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Anemia and Dietary Habits among Pregnant Women in Jazan, Saudi Arabia

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Authors' contributions

All authors have worked closely and collaboratively during this project. All authors contributed to the study design, literature search and study protocol. Authors HA, AA and FA did the statistical analysis. Author SS wrote the first draft of the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Aims: To determine the prevalence of anaemia among pregnant women in Jazan in the Southern region of Saudi Arabia, and identify some food habits of pregnant women. The association between having anaemia and some maternal factors like age and obstetric history are also studied.
Study Design: A descriptive cross sectional study.
Place and Duration of Study: Five different health care centres and Jazan general hospital in Jazan, Southern region of Saudi Arabia during November 2014.
Methodology: A sample of 389 pregnant women in the reproductive age (15-49 years) was studied. Cluster sampling was used to choose the different health facilities and systemic random sampling technique was used to select the women within these institutes.
Data was collected using a pre-structured interview questionnaire and review of files of pregnant women in these facilities.

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Results: The prevalence of anaemia among the pregnant women was found 58.9%. The percentage of pregnant women who experienced cravings was 35.5%, 56.1% had aversions and 67.3% had pica. The study also found that two thirds of women who got pregnant more than 5 times were anaemic with a P value (0.005). However, no significant relation was found between anaemia and maternal age, number of deliveries or number of abortions.
Conclusion: Anaemia among pregnant women in Jazan region is high. Many pregnant women experience cravings and aversions which affect their nutrition. These findings signal the need for proper interventions to address female's nutritional habits in this area. Nutritional advice during ante-natal care visits for pregnant women are advised.

Keywords: Anemia; diet; pregnant; Jazan.

1. INTRODUCTION

The World Health Organization global report on anaemia indicates that 38.9% (range 32.7 to 46.3) of pregnant women are anaemic in the Eastern Mediterranean region [1]. Studies suggest that anaemia in pregnancy remains a major problem in nearly all developing and many industrialized countries. In the Arab Gulf countries maternal anaemia, especially iron deficiency anaemia has been considered as an important public health problem with prevalence ranging from 22.6% to 54.0% [2].

In Saudi Arabia, the estimated prevalence of anaemia in pregnant women is 40% making it a severe public health problem. However, it is also important to note that many of these women were already anaemic at the time of conception, with an estimated prevalence of anaemia of 37.7 (30.7 to 45.6) in non-pregnant women compared to 29% globally [1].

During pregnancy there is an elevation in both red blood cell mass and plasma volume to accommodate the needs of the growing uterus and foetus. The plasma volume increases more than the red cell mass leading to a fall in the concentration of haemoglobin in the blood, despite the increase in the total number of red cells, this drop in haemoglobin concentration decreases the blood viscosity and it is thought this enhances the placental perfusion providing a better maternal-foetal gas and nutrient exchange [3].

The common causes of anaemia include iron deficiency, foliate deficiency, vitamin B12 deficiency, bone marrow suppression, haemolytic diseases, malaria, chronic blood loss, and underlying malignancies. Iron deficiency is the most common cause of anaemia in pregnant women worldwide [4].

Nutrition plays an important role in pregnancy and affects the health of the mother and foetus [5]. It is well documented that dietary modifications during pregnancy have an effect on the nutritional status of both mother and foetus [6]. This can result in many diseases and malformations for the new born. It is estimated that about 24% of new born babies have low birth weight as a consequence of improper maternal nutrition [7].

Data on anaemia among women in Saudi Arabia is scarce, however, studies has shown the prevalence of anaemia during pregnancy to range from 31.9% in Asir region to 39% in Makkah with a haemoglobin (Hb) concentration less than 11 g/dl. Anaemia (Hb <12 g/dL) was present in 40% women in the capital city of Riyadh [8,9,10].

