

General Population Awareness and Knowledge Regarding Anemia Symptoms, Types, and Risks in Saudi Arabia

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Abstract

Anemia, a hematological disease in which the hemoglobin concentration is lower than normal, is a prevalent condition that can develop regardless of age. Approximately 800 million women and children worldwide were affected by anemia in 2011, according to WHO. The study aimed to assess the knowledge and awareness level of anemia symptoms, types, and risks among the Saudi Arabian population. This observational cross-sectional study was carried out using a self-administered questionnaire during the period from July 2022 to May 2023 across various regions of Saudi Arabia. A total of 1003 participants from different cities in Saudi Arabia will take part in the study. Data was encoded in Microsoft Excel files before being exported into SPSS program (version 26) for analysis. All tests utilized in the study will have a significance level of 0.05. The study included 1003 participants; most of them, 76.6%, were females and 23.4% males. 41.2% of participants aged 18-24 years. Nearly half of the participants, 49.5%, reported knowledge above average score, followed by 27.1% with an excellent score, 23.3% middle score, and only 0.1% reported a poor score about anemia knowledge. Based on the findings of the current study, it could be concluded that participants had adequate general knowledge about anemia and a good knowledge score on anemia. It generally corresponded with reported figures from other parts of the world. Our findings indicate a substantial relationship between knowledge score, gender, and age.

Keywords: Anaemia, Awareness, Saudi Arabia, Haemoglobin

INTRODUCTION

Anemia is a common hematological disorder characterized by low hemoglobin levels affecting people at any age [1]. It is divided into nutritional and non-nutritional etiology, and the most common dietary causes are iron, cobalamin, and folate deficiencies [2]. It affects different body systems. Its multifactorial condition may extend to the respiratory, circulatory, digestive, endocrine, and nervous systems [3]. It is classified from mild to severe [4]. Anemia has been linked to decreased quality of life and survival in selected populations [5]. It starts as a nonspecific sign, such as weakness, fatigue, or even reduced cognitive abilities [6]. The World Health Organization (WHO) estimates that 2011 anemia impacted about 800 million women and children worldwide. The same WHO survey also noted that 29.4% of women of reproductive age and 38.2% of pregnant women are anemic [7]. Anemia can be caused by several combinable and uncombinable variables, either together or separately. These factors may include genetic makeup, gynecological/obstetric history, malignancies, anti-cancer medications, ethnicity, gender, age, socio-demographic status, dietary habits, physical health, and mental health [8].

A Study has been published on the knowledge and attitude of secondary school Iranian girls about iron deficiency anemia. Shojaeizadeh *et al.* reported that approximately 57.3 % of girls had insufficient information, 44.5 % had weak practice, and 54.1 % had a negative attitude related to IDA. Additionally, the study's results showed a significant association between knowledge of IDA and the level of education, age, mother's and father's jobs, and education

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sector [9]. In 2015, a study conducted in India to measure Anemia-Related Knowledge Among Adolescents and its risk factors showed that only 25% of the participants had good knowledge about anemia [10]. According to Rana *et al.* (2019), Awareness Assessment of Anemia in the Western region of Saudi Arabia, the result showed that most participants had good knowledge about anemia and knew that some types of anemia could be inherited. Regarding the risk factors, 75 % of participants had a high level of understanding about the possibility that pregnancy could lead to anemia in pregnant females. However, 67 percent of participants who were unaware of the link between pregnancy and anemia were Female [11].

Anemia is a very prevalent disease, so there is an obvious need to assess whether the general public is aware of this disease in any shape or form and, if not, what measures can be adopted by the government to raise awareness about it. The main aim of conducting this study was to assess the knowledge and awareness level of the Saudi Arabian population about anemia. In the previous studies, the prevalence of anemia in the UAE was 14%. This study was carried out to assess whether the general public has some knowledge about this disease or if they are familiar with anemia in any respect. Curable diseases sometimes become serious due to the lack of knowledge about them. The region's general public is usually not familiar with the cause, symptoms, and treatment of even the most common health complications, due to which the curable diseases often remain undiagnosed and untreated. The main purpose of this study was to assess the knowledge and awareness level of anemia symptoms, types, and risks among the Saudi Arabian population.

MATERIALS AND METHODS

Study Design

An observational cross-sectional study design was performed between July 2022 and May 2023, targeting all Saudi Arabian populations. The target sample in this study is the Saudi Arabian population aged 18 to 65.

Inclusion and Exclusion Criteria

In this study, include a Saudi adult older than 18 years old who agreed to participate in our study. People who were more than 65 years old were excluded.

