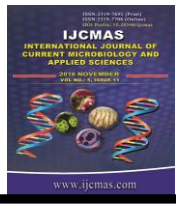
Int.J.Curr.Microbiol.App.Sci (2016) *5*(11): 407-415

International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 5 Number 11 (2016) pp. 407-415**
Journal homepage: http://www.ijcmas.com



Original Research Article http://dx.doi.org/10.20546/ijcmas.2016.511.047

Relationship between Dietary Patterns and Body Mass Index of Pregnant Women in Khamis Mushayt, Saudi Arabia

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Keywords

Dietary habits, pregnant women, Body Mass Index.

Article Info

Accepted:
23 October 2016
Available Online:
10 November 2016

A B S T R A C T

Pregnant women need more essential nutrient than other women. The body of pregnant women needs 300 calories per day to support the growth of the baby. It is important to eat healthy foods every day to tissues and organs develop during weeks of your pregnancy and the baby is always growing. The purpose of this study was to identify dietary patterns of pregnant women and examine the association between these patterns and body mass index. This cross sectional descriptive study was conducted on one hundred and fifty Saudi women (150 females) between the ages of 18 and 45. They were chosen by a systemic random method, recruited from hospital women and birth in khamismushayt, Saudi Arabia. This study was carried out to determine (BMI), dietary habits and lifestyle behaviors among pregnant women. The survey was conducted March 2015.A self-administered questionnaire was used to collect the research data. All subjects were asked to complete the Food Frequency Questionnaire (FFQ) with questions on dietary habits. A self-reported height and weight were used to calculate BMI (BMI = weight (kg)/height (m)2). Statistical analyses were performed using the Statistical Package (SPSS). On the basis of self-reported height and weight. The Majority of participants 51.7 % were classified over weight while 24.5 and 23.2 of participant were classified normal and obese respectively. There were significant differences between BMI category and dietary patterns. About 21.3 % from all participants were normal weight who ate meat one to two times per week while 18 % of participants have obese who ate meat rarely per week. About 22.5% of participants were overweight who ate chicken three to four times per week while 26.6% of participants were overweight consumed rarely fish per week and about (23.3%) of pregnant women were obese who consumed rarely cheese during pregnancy. Vegetables and fruits consumed there was statistically significant difference ($p<0.001$) between all most of participants (28.5%) ate fruits and vegetables one to two times per week. 31.8% from all participants ate sweets one to two times per week. All most of participants (84.1%) reported rarely practicing physical activity while 2 % reported only practice physical activity three times per week. Our results show that there were significant differences between BMI category and dietary patterns but the dietary habits of pregnant women were unhealthy and more than half of participants ate fast foods. Our study suggests that increasing nutrition education and counseling to Promote optimal fetal nutrition, which includes: ensuring appropriate maternal nutrition and micronutrient supplementation before and during pregnancy and providing counseling on diet and food safety to pregnant women.

Introduction

World Health Organization Regional Office for Europe, 2001 reported that women have different health issues than men. In addition to obvious differences related to reproductive health, such as diseases related to pregnancy and birth, certain disorders, such as anaemia, depression, anxiety and eating disorders, are more frequent in women than in men.

Maternal health refers to the health of women during pregnancy, childbirth and the postpartum period. Perinatal health refers to health from 22 completed weeks of gestation until 7 completed days after birth. Newborn health refers to babies' first month of life. A healthy start during the perinatal period influences infancy, childhood and adulthood according to World Health Organization Regional Office for Europe, 2004**.**

According to document of the New Zealand Ministry of Health (2006) showed that Energy requirements increase in pregnancy by about 12 percent. This is because of the increase in maternal body weight, an average 10–15 percent increase in basal metabolic rate (BMR), the energy costs of the growing foetus, and maternal physiological changes in pregnancy.

Energy requirements are higher in later pregnancy but may be, at least partially, offset by the mobilization of fat stored in early pregnancy Energy requirements increase in pregnancy by about 12 percent. This is because of the increase in maternal body weight, an average 10–15 percent increase in basal metabolic rate (BMR), the energy costs of the growing foetus, and maternal physiological changes in pregnancy. Energy requirements are higher in later pregnancy but may be, at least partially, offset by the mobilisation of fat stored in early pregnancy.