In a study on nutritional habits of pregnant women in Saudi Arabia, factors most frequently correlated to anaemia were infrequent intake of meat and juices, menorrhagia, intake of antacids, and non-steroidal anti-inflammatory drugs [8]. Another study found that 13.2% of women experienced some form of pica [11]. Most craved food items by Saudi women were milk, salty and sour foods, sweets and dates. On the other hand, spicy foods and beverages were most avoided items [12].

No previous studies specific to Jazan region were found to estimate the magnitude of this seemingly significant health problem in Saudi Arabia. This study will determine the prevalence of anaemia among pregnant women in Jazan region and assess the dietary food habits of pregnant women. The association between anaemia and maternal age and obstetric history will also be considered.

2. MATERIALS AND METHODS

2.1 Study Design

A descriptive cross sectional study design was used.

2.2 Study Area and Setting

The study area is Jazan region, situated in the South-Western corner of Saudi Arabia along the Red Sea coast on its west and the Yemeni border on its south. It covers an area of about 13,457 km^2 and is sub-divided into 14 governorates. Population is estimated at above 1.5 million according to the 2010 census.

The study was conducted in 5 health facilities, Jazan General Hospital and 4 health centres that provide maternal health services.

2.3 Sampling

The sample size calculated for this study was 400 pregnant women age (19- 48) years old. The response rate was 97.3% (389) Saudi pregnant women. This was based on 50% estimated prevalence rate due to lack of previous data on prevalence of anaemia among pregnant women in Jazan (π= 0.5). The margin of error selected was 0.05 with a 95% confidence level and 10% for non response.

A Cluster sampling technique was used to choose 5 health facilities (A general hospital and 4 health centres) covering the different administrative areas. Participants were selected by systematic random sampling.

2.4 Data Collection Tools

Data was collected by medical students who were trained and supervised for the purpose. Retrospective data was collected from the pregnant women ante- natal records and health file and prospective data was collected by face to face interview with pregnant women using a pre-structured questionnaire in Arabic language. The questionnaire consisted of 26 questions and was divided into 4 categories: Socio-demographic information, dietary habits, obstetric history and the fourth part was recording the participants' measurements (Weight and height). Secondary data regarding their mean haemoglobin level and fasting blood glucose was collected from their ante- natal records.

Dietary habits were determined using the food frequency and amount questionnaire with a checklist for food type consumed during a week. A divided plate of standard portions was used to help participants identify portions consumed. Additional questions were added regarding cravings, aversion and pica with some open ended questions if the items involved are not in the checklist.

2.5 Data Management

Data was entered, cleaned and verified by the research team. Data analysis and descriptive statistics were done using the Statistical Package for Social Sciences software (version 17.0). Frequency measures were done, odds ratios with confidence intervals were considered and confidence level was set at 95%. A *P*- value of < 0.005 was considered as statistically significant.

3. RESULTS AND DISCUSSION

3.1 Demographic Characteristics

The number of studied pregnant women was 389 for the prevalence of anaemia and obstetric history of the patients; however, direct face to face interview regarding eating habits was possible with only 104 of them.

Table 1 shows socio-demographic characteristics of the sample. The age distribution shows that more than 80 % of women are between 15 and 34 years old. About 60% of women live in rural areas. The majority of women are educated and 50% of them have a university degree or higher. However, 55.8% of them are not employed and 22% are still studying. Most of the sample is of middle income level and about 12% are living in poverty (Extreme poverty line has been estimated at about $2 a day per person) [13] and only 1% are of relatively high monthly income.

3.2 Prevalence of Anaemia

Of the total 389 pregnant women, 58.9% were anaemic with a haemoglobin concentration of less than 11 grams per decilitre (Hb <11g/dl) (CI= 0.54 to 0.64, Odds ratio= 1.43 (1.69- 1.75)).

This result is much higher than the country average of about 40% [1] and higher than the prevalence found in other areas in Saudi Arabia which ranged from 31- 40% [8,9,10].