Sample Size

Considering the standard normal deviation set as a 95% confidence level ($z = 1.96$), a sample proportion of 50 % ($p = 0.5$), A margin of error of 5% ($e = \pm 0.05$)

So, the minimum sample size required was 385.

Method for Data Collection and Instrument (Data Collection Technique and Tools)

A 30-item instrument was adopted to measure the knowledge and awareness of anemia symptoms, types, and risk factors. The questionnaire was translated into Arabic and validated. A pilot test was done to ensure the clarity of the questionnaire, and slight modifications were made if necessary.

The questionnaire has been divided into five sections. If the participant answered correctly, they would receive one point; incorrect and I don't know answers will receive zero points for the multiple-choice questions. For the degree of agreement toward the statement. The correct answer is given a score of 5, the closest answer is given a score of 4, and so on until we reach the end.

The total point is 62, and the participant who receives a score above 50 has excellent knowledge; those with scores of 40 and above have knowledge above average; those who receive 20 and above are considered to have average, and those below 19 have poor knowledge.

Analyses and Entry Method

Data is encoded into Microsoft Excel worksheets and imported to Statistical Package for the Social Sciences (SPSS®- version 26) software for analysis. Qualitative variables were represented as percentages and numbers (frequency, median, etc.) and were shown in the figures. The mean and median are calculated for the knowledge score. The chi-square test is used to determine the association of socio-demographic variables with the level of knowledge about anemia. A 0.05 significance level was used in all tests used in the study.

RESULTS AND DISCUSSION

Table 1 shows the socio-demographic characteristics of participants; the study included 1003 participants (76.6% were females and 23.4% were males. 41.2% of participants were aged 18-24 years, 23.6% 25-34 years, 15.2% 35-44 years only 7.6 were 55-65 years old. As regards educational level, the majority had a high educational level: more than half of the participants, 62.2%, had a bachelor followed by 18.6% graduated from high school. 45.6% of participants were from the western region, 16.1% from the southern, and 14.8% from the northern.

Table 1. Socio-demographic characteristics of participants (n=1003)

	Parameter	No.	%
Gender	Male	235	23.4
	Female	768	76.6
Age	18-24	413	41.2
	25-34	237	23.6
	35-44	152	15.2
	45-54	125	12.5
	55-65	76	7.6

Region	Southern	161	16.1
	Eastern	99	9.9
	Northern	148	14.8
	Western	457	45.6
	Middle	138	13.8
Education level	Less than high school	21	2.1
	High school	187	18.6
	Bachelor	624	62.2
	Diploma	97	9.7
	Higher degree	72	7.2
	Master's Degree	2	.2

Figure 1 shows that 98.8% of participants have heard of anemia before.



Figure 1. Participants heard of anemia (n= 1003)

As illustrated in **Table 2**, 74.2% of participants think anemia can be hereditary. 78.9% reported that meat and fish are good sources of vitamin B12. 56.3% reported that vitamin B12 deficiency causes anemia. 77.9% reported that pregnancy can cause anemia. 58.7% reported that drinking red tea while eating can lead to anemia. 32.1% reported that stress can cause anemia. As for symptoms, 42.5% reported that changes in bowel habits and the presence of dark-colored and foul-smelling stools are symptoms of anemia, while 84.3% reported that fatigue, shortness of breath, and pale skin are symptoms of anemia.

Table 3 shows that 42.8% of participants strongly agree that there is a possibility that anemia may affect cognitive ability. 33.3% strongly agree that there is a relationship between severe anemia and death. 20% strongly agree that anemia leads to premature birth. 32.2% strongly agree that anemia threatens the life of a mother during pregnancy. 60.3% strongly agree that premarital examination can prevent some types of anemia.

Table 4 shows the relation between knowledge score and the different characteristics of participants. The study reported that there was a significant association between knowledge score and gender ($p=0.001$); females had better knowledge than males; thus, 84.9% of females had excellent scores, but in a high percentage, nearly a third of males 31.6% reported middle knowledge score about anemia. Also, there was a significant relationship with knowledge score of anemia ($p=0.001$); the 18- 24 years age group had better scores than other age groups; 29.8% of them reported excellent score, 46.6% above average, 43.2% middle score, and no one reported poor knowledge score. Moreover, the participant region had a positive association with knowledge score ($P=0.006$), and participants from the western region had higher scores than other groups. Participants with bachelor's degrees had higher scores than other educational level groups, but there was no significant association between knowledge score and educational level ($=0.531$).