Streitfeld, 1978 reported that pregnant women be informed of the risks and benefits of certain dietary practices. This is not a simple task, as many foods, beverages and medications carry unknown risks.

The main objectives of this study to identify dietary patterns of pregnant women and examine the association between these patterns and body mass index.

Subject and Methods

This cross sectional descriptive study was conducted on one hundred and fifty Saudi women (150 females) between the ages of 18 and 45. They were chosen by a systemic random method, recruited from hospital women and birth in khamismushayt, Saudi Arabia. This study was carried out to determine (BMI), dietary habits and lifestyle behaviors among pregnant women, The survey was conducted March 2015. For ethical consideration all selected women were informed about the objectives and proposal of the study, Also the selected women completed questionnaire. A self-administered questionnaire was used to collect the research data. All subjects were asked to complete the Food Frequency Questionnaire (FFQ) with questions on dietary habits. A self-reported height and weight were used to calculate BMI (BMI = weight (kg)/height (m)2). Statistical analyses were performed using the Statistical Package (SPSS).

Results and Discussion

A total of 150 pregnant completed the questionnaires. Most women (84.8%) were aged 35 or young. All most of the participants (76.8%) did not complete degree graduate less than a quarter of the women (22.5%) possessed a college (table 1).

Table 2. represent the health history of participants all most of the participants reported did not suffer anemia, diabetes and hypertension but 34.4 %, 22.5 % and 17.2 % had anemia, diabetes and hypertension respectively.

Frequency distribution of participants based on BMI categories in table (3). The Majority of participants 51.7 % were classified over weight while 24.5 and 23.2 of participant were classified normal and obese respectively.

Table (4) shows relationship BMI there was a statistically significant difference ($p<0.01$) between the dietary habits and BMI. About 21.3 % from all participants were normal weight who ate meat one to two times per week while 18 % of participants have obese who ate meat rarely per week. About 22 5 of participants were overweight who ate chicken three to four times per week while 26.6% of participants were overweight consumed rarely fish per week and about (23.3%) of pregnant women were obese who consumed rarely cheese during pregnancy. A high than of participants were normal (19.3%) who ate eggs one to two times per week during pregnancy. Vegetables and fruits consumed there was statistically significant difference ($p<0.001$) between all most of participants (28.5%) ate fruits and vegetables one to two times per week. 31.8% from all participants ate sweets one to two times per week.

Nearly half of sampled women 48.3% reported drinking a milk daily during their pregnancies. Most participants reported consuming vitamin during the pregnancy.

About half of participants (52.3%) reported eating fast foods during then pregnancy. While consumption patterns for fast foods in take were varied (70.2%) reported eating fast once per week, 20.5% reported eating fast foods two times per week and (8.6%) only ate fast foods three times per week during then pregnancy. All most of participants (84.1%) reported rarely practicing physical activity while 2 % reported only practice physical activity three times per week.

The current data demonstrated that (84.4%) of participants were aged 35 or young and more than two third of the participants did not get university degree. However these findings was not in agreement with Ismail Eman Mohamed *et al*., 2013 studied the mean age for all subjects was31.6±7.15y and most subjects got university degree (58.3%) or secondary education (27.8%).

According to the current study findings, 34.4%, 22.5% and 17.2% of the participants had anemia, diabetes and hypertension respectively. Ismail Eman Mohamed *et al*., 2013 reported that 36.8 % and 18.4 % had obesity and hypertension respectively while 42.1% did not have other diseases.

The current data found that statistically significant difference ($p <0.001$) between BMI and dietary patterns. More than half 51.7 % of pregnant women were overweight and 23.2% and 24.5 % were obese and normal weight respectively. In China Haoyue Gao *et al*., 2013 mentioned that most women had a pre-pregnancy BMI within the normal range before conceiving (68.7%; $18.5 \leq BMI < 25$). About a quarter were found to be underweight with a BMI of <18.5 (26.3%; 20.8% in urban *vs.* 35.6% in rural areas); while a small number were overweight with a BMI of ≥25 to <30 (5.1%). None of the women had been obese ($BMI \geq 30$) before conceiving.

