td>Normal 27, Overweight or obese 73, Marital status Single 20, Married or Common Law 80, Number of children &lt;18 years of age None 50, 1 50</td>
</tr>
<tr>
<td>Level of education</td>
<td>High school 20, College/University 73, Post-graduate 7</td>
</tr>
<tr>
<td>Employment status</td>
<td>Unemployed 27, Employed 73</td>
</tr>
<tr>
<td>Annual household income</td>
<td>Less than 20,000 13, 20,000–39,999 27, 40,000–59,999 27, 60,000 over 33</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>Caucasian 53, Asian 27, African 10, Aboriginal 10</td>
</tr>
<tr>
<td>Received insulin treatment</td>
<td>Yes 43, No 57</td>
</tr>
</tbody>
</table>

All participants received dietary advice from the dietitians on food groups, portion sizes, sugar alternatives, label reading, and sometimes carbohydrate counting if the participant was on insulin. The Diabetes Food Guide (adapted from the Canada Food Guide) was given to all the participants.

Beliefs that may enable women following dietary advice were expressed as the controlled eating is temporary and will be over soon and high blood sugar is dangerous to the baby and will cause problems in delivery. This group of women generally agreed the advice from healthcare professionals such as high blood glucose leads to complication for both mother and the baby. Their trust in the medical facts presented by the healthcare professionals could be related to this group of women’s education level. As one woman said, “The doctor told me, with gestation diabetes, your target readings have to be lower (than type 1 and 2 diabetes). Then other people who have diabetes actually argue about it. I have to do what the doctor says. I am sorry.” Another similar comment was, “I haven’t followed what other people say about diabetes. I have been sticking with what the doctor says. I figure she had gone to school long enough. I probably can trust her”.

However, the belief in medical facts was not enough to eliminate barriers to following dietary advice. There were four common barriers that women encountered when following dietary advice. (1) personal food preference conflicted with dietary advice; (2) eating in different social environments where food choice and portions were out of control and food choice decisions were affected by social norms; (3) lack of knowledge and skills in dietary management and lack of tailored dietary planning; (4) limited time for dietary changes. These barriers were explained by the underlying beliefs and the influencing factors from the Integrated Model of Behavioral Prediction.

3.1. Behavioral beliefs and outcome evaluations

Two behavioral belief expressed by 21 women was that food decision making should be based on personal food preference and craving during pregnancy is normal and should not be neglected. Therefore, when recommended dietary advice did not fit into this belief, then noncompliance could occur. One woman stated, “sometimes I feel there’s so much meat, and I would normally not eat that much meat. But it’s one of the things that the dietitian said it does’t affect your blood sugar!”. Another woman said, “I found the advice is hard to follow because I am not able to eat what I want to eat, like I normally would”. One woman commented on her struggles with cravings, “I’m sorry, but, if you’re pregnant, guess what, you’re eating ice cream. It just goes hand-in-hand”.

Another behavioral belief was that meal spacing should follow one’s lifestyle habits or work schedule. It was expressed by seven women that rescheduling new meal times was hard because the recommended frequency of meals conflicted with their work schedules and lifestyle. One woman said, “My lifestyle was really low key and just grab something (to eat). But now I have to put things together and sit down and actually have a specific time to eat and so it’s not easy.” Another woman commented on the difficulty of eating smaller frequent meals, “When I was working, I would eat breakfast early in the morning. I am always on my feet so then like a small breakfast would make me hungrier.”

When there was a conflict between eating personal preference foods and trying to meet the blood glucose targets, seven women decided to eat the “forbidden food” as a snack. They purposely did not check the blood glucose afterwards. One woman said, “The doctor said only check after meals, not after the snacks”.

Although the belief of “high blood sugar is dangerous to the baby” could motivate women to follow dietary advice, fear and worry about GDM complications could hinder women following dietary advice. Some women reacted extremely worried with abnormal blood glucose readings; even if it was slightly outside the target range. The emotional distress often resulted in crying, running outside after high readings hoping to lower blood glucose, or skipping meals. These women believe that achieving the blood glucose target is more important than eating healthy balanced meals. One woman said, “I check with the meter and if it goes high, I don’t eat anymore”. Another woman who chose to have more frequent clinic visits than needed explained that she wanted to receive more monitoring and assurance on the baby’s health. However, she repeatedly ate the same meals that stabilized her blood glucose.