Table 2. Participants' knowledge of anemia symptoms, types, and risk (n=1003)

Parameter	Yes	No	Don't know
Can anemia be hereditary?	744 74.2%	105 10.5%	154 15.4%
Is meat and fish a good source of vitamin B12?	791 78.9%	37 3.7%	175 17.4%
Does drinking tea and coffee prevent iron absorption?	789 78.7%	113 11.3%	101 10.1%
Does vitamin B12 deficiency cause anemia?	565 56.3%	92 9.2%	346 34.5%
Do you think pregnancy can cause anemia?	781 77.9%	85 8.5%	137 13.7%
Does folic acid deficiency cause anemia?	556 55.4%	109 10.9%	338 33.7%
Is it possible that the cause of anemia is kidney failure?	326 32.5%	279 27.8%	398 39.7%
Does exposure to pollution such as lead cause anemia?	305 30.4%	154 15.4%	544 54.2%
Drinking red tea while eating can lead to anemia:	589 58.7%	199 19.8%	215 21.4%
Can stress lead to anemia?	322 32.1%	311 31.0%	370 36.9%
Are brittle nails a sign of anemia?	729 72.7%	123 12.3%	151 15.1%
Is a change in bowel habit and the presence of dark-colored and foul-smelling stools a symptom of anemia?	426 42.5%	177 17.6%	400 39.9%
Fatigue, shortness of breath, and pale skin are symptoms of anemia?	846 84.3%	61 6.1%	96 9.6%
In cases of mild anemia, there are no symptoms?	588 58.6%	194 19.3%	221 22.0%

Palpitations and dizziness are a symptom of anemia?	924 92.1%	14 1.4%	65 6.5%
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Table 3 shows that 42.8% of participants strongly agree that there is a possibility that anemia may affect cognitive ability. 33.3% strongly agree that there is a relationship between severe anemia and death. 20% strongly agree that anemia leads to premature birth. 32.2% strongly agree that anemia threatens the life of a mother during pregnancy. 60.3% strongly agree that premarital examination can prevent some types of anemia.

Table 3. Participants' attitude toward anemia symptoms, types, and risk (n=1003)

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
There is a possibility that anemia may affect cognitive ability:	429 42.8%	406 40.5%	132 13.2%	29 2.9%	7 .7%
Is there a relationship between severe anemia and death?	334 33.3%	346 34.5%	246 24.5%	59 5.9%	18 1.8%
Is there an increased risk of anemia with heavy menstrual bleeding?	404 40.3%	345 34.4%	195 19.4%	47 4.7%	12 1.2%
Is anemia associated with an increased risk of miscarriage?	298 29.7%	343 34.2%	299 29.8%	55 5.5%	8 .8%
Does anemia lead to premature birth?	201 20.0%	243 24.2%	469 46.8%	83 8.3%	7 .7%
Are vegetarians more likely to suffer from anemia?	235 23.4%	267 26.6%	342 34.1%	133 13.3%	26 2.6%
Anemia threatens the life of a mother during pregnancy?	323 32.2%	427 42.6%	206 20.5%	43 4.3%	4 .4%
A premarital examination can prevent some types of anemia?	605 60.3%	264 26.3%	107 10.7%	23 2.3%	4 .4%

Figure 2 shows the score of knowledge about anemia: nearly half of the participants, 49.5%, reported knowledge above average score, followed by 27.1% with an excellent score, 23.3% middle score, and only 0.1% reported a poor score about anemia knowledge.

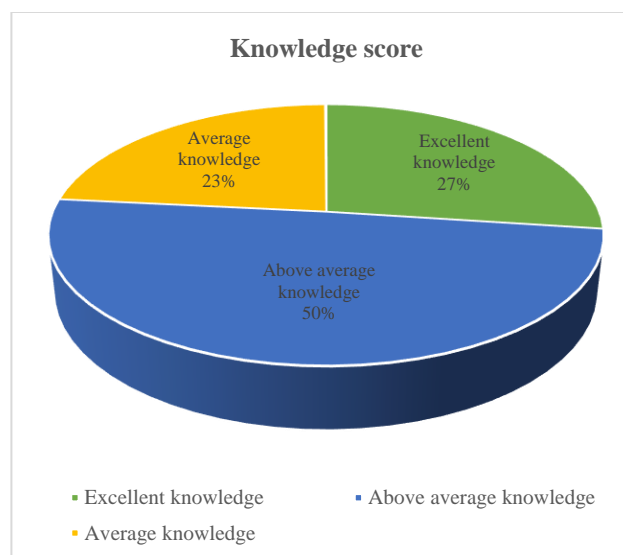


Figure 2. Knowledge score among participants regarding anemia (n= 1003)