The current data studied that 42.4 % of participants ate red meat one to two times

per week while 33.1 % ate rarely red meat per week. In general, a Western dietary pattern (characterized by high intakes of red and processed meat, refined grains, sweets, desserts and potatoes), has been shown to be associated with greater weight gain in women (Schulze *et al*., 2006).

According to the current study findings 36.4 % of pregnant women ate chicken three to four times per week and 31.1 % ate chicken one to two times per week but 4.6 % ate rarely chicken per week. Juliana *et al*., 2013 reported that Most of the items in the common-Brazilian pattern are typical Brazilian foods. For example, the main meals (lunch and dinner) usually contain rice or pasta and beans with beef, chicken or eggs, together with artificial juice. Chicken was the most frequently reported meat consumed (98.5%), followed by beef (84%), then pork (52%). Most women (81.9%) consumed meat at least once a week, with 30.4% consuming meat at least four times a week (Santiago *et al*., 2013).

In this study, 49.7% of the pregnant women ate fish rarely per week but 29.1 % ate fish once per week. However these findings were not in agreement with Santiago, *et al*., 2013 studied that Most participants (73.9%) consumed fish during pregnancy. The most commonly consumed type of fish was tuna (52%), followed by tilapia (34.2%) and salmon (25.5%). Less than a quarter of the women (19.9%) also reported eating other kinds of fish or shellfish, with shrimp being the most frequently written in option. Most women ate fish less than once a week (80%), and nearly a third of women (31.2%) ate fish during all three trimesters.

The current study results found that nearly a third of pregnant women (31.1%) ate cheese a once per week. The Chinese government has urged an increase in milk production and consumption as an effective approach to improve the Ca intake of the Chinese population (Lu, 2013 and Ge and Chang, 2001). Integrating all this core information, the emphasis on improving Ca intake must not be restricted to dairy products, but rather should be extended to include selected Ca-fortified soybean products such as tofu. Differences between the first time mothers and others in the pregnant group, and between those without and with children in the non-pregnant group were analyzed. Pregnant women with children were found to consume significantly less raw milk cheese, and to score significantly higher on preparing meat well-done as compared to pregnant women without children (Verbeke and Bourdeaudhuij, 2013).

In this study, 35.1 % ate egg rarely per week but nearly a third of pregnant women (33.1 %) ate egg one to two times per week and nearly half of pregnant women drank milk daily. These findings were in agreement with Santiago *et al*., 2013 reported that Most women (95.4%) drank milk during their pregnancies.Of those women, 79% drank low-fat milk, 20.9%drank whole milk, 6.7% drank organic milk, 3.9% drankskim milk, and 8.6% drank "other" milk, with 3.6%identifying "other" as soy milk. Two-thirds of women (66.6%) drank milk at least 4 times per week. Most (71.4%) drank milk during all three trimesters.

The current datademonstrated that most women (84.1 %) did not practice physical activity during their pregnancies. Clapp, 2008 studied that Maintaining exercise during pregnancy may have many benefits including short terms benefits to the baby and long term benefits for the mother and further pregnancies. Long term effect of continuing vigorous weight-bearing exercise during pregnancy was examined in a follow up observational study in 39 subjects.

The current data demonstrated that more than a quarter of women pregnant ate vegetables and fruits one to two times per day and 27.2 % of pregnant women ate vegetables and fruits rarely. A similar finding was reported in a study described aspects of) maternal intake of food, drink and medication in populations of predominantly Hispanic Southern California by (Santiago *et al*., 2013). All women reported eating fresh fruit during their pregnancies. Two thirds (65.8%) of women ate fruit at least four times a week. Although the majority of women (77%) reported consuming fruit during all three trimesters of their pregnancies, only a third of the women (31.1%) ate the recommended amount of more than one serving of fruit per day.

The current data demonstrated that more than quarter of pregnant women 27.8 % ate sweets daily. In line with these finding were in agreement with Santiago *et al*., 2013 reported that almost all women (97.5%) reported eating high-sugar desserts during their pregnancies. Ice cream was the favored dessert: 82.7% reported eating ice cream. Additionally, 70.1% reported eating baked desserts, 65% reported eating chocolate, and 3.6% reported eating other desserts, such as candy or frozen dessert beverages during their pregnancies. Most women (76.2%) consumed desserts between one time per month and three times per week. Over half (53.2%) reported eating sugary desserts throughout their pregnancies.

