

NUTRITIONAL ASSESSMENT OF GESTATIONAL DIABETIC WOMEN

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ABSTRACT: : **Background:** Gestational diabetes mellitus (GDM) affects a significant proportion of pregnant women worldwide. GDM occurs when a woman's pancreatic function is not sufficient to overcome the diabetogenic environment of pregnancy and causes high blood glucose levels due to the body's extra demand for insulin. **Objectives:** The present article aims to study the health status and to provide the nutritional education initiative of the selected gestational diabetes mellitus subjects in Namakkal district. **Methods:** The hospital based study was conducted at Nirmala hospital and government primary health center in Namakkal. The socio economic status, life style pattern, health status and anthropometric measurement such as height, weight, body mass index (BMI) were noted with the standard equipment and the biochemical parameters such as blood and urine report were collected from primary source. Nutritional intake of the selected subjects were recorded by using 24 hour dietary recall method and their food frequency were also taken to know about their consumption pattern. **Results:** Majority of the GDM patients were in normal BMI and their dietary intake is sufficient to fulfill their nutritional needs.

Key Words: Gestational diabetes mellitus, socio economic status, Anthropometry assessment, Biochemical analysis, Dietary assessment.

INTRODUCTION

Diabetes mellitus is one of the most prevalent non communicable disease worldwide, affecting over 370 million people and resulting in 4.8 million deaths annually. the current trend indicates that the age of onset of type 2 diabetes mellitus(T2DM)is rapidly decreasing, with a growing proportion of young people become affected. Pregnancy is associated with a certain degree of insulin resistance and hyperinsulinemia in order to ensure appropriate nutrient supply to the fetus; however, in some women this progresses to gestational diabetes mellitus¹.These hormones affect your placenta and help sustain your pregnancy. Over time, the amount of these hormones in your body increases. The insulin resistance becomes too strong, your blood glucose level may rise abnormally. This can cause gestational diabetes².The gestational diabetes women usually have no symptoms or mild, non-life threatening symptoms, according to the NIH. These symptoms are mostly related to abnormal blood sugar levels, and can include fatigue, excessive thirst and increased urination³. In particular women with gestational diabetes should pay special attention to their nutrients intake. Carbohydrates should account for only 40 to 50 percent of your calories each day. Aim to get 20 to 25 percent of your calories from protein 25 to 35 percent of your calories from fat⁴. The recommended daily caloric intake is individually suited to every women. the main goals of nutritional management are to maintain balanced glucose levels and to provide enough energy and nutrients for all pregnant women, while avoiding ketosis, and minimizing the risk of hypoglycemia (in women treated with insulin)⁵. The optimal diet help appropriate exercise will result in 50-70% of women with GDM achieving management targets. Regular moderate exercise, such as walking, is helpful in maintaining fitness and can also assist greatly with maintaining glycemic levels within target⁶.

Objectives

1. To select 60 gestational diabetic women.
2. To assess the Nutritional status of the selected gestational diabetic women.

MATERIALS AND METHODS

1. Selection of Subjects

The study was a hospital based study conducted in the year 2019. 60 gestational diabetic women were selected from the outpatient of Nirmala hospital and government primary health center in Namakkal district.

Socio economic status like types of family, earning family members, types of work and financial status etc. were also collected from the selected subjects.

2. Assessment of Nutritional status of the selected Subjects

2.1. Anthropometric measurements

Height: Height is the perpendicular distance between the top of the head and the bottom of the feet. In countries where food is widely available during childhood and adolescence, most individuals reach their genetically predetermined height. Adult height is usually reached by age 25 years and remains relatively stable until middle age. **Weight:** Weight is the force the matter in the body exerts when standing in a gravitational field. Body weight reflects both body dimensions (especially height) and body composition. Major components of total body mass are fat mass (ie, adipose tissue) and lean body mass (ie) muscle, bone and water).

2.2. Biochemical analysis: The researcher collected the biochemical parameter such as blood and urine from the selected subjects and analyze the blood glucose, serum protein, serum calcium and serum globulin etc.