Table 4 shows the relation between knowledge score and the different characteristics of participants. The study reported that there was a significant association between knowledge score and gender (p=0.001); females had better knowledge than males; thus, 84.9% of females had excellent scores, but in a high percentage, nearly a third of males 31.6% reported middle knowledge score about anemia. Also, there was a significant relationship with knowledge score of anemia (p=0.001); the 18- 24 years age group had good scores than other age groups, 29.8% of them reported excellent scores, 46.6% above average, 43.2% middle score and no one reported poor knowledge score. Moreover, the participant region had a positive association with knowledge score (P=0.006), and participants from the western region had higher scores than other groups. Participants with bachelor's degrees had higher scores than other educational level groups, but there was no significant association between knowledge score and educational level (=0.531).

Table 4. Association between knowledge scores with socio-demographic characters of participants (n=1003)

		Knowledge score				Total (N=1003)	P value
		Excellent	Above average	Middle	Poor		
Gender	Male	41 15.1%	120 24.2%	74 31.6%	0 0.0%	235 23.4%	0.001
	Female	231 84.9%	376 75.8%	160 68.4%	1 100.0%	768 76.6%	
Age	18-24	81 29.8%	231 46.6%	101 43.2%	0 0.0%	413 41.2%	0.001
	25-34	63	117	57	0	237	

	23.2%	23.6%	24.4%	0.0%	23.6%	
	51	66	34	1	152	
35-44	18.8%	13.3%	14.5%	100.0%	15.2%	
	49	54	22	0	125	
45-54	18.0%	10.9%	9.4%	0.0%	12.5%	
	28	28	20	0	76	
55-65	10.3%	5.6%	8.5%	0.0%	7.6%	
	33	101	27	0	161	
Southern	12.1%	20.4%	11.5%	0.0%	16.1%	
	26	48	25	0	99	
Eastern	9.6%	9.7%	10.7%	0.0%	9.9%	
	37	73	38	0	148	
Northern	13.6%	14.7%	16.2%	0.0%	14.8%	0.006
	148	194	114	1	457	
Western	54.4%	39.1%	48.7%	100.0%	45.6%	
	28	80	30	0	138	
Middle	10.3%	16.1%	12.8%	0.0%	13.8%	
	6	9	6	0	21	
Less than high school	2.2%	1.8%	2.6%	0.0%	2.1%	
	45	99	43	0	187	
High school	16.5%	20.0%	18.4%	0.0%	18.6%	
	177	309	137	1	624	
Bachelor	65.1%	62.3%	58.5%	100.0%	62.2%	0.531
	23	39	35	0	97	
Diploma	8.5%	7.9%	15.0%	0.0%	9.7%	
	20	39	13	0	72	
Higher degree	7.4%	7.9%	5.6%	0.0%	7.2%	
	1	1	0	0	2	
Master's Degree	0.4%	0.2%	0.0%	0.0%	0.2%	

The World Health Organization defines anemia as a condition in which red blood cells' number or oxygen-carrying capacity is lower than expected [12]. It is a global public health problem affecting 1.62 billion people globally, which corresponds to 24.8% of the population as per the World Health Organization (WHO) [13, 14]. The etiology of anemia results from a wide diversity of causes that can be lonely but more often exist. Iron deficiency has been the protuberant cause for the onset of anemia, while other causes recognized include heavy blood loss because of menstruation or parasite infections such as hookworms, schistosomiasis, and other infections like malaria, cancer, tuberculosis, and HIV. In addition, micronutrient deficiencies, including vitamins A and B12, foliate, riboflavin, and copper, can increase the risk of anemia [14]. An increase in awareness about the consequences and prevalence of anemia could lead to early detection and management. This observational cross-sectional study was carried out among 1003 participants from different cities in Saudi Arabia. The study aimed to assess the