Table 1. Socio-demographic characteristics of the studied pregnant women in Jazan

Characteristic	Number	%
Age group in years		
15-24	139	35.7
25-34	181	46.5
35-44	60	15.4
Residence		
Rural	62	59.6
Urban	42	40.4
Education level		
Illiterate	6	5.8
Primary school	6	5.8
Intermediate school	12	11.5
High school	28	26.9
University degree OR higher	52	50.0
Occupational status		
Student	23	22.1
Employed	23	22.1
House wife	58	55.8
Family Income in Saudi Riyal per month		
Less than 3000	13	12.5
From 3000 to 5000	34	32.7
From 5000 to 10000	48	46.2
From 10000 to15000	8	7.7
More than 15000	1	1.0

In the Gulf countries overall, the prevalence of iron deficiency anaemia during pregnancy ranged from 22.7% to 54% [14]

It is known that anaemia during pregnancy is multi- factorial and factors include eating habits, preconception anaemia, parasitic diseases like malaria and hook worm and other economical and environmental factors [1,15,16]. These reasons might explain the high prevalence of anaemia found in Jazan region due to its relatively lower economical status; 34% of Saudi families in Jazan live in poverty [17] and more than 12% in this study. Jazan has the highest prevalence of malaria infection compared with the rest of the kingdom which is free of the disease. However, the malaria parasite prevalence rate is still low (0.1 -1 confirmed cases per 1000/ parasite prevalence) [18].

Further, the prevalence of anaemia was analyzed in terms of age and obstetric history among pregnant women. The findings are presented in Tables 2 and 3 respectively.

Table (2) shows that the distribution of anaemic women is almost the same between the different age groups ranging from 57.5% to 60%. No significant relationship was found between having anaemia and age of the woman (*P*= 0.898).

Although some studies suggest a relationship between anaemia and age of the pregnant woman, and that anaemia is higher with younger maternal age, many other studies showed no significant relationship between age of the mother and being anaemic [19,20,21,22,23].

3.3 Obstetrical History

Regarding the number of pregnancies, deliveries and abortions of the studied pregnant women, a significant relationship was found between being anaemic and the number of times the woman got pregnant. More than two thirds (68.8%) of women who got pregnant 6- 10 times were anaemic (*P* value =0.0005).

Sixty eight percent of anaemic women have given birth 5 to 10 times. 58.8% of them experienced abortion 1 to 3 times. However, no significant relationship was found between number of deliveries or number of abortions and having anaemia in the studied group.

Table (3) compares the percentage of anaemic and non anaemic women in terms of number of pregnancies, deliveries and abortion. It shows that the percentage of anaemic women is higher than non anaemic in terms of number of pregnancies, deliveries and abortions except for those who delivered more than 10 times and this is probably due to their small number (only 6 subjects) .

Similar results were found by other studies where no association was detected between anaemia, gestational age, parity, and number of abortions [10]. While contradicting results were found in other studies [9,23,24].

3.4 Eating Habits

One of the limitations of this study is that direct face to face interview regarding the pregnant woman's eating habits was done with 104 women of the total sample of 389. Although this might not be a representative sample of the population, however, it can still provide useful insight of the eating habits of pregnant ladies in Jazan.

About 66% of women consumed 1 to 3 portions of meat (chicken, fish or lamb) per week. Fifty five percent consumed milk from 4 to 7 times per

week. 68% consumed beverages 1 to 3 times per week. The consumption of bread, rice, fruits and vegetables was all more than 3 times per week.

The proportion of women who experienced cravings (increase desire or appetite for a specific food item) was 35.5% (CI 0.27- 0.45, OR 0.55). Figs. (1 and 2) show the percentage of women with cravings and type of food items commonly craved for. Meat and milk were the most craved food items among the studied population by 31% each, followed by eggs (20%). Craving for other food items like salty & sour food, sweets, fruits and vegetables was experienced by 18%.

Fig. (3) shows that aversion of some food items was experienced by 56.1% of pregnant women (CI 0.46- 0.65, OR 1.27). Fig. (4) show that meat was the highest food item averted (25.2%) by pregnant women. Tea and coffee and beverages were averted by about 10% each while fruits were the least averted food item at 0.9%.

