

KNOWLEDGE OF ANEMIA IN A SAMPLE OF MOROCCAN PREGNANT WOMEN

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Abstract

Pregnancy-related anemia, primarily due to iron deficiency, is a health problem among pregnant women, especially in developing countries. This study aims to examine the knowledge of pregnant women about anemia, focusing on their ability to identify symptoms and their understanding of dietary factors affecting iron absorption. 416 pregnant women followed in maternity homes, health centers, and general medical practices in the province of Sidi Kacem were interviewed via a questionnaire translated into Arabic. The results showed that a lack of awareness about the symptoms of anemia and dietary interactions, such as the inhibitory effect of coffee and dairy products, are significant predictors of pregnancy-related anemia. Additionally, psycho-cultural factors also influence dietary choices and consumption habits. These findings highlight the importance of nutritional education in prenatal care to bridge knowledge gaps and improve the health of mothers and newborns. It is also crucial to integrate this education into school curriculums to prepare future mothers to adopt healthy eating practices.

Keywords: Anemia, Knowledge, Frequency, Symptoms, Nutritional Education, Morocco.

1. INTRODUCTION

Pregnancy-related anemia, defined by a decrease in haemoglobin concentration in pregnant women, constitutes a public health issue, especially in developing countries [1]. Often due to iron deficiency, it can also result from other nutritional deficiencies, infections, or chronic diseases [2,3]. Its consequences during pregnancy are severe, increasing the risk of maternal mortality, preterm birth, low birth weight, and perinatal complications [4,5].

Despite efforts to combat this condition, pregnancy-related anemia remains prevalent. A key reason for this prevalence could be the lack of awareness among pregnant women regarding the symptoms of anemia and the nutritional factors influencing iron absorption [6,7].

Recognizing these symptoms and understanding these factors is essential for early diagnosis and proper management. Pregnancy, a period marked by significant physiological changes, requires special attention to the health of the mother and fetus. Anemia, characterized by a decrease in hemoglobin levels in the blood, remains a common complication during this period.

Pregnant women can sometimes put their health and that of their baby at risk, especially when they combine alternative remedies with conventional medical treatments for conditions such as anemia. These traditional remedies, anchored in cultural practices and passed down from generation to generation, often offer alternatives to standard medical treatments [8].

The appearance of anemia in pregnant women is most often due to a lack of iron (this is called iron deficiency anemia). During pregnancy, your iron needs are higher: you must first cover the needs of your own body, whose blood volume increases. It is also necessary to meet the iron needs linked to the growth and development of the fetus, and the functioning of the placenta.

Thus, as the pregnancy progresses and as the months pass, iron needs increase. If 1 mg of iron per day is enough in the 1st trimester, pregnant women need 8 mg of iron in the 3rd trimester! However, iron intake through food is not always sufficient [9].

Anemia can also be caused by a deficiency of vitamin B12 and vitamin B9, or folic acid. Essential for the growth and maturation of the fetus, folic acid participates in its physiological development, the production of its genetic material and the development of its nervous system. Folic acid deficiency generally appears in the first weeks of pregnancy [8].

Other factors can also promote the appearance of anemia in pregnant women: a twin pregnancy (twins), several closely spaced pregnancies, frequent vomiting linked to nausea, taking certain medications (non-steroidal anti-inflammatory drugs), infections and other pathologies.

Traditional therapy encompasses all knowledge and practices, regardless of their scientific validation, aimed at diagnosing, preventing or treating physical, mental or social ills [10-18]. This knowledge is essentially based on practical experiences and observations transmitted from generation to generation, orally or in writing.

This study explores pregnant women's knowledge of anemia, identifying gaps to propose targeted educational interventions to reduce this condition and improve maternal and neonatal health.

2. MATERIALS AND METHODS

2.1 Study type

We adopted a cross-sectional and analytical approach, conducted over a one-year period, from August 1, 2018, to August 1, 2019.

2.2 Criteria for selecting Health centers

The province of Sidi Kacem was chosen due to the lack of previous maternal health data and its good geographical accessibility, facilitating data collection.

2.3 Sampling

The most frequented centers by pregnant women, recommended by the provincial medical delegation and the PSGA program coordinator, were selected. These centers exemplarily practice prenatal consultations in accordance with established protocols.

Inclusion Criteria

- Moroccan pregnant women coming for prenatal consultation or delivery, who have undergone a complete blood count (CBC).
- Signed an informed consent form.

Exclusion Criteria

- Pregnant women without a CBC.
- Women with psychiatric disorders.
- Women of foreign nationality.

2.4 Data Collection

Data were collected via a questionnaire translated into Arabic and pre-tested with 15 patients, then administered by the principal investigator. Information was recorded prospectively and supplemented from the participants' health records.

2.5 Statistical Analysis

Data were analysed using SPSS version 26. Descriptive statistics were used to present participants' characteristics. Associations were examined using the Chi-square test, and multivariate logistic regression models were used to identify predictive factors of anemia, with a significance threshold of $p < 0.05$.

