

Observation on the Effect of Individualized Nutrition Combined with Exercise Therapy for Pregnant Women with Gestational Diabetes Mellitus

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Abstract: *Objective:* To analyze the effect of individualized nutrition combined with exercise therapy for pregnant women with gestational diabetes mellitus. *Methods:* From March 2021 to March 2023, 100 pregnant women with gestational diabetes in our hospital were randomly divided into a control group and an observation group (50 cases in each group). The control group received routine nursing care, and the observation group received individualized nutrition and exercise therapy, and the intervention effects of the two groups were compared. *Results:* The fasting, 2-hour postprandial blood glucose, and glycosylated hemoglobin of the observation group were lower than those of the control group; the weight gain of each time period during pregnancy was lower than that of the control group; the incidence of adverse pregnancy events was lower than that of the control group; the quality-of-life score was higher than that of the control group ($P < 0.05$). *Conclusion:* Among pregnant women with gestational diabetes, individualized nutrition, and exercise therapy intervention can improve their blood sugar indicators, help control their weight during pregnancy, prevent adverse pregnancy events, and significantly improve their quality of life.

Keywords: Gestational diabetes mellitus; Individualized nutrition; Exercise therapy; Blood sugar index; Body weight

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1. Introduction

Gestational diabetes mellitus is a disease unique to pregnancy, and its occurrence is mainly related to changes in eating and living habits^[1]. After the disease occurs, the blood sugar of the patient will rise. If it is not effectively controlled, it will even make the blood sugar level higher and cause great harm to the fetus. In severe cases, it will cause premature birth, miscarriage, postpartum hemorrhage, fetal distress, and other adverse consequences^[2]. Therefore, it is necessary to early intervene in pregnant women with gestational diabetes, reasonably control the blood sugar indicators in the body, and cooperate with relevant clinical interventions while applying drugs, so as to ensure the health of pregnant women and promote the healthy development of fetuses^[3,4]. Studies in recent years have shown that the occurrence of gestational diabetes is

closely related to body weight, lifestyle, and diet. Therefore, when interfering with pregnant women, attention should be paid to their exercise and nutritional guidance^[5]. Based on this, this article will analyze and study the effect of individualized nutrition and exercise therapy, aiming to explore its significance on gestational diabetes, and the details are as follows.

2. Materials and methods

2.1. General information

A total of 100 pregnant women with gestational diabetes in our hospital from March 2021 to March 2023 were recruited and randomly divided into a control group and an observation group. The control group consisted of 50 cases with the age of 22–37 (27.15 ± 2.14) years old and pregnancy time of 20–32 (28.59 ± 1.20) weeks. The observation group consisted of 50 cases with the age of 22–38 (27.21 ± 2.20) years old and pregnancy time of 20–33 (28.61 ± 1.18) weeks. The data comparison between groups was insignificant ($P > 0.05$).

2.2. Inclusion and exclusion criteria

Inclusion criteria included: (1) pregnant women who are diagnosed with gestational diabetes; (2) pregnant women who are aged between 20 and 40 years old; and (3) pregnant women who or whose family members are aware of the study and signed the consent form.

Exclusion criteria included: (1) pregnant women with multiple pregnancies; (2) pregnant women with diabetes before pregnancy; and (3) pregnant women with mental and intellectual impairment.

2.3. Methods

2.3.1. Control group

The control group received routine nursing care, blood sugar control as directed by the doctor, rational use of drugs, and were informed to pay attention to diet control, limit the intake of sugary foods, pay more attention to rest, avoid overeating, work and rest regularly, take more walks and exercise more every day.

2.3.2. Observation group

The observation group was given individual nutrition and exercise therapy, as follows:

