

## Dietary Practice and Nutritional Status Among Pregnant Women Attending Antenatal Care of Egyptian, Rural Family Health Unit

Safa Hamdy Alkalash<sup>1</sup>, Rasha Tawakal ELnady<sup>2</sup>, Nazeha A. Khalil<sup>3</sup>, Nagwa Nashat Hegazy<sup>1</sup>

<sup>1</sup>Family Medicine Department, Faculty of Medicine, Menoufia University, Menoufia, Egypt

<sup>2</sup>Family Medicine Department, Tenna Family Health Unit Al Mahalla Al Kobra, Gharbia Governorate, Egypt

<sup>3</sup>Faculty of Home Economics, Department of Nutrition and Food Sciences, Menoufia University, Menoufia, Egypt

\* Corresponding author: Rasha ELnady, Mobile: +20 103 331 9285, Email: dr.rashaelnady2021@gmail.com

### ABSTRACT

**Background:** Appropriate balanced maternal nutrition is the principal determinant for maternal and fetal wellbeing. Consequently, the dietary practice and nutritional status of pregnant ladies need to be addressed properly as it should follow the recommendations of the food pyramid. **Objective:** to assess dietary practice and nutritional status among pregnant women attending antenatal Care In the rural Family Health Unit. **Methods:** The study was a Facility-based cross-sectional study conducted in the Terrene family health unit, Gharbia Governorate on 350 pregnant ladies chosen by a simple random sample. Data were collected via face-to-face interviews using semi-structured questionnaires. Analyses were done using the statistical package of social science (SPSS version 20).

**Results:** In the current study the mean age of the enrolled pregnant women was about 24-year-old (Rang 16-49 years old). Above two-third of them (65.14%) eat three times per day. Most of the studied pregnant women (73.43%) had varied favorite foods. About (46.57%) of them use animal fats for cooking. Most of them (72.57%) add average salt to their food. But (88.86%) of them prefer diverse foods. Multivariate logistic regression analysis revealed that age, women education, occupation, getting medical service, socio-economic status, previous delivery, presence of sickness, hemoglobin level, and daily meals frequency were significant predictors to nutritional status among pregnant women attending antenatal. **Conclusion:** The present study revealed that there is a burden of suboptimal dietary practice and undernutrition among these studied participants especially for low-income women.

**Keywords:** Dietary practice, Meal intake, Nutritional status, PHC, Pregnant women.

### INTRODUCTION

The prevalence of maternal and newborn complications, as well as death association with anemia and malnutrition, is immense <sup>(1)</sup>. Among the most common causes of maternal mortality are Preexisting conditions like undernutrition and anemia are more common and accounted for 28%. <sup>(2)</sup>. These most remarkable maternal health problems can be minimized and preventable with daily iron-folic supplementation for pregnant women to improve pregnancy outcomes <sup>(3-5)</sup>. Pregnancy is one of the critical periods when nutrition is very important. In this period, unhealthy nutrition of the mother or an inability to meet the nutritional requirements which may cause some health problems that can be seen in both mother and the infant. <sup>(4)</sup> The investigation for maternal nutritional status during pregnancy is vital for the optimization of maternal, fetal, and neonatal health <sup>(2)</sup>.

The relationship exists between the pregnant mother's food intake and the baby's health. Pregnant women must be provided with adequate and balanced nutrition throughout their pregnancy to supply energy and nutrients for milk production and breastfeeding. This would, in turn, allow normal physical and mental growth and development of the baby by reducing the risk of developing chronic diseases, such as diabetes, cardiovascular diseases, obesity, and hypertension during adulthood <sup>(3)</sup>.

Antenatal care (ANC) services approach with appropriate information and evidence-based

interventions immense for a healthy pregnancy. For a healthy pregnancy supply of nutrients and standard antenatal care (ANC) are essential <sup>(4,5)</sup>. Nutritional knowledge, behaviors, and practices of pregnant women vary depending on education levels, age, and sociocultural factors, although pregnant women prefer private counselors as their primary source of information on pregnancy, with a preference for relatives and friends who are also pregnant, the information provided by health professionals, especially on nutritional changes is more effective than that obtained from other sources <sup>(6)</sup>.