Ethical Considerations

The study received approval from the medical delegate of the province of Sidi Kacem and the regional director of the Ministry of Health and Social Protection of the Rabat-Salé-Kénitra region. All participants gave their informed consent, and data confidentiality was ensured by assigning codes and conducting anonymous analysis.

3. RESULTS

Description of the Study Population

The sample for this study consisted of 416 pregnant women followed in maternity homes, health centers, and general medical practices in the province of Sidi Kacem. Among them, 179 women (43.03%) were anemic. The age of the participants ranged from 18 to 48 years, with an average of 1.25 children per woman (± 1.37).

- Education Level: 62.02% of the participants were illiterate.
- Marital Status: 100% of the women were married.
- Social Coverage: 73.8% had social coverage, primarily RAMED (71.9%).
- Occupation: 98.1% of the women were housewives.
- Socioeconomic Level: 88.7% of the participants had a low socioeconomic status.
- Anemic women mainly came from rural areas (52.2%). The majority (86.3%) had their first consultation in a health center or dispensary, primarily followed by midwives (86.3%). Finally, 62.5% of the participants lived more than 3 km from the follow-up center and the laboratory.

Knowledge about Anemia

The analysis of knowledge about anemia, presented in Table 1, revealed that 82.5% of the women who received IEC (Information, Education, Communication) on anemia prevention got it from midwives. Among the participants who knew the symptoms of anemia, 61.8% only knew about fatigue and paleness, while only 38.2% also knew other symptoms such as headaches, shortness of breath, and dizziness.

21.9% of the participants were aware that citrus fruits contribute to iron absorption. In contrast, only 7.5% were aware that strawberries have this property, while this figure was 13.7% for fresh herbs. None of them knew that sweet potatoes are among these beneficial foods. For these women, the source of information was 72.8% from health personnel and 27.2% from family and friends.

Table 1: Knowledge of Pregnant Women about anemia and foods that promote iron absorption

Characteristics		Number	Percentage %
Symptoms of anemia	Yes	147	35.3
	No	269	64.7
If yes, which symptoms (n=147)	Fatigue and paleness	91	61.8
	Headaches, shortness of breath, dizziness	56	38.2
IEC on anemia prevention	Yes	303	72.8
	No	113	27.2
If yes, the source of information (n=303)	Health personnel (midwife)	250	82.5
	Family/friends	53	17.5
Citrus fruits	Yes	91	21.9
	No	325	78.1
Strawberries	Yes	31	7.5
	No	385	92.5
Sweet potatoes	Yes	0	0
	No	416	100
Fresh herbs	Yes	57	13.7
	No	359	86.3
The source of this information (n=179)	Health personnel	130	72.8
	Family/friends	49	27.2

The women surveyed had no knowledge of foods that hinder iron absorption, such as calcium-rich dairy products and whole grains. However, 41.3% were aware of the harmful effects of coffee consumption, while all were informed of the negative impact of tea on iron absorption.

Regarding the source of information, 87.3% of the participants acquired this knowledge from health personnel, while 12.7% obtained it from their family or friends. It was also noted that none of the women surveyed had ever been referred to a dietitian.

Table 2: Knowledge of Pregnant Women about foods that hinder iron absorption

Characteristics		Number	Percentage %
Calcium-rich dairy products	Yes	0	0
	No	416	100
Coffee	Yes	172	41.3
	No	244	58.7
Tea	Yes	416	100
	No	0	0
Whole grains	Yes	20	4.8
	No	396	95.2
The source of this knowledge	Health personnel	363	87.3
	Family/friends	53	12.7
Have you ever been referred to a dietitian?	Yes	0	0
	No	416	100

The analysis of the Chi-square test results regarding women's knowledge of anemia reveals statistically significant associations between several variables and the presence of anemia in women.

Firstly, knowledge of anemia symptoms ($p=0.002$), IEC on anemia prevention ($p=0.000$), women's knowledge of foods that promote iron absorption such as strawberries ($p=0.003$) and fresh herbs ($p=0.011$), and their knowledge of foods that hinder iron absorption such as coffee ($p=0.023$) and whole grains ($p=0.002$).

Table 3: Association between Knowledge about Anemia and Anemia

Variables		Total	With anemia		Without anemia		p-value
			n	%	n	%	
Knowledge of anemia symptoms	Yes	147	80	44,7	67	28,3	0.002*
	No	269	99	55,3	170	71,7	
IEC on anemia prevention	Yes	303	66	36,9	237	100	0.000*
	No	113	113	63,1	0	0	
Citrus fruits	Yes	91	35	19,6	56	23,6	0.201
	No	325	144	80,4	181	76,4	
Strawberries	Yes	31	31	17,3	0	0	0.003*
	No	385	148	82,7	237	100	
Sweet potatoes)	Yes	0	0	0	0	0	ns
	No	416	179	100	237	100	
Fresh herbs	Yes	57	57	31,8	0	0	0.011*
	No	359	122	68,1	237	100	
Calcium-rich dairy products	Yes	0	0	0	0	0	ns
	No	416	179	100	237	100	
Coffee	Yes	172	172	96,1	0	0	0.023*
	No	244	7	3,9	237	100	
Tea	Yes	416	179	100	237	100	ns
	No	0	0	0	0	0	
Whole grains	Yes	20	9	5	11	4,6	0.002*
	No	396	170	95	226	95,3	
Referred to a Professional diet	Yes	0	0	0	0	0	ns
	No	416	179	100	237	100	

Multivariate Analysis between Anaemia Knowledge and Anemia

The association between knowledge about anemia and "pregnancy-related anemia" is summarized in Table 2.

