Assessment of the knowledge of pregnant women with gestational diabetes regarding diet and physical activity in Morocco

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ABSTRACT

Gestational diabetes is an increase in blood sugar levels that appears during pregnancy and disappears after delivery. This study aimed to assess the level of knowledge of pregnant women with gestational diabetes regarding diet and physical activity. We conducted a descriptive observational study using a well-structured questionnaire to evaluate data from 100 pregnant women with gestational diabetes. The average age of pregnant women was 30.92 years, with a notable concentration of participants in the 25-29 age group. The distribution of educational levels shows that secondary school constitutes the largest proportion at 32.0%. A very large percentage of participants agreed on the importance of incorporating vegetables and fiber into their diet while abstaining from processed meats. However, only 30% of participants understood the importance of choosing monounsaturated fats over saturated fats. 80% of our participants recognized the importance of physical activity in managing gestational diabetes. The results underline the need for better information and improved dietary education and physical activity for these patients in order to improve the outcome of these pregnancies at risk of complications.

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Introduction

Pregnancy is an important stage in a woman's life, during which the mother's body undergoes immense changes involving all organ systems to support the growth of the fetus. Moreover, abnormalities occurring during pregnancy can lead to further complications that affect the health of both mother and fetus.[1] Some of the maternal complications reported may include anemia, depression, cardiac disorders, arterial hypertension (pre-eclampsia), weight gain, hyperemia gravidarum, anxiety, and gestational diabetes.[2]

Gestational diabetes (GD) is defined by the World Health Organization as "a disorder of carbohydrate tolerance leading to hyperglycemia of variable severity, beginning or first diagnosed during pregnancy, irrespective of the treatment required and the evolution in the post-partum period".[3]

Clinical risk factors for GD include high body weight (with a body mass index greater than 25 kg/m^2), maternal age, and reduced physical activity, history of GD or birth of a large baby (macrosomia), polycystic ovary syndrome.[4]

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GD is a global public health problem with both short-

and long-term health implications. In Morocco, research suggests that 8-10% of Moroccan women have been diagnosed with GD.[5] The immediate consequences of GD are negative for pregnant women: pre-eclampsia (high blood pressure and protein in the urine), premature or cesarean delivery, and the development of type 2 diabetes later in life. In addition, their babies may suffer from complications such as excessive birth weight and difficulties during childbirth.[6] Consequently, early detection and treatment of GD are essential to ensure good fetal development and prevent fetal and neonatal complications linked to maternal hyperglycemia.[7] Today, research shows that raising women's awareness of the GD is crucial to improving future results.[8] In the absence of education, complications for both mother and child are more likely to occur. Therefore, prior to any educational therapy, knowledge assessment is a crucial element, as it tells healthcare professionals which areas need the most attention and how to tailor educational material. Therefore, it is imperative that pregnant women with GD benefit from management that consists of adaptation of a healthy diet and increased physical activity during pregnancy, as well as regular self-monitoring of blood glucose levels and specific nutritional advice and precautions to avoid complications related to GD.

The aim of this study was, therefore, to assess the level of knowledge of pregnant women with GD regarding diet and physical activity.

Materials and Methods

Study context and sample

This is a descriptive observational study of a sample of 100 pregnant women with GD, conducted over a 2-month period (September-October 2024) in hospitals in the Rabat-Salé-Kenitra Region, aiming to assess the level of knowledge of pregnant women with GD about diet and physical activity. The subjects recruited were people already diagnosed with GD who presented to the hospital for a simple check-up.

With the help of the healthcare staff, we explained the purpose of the study, and then they volunteered and signed the consent form. We took responsibility for filling in the questionnaires and socio-demographic information ourselves, based on their own responses.

Data collection

We collected data using a paper questionnaire that was administered directly to pregnant women and included a series of closed- and open-ended questions. The structured questionnaire was created by incorporating ideas drawn from a literature review, personal expertise, and consultations with specialists.

The three-part questionnaire was designed to collect the following data: i) epidemiological characteristics of the patients questioned (age, level of education, socio-professional category, family history, pathological history); ii) attitude questions with multiple-choice answers to assess dietary habits; iii) questions concerning physical activity.