Women from lower socioeconomic backgrounds are at higher risk of developing obesity postnatally and should be targeted for weight loss interventions <sup>(7)</sup>.

Pregnant women should be advised to follow the recommendations of the food pyramid. Less than 50% of pregnant women meet the recommendations for each group of the food pyramid <sup>(8)</sup>.

Therefore, this study aims to improvement of maternal and fetal health. The objective of the present study is to assess dietary practice and nutritional status among pregnant women attending antenatal care in the rural family health unit in terms of food awareness, food habits, macro, and micronutrient serum levels.

### SUBJECTS AND METHODS

#### Ethical consideration:

The study was approved by the ethical committee of the Faculty of Medicine, Menoufia University where



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**an official permission letter was obtained from the authorities and directed to health administration in the Treena Family Health Unit.** All participants were volunteers. A written questionnaire was filled by all pregnant women who attended the family health unit of Terrene explaining the purpose of this study to each participant and assuring confidentiality and **Communication with local authorities:** This communication aimed to orient the local health authorities to the objectives and procedures of the study Communication also made with the health unit official to acquaint them about the objective and procedures of study to get their cooperation and facilitation throughout its practical aspect.

**Study setting:** The study setting was the Terrene Family Health Unit, Al-Mahalla Al Kobra, Gharbia Governorate. It lies in the northern part of Egypt, along the western branch of the Nile in the Nile delta.

**Studied sample:** Sample size was calculated using EPI info program version 7, based on the prevalence of 31.8% of malnutrition among pregnant women and a total number of women of reproductive age in Terrene village was 1023 women <sup>(9)</sup>. The sample size was calculated with a confidence level of 95%, a power of 88%, a marginal error of 5%, and a 10 percent (10%) non-response rate was added. Finally, 350 pregnant women were included in this study.

**Simple random sampling was used to select the pregnant women from rural health care facilities based on their medical registration number.**

**Inclusion criteria:** All pregnant women attending Trenea family health unit at their first trimester.

**Exclusion criteria:** All women not ideal for applying for a program e.g., chronic disease.

**Tools: The questionnaire:** The questionnaire was comprised of three sections: **Section one:** Socio-

demographic information; Specialty, Age, Sex, Education level, Marital status, owns, taxes, house criteria, education...etc. Socioeconomic data included education level, family income. The socioeconomic level of the family was determined based on the scoring system of **El-Gilany et al., <sup>(10)</sup>**, **Section two:** involved 15 questions to detect the health status of pregnant woman specialty age of menarche, regularity of menses, times of pregnancy, abortion, and labor.... etc., **Section three:** involved 16 questions about nutritional awareness specialty, number of meals per day, neglected meals, daily having fried food, having sweets, types of snacks, type of fat used in cooking, any food sensitivity...etc. and Section

**Statistical analyses**

Results were scheduled and analyzed statistically using a PC and programs of Microsoft Excel 2019 and SPSS v.25 (SPSS Inc., Chicago, IL, USA. Statistical analysis was done using Descriptive: e.g., percentage (%), mean and standard deviation. Analytical: that involves chi-square test and Paired t-test. A value of P less than 0.05 was considered statistically significant.

**RESULTS**

It can be seen that **Table (1)** illustrates the distribution of the study's volunteers regarding their ages and anthropometric measurements. The collected data in table (1) showed that the mean age of the enrolled pregnant women was about 24-year-old as they were ranged between 16 and 49 years old. Also, the mean of their weight was 70.77±13.17 kg, while the mean of their height was 157.76±7.70 cm, thus, the mean value of their body mass index was calculated and was 28.33±4.95 kg/m<sup>2</sup>.