3.2. Normative beliefs

Normative beliefs such as “People would expect me to eat like a normal pregnant woman”, and “I don’t want my friends or relatives think I am an outsider” caused barriers to following dietary advice. Seven women were challenged by eating in different social environments. They were uncomfortable measuring the amounts of food in public and felt that their friends or relatives would expect them to eat like a normal pregnant woman. One woman said, “There’s going to be like twenty-five other people in the house. I do not want my cousins looking and going like – why don’t you just take a scoop and forget about it. I’m debating in my head, should I take my measuring cups and my scale or should I just enjoy myself and write down the consequences?”

In this study, sixteen women mentioned that their spouses or partners showed support by helping with food preparation and...
grocery shopping. Some spouses even supervised the following of dietary advice from healthcare professionals and believed that “this is the right thing to do” and “it is good for the baby”. However, when women and their spouse involved in social eating events, the social environment posed specific norms and environmental constraints on some women. One woman said, “His friends are here so we have been going out late at night. Like around 8 or 9 o’clock at night and they want to go for wings and ice cream. I had ice cream almost every day this week.”

Although many spouses agreed with the importance of dietary management, some also supported the normative belief that pregnancy craving should be satisfied. This kind of support sometimes provided the opportunity for women to indulge in certain forbidden foods. As one woman said, “we had seen a hot dog vendor again and again but being pregnant I wouldn’t buy from a vendor. I feel comfortable if my husband makes the hot dogs. Finally, we made it to Safeway and bought hot dogs. I had three hot dogs for supper that day”.

3.3. Skills and environmental constraint

Justifying the amount of carbohydrates for a meal was a big challenge for twelve women trying to follow dietary advice. The lack of knowledge and skills in label reading or carbohydrate counting created difficulties in estimating carbohydrate content in daily food and limited food variety. Eighteen women including all the women on insulin experienced challenges on matching food carbohydrate to insulin or understanding the carbohydrate amount in foods. After trials and failures, women felt discouraged and stressed with following dietary advice. One woman stated, “You’d think, okay, this will be fine for me to eat. Then I will check my sugars two hours later and it would not. I would be why? No, no, that is not okay. It was disappointing and it was definitely stressful, it was really not fun”. One woman shared her frustration on giving up the food that she likes, “I was told that I could have oatmeal but every time I have oatmeal my sugar was so high. It was ridiculous”.

Eating out posed as an environmental constraint as not knowing the carbohydrate content of food. One woman expressed her worry about eating in restaurants, “My anxiety and my discomfort come when someone says let’s go for lunch and then I sort of panic. It is like what am I going to eat? Even a salad in a restaurant could be not too good for you, you know, like depending on how much sugar is in the dressing”.

Every woman received a copy of the Diabetes Food Guide. However, the Diabetes Food Guide information was considered too general by this group of women. Experiencing how different food affects blood glucose was not easy for them and they preferred more guidance. As one woman stated, “Your first couple of weeks you have to eat and figure out what it does for you. That’s why I found the first couple of weeks were harder”; another woman said, “I don’t need them to give me a meal plan but a list of options or suggestions and then it won’t be like figure it out on your own”.

Structured sample meal ideas were considered helpful by half of these women. One woman said, “I’m finding a meal plan would have been helpful, just to know that if you want to have this, if you put it with this and this you’ll be full and you’ll be safe”; another woman said, “I would like to know like grams of sugar or something, what would be too much in a day, or what would not be enough, like the exact amount of sugar, but they (healthcare professionals) said, “Oh, we don’t really tell you the exact amount of sugar that you should not be eating”.

3.4. Efficacy beliefs

Not able to adapt to dietary changes in a limited time period was one common efficacy belief, especially when women had strong food preferences and long-term eating habits. One woman said, “I have to say this whole diabetes thing is really, really new to me so I have to learn portion size, how much carbohydrate today. It
is hard to get your head wrapped around to eat this and that.” Another woman commented, “I am scared of doing the wrong thing, because I have been doing it in a certain way for forty years, that it would slip. I am in a world of unknown”.