Ethical considerations

All precautions according to the Declaration of Helsinki were taken to protect the privacy and confidentiality of the personal information of those involved in the research. Informed consent was obtained from the participants, who were properly informed of the objectives and methods.

Statistical analysis

Once all the information required for our study had been collected *via* the questionnaire, the data were entered and analyzed using SPSS 23.0 (IBM, Armonk, NY, USA) and Excel 2013 software (Microsoft, Redmond, WA, USA).

Results

Socio-demographic characteristics

Age

This study was carried out on 100 pregnant women. The mean age of the participants was 30.92 years. 39 were aged 25 to 29 (39%), 23 aged 35 to 39 (23%), 20 aged 30 to 34 (20.0%), 13 aged 20 to 24 (13%), 3 aged 40 or over (3%), and 2 aged 18 to 20 (2%) (Figure 1).

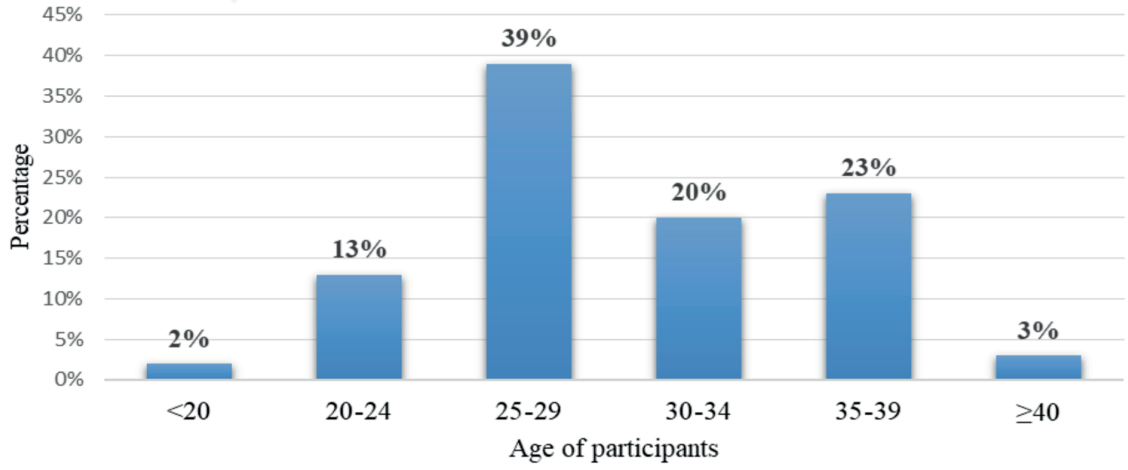

Figure 1. Age distribution of women.

Level of education

The distribution of educational levels showed that junior high school constituted the largest proportion with 32%. Elementary school represented a percentage of 30%, while high school accounted for 15%, and the illiteracy class was the least represented with only 10% (Figure 2).

Dietary rules during pregnancy

Table 1 shows pregnant women's knowledge of the GD diet. 95% of participants stated that they could eat two to three meals a day. In addition, 85% of pregnant women noted that vegetables should make up half of their meals, and all participants (100%) claimed to have controlled their daily food intake to achieve better blood glucose results. However, only 30% recognized the importance of choosing monounsaturated fatty acids over saturated fatty acids. The majority (850%) disagreed with the statement that they can eat "sugar-free foods" as much as they like, and 96% agreed that they should stop eating sweets. The study also revealed that 56% of those surveyed thought fruit and vegetables could replace starchy foods, while 60% rightly said that starchy foods should make up a quarter of their meal.

Physical activity and gestational diabetes

Participants' views on physical activity

Pregnant women's responses to the question of physical activity are presented in Table 2. It was noted that 80% of women thought they should take part in physical activ-

Table 1. Pregnant women's knowledge of the gestational diabetes diet.