The percentage of women who craved non food items (pica) was 67.3% (CI 0.58- 0.75, OR 2.05) as shown in above Fig. (5). The items of pica listed in above Fig. (6) are ice (17.8%), clay (6.5%), chalk (9%) and 39.3% of pregnant women craved many different items including sand, gum, paint, etc.

These results show similar craving and aversion experience among pregnant women in Jazan compared to studies done in other parts of Saudi Arabia, however, Pica is much higher where the percentage ranged from 8.8% to 13% in other studies [7,11].

Table 2. Age distribution of anaemic pregnant women in Jazan, 2014

			Haemoglobin status		Total	Confidence interval at 95%
			Anaemic	Not Anaemic		
Age group in years	15-24	Count	83	56	139	0.51-0.67
		%	59.7%	40.3%	100.0%	
	25-34	Count	104	77	181	0.50- 0.64
		%	57.5%	42.5%	100.0%	
	35-44	Count	36	24	60	0.47- 0.71
		%	60.0%	40.0%	100.0%	
Missing		Count	4	5	9	0.18- 0.73
		%	44%	66%	100%	
Total		Count	227	162	389	0.53-0.63
		%	58.7%	41.3%	100.0%	

Table 3. The relationship between anaemia and obstetric history of pregnant women

Variables	Anaemic	Not anaemic	Total	Confidence interval at 95%	P value
Number of pregnancies					
1-5	192 (58.3%)	137 (41.6%)	329	0.53-0.63	0.005
6-10	33 (68.8%)	15 (31.2%)	48	0.54-0.80	
11-15	0 (0.0%)	6 (100%)	6	0.00- 0.39	
Missing			9		
Total			389		
Number of deliveries					
0-4	205 (58.2%)	(147) (41.8)	352	0.53-0.63	0.236
5-10	24 (68.6%)	(11) (31.4)	35	0.52- 0.81	
Missing			2		
total			389		
Number of abortions					
0-3	225 (58.4%)	160 (41.6)	385	0.53-0.63	0.145
4-7	3 (100%)	0 (0.0%)	3	0.43- 1.00	
Missing			1		
Total			389		