2.3. Clinical Assessment: Clinical assessment were also done in selected subjects of gestational diabetic women.

2.4. Dietary assessment: Dietary assessment were done in the selected gestational diabetic women through 24 hour recall method.

3. Assessment of Health status of the selected subjects: Health status were assessed from selected gestational diabetic women in their gestational period- family history of gestational diabetes mellitus, complications of during pregnancy, habits of exercise in the regular period and weight loss in the gestational diabetes etc. were collected from the selected subjects.

4. Analysis and Interpretation of data

The collected data were analyzed and interpreted graphically.

RESULT AND DISCUSSION

1. Socio Economic Status of the gestational diabetic women

Table 1-Socio Economic Status of gestational diabetic women

S.NO	SUBJECTS	PERCENTAGE
1	Type of family	
	Nuclear family	15
	Joint family	85
2	Family members	
	Two	17
	Above two	83
3	Regularly work	
	Yes	81
	No	19
4	Type of work	
	Private	55
	Home maker	45
5	Working time	
	6-8 hours	30
	8-10 hours	70
6	Financial status	
	Low	3
	Lower middle	7
	Middle	68
	Upper middle	15
	High	7

The result showed that is majority 85percent of the selected subjects were joint family the remaining minority15percent of the selected subjects were the members of nuclear family.83percent of the selected subjects had above two members in their family.81percent of the selected subjects were performing regular work in their day to day life. The type of work reveals that is majority 55percent of the subjects were worked under private sector and 45percent of the subjects were home maker. Working hour's show that minority only 30percent of the subjects worked 6-8 hour and majority 70percent of selected subjects work

8-10 hours in the their daily life. The result showed that is financial status of 3percent of the selected subjects were low, 7percent were lower middle, 68percent were middle, 15percent were upper middle and 7percent were high level of financial status.

Socioeconomic status (SES) is a composite measure of an individual’s economic and sociological standing. It is a complex assessment measured in a variety of ways that account for a person’s work experience and economic and social position in relation to others, based on income, education, and occupation⁷.

2. Assessment of Nutritional status of the selected subjects

2.1. Anthropometric measurement of the gestational diabetic women

Table 2-Mean anthropometric assessment of gestational diabetic women

S.NO	HEIGHT, WEIGHT OF THE SUBJECTS	Mean stand deviation
1	Mean height(cm)	157.4
2	Mean weight(kg)	57.1

The table described that is height and weight range of mean standard deviation in calculated the sixty samples in the subjects. Compare with Standard height and weight, all selected subjects had normal range of height and weight.

Table 3-Body mass index of the respondents

S.NO	BMI CLASSIFICATION	NUMBERS OF THE SUBJECTS	PERCENTAGE
1	Underweight <18.5	9	15
2	Normal 18.5-24.9	42	70
3	Overweight 25-29.9	9	15

The table described that the majority 70percent of the subjects’ hadnormal weight,minority15percent had underweight, and 15percent were overweight. BMI is a simple, inexpensive, and noninvasive surrogate measure of body fat. In contrast to other methods, BMI relies solely on height and weight and with access to the proper equipment, individuals can have their BMI routinely measured and calculated with reasonable accuracy³.