knowledge and awareness level of anemia symptoms, types, and risks among the Saudi Arabian population. According to the knowledge score about anemia, the results of this study showed that nearly half of the participants, 49.5%, reported knowledge above average score, followed by 27.1% excellent score, 23.3% middle score, and only 0.1% reported poor score about anemia knowledge. In accordance with our results in Riyadh, Saudi Arabia, a cross-sectional study was conducted among 450 adults, which revealed that 27.6% of the participants had good knowledge about anemia, as evidenced by 75% or more correct answers to the questions. About half (51.3%) of the participants had heard of Iron deficiency anemia (IDA), 64% correctly knew the causes, 31.3% correctly knew the clinical features, 56.9% believed that IDA could be prevented, while 46% believed that IDA could be treated, and 66.9% correctly knew the treatment options for IDA [15]. Also, in the Qassim region, Waggiallah *et al.* conducted a study involving 1281 individuals and found that the general awareness of anemia was 89.2%, whereas satisfactory, fair, and poor awareness of anemia represented 20.5%, 50.5%, and 29.0%, respectively [16]. It was determined that Saudi citizens in the Qassim region had adequate and satisfactory general knowledge of anemia; however, they were not aware of the causes of anemia [16]. However, in Tabuk, Saudi Arabia. Aboub *et al.* highlighted the poor level of knowledge about IDA among pregnant women. The results revealed that two-thirds of the study participants had poor awareness regarding anemia, while only 3.7% had good knowledge [17]. In the Western zone of Saudi Arabia, a questionnaire-based cross-sectional study carried out among 321 parents aged 18 years and above, it was established that nearly 27% of interviewed parents asserted that they were not aware, whereas about 73% indicated their high awareness level about the IDA condition experienced in children [9]. Another study was carried out among 433 Saudi and non-Saudi male and female from the western regions of Saudi Arabia and found that most of the participants demonstrated a good understanding regarding what is the anemia 89%, more than two-thirds of participants (77%) knows that some types of anemia can be inherited [11]. In Egypt, a descriptive study was conducted among 400 pregnant women. The results showed that 60% of participants had poor knowledge scores, only 18.8% had good knowledge scores, and 21% of them had negative attitudes about iron deficiency anemia [1].

Moreover, M'Cormack & Drolet, 2012 illustrated that the studied participants 'knowledge about anemia was generally poor [18]. As well as it agrees with Sonkar *et al.*, 2017 who indicated that there was a lack of women's knowledge regarding anemia [19]. In Western-North Region, Ghana, a descriptive cross-sectional was conducted among 598 pregnant women reported that about 13.5% of the pregnant women had high knowledge of anemia, while 58.4% and 28.1% had moderate and low knowledge, respectively [20]. Also, a study to assess the knowledge and risk factors of anemia among pregnant women in Libya revealed that all the women had moderate knowledge of anemia [21]. In India,

another study carried out among Adolescent Girls reported that only one-fourth (25%) of subjects had good knowledge about anemia, 36% had fair knowledge, and the rest of them had poor knowledge about anemia [10].

Regarding the relation between knowledge score and the different characters of participants, the study reported that there was a significant association between knowledge score and gender ($p=0.001$); females had better knowledge than males; thus, 84.9% of females had excellent scores but high percentage nearly third of males 31.6% reported middle knowledge score about anemia. Also, there was a significant relationship with knowledge score of anemia ($p=0.001$), and the 18- 24 years age group had good scores than other age groups; 29.8% of them reported excellent scores, 46.6% above average, 43.2% middle score and no one reported poor knowledge score. Moreover, the participant region had a positive association with knowledge score ($P=0.006$), and participants from the western region had higher scores than other groups. Participants with bachelor's degrees had higher scores than other educational level groups, but there was no significant association between knowledge score and educational level ($=0.531$). Like our results, another study conducted in Riyadh City showed that there was a statistically significant association between the awareness of IDA and age, gender, marital status, nationality, educational level, and occupation [15]. Furthermore, the results show that good awareness was observed more in males as compared to females ($p = 0.000$), which was in contrast to our results. Also, the age group of 26-35 years recorded the highest level of awareness [15]. As contraindicated to our results, people who had a bachelor's degree as their highest level of education recorded the highest level of awareness [15]. It was also noted that married individuals, Saudi nationals, and employed individuals had recorded the highest level of knowledge [15]. Results from another study show that the females were more aware of anemia than males, and the participants lying in the age group of 18-25 years were majorly aware of IDA without significant association ($p>0.05$) [9]. Based on the education level, the study revealed that the level of education was significantly associated with anemia, where it was recognized that the parents with bachelor's degrees had better knowledge of IDA conditions [9]. Also, another study conducted in western regions of Saudi Arabia reported a significant proportion between the educational level and degree of anemia awareness [11]. Another study conducted among pregnant women found that there were significant associations between knowledge of anemia where the pregnant woman resides in the district ($p = 0.003$) and occupational status ($p < 0.001$). There was a positive association between knowledge of anemia and woman's educational ($p = 0.002$) which was contrast to our results [20].

CONCLUSION

Based on the findings of the current study, it could be concluded that participants had adequate general knowledge

about anemia and a good knowledge score on anemia. It generally corresponded with reported figures from other parts of the world. Our findings indicate a substantial relationship between knowledge score, gender, and age. However, no meaningful correlation with an educational degree was discovered. Awareness campaigns and conferences are recommended.

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