**Table (1):** Sociodemographic characteristics of the pregnant women

Items	Studied pregnant women (N= 350)		95% Confidence Interval of the Difference	
	No.	%	Lower	Upper
<b>Residence</b>				
• Rural	347	99.14	0.99	1.00
• Urban	3	0.86		
<b>Husband education</b>				
• Illiterate/literacy certified	34	9.71		
• Basic education	65	18.57	3.97	4.32
• Secondary education	188	53.71		
• Higher education	63	18		
<b>Wife education</b>				
• Illiterate/literacy certified	46	13.14		
• Basic education	39	11.14	4.02	4.37
• Secondary education	200	57.14		
• Higher education	65	18.57		
<b>Husband occupation</b>				
• Doesn't work	305	87.14		
• Worker or farmer	12	3.43	1.24	1.45
• Craftsman	5	1.43		

Items	Studied pregnant women (N= 350)		95% Confidence Interval of the Difference	
	No.	%	Lower	Upper
• Government employee	13	3.71		
• Trader or businessman	15	4.29		
<b>wife occupation</b>				
• Doesn't work	2	0.57	2.04	2.26
• Worker or farmer	96	27.43		
• Craftswoman	161	46.00		
• Government employee	30	8.57		
• Trader or businesswoman	61	17.43		
<b>Family members</b>				
• Less than 5 members	348	99.43	0.99	1.01
• More than 5 members	2	0.57		
<b>Socio-economic status</b>				
• Not enough	61	17.43	0.83	0.93
• Enough	269	76.86		
• It suffices and increases; more than enough	20	5.71		
No. of family members getting income				
• One	314	89.71	1.07	1.13
• Two	35	10.00		
• Three or more	1	0.29		
No. of children educated				
• They all don't learn	290	82.86	0.31	0.52
• Less than half	16	4.57		
• More than half	2	0.57		
• They all learn	42	12.00		
No. of members in bedroom				
• Less than three for room	348	99.43	0.99	1.03
• More than three for room	2	0.57		
Type of house				
• There is no home	2	0.57	3.29	3.42
• Rent a room	2	0.57		
• Rent from two rooms to 4 rooms	8	2.29		
• Ownership of three rooms or less	208	59.43		
• The ownership equal to four rooms	120	34.29		
• Owning more than four rooms	10	2.86		

Studied subjects	Mean ± SD	Range	95% Confidence Interval of the Difference	
			Lower	Upper
Age /years	26.28±4.90	16-49	25.76	26.79
Weight /kg	70.77±13.17	43 -107	69.39	72.15
Height /cm	157.76±7.70	60 - 176	156.95	158.57
BMI (kg/m <sup>2</sup> )	28.33±4.95	19 - 45	27.81	28.85

Regarding the collected demographic data between the pregnant ladies, it can be noticed in **Table (2)** that, the current clinical family unite used in the study is located in the rural area and indeed that is confirmed by the area described earlier in the introduction chapter. This has been reflected by the collected data analysis as most of the participated pregnant women (99.14%) shown to be live in a rural area (347 out of 350 pregnant women). Concerning the husbands' and wife's educational levels that have been recorded with our demographic data in table 2, it can recognize that fathers showed much progress with their educational levels as they were only 34 (9.71% of all the husbands' sample size) illiterates with 65 (18.57%) subjects with their basic education. While the wife's shown 46 and 39 subjects in comparing to the husbands. However, husbands presented about 12 subjects (188 husbands and that represented 53.71% of the sample size) less than the mothers within the secondary educational levels (200 ladies, 57.14% of the ladies' sample size). Also, the higher educational levels were a little bit higher for wives (65 ladies, 18.57 % of the sample size) comparing to the husbands' levels (63 men, 18 % of the sample).