According to the current study findings, 68.9 % reported that took dietary supplementary during pregnancy in agreement with Santiago *et al*., 2013 reported that most women consumed prenatal vitamins during their pregnancies (83.4 %).

In this study, most women (84.8%) reported eating fast foods during their pregnancies and 70.2 % ate fast foods once per week. these s was agreement with Santiago *et al*., 2013 reported that nearly all of the +women (96 %) ate fast foods during their pregnancies with burgers -/being the most commonly consumed item (85.2%), followed by french fries (77.9%), chicken products (53.6%), and other fast foods such as Mexican fast foods and chicken salads.

Table.1. Distribution of participants in different age groups**.**

		Frequency	Percent	Valid Percent	Cumulative Percent
Age	15-20	16	10.6	10.7	10.7
	20-25	35	23.2	23.3	34.0
	25-30	51	33.8	34.0	68.0
	30-35	26	17.2	17.3	85.3
	35-40	17	11.3	11.3	96.7
	40-45	5	3.3	3.3	100.0
	Total	150	99.3	100.0	
Missing	System	1	.7		
Total		151	100.0		

Table (3). Percent distribution of levels of BMI

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Normal	37	24.5	24.7	24.7
	over weight	78	51.7	52.0	76.7
	Obese	35	23.2	23.3	100.0
	Total	150	99.3	100.0	
Missing	System	1	.7		
Total		151	100.0		

Table.4 Dietary Pattern and selected behaviors of participants

Variable	**No.**	**%**
How many times you eat red meat per week		
Two to three times	64	42.25
Three to four times	18	11.9
Daily	15	9.9
Two times per day	3	2
Rarely	50	33.1
How many times you eat chicken per week		
Two to three times	47	31.1
Three to four times	55	36.4
Daily	31	20.5
Two times per day	10	6.6
Rarely	7	4.6
How many times you eat fish per week?		
Two to three times	44	29.1
Three to four times	14	9.3
Daily	11	7.3
Two times per day	6	4
Rarely	75	49.7
How many times you eat fruits and vegetables per week?		
Two to three times	44	29.1
Three to four times	14	9.3
Daily	11	7.3
Two times per day	6	4
Rarely	75	49.7
How many cups you drink milk daily?		
Once	73	48.3
Two to three times	30	19.9
Three to four times	20	13.2
More than four times	12	7.9
Rarely	15	9.9
How many times you eat sweets per week?		
Once	42	27.8
Two to three times	48	31.8
Three to four times	23	15.2
More than four times	15	9.9
Rarely	22	14.6
Having Fast foods		

Yes	79	52.3
No	22	14.6
Sometimes	49	32.5
Frequency of fast foods per week		
Three times	13	8.6
Twice	31	20.5
Once or less	106	70.2
How many times you practice sports per week?		
Once	12	7.9
Twice	8	5.3
Three times	3	2
Rarely	127	84.1

Consumption patterns for fast food intake were varied: 19.1% reported only eating fast foods 1-3 times during their entire pregnancies, 47.5% reported eating fast foods 1-3 times per month, and 25.7% reported eating fast foods 1-3 times per week. Only 5.5% of women reported eating fast food more than four times per week during their pregnancies. Forty-three percent of women reported eating fast foods during all three trimester.

In conclusion, our results show that there was significant differences between BMI category and dietary patterns but the dietary habits of pregnant women were unhealthy and more than half of participants ate fast foods.

Recommendation

Our study suggests that increasing nutrition education and counseling to Promote optimal fetal nutrition, which includes: ensuring appropriate maternal nutrition and micronutrient supplementation before and during pregnancy and providing counseling on diet and food safety to pregnant women.

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How to cite this article:

Bothaina Abd El Hakeem, Hanan A. Emarah and Sraa A. Abo Melha. 2016. Relationship between Dietary Patterns and Body Mass Index of Pregnant Women in Khamis Mushayt, Saudi Arabia. *Int.J.Curr.Microbiol.App.Sci.* 5(11): 407-415.
doi: http://dx.doi.org/10.20546/ijcmas.2016.511.046