Questions	Yes, n (%)	No, n (%)	Not sure, n (%)
When I'm diagnosed with gestational diabetes, I can eat 3 meals a day.	95 (95)	0 (0)	5 (5)
When I'm diagnosed with gestational diabetes, my meals have to be taken at the same time.	42 (42)	58(58)	0 (0)
If I'm diagnosed with gestational diabetes, I can have 2 to 3 snacks a day.	80(80)	20 (20)	0 (0)
If I'm diagnosed with gestational diabetes, starchy foods should make up a quarter of my meal.	60(60)	20 (20)	20 (20)
If gestational diabetes is diagnosed, fruits and vegetables can replace starchy foods.	65 (65)	10 (10)	25 (25)
When I'm diagnosed with gestational diabetes, vegetables make up half of my meal.	85(85)	5 (5)	10 (10)
Once I've been diagnosed with gestational diabetes, I can eat two portions of fruit a day.	80 (80)	10 (10)	10 (10)
If diagnosed with gestational diabetes, I should increase my fiber intake to control my blood sugar.	60(60)	20 (20)	20 (20)
If gestational diabetes is diagnosed, lean animal protein sources are preferable to vegetable protein sources.	40 (40)	0 (0)	60 (60)
When diagnosed with gestational diabetes, I should choose monounsaturated fatty acids over saturated fatty acids.	30 (30)	30 (30)	40 (40)
When I'm diagnosed with gestational diabetes, I should stop eating sweets.	96(96)	0 (0)	4 (4)
When I'm diagnosed with gestational diabetes, I must avoid processed meats.	90 (90)	0 (0)	10 (10)
If I'm diagnosed with gestational diabetes, I can eat "sugar-free foods" as much as I like.	15 (15)	85 (85)	0 (0)
If I'm diagnosed with gestational diabetes, I should control my daily food intake to achieve better blood glucose results.	100 (100)	0 (0)	0 (0)
If diagnosed with gestational diabetes, eat more, eat for two, because I'm pregnant.	(50)	25 (25)	25 (25)

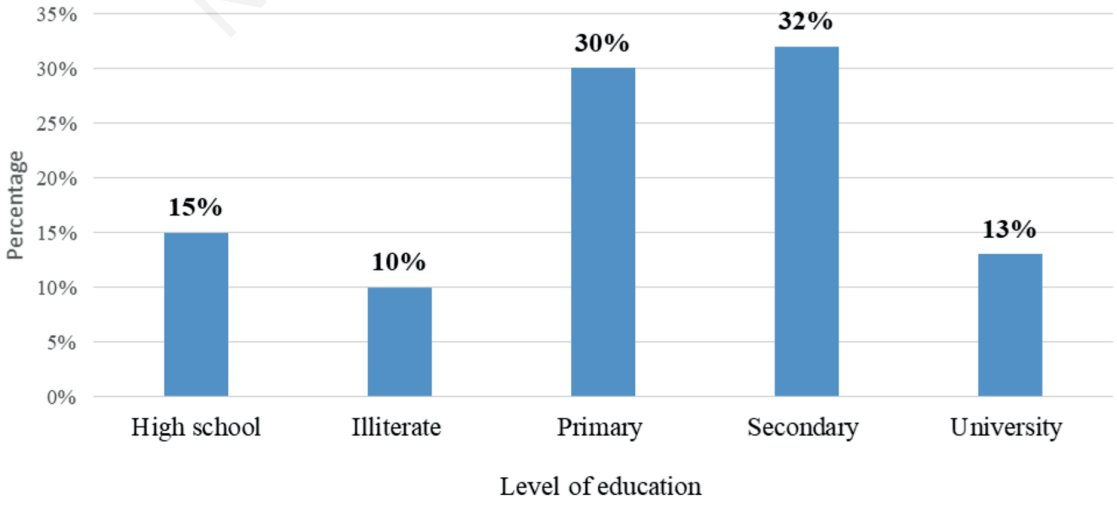

Figure 2. Distribution of participants by level of education.

ity, while 20% thought they should avoid practicing physical activity.

Physical activities preferred by pregnant women

The physical activity preferred by pregnant women is shown in Figure 3. The percentage of 15% was the same for both swimming and soft gymnastics, but 70% of pregnant women preferred walking as a physical activity.

Frequency of activities per week

75% of pregnant women preferred to exercise 2 times a week, 20% preferred 3 times a week, and 5% preferred 1 time a week. This indicates that most people prefer physical activity 2 times a week (Figure 4).

Table 2. Pregnant women's response to physical activity.