**Table (2):** Distribution of the studied pregnant women regarding health status

	Studied pregnant women (N= 350)		95% Confidence Interval of the Difference		
			Lower	Upper	
Age of the beginning of the menstrual cycle (Years)	• Mean ± SD	11.83±1.46		11.67	11.98
	• Range	15-Sep			
		No.	%		
Type of menstruation	• Regular	255	72.86	1.22	1.32
	• Irregular	95	27.14		
Is menstruation accompanied by pain?	• Yes	84	24	2	2.42
	• No	157	44.86		
	• Sometimes	109	31.14		
Previous delivery	• She did not give birth before	156	44.58	0.72	0.88
	• Natural birth	111	31.71		
	• Cesarean births	83	23.71		
Do you suffer from diseases during pregnancy?	• Yes	107	30.57	1.68	1.79
	• No	229	65.43		
	• Sometimes	14	4		
Have you ever used contraceptives?	• Yes	153	43.71	1.51	1.62
	• No	197	56.29		
Has bleeding occurred with the contraceptives	• Yes	57	37.25	0.68	0.87
	• No	96	62.75		
Has pregnancy occurred during the contraceptives	• Yes	26	16.99	0.73	0.93
	• No	127	83.01		
Are you under medical supervision during pregnancy	• Yes	335	95.71	1.01	1.05
	• No	15	4.29		
Previous delivery	She did not give birth before	156	44.58	0.72	0.88
	• Natural birth	111	31.71		
	• Cesarean births	83	23.71		
Do you suffer from diseases during pregnancy	• Yes	107	30.57	1.68	1.79
	• No	229	65.43		
	• Sometimes	14	4		
Have you ever used contraceptives	• Yes	153	43.71	1.51	1.62
	• No	197	56.29		
Has bleeding occurred with the contraceptives	• Yes	57	37.25	0.68	0.87
	• No	96	62.75		
Has pregnancy occurred during the contraceptives	• Yes	26	16.99	0.73	0.93
	• No	127	83.01		
Are you under medical supervision during pregnancy	• Yes	335	95.71	1.01	1.05
	• No	15	4.29		
Age at marriage (Years)	• Mean ± SD	19.71±2.78		19.42	20.01
Number of marriages	• Mean ± SD	1.01±0.11		1	1.02
The number of pregnancy times including the current pregnancy	• Mean ± SD	1.95±1.12		1.83	2.07
Number of abortions	• Mean ± SD	0.24±0.69		0.17	0.32
The period between marriage and pregnancy (Months)	• Mean ± SD	5.67±7.81		4.85	6.49
The period between the current pregnancy and the previous pregnancy (Months or years)	• Mean ± SD	1.45±1.93		1.25	1.65

**Table (3)** illustrates the distribution of the studied pregnant women's food awareness and shows that above two-third of them (65.14%) eat three times per day. Also, (58.86%) deleted the dinner meal. most of the studied pregnant women (73.43%) had varied favorite foods. About (46.57%) of them use animal fats for cooking. And above one third (39.43%) add only one spoon to drinks. But most of them (72.57%) add average salt to their food. About (90%) weren't suffer from food allergies. Most of these women (79.14%) weren't go hiking. Also, about (83.14%) of them not caring about eating fruits. But (88.86%) of them prefer diverse foods.

**Table (3):** Food awareness and eating behaviors among the studied pregnant women.

		Studied pregnant women (N= 350)		95% Confidence Interval of the Difference	
		No.	%	Lower	Upper
		Number of meals you eat per day	Twice	88	25.14
	Three times	228	65.14		
	Five times	34	9.71		
Deleted meals	Breakfast	140	40	0.84	1.12
	Lunch	4	1.14		
	Dinner	206	58.86		
Do you have breakfast	Yes	288	82.29	1.22	1.36
	No	23	6.57		
	Sometimes	39	11.14		
Do you try to drink tea daily	Yes	128	36.57	1.91	2.09
	No	94	26.86		
	Sometimes	128	36.57		
Do you eat fried foods daily	Yes	234	66.9	1.51	1.7
	No	20	5.7		
	Sometimes	96	27.4		
Do you eat foundry foods daily	Yes	224	64	1.5	1.68
	No	46	13.14		
	Sometimes	80	22.86		
Do you eat sweets daily	Yes	135	38.57	1.87	2.05
	No	95	27.14		
	Sometimes	120	34.29		
Do you drink milk daily	Yes	221	63.14	1.56	1.75
	No	30	8.57		
	Sometimes	99	28.29		
Favorite foods to eat between meals	Juice	32	9.14	5.41	5.89
	Fruit	44	12.57		
	Carbonated water	14	4		
	Nuts	0	0		
	Chocolate	1	0.29		
	Another	2	0.57		
	Diverse	257	73.43		
What kind of lipids is used for cooking	Oils	33	9.43	2.57	2.79
	Animal fats	163	46.57		
	Industrial ghee	37	10.57		
	Varied	117	33.43		
How many sugar suspensions are added to drinks	One Spoon	11	3.14	2.57	2.72
	Two spoons	138	39.43		
	Three tablespoons	166	47.43		
	More	35	10		
The amount of salt added to the food	Little salt	56	16	1.9	2.01
	Average salt	254	72.57		
	Salty	40	11.43		
Do you suffer from a food allergy	Yes	35	10	1.87	1.93
	No	315	90		
Do you go hiking	Yes	73	20.86	1.75	1.83
	No	277	79.14		
Do you care about eating fruits	Yes	291	83.14	1.13	1.21
	No	59	16.86		
What foods do you prefer	Vegetables	3	0.86	5.58	5.79
	Fruit	10	2.86		
	Meat	10	2.86		
	Fish	10	2.86		
	Starches	6	1.71		
	Diverse	311	88.86		