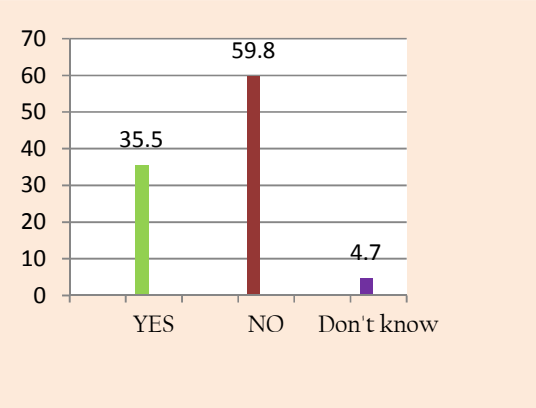

Fig. 1. The percentage of pregnant women who experienced cravings in Jazan

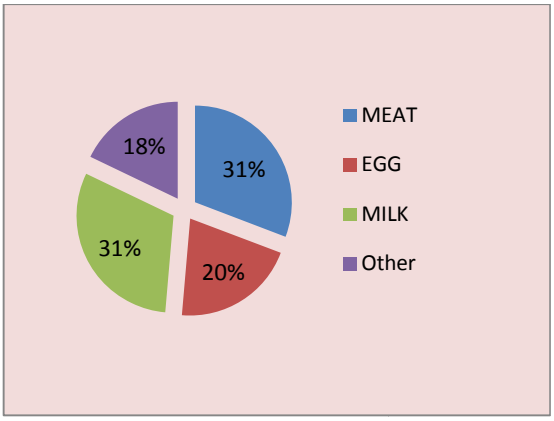

Fig. 2. Type of food craving among pregnant women in Jazan

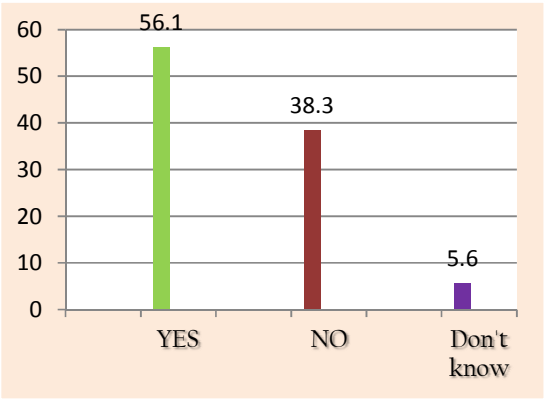

Fig. 3. Food aversion among pregnant women in Jazan

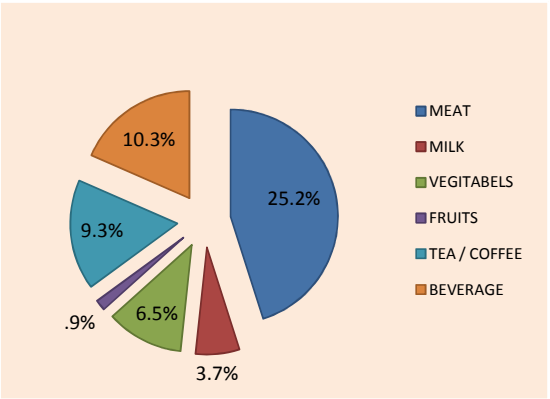

Fig. 4. Types of food averted by pregnant women in Jazan

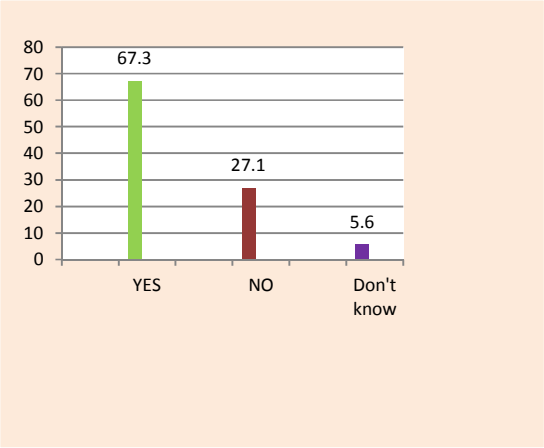

Fig. 5. The percentage of Pica among pregnant women in Jazan

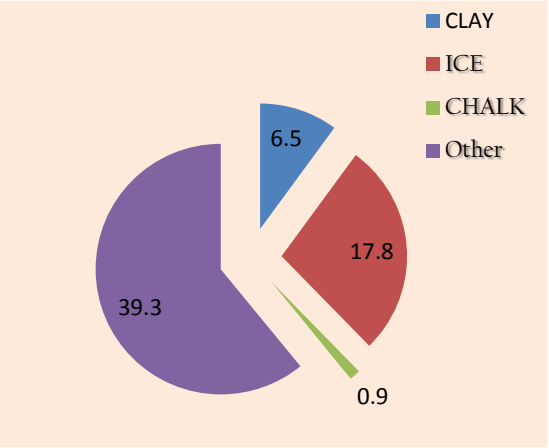

Fig. 6. Types of Pica consumed by pregnant women in Jazan

4. CONCLUSION

Anaemia among pregnant women in Jazan region is high. Many pregnant women experience cravings and aversions which affect their nutrition and Pica is high. These findings signal the need for proper interventions to address female's nutritional habits in this area. Nutritional advice during ante-natal care visits for pregnant women are advised.

CONSENT

Informed written consent was obtained from all study subjects. Complete privacy, anonymous responding, voluntary participation and rights of withdrawal at any time from the study by participating subjects were all explained and applied to potential respondents.

ETHICAL APPROVAL

The authors have obtained all necessary ethical approval from involved institutions.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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