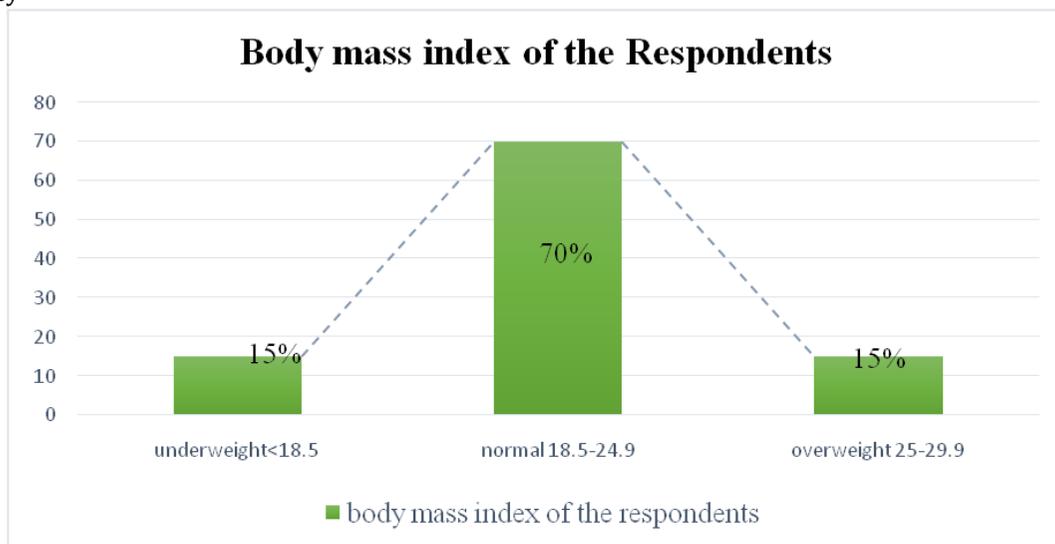


Fig 1: Body mass index of the Respondents

2.2.Biochemical assessment of the gestational diabetic women

Table 4-Biochemical analysis of gestational diabetic women

S.NO	Biochemical Analysis	Normal value	Obtained Percentage
1	Hemoglobin (mmHg)		
	Low	<12.0	67
	Normal	12-15.5	26
	High	>15.5	7
2	Blood sugar (mg/dl)		
	Fasting	60 – 110	20
	Random	140	80

3	Blood urea (mg/dl)		
	Below	10	10
	Normal	10-30	68
4	High	30	22
	Serum protein (gm/dl)		
	Below	6.0	13
5	Normal	6.0-8.0	77
	High	8.0	10
	Serum albumin ((m mol/l)		
6	Below	3.8	15
	Normal	3.8 - 5.0	73
	High	5.0	12
7	Serum globulin (g/dl)		
	Below	2.0	20
	Normal	2.0 - 3.5	67
8	High	3.5	13
	Serum calcium (mg/dl)		
	Below		18
9	Normal		72
	High		10
	Serum alkaline phosphate(U/L)		
10	Below	100	23
	Normal	100 - 250	67
	High	250	10
9	Blood pressure		
	Systolic blood pressure	120 - 139	32
	Diastolic blood pressure	80 - 89	68
10	Pulse rate (per mint)		
	Below	72	5
	Middle	72-75	72
	Normal	80	20
	High	85	3

The result revealed that the majority 67percent of the subject's had hemoglobin < 12.0 mg/dl, minority 26percent of the subjects had hemoglobin within normal range 12-15.5 mg/dl and 7percent of the subjects had hemoglobin>15.5 mg/dl. Minority 20percent of the subjects had blood sugar(60-110mg/dl) fasting level and majority 80percent of the subjects had blood sugar random level(140mg/dl).Majority80 percent of the subjects had random blood sugar about 140mg/dl and 68 percent of the subject had normal level of blood urea level and 77 percent of the diabetic women had normal level of serum protein ,serum albumin and serum calcium. Majority 67 percent of the selected subjects had normal level of serum globulin and serum alkaline phosphatase.

2.3. Clinical Assessment of the selected subjects

The clinical assessment were done in the selected subjects but all the subjects had normal clinical signs and symptoms.

2.4. Dietary assessment of gestational diabetic women

Table 5- Dietary assessment of gestational diabetic women

S.NO	FOOD HABITS	NUMBER OF THE SUBJECTS	PERCENTAGE
1	Vegetarian	18	30
2	Non-Vegetarian	30	50
3	Ova-Vegetarian	12	20

The above table revealed that meal pattern of selected gestational diabetic women. Minority 30 percent of the gestational diabetes was found to be vegetarian, majority 50 percent of the gestational diabetes was

found to be non-vegetarian and 20 percent of the gestational diabetes was found to be ova-vegetarian, vegetarian lifestyle is generally associated with gestational diabetes mellitus.

A healthful diet is important during pregnancy, and particularly so if a women develops gestational diabetes. The American diabetes association recommended that women with gestational diabetes should eat three small-to-moderate meals and two to four snacks per day⁸.