**Table (4)** shows that, according to multivariate logistic regression analysis revealed that age (OR 2.16, CI95% 589-2.98), mother education (OR 6.10, CI95% 4.71-5.42), mother occupation (OR 2.93, CI95% 0.71-1.88), getting medical service (OR 1.08, CI95% 0.42-0.90), socio-economic status (OR 2.50, CI95% 0.80-1.13), previous delivery (OR 8.21, CI95% 2.90-5.21), presence of sickness (OR 3.90, CI95% 0.60-1.02), hemoglobin level (OR 2.86, CI95% 21.04-1.63), and daily meals frequency (OR 2.86, CI% 1.43-3.09) were significant predictors to nutritional status among pregnant women attending antenatal.

**Table 4: Multivariate logistic regression analysis to predict nutritional status among pregnant women attending antenatal.**

	Studied pregnant woman	BMI (kg/m <sup>2</sup> )			
		BMI<25	BMI≥25	OR (95% CI)	Sig.
		(n=173)	(n=177)		
Age /years	<24	48	27	2.16 (.589-2.98)	.004*
	24- < 35	95	58		
	≥35	30	92		
Residence	Rural	171	177	0.11 (.04-0.56)	0.803
	Urban	2	0		
Husband education	Illiterate/literacy certified	22	12	1.03 (0.87-0.95)	0.672
	Basic education	11	54		
	Secondary education	85	103		
	Higher education	55	8		
wife education	Illiterate/literacy certified	20	26	6.10 (4.71-5.42)	0.002*
	Basic education	31	8		
	Secondary education	62	138		
	Higher education	60	5		
wife occupation	Doesn't work	1	1	2.93 (0.71-1.88)	0.012*
	Worker or farmer	59	37		
	Craftswoman	70	91		
	Government employee	26	4		
	Trader or businesswoman	17	44		
Family members	Less than 5 members	171	177	0.01 (0.004-0.32)	0.65
	More than 5 members	2	0		
Getting medical services	Private clinics and hospitals y/n	1	4	1.08 (0.42-0.90)	0.039*
	Health insurance	30	70		
	Governmental service	115	99		
	Self-care	5	10		
	More than one source	22	4		
Socio-economic status	Not enough	43	18	2.50 (0.80-1.13)	0.005*
	Enough	130	139		
	It suffices and increases	0	20		
The period between the current pregnancy and the previous pregnancy	<2 y	143	142	0.16 (0.04-0.50)	0.103
	≥2 y	30	35		
Previous delivery	First pregnancy	66	65	8.21 (2.90-5.21)	0.001**
	Natural birth	11	100		
	Caesarean births	96	12		
Do you suffer from diseases during pregnancy (presence of sickness)?	Yes	37	70	3.9	0.024*
	No	136	107		
Are you under medical supervision during pregnancy?	Yes	15	43	0.06 (0.02-0.34)	0.76
	No	158	134		
Has bleeding occurred with the contraceptives?	Yes	25	32	0.10 (0.03-0.42)	0.511
	No	148	145		
Abortions	Yes	2	5	0.12 (0.05-0.20)	0.915
	No	171	172		
Hemoglobin level	Hg ≥11 g/dl	123	77	2.86 (1.04-1.63)	0.009*
	Hg <11 g/dl	50	100		
Daily meal frequency:	3	8	52	5.60 (1.43-3.09)	0.018*
	≤3	165	125		