Efficacy beliefs also can be affected when women encounter the above-mentioned barriers in dietary management. The abnormal readings created emotional distress, which affected women's attitudes of “I can do this”. One woman commented, “It is frustrating when you watch your carbs, you portion it and then your reading is still high.” In addition, when women started insulin treatment or increased insulin dosage, there was a sense of failure that their dietary management was not successful. One woman who needed to adjust her insulin said, “It was discouraging to hear that I need that much insulin whereas some people don’t”.

3.5. Coping strategies

Challenges in dietary management could affect women's self-efficacy, their attitude and intention to following dietary advice. Some women developed coping strategies.

- Restrict carbohydrates. The fear of going on insulin treatment sometimes resulted in obsessively reducing carbohydrate intake in women treated with diet only. For these women, the evaluation of GDM dietary management was based on blood glucose readings. The fear of insulin outweighed the concerns of eating imbalanced meals. One woman stated, “Well, I steer clear of the carbs and that’s where I’m struggling; like sometimes I’m not taking the amount that they want me to have. I’m taking less, because I know it’s going to spike my sugar.”

- Stay with a simple diet that works. One of the coping strategies used by seven women was to stay with a simple diet that worked. As one woman explained, “I just eat plain, boring for a little period of time, then (after delivery) I will be fine.” Meeting the blood glucose target was often considered the first priority for these women because they worried about infant complications. Following the Diabetes Food Guide and eating balanced meals were not that important for these women. One woman said, “Because, again it’s about trying to balance my sugars. We’ve been having a hard time getting them down, so when I find something that works, I stick to it”. Another woman said, “When I found this breakfast and then with the amount of insulin, the blood sugar is okay, so I stick with the same breakfast”.

- Avoid social eating. Six women either reduced frequencies of eating out due to unfamiliar carbohydrate content in restaurant food or avoided eating in social settings because the difficulties of controlling food choices and portion sizes. One woman tried to avoid eating with her parents who lived down the street. She said, “If they're at mealtime, I won't go there. I will just come home and eat whatever I have because my family has bad choices. They are where I was. They eat deep fried foods and garbage and Pepsi”.

- Spiritual support. Praying for will power to resist food temptation was mentioned by four participants. One woman said, “I pray a lot and I trust in the Lord and I know things will be fine. That helps me not to want things that I shouldn't be eating”. Another woman relied on a spiritual coach to balance her stressful life with GDM. She said, “The nutritionist in the hospital didn’t stress enough that this (GDM) is the major priority. Whereas with the spiritual coach said this (GDM) is number one. It is telling me to stop and pay attention”.

4. Discussion

A conceptual framework was developed based on the study results to illustrate the underlying factors as possible barriers of following dietary advice (Fig. 1). In the left box, the underlying beliefs from behavioral, normative, and efficacy beliefs affected women to follow dietary advice based on the Integrative Model of Behavioral Prediction. Two other factors such as skills (perception of lacking of dietary management skills) and environmental constraint (unfamiliar eating environment) added extra barriers in the following dietary advice process. On the bottom, a new insight is that when women encountered barriers of following dietary advice, several coping strategies emerged. Client-centered approach nutrition counselling is recommended in Canadian dietetic practice. However, issues remained as during limited clinic consultation time, dietitians struggle between their pre-determinate health information and what the clients wants.21 This study finding contributes to this research gap by providing a better understanding for dietitians about the meaning of dietary management in women with GDM from the clients own perspective.

Women with GDM whose food choice decisions were mainly influenced by personal food preference could be challenged by dietary interventions. The eating foods on one's favorite foods or meals has been reported in a Canadian study of Aboriginal women with GDM.8 These women could have benefited from a diet consultation, which considered their personal preference foods.

In this study, the benefits of dietary management and controlling blood glucose during GDM pregnancy were recognized by many spouses and partners of the participants. However, the perceptions of eating during a GDM pregnancy were different outside these women's home. This is consistent with previous studies' findings that women with GDM felt eating on social occasions could create an inconvenient and awkward situation. Thus, they felt socially apart.2,24 In this study, some women chose to avoid these kinds of social eating events. Losing control is not only about losing personal control in following dietary advice, but also losing such control within a social environment.