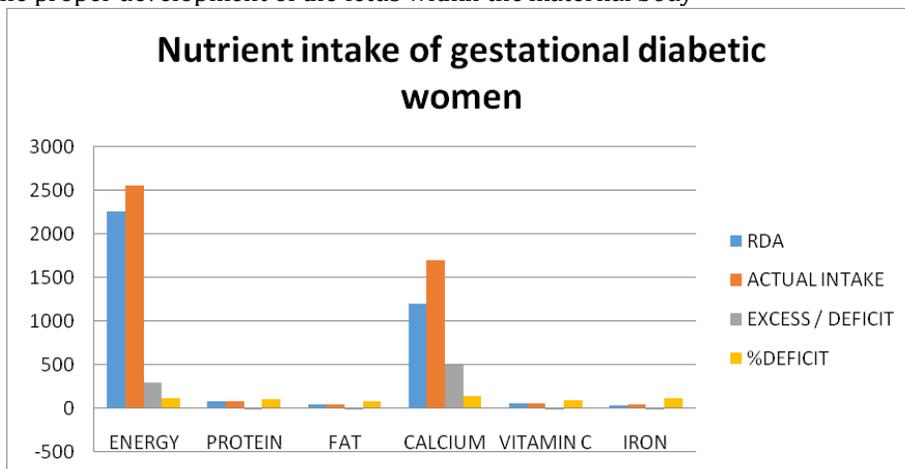
2.4.1 Twenty four hours dietary recall method

Table 6-Nutrients intake of gestational diabetic women

NUTRIENTS	RDA	Actual intake	Excess / Deficit	Percent Deficit
Energy	2250	2547.515	297.51	113.22
Protein	82.2	83.9	1.7	102.06
Fat	30	43.3	-7.7	72.1
Calcium	1200	1697.57	497.57	141.46
Vitamin c	60	56.3	-3.7	93.83
Iron	35	40.8	-5.8	116.57

It can be observed that intake of energy was found 113.22 percent deficient, comparing the Recommended Dietary Allowances (RDA). 102.06 percent protein intake the daily life similarly calcium, vitamin were also less. Intake of carbohydrate found to be equal than RDA.

Meeting the basic nutritional requirements of the mother while maintain proper storage of nutrients is essential for the proper development of the fetus within the maternal body¹².



3. Health status of the selected subjects

S.NO	HEALTH STATUS	PERCENTAGE
1	Family History	
	Yes	70
	No	30
2	Gestational Period	
	First pregnancy	90
	Second pregnancy	10
3	Habits of exercise Regularly	
	Yoga	18
	Walking	82
4	Complications	
	Heartburn	5
	Nausea & Vomiting	54
	Constipation	33
	Diarrhea	8
5	Weight Loss	
	Yes	45
	No	55
6	Supplements regularly	

	Yes	68
	No	32
	Types of supplements	
	Calcium	52
	Vitamin D	18
	Folic acid	15
	Iron	15

Majority 70 percent of the subjects had family history of gestation diabetes.90 percent of the subjects had gestation diabetes in their first pregnancy .80 percent of gestation diabetes women had the habit of walking regularly. Majority 54 percent of the gestation diabetes women had nausea and vomiting in their pregnancy period. 45 percent of the gestation diabetes women experienced weight loss in their pregnancy period .68 percent of the gestation diabetes women taken supplements regularly.

CONCLUSION

This study was undertaken to give an awareness about the importance of nutritional assessment and education of gestational diabetes. This study was conducted in the Nirmala hospital and government primary health center in Namakkal district. 60 patients were selected from these hospitals and anthropometry, biochemical, clinical and dietary assessments were assessed. The result shows that the all the patients were normal in their clinical condition. Nutritional education about the ill effects of gestational diabetes mellitus was given to the diabetic mother while assessing them. Intake of fruits and vegetables doing simple exercises elimination of high carbohydrate foods will be beneficial to prevent diabetes.

Uncontrolled diabetes during the first three months of pregnancy increases the risk of abortions and congenital malformations in the fetus. Diet, exercise and appropriate drugs have proved effective in controlling diabetes.

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