## DISCUSSIONS

The current study showed that the mean age of the studied pregnant women was  $23.55 \pm 4.90$  years, while their mean weight was  $70.77 \pm 13.17$  kg. Also, the mean height was  $157.76 \pm 7.70$  cm, and the mean value of body mass index was  $28.33 \pm 4.95$  kg/m<sup>2</sup> (**Table 1**). Results of the current are similar to that were obtained by an Iranian study which was done by **Fallah et al.** <sup>(5)</sup> as they found that the mean age of pregnant women was  $26.5 \pm 5.6$  years but both studies were different in term o BMI of their study samples as in current study mean value of pregnant' BMI was  $28.33 \pm 4.95$  kg/m<sup>2</sup> (overweight) while in the Iranian study majority of the pregnant had normal BMI. The present study showed that 53.71% of fathers and 57.14% of mothers were secondary educated. Also, most fathers (87.14%) had no work, but (46.0%) of mothers were craftswomen. Most of the women (99.14%) were living in rural. About (99.43%) of families' members were less than 5. The present study showed that the mean age of the beginning of the participants' menstrual cycle was  $11.83 \pm 1.46$  years. About (72.86%) of studied pregnant women have regular menstruation. (44.86%) of their menstruation is accompanied by pain. Also, the mean age of them at marriage was  $19.71 \pm 2.78$  years, and the mean number of marriages was  $19.71 \pm 2.78$  times. The results of the present study go in line with data obtained by **Morsy and Alhady**, <sup>(11)</sup> indicated that about 63 % of mothers had more than two years between repetitive pregnancies and 37% of women had a child spacing of less than two years. Also, the results were close to those of two studies by **Fallah et al.** <sup>(5)</sup> as they found that, (42.3%) of studied subjects had no prior pregnancy and 78% had a marriage age of over 18 years respectively.

The present study showed that the mean age of the beginning of the menstrual cycle was  $11.83 \pm 1.46$  years. About (72.86%) of studied pregnant women have regular menstruation. (44.86%) of their menstruation is accompanied by pain. Also, the mean age of them at marriage was  $19.71 \pm 2.78$  years, and the mean number of marriages was  $19.71 \pm 2.78$  times. While the mean number of pregnancy times was  $1.95 \pm 1.12$  times. And the mean number of abortions was  $0.24 \pm 0.69$  times. Also, the mean period between marriage and pregnancy was  $5.67 \pm 7.81$ , and the mean period between the current pregnancy and the previous pregnancy was  $1.45 \pm 1.93$ . Also, more than half (56.29%) hadn't ever used contraceptives., while, 43.71% had used contraceptives, above two thirty (62.75%) of them had no bleeding with the contraceptives. It's good to mention that most studied pregnant women (95.71%) were under medical supervision during pregnancy (**Table 2**). The results of the present study go in line with data obtained by **Yilmazel and Elçin Balci** <sup>(12)</sup> found 50.8% of pregnant women reported that they would be second-time mothers, 49.5% said that they didn't use any method before pregnancy. 86.4% of pregnant implied that they would use a contraceptive method in the postpartum period. IUD was the most preferred method. Status of using