The participants faced the challenges of adapting to an altered dietary behavior within a limited period of time. Insulin therapy was recommended when lifestyle intervention failed to achieve target blood glucose.9 One study reported that women with GDM considered insulin as “an easy option” to achieve optimal glucose targets.24 This study with a specific focus on dietary compliance found that dietary management was especially challenging for women who were on insulin. They coped with sticking to simple, repeated meals that gave them satisfied postprandial blood glucose readings. Some women who were not on insulin restricted their carbohydrate intake to avoid insulin initiation. These self-practice food restrictions might result in blood glucose readings within target ranges. Hence, these eating behaviors were reinforced. However, restricted low caloric or low carbohydrate diets during pregnancy could increase ketone levels. Studies have shown that ketonuria or ketonemia could affect the cognitive development of infants.16,18 These women could benefit from a structured, personalized meal plan, as suggested by the participants.

Low education level and low health literacy level have been associated with decreased perceptions of the seriousness of GDM and self-management.22 The majority of this group of women had college education and they believe that GDM self-management is important. However, lack of dietary knowledge and skills decreased these women’s self-efficacy that they can make a dietary adaptation in limited time. Some coping strategies that this group of women used could make them feel deprived from the pleasure of eating, both physically and socially. One Canadian study on Aboriginal women with GDM reported that some participants used “binge eating” in diet struggles.8 This was not observed in the study sample. However, the
intention of binge eating after delivery was mentioned by this group of women. This intention could affect postpartum eating habits. Women with GDM are at higher risks of developing future type 2 diabetes.26,27 Studies have shown that healthy eating after a GDM pregnancy was not easy.18,28 An intention of binge eating could create more barriers to dietary improvement postpartum.

This study did not record the frequencies of the participant interaction with the diettian. In general, women on insulin might have more frequent follow-up visits to adjust insulin and receive dietary review. Increased dietitian interaction might improve women’s knowledge and skills on label reading and carbohydrate counting. However, other beliefs that hinder dietary compliance need to be explored to ensure the behavioral changes to happen.

4.1. Study limitations

The limitations of this study are related to qualitative research. The participants were recruited purposively and the sample size was small. This resulted in the demographic composition of the majority of the participants were married and with college education level. This could be due to pregnant women with low socioeconomic status tended to have less access to healthcare services.30 Therefore, fewer were contacted at the recruitment clinic. The results of this study cannot be generated to a larger population but to provide understanding of barriers to following dietary advice in this demographic group. In Manitoba, Canada, advanced age is one contributing factor for the increased rate of GDM.31 In this society, there are an increasing number of women who enter pregnancy at an older age, with established careers and stable incomes, and are at risk of GDM. The findings of this study are still meaningful to understand this group of women.

5. Implications for research and practice

The findings from this study suggested that individualized meal plan with considerations on personal food preference and possible social eating environments could be beneficial to women with GDM. Follow-up assessments on appropriate intake and meal balancing could help to identify barriers in dietary modification. Therefore, specific nutrition knowledge and skills can be reinforced, especially for women on insulin. It is important to education the clients that achieving target blood glucose and health eating are both important for healthy fetal growth.

Further study focus on women in different socio-economic groups could complement the results from this study.

Appendix 1. Food Choice Map interview guide

Have you changed the amount or type of foods you eat? Did the amount increase or decrease, and by how much? Why? Are you planning to change the amount of any food you eat? Which ones? Why? Where do you get the information on the best buys, what is in the food, how healthy is it? Where do you buy your food? Do you share the money for the foods/meals? With whom? Who contributes? Who decides what foods will be purchased? Where is the meal prepared? Do you prepare meals alone or do you have help? How often do you prepare meals each day? What nutrition information did you receive from the dietitian? Do you receive nutrition information from anyone else? If so, what did they say? Have you made any changes on food choices after the diagnosis of gestational diabetes? Do you follow the nutrition information that you receive from the dietitian? How do you feel about eating healthy and managing your blood sugar at the same time? Do you feel confident on making decisions on eating for your health and your baby’s health? Is there any fear that your food choices might complicate your blood sugar? Are you afraid that your eating might harm the baby? In what way? Do you feel comfortable on buying the foods that are recommended by the dietitian?

References