- (1) Individualized nutritional intervention: (i) During the pre-pregnancy examination, the real situation of the patients was determined, and the daily calorie needs of the pregnant woman were calculated based on their gestational age, fetal status, weight, body weight, etc., followed by referring to the GDM diet guidelines, formulated individualized dietary plans for them, and urged pregnant women to strictly abide by them; (ii) According to the pre-pregnancy examination results of each period, the blood sugar of pregnant women was evaluated, and the diet of pregnant women was adjusted appropriately according to the principle of small portion and frequent meals. Also, attention is required to controlling the amount of edible salt, supplement potassium, calcium, and other elements, and more vegetables such as celery and leeks are encouraged during the period; (iii) Pregnant women were instructed to accurately fill in the diet plan, reminded to write the three meals and extra meals correctly, checked the diet plan from time to time, and corrected the inaccuracies, so as to ensure that pregnant women have a reasonable and scientific diet; (iv) The calories needed for pregnant women's weight were calculated, and the nutritional mix of three meals followed the calories needed for each time period. For example, 10% of calculated calories in the morning, 30% of calculated calories at noon, and 30% of calculated calories in the evening, and maintaining around 10% of calculated

calories for three meals plus meals; (v) The dietary nutrition comparison table was distributed to pregnant women so that they can use it as a reference for nutritional supplements every day to ensure that the fetus gets good development.

- (2) Exercise therapy: According to the physical characteristics of pregnant women, after a comprehensive evaluation, corresponding exercise interventions are carried out. The main sports items are walking, yoga, dancing, and other exercises. Dancing can improve blood circulation in pregnant women but jumping and rotating are inadvisable during the dance to avoid accidents, and gentle aerobic dance is highly recommended. At the same time, walking can also be used to relieve the discomfort of some body functions during pregnancy. Walking can improve heart and lung function and promote blood circulation. Compared with other exercise methods, walking is also the safest kind. In the process of walking, pregnant women can also feel the fresh air outside, and the range of activities is wider, which helps to relax the mood, and is also an effective way to prevent and alleviate the adverse psychological conditions of pregnant women with gestational diabetes. Yoga exercise also has more advantages, however, specific yoga is chosen for pregnant women, and it needs to be distinguished from conventional yoga. Through yoga, the body's blood circulation can be sped up, enhancing the body's immunity and flexibility. However, attention should be paid when doing physical exercise, and pregnant women are required to wear some loose clothes, so as not to affect the blood circulation of the body if the clothes are too tight. During exercise, it is also necessary to limit the time to 30–40 minutes, and it must be done within 30 minutes after eating, which can improve the sensitivity of insulin, so as to achieve the control of blood sugar in the body.

2.4. Observation indicators

The observation indicators of this study are as follows:

- (1) Observe the blood glucose indicators of the two groups, and detect them with a portable blood glucose detector, including fasting, 2-hour postprandial blood glucose, and glycosylated hemoglobin.
- (2) Record the weight gain of the two groups at each time period during pregnancy, including weekly weight gain, total weight gain, weekly BMI gain, and total BMI gain.
- (3) The adverse pregnancy events of the two groups were counted.
- (4) Use the SF-36 scale to score the quality of life of the two groups. The higher the score is, the better the quality of life is.

2.5. Statistical methods

Statistical software SPSS 22.0 was used to analyze and process the data. The measurement data (mean \pm standard deviation) and count data (%) were tested by t and χ^2 tests, respectively, and the difference was considered statistically significant when $P < 0.05$.

3. Results

3.1. Blood glucose indicators of the two groups

Fasting, 2-hour postprandial blood glucose, and glycosylated hemoglobin in the observation group were lower than those in the control group ($P < 0.05$). See **Table 1** for details.

Table 1. Blood glucose indexes of the two groups before and after intervention (mean ± SD)

Group	Fasting blood glucose (mmol/L)		2 hours postprandial blood glucose (mmol/L)		Glycated hemoglobin(%)	
	Before	After	Before	After	Before	After
Control group (n = 50)	5.52 ± 0.51	4.65 ± 0.52	10.26 ± 1.48	7.05 ± 0.58	9.26 ± 0.51	5.78 ± 0.52
Observation group (n = 50)	5.50 ± 0.50	4.11 ± 0.10	10.15 ± 1.39	6.54 ± 0.21	9.28 ± 0.50	5.21 ± 0.15
<i>t</i>	0.152	5.926	0.154	2.658	0.162	2.654
<i>P</i>	0.589	0.000	0.526	0.000	0.485	0.000

3.2. Weight gain of the two groups at each time period during pregnancy

The weight gain of the observation group at each time period during pregnancy was lower than that of the control group ($P < 0.05$). See **Table 2** for details.