Univariate analysis showed that pregnant women who were more likely to be anemic were those who did not receive IEC on anemia prevention ($p=0.000$), as well as those who were unaware of anemia symptoms ($p=0.002$), those unaware of foods promoting iron absorption such as strawberries ($p=0.003$) and fresh herbs ($p=0.011$), and those unaware that certain foods, such as coffee ($p=0.023$) and whole grains ($p=0.002$), can inhibit iron absorption.

The logistic regression model showed that knowledge about anemia is a predictor of "pregnancy-related anemia."

Additionally, lack of knowledge of anemia symptoms increased the risk of pregnancy-related anemia by 4.325 times, and not knowing about foods hindering iron absorption such as coffee and whole grains increased the risk of pregnancy-related anemia by 7.601 times and 3.865 times, respectively.

Table 4: Multivariate Analysis between Anemia Knowledge and Anemia

Variables		With anemia n (%)	Without NA n (%)	OR	95% CI	p- value
Knowledge of anemia symptoms	Yes	80(44,7)	67 (28,3)			
	No	99(55,3)	170(71,7)	4,325	[1,372-13,763]	0,013*
IEC on anemia prevention	Yes	66(36,9)	237(100)			
	No	113(63,1)	0(0)	1,024	[0.321- 2.715]	0,224
Knowledge of foods promoting iron absorption (Strawberries)	Yes	31(17,3)	0(0)			
	No	148(82,7)	237(100)	1,123	[0.512-5.895]	0,203
Knowledge of foods promoting iron absorption (Fresh herbs)	Yes	57(31,8)	0(0)			
	No	122(68,1)	237(100)	1,815	[0.541- 8.615]	0,116
Knowledge of foods hindering iron absorption (Coffee)	Yes	172(96,1)	0(0)			
	No	7(3,9)	237(100)	7,601	[5.651- 25.325]	0,012*
Knowledge of foods hindering iron absorption (Whole grains)	Yes	9(5)	11(4,6)			
	No	170(95)	226(95,3)	3,865	[1.328-10.315]	0,017*

*Significant at $p < 0.05$

4. DISCUSSION

Health knowledge plays a crucial role in disease prevention. A good understanding of the disease and its risk factors enables early diagnosis and effective management, thereby reducing the prevalence and severity of the condition.

Particularly, nutritional education and awareness of dietary interactions can prevent diseases such as anemia, thus improving overall health of individuals and communities. The objective of our study was to examine the knowledge of pregnant women about anemia, focusing on their ability to identify symptoms and their understanding of dietary factors affecting iron absorption

In our study, in terms of knowledge, the results of binary logistic regression reveal significant associations between the lack of knowledge of anemia symptoms and anemia, as well as between not knowing foods that hinder iron absorption such as coffee and whole grains, and anemia.

Furthermore, research has demonstrated that psycho-cultural elements (knowledge, religious beliefs, traditions, taboos) also influence individuals' dietary preferences and consumption volumes [5]. Similarly, in Benin, a high level of nutrition knowledge has been correlated with the adoption of good dietary and hygiene habits.

Participants in our research had limited nutrition knowledge, especially regarding effective strategies to prevent anemia and iron deficiency.

They were not informed about food sources rich in iron and vitamin C, nor about the facilitating role of consuming meat, poultry, fish, and vitamin C-rich foods in non-heme iron absorption. They were also unaware of the inhibitory effect of consuming certain products, such as coffee and phytates, on this absorption [19,20].

It is noteworthy that although various cooking methods, such as dehusking and soaking, are commonly practiced in their environment, pregnant women were not aware of the crucial importance of these methods for optimizing non-heme iron absorption (by reducing phytates).

Similar observations were reported by [21, 22], who found that only a small fraction of Tunisian women of childbearing age were aware of the correlation between iron deficiency and anemia.

Thus, there is a pressing need for nutritional education among women, especially pregnant women, regarding the importance of iron for the body and the benefits of a balanced and iron-rich diet [23-29].

Studies show that increased nutrition knowledge is associated with improved dietary practices and nutritional status of individuals [30-37]. Integrating nutritional education into school curricula would therefore be crucial, as adolescents, who largely comprise future mothers, need to acquire skills to wisely select foods, combine them properly, and adopt appropriate cooking techniques (dehusking, soaking, steaming) to prevent or address iron deficiency [38-41].

5. CONCLUSION

In conclusion, our study underscores the importance of educating pregnant women about anemia symptoms and dietary factors influencing iron absorption. Targeted interventions aimed at improving pregnant women's knowledge in these areas could potentially reduce the prevalence of pregnancy-related anemia.

Healthcare professionals should integrate specific educational programs into prenatal care to address these knowledge gaps. Better understanding and management of pregnancy-related anemia are essential for improving maternal and neonatal health outcomes.

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