contraceptives before and receiving contraception counseling in pregnancy were the effective variables on thoughts about using a contraceptive method. Also, **Ajaji et al.** <sup>(13)</sup> found the rates of ever use and current use of contraception was 80 and 66.6%, respectively. However, only 43.9% of the participants had ever used any modern contraceptive methods, considered to be more reliable. The fear of side effects of modern contraceptive methods drove women to rely on less effective traditional methods (withdrawal and rhythm methods). Some women employed crude and unproven contraceptive methods to prevent pregnancies. In a study conducted in Malatya 32.9% of women, in Western Europe 19.0%, in the Czech Republic, 18.8% thought to use IUD in postpartum <sup>(14,15,16)</sup>. In **Yilmazel and Elçin Balci** <sup>(12)</sup> study, 35.7% of women stated that their contraceptive choice was IUD in the postpartum period. Reasons such as being safe, failing no load to users, and using for a long time can contribute to IUD to be more preferred than other methods. Also, husbands' choices influenced the using contraceptives in our study (35.0%). In El Salvador and the United States results are consistent with those obtained from our study. <sup>(17,18)</sup> **Ergoçmen et al.** <sup>(19)</sup> found that the rate of using any contraceptive method is 73.0% and using an effective method is 46% among 15-49 years of age.

The current study illustrated the distribution of the studied pregnant women's food awareness and showed that above two-thirty of them (65.14%) eat three times per day. Also, (58.86%) deleted the dinner meal. Also, most of the studied pregnant women (73.43%) had varied favorite foods. About (46.57%) of them use animal fats for cooking. And above one thirty (39.43%) add only one spoon to drinks. But most of them (72.57%) add average salt to their food. About (90%) weren't suffer from food allergies. Most of these women (79.14%) weren't go hiking. Also, about (83.14%) of them not caring about eating fruits. But (88.86%) of them prefer diverse foods (**Table 3**). Our results were lower than that of another study performed by **Emara** <sup>(20)</sup> it indicated that 42.7% ate red meat two to three times per week and 36.7 % of pregnant women ate chicken three to four times per week. Meanwhile consistent with our study, the majority of them rarely practice sport during pregnancy. Also, disagreeing with our results half of the women (50.0%) reported eating fruits and vegetables rarely per week, and a partially equal percentage drank one cup of milk per day (48.7%), and 32.0% were eating sweets two to three times per week. This finding in the same line with **Zelalem et al.** <sup>(21)</sup> study in Addis Ababa who reported that 204 (50.2%) were in line with meat and legume servings (protein foods), 172 (42.4%) in line with dairy products, and 187 (46.1%) in line with green vegetable servings. Less than half (44.1%) of the pregnant women reported eating at least two fruits per day. Also, in the study of **Zelalem et al.** <sup>(21)</sup> 69.7% of the pregnant women have added at least one additional meal from the non-pregnant state. On contrary another study conducted in Wondo Genet, Ethiopia also reported that 75.2% of the pregnant

women did not take any additional meal during pregnancy. The economic disparities and knowledge differences may affect this discrepancy. <sup>(22)</sup> As well the study revealed that the practice of pregnant women on recommended food servings of meal per day during pregnancy: 42.4%, 46% were in line with dairy products and green vegetable servings respectively. The result of our study was higher than that revealed by the study conducted in the USA where 42.7% of the participants had a habit of drinking milk daily. Whereas regarding green vegetables, unlike our study the study conducted in America reported that 58.9% of respondents had a habit of daily eating fresh vegetables. <sup>(23)</sup> The differences in the diet of the communities and the knowledge difference may create these disparities. Also, **Sunuwar *et al.*** <sup>(24)</sup> conducted a quasi-experimental study among pregnant women who were in the second trimester. Pregnant women aged 15–49 years who were willing to participate with mild and moderate anemia were included in the study. It showed that pregnant women who received nutrition education and iron-rich food-based menu plan had a significant increase in the consumption level of red meat, fish liver, vitamin C rich fruits, dairy products, eggs, and dark green vegetables compared to the control group. Our results were consistent also with the study done by **Liu *et al.*** <sup>(25)</sup> results which showed that increased fruit consumption in the intervention group <sup>(26)</sup>. Pregnant women in the intervention group reflected behavioral change by practicing a minimum of 3 or more meal consumption <sup>(27)</sup>.

## CONCLUSION

The present study revealed that there is a burden of suboptimal dietary practice and undernutrition among these studied participants. Predictors identified for suboptimal dietary practice were women's age, education, occupation, getting medical service, socio-economic status, previous delivery, presence of sickness, hemoglobin level, and daily meal frequency.

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