Response	I should practice physical activity, n (%)	I should avoid physical activity, n (%)
Yes	80 (80)	20 (20)
No	10 (10)	75 (75)
Not sure	10 (10)	5 (5)

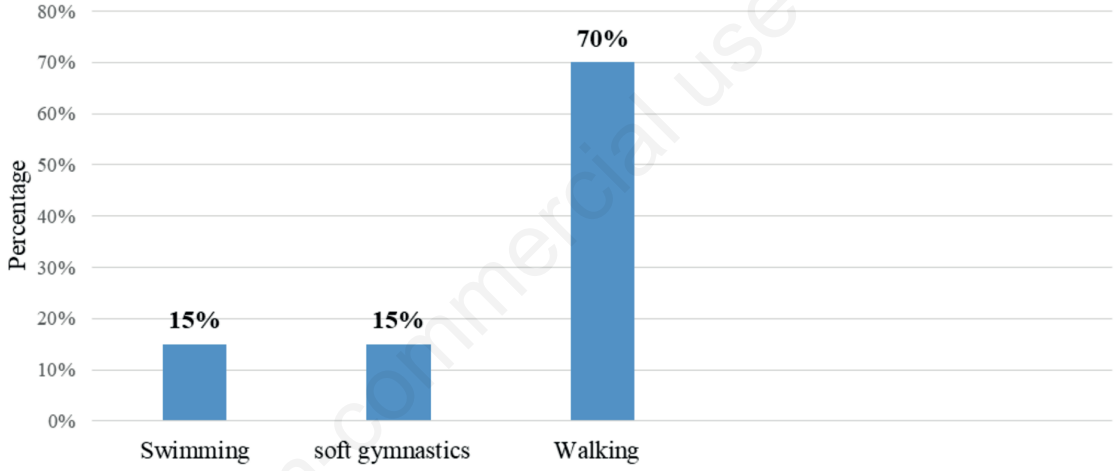

Figure 3. Physical activity preferred by pregnant participants.

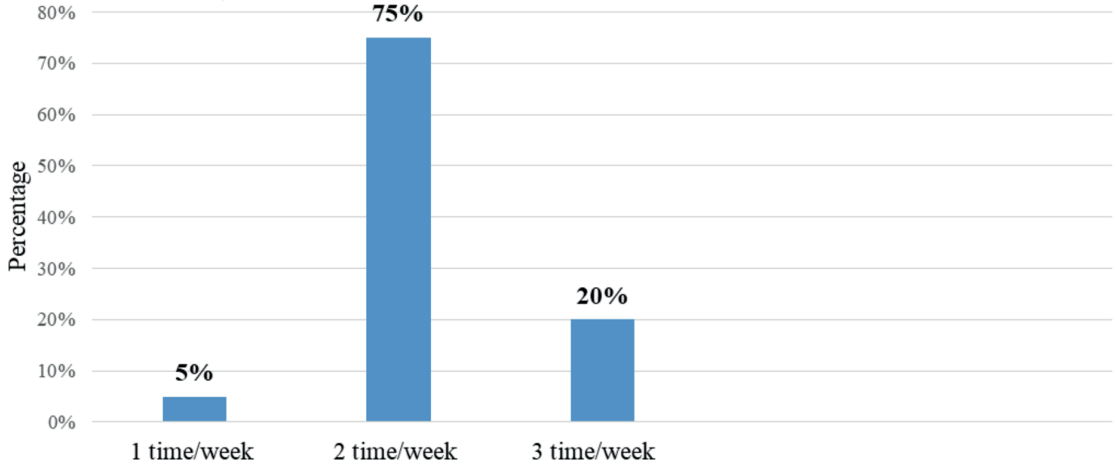

Figure 4. Weekly frequency of physical activity.