Table 2. The weight gain of the two groups at each time period during pregnancy (mean ± SD)

Group	Weight gain per week (kg)	Total weight gain (kg)	Weekly BMI increase (kg/m ²)	Total BMI increase (kg/m ²)
Control group (n = 50)	0.42 ± 0.12	16.26 ± 4.52	0.17 ± 0.06	6.25 ± 1.95
Observation group (n = 50)	0.32 ± 0.05	13.20 ± 1.50	0.12 ± 0.01	5.15 ± 0.52
<i>t</i>	1.654	7.485	1.525	2.165
<i>P</i>	0.000	0.000	0.000	0.000

3.3. Adverse pregnancy events in the two groups

The incidence of adverse pregnancy events in the observation group was lower than that in the control group ($P < 0.05$). See **Table 3** for details.

Table 3. Adverse pregnancy events in the two groups [*n* (%)]

Group	Neonatal distress	Macrosomia	Premature infant	Neonatal hyperbilirubinemia	Total incidence
Control group (n = 50)	3 (6.00)	1 (2.00)	2 (4.00)	3 (6.00)	9 (18.00)
Observation group (n = 50)	1 (2.00)	0 (0.00)	0 (0.00)	1 (2.00)	2 (4.00)
χ^2	1.042	1.010	2.041	1.042	5.005
<i>P</i>	0.307	0.315	0.153	0.307	0.025

3.4. The quality of life of the two groups

The quality of life score of the observation group was higher than that of the control group ($P < 0.05$). See **Table 4** for details.

Table 4. The quality of life of the two groups before and after intervention (mean ± SD)

Group	Vitality (points)		Physiological functions (points)		Emotional function (points)		Social function (points)	
	Before	After	Before	After	Before	After	Before	After
Control group (n = 50)	52.64 ± 8.14	61.36 ± 8.51	53.29 ± 8.45	60.45 ± 8.29	52.36 ± 8.45	62.68 ± 8.45	53.28 ± 8.41	63.40 ± 8.28
Observation group (n = 50)	52.81 ± 8.20	72.41 ± 3.15	54.50 ± 8.36	73.41 ± 3.15	51.48 ± 8.28	75.74 ± 3.20	53.45 ± 8.32	74.45 ± 3.20
<i>t</i>	0.162	9.825	0.284	8.595	0.281	8.265	0.084	9.265
<i>P</i>	0.784	0.000	0.968	0.000	0.785	0.000	0.752	0.000

4. Discussion

During pregnancy, due to changes in body hormones, both diet and living habits also change, so the number of complications will gradually increase [6,7]. Among them, gestational diabetes mellitus is the most common complication during pregnancy. If the blood sugar of pregnant women remains at a high level, it will cause various serious consequences, and even lead to ketosis [8,9]. For gestational diabetes, if the blood sugar of pregnant women continues to rise and the control effect is not good, various adverse pregnancy events will also occur, which will also have a serious impact on the healthy development of the fetus [10,11]. Therefore, it is particularly necessary to implement the treatment and intervention of gestational diabetes mellitus.

According to relevant clinical data, effective control of blood sugar in pregnant women with gestational diabetes can ensure the normal development of newborns and also ensure the health and safety of pregnant women [12,13]. Therefore, clinically, it is not only necessary to effectively treat pregnant women with gestational diabetes but also to take good care of them [14]. The development of an individualized nutrition plan can provide dietary guidance to pregnant women with reference to the dietary standards recommended abroad, so as to achieve the purpose of standardizing dietary behavior [15,16]. In exercise therapy, exercise guidance for pregnant women can be strengthened, the amount of exercise can be increased, and blood sugar can be adjusted through exercise to improve blood sugar status [17,18]. In addition, exercise therapy can effectively promote the development of large muscle groups in pregnant women, thereby improving their physical functions and promoting production [19,20]. In this paper, pregnant women in the observation group were combined with individualized nutrition and exercise therapy. Compared with routine care, under this combined intervention, pregnant women had lower blood sugar indicators, less weight gain during pregnancy, fewer adverse pregnancy events, and improved quality of life.

To sum up, the effect of individualized nutrition combined with exercise therapy is remarkable, and it is significant for pregnant women with gestational diabetes.

Disclosure statement

The author declares no conflict of interest.

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