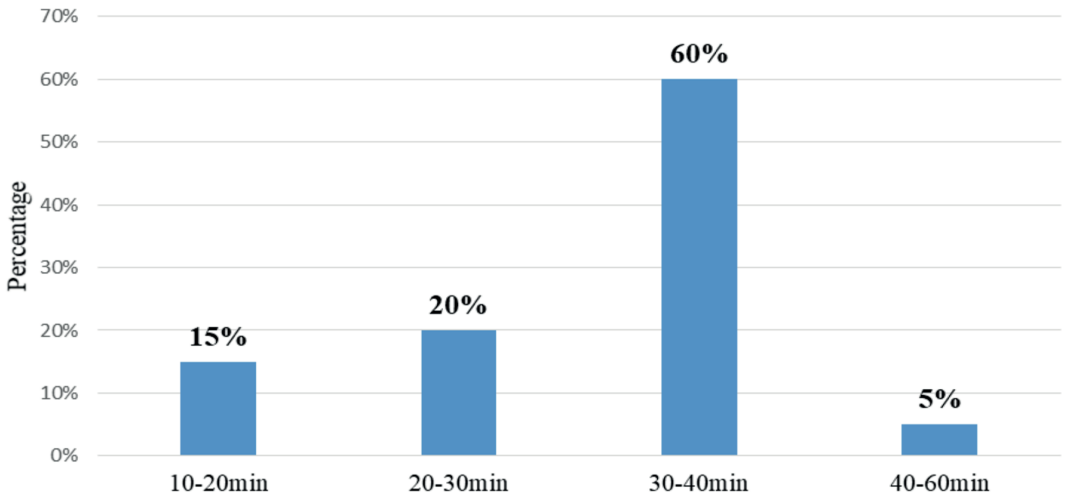

Figure 5. Duration of physical activity preferred by pregnant women.

Duration of physical activity preferred by pregnant women

60% thought that a woman should preferably engage in physical activities lasting 30 to 40 minutes, while 20% chose physical activities lasting 20 to 30 minutes, 15% preferred activities lasting 10 to 20 minutes, and 5% preferred physical activities lasting 40 to 60 minutes (Figure 5).

Discussion

Our study showed that the average age of pregnant women was 30.92 years, with a notable concentration of participants in the 25-29 age group. In comparison with other studies, the study conducted by Price *et al*. in Samoa showed a mean age of pregnant women of 26 years, with a very high distribution of age groups between 18 and 49 years.[9] In parallel, another study of 107 pregnant women in Bangladesh showed that the majority of respondents (30.8%) were aged between 30 and 34, followed by the 20-24 age group (29%), the 25-29 age group (25.2%), and the 35-39 age group (15%).[10] In the same vein, another study carried out on a sample of 189 Nigerian pregnant women showed that the average age of respondents was 28.9±4.63 years.[11]

These results underline the importance of targeting women of maximum fertile age using GD education programs.

In our study, the distribution of education levels shows that secondary school constitutes the largest proportion, with 32.0%. The elementary school represents 30%, and illiteracy is the least represented, with only 10%. In contrast to our results, a study carried out in Bangladesh showed that 14% of respondents had completed primary school, 7.5% secondary school, 41.1% higher education, and 1.9% were illiterate.[10] The study by Shriraam *et al.* in 2013 showed a different distribution: 8.3% of women were illiterate, 9.2% had primary education, 65% had secondary education, and 17.5% had higher education.[12] Another study carried out in France showed that almost 90% of women had a level of education equal to or higher than the baccalaureate (n=138), with 44.2% of them having a level of education higher than baccalaureate +2 (n=68).[13] In conclusion, the level of education differs from one study to another and from one country to another due to the various socio-economic and cultural differences within the populations studied.

The survey revealed that participants had a varied understanding of the dietary management of GD. A very large percentage of participants agreed on the importance of incorporating vegetables and fiber into their diet while abstaining from processed meats. However, only 30% of participants understood the importance of choosing monounsaturated fats over saturated fats. A majority (85.0%) disagreed with the statement that they can eat "sugar-free foods" as much as they like, and 96% agreed that they should stop eating sweets. The study also revealed that 56% of those surveyed believed that fruit and vegetables could replace starchy foods, while 60% correctly indicated that starchy foods should make up a quarter of their meal. Our results underlined the importance of promoting nutritional and dietary education to pregnant women with GD.

80% of our participants recognized the importance of physical activity in managing GD. Nevertheless, pregnant women with GD showed differences in their preferences for the type and duration of physical activity, with the majority choosing walking (70%). The benefits of physical activity and sport are proven in terms of public health and improved quality of life for all, but particularly for pregnant women with GD.

Conclusions

The study highlights important gaps in the understanding of diet management and the importance of physical activity in pregnant women with GD. Our results, therefore, underline the need for better information and improved dietary education and physical activity for these patients in order to improve the outcome of these pregnancies at risk of complications.

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