



ASSESSMENT KNOWLEDGE ABOUT GENERAL ANAEMIA SIGNS AND SYMPTOMS AMONG ADULT PATIENT ATTENDING AT PRIMARY HEALTH CARE, MAKKAH AL-MOKARRAMA, SAUDI ARABIA 2022.

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Abstract

Background.

Despite its high prevalence, anemia often does not receive proper clinical attention, and detection, evaluation, and management of iron deficiency anemia and iron-restricted erythropoiesis can possibly be an unmet medical need. A multidisciplinary panel of clinicians with expertise in anemia management convened and reviewed recent published data on prevalence, etiology, and health implications of anemia as well as current therapeutic options and available guidelines on management of anemia across various patient populations and made recommendations on the detection, diagnostic approach, and management of anemia. The available evidence confirms that the prevalence of anemia is high across all populations, also effect in diminished quality of life, and increased risk of morbidity and mortality, and it is a modifiable risk factor of allogeneic blood transfusion with its own inherent risks. Anemia is a condition in which the number of red blood cells and consequently their oxygen-carrying capacity is insufficient to meet all the body's physiologic needs which are vary with a person's age, gender, altitude, smoking and different stages of pregnancy.

Aim of the study: To assessment Knowledge about general anemia signs and symptoms among adult patient attending at Primary Health Care, Makkah Al-Mokarrama, Saudi Arabia 2022.

Methods: across-sectional study was conducted at Makkah primary healthcare centers among among adult patient attending at Primary Health Care who visited clinic for routine follow-up were selected through convenience sampling technique. A questionnaire filled out by the researcher through an interview with the adult patient was utilized for data collection.

Results: most of the participants (41.0%) were in the age group >30 years. Regarding the marital status the majority of participant married were (73.0%). Regarding educational level the majority of participant are Secondary education were (45.0%) also regarding Nationality the majority of participant are Saudi were(77.0%). Regarding the Occupation the majority of participant Government/private employed were (42.0%).

Conclusion. Anemia is a risk factor for major morbidity and operative mortality in adult . This finding is confirmative of the role of preoperative anemia in determining adverse events in major non operations. In internal medicine setting adult patients are characterized by multi morbidity and poli-pharmacologic treatments, which might affect the erythropoietin compartment, contributing to anemia and iron deficiency.

Keywords: Knowledge, Anaemia, Clinic, adult, PHC, Makkah .

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Introduction .

Anaemia is one of the most common nutritional deficiency diseases observed globally and affects more than a quarter of the world's population. Globally, 41.8% pregnant women and close to one third of non-pregnant women (30.2%) are anaemic.[1] According to the Ministry of Health, the prevalence of anaemia among pregnant women is 55.1%. Other more dated risk stratification scores do not include anemia within the risk factors [2], which is conversely included in the score proposed by Higgins and colleagues in 1992 [3]. Despite this, preoperative anemia was considered significantly associated with postoperative morbidity and mortality [4]

Anaemia, defined as a decreased concentration of blood hemoglobin, is one of the most common nutritional deficiency diseases observed globally and affects more than a quarter of the world's population [5]. It is estimated that 41.8% of pregnant women worldwide are anaemic. In Africa, 57.1% of pregnant women are anaemic [6]. In Saudi Arabia, the prevalence of anaemia among pregnant women is 55.1% [7]. When the prevalence of anaemia among pregnant women is 40.0% or more, it is considered as a severe public health problem [8]. Anaemia during pregnancy is considered severe when Hb concentration is less than 7.0 g/dl, moderate when Hb level is 7.0 - 9.9 g/dl, and mild when Hb level is 10.0 - 10.9 g/dl [9]. Anaemia is a major cause of morbidity and mortality of pregnant women and increases the risks of fetal, neonatal and infant mortality [10]. Anaemia during pregnancy contributes to 20% of all maternal deaths [11]

There are about 1.2 billion adolescents in the world, which is equal to 1/5th of the world's population and their numbers are increasing. Out of these, 5 million adolescents are living in developing countries (International Letters of Natural Sciences 2 (2015) [12] Out of 1 billion total Saudi Arabia populations, 21% are adolescents[13] . The world's adolescent population is facing a series of serious nutritional challenges which are not only affecting their growth and development but also their livelihood as adults. [14] Yet, adolescents remain a largely neglected, difficult- to- measure and hard -to-reach population, in which the needs of adolescent girls in particular, are often ignored [15]. The commonest causes of anemia in developing countries, particularly among the most vulnerable groups (pregnant women and preschool age children), are nutritional disorders and infections[16]. Anemia not only causes growth

retardation of fetus, puts pregnant women at high risk of complications, causes poor growth and development among children, but also affects adults with a significant effect on productivity and economic growth [17] .

Iron deficiency is the most common and widespread nutritional disorder in the world. There are no current global figures for iron deficiency, but using anaemia as an indirect indicator it can be estimated that most preschool children and pregnant women in non-industrialized countries, and at least 30-40% in industrialized countries, are iron deficient.[18] Nearly half of the pregnant women in the world are estimated to be anaemic: 52% in non-industrialized - as compared with 23% in industrialized – countries.[19]

Iron deficiency anemia has many causes. These causes fall into two main categories: increased iron needs and decreased iron intake and absorption. Increased iron needs includes the rapid growth, pregnancy, blood loss due to heavy menstrual periods, frequent blood donation and some stomach and intestinal conditions such as food sensitivity and hookworms. [20]

Review of literatures

A study that analyzed the cost of iron deficiency in 10 developing countries found that the median value of physical productivity losses per year due to iron deficiency was about US\$2.32 per capita, or 0.57% of the gross domestic product and combining the effect of iron deficiency on cognition, total economic loss was estimated to be US\$16.78 per capita or 4.05% of the GDP [21]. As per the World Health Organization's (WHO) estimates globally 12.7% of the adult males suffer from anemia [22].

According to World Health Organization (WHO) report, 32.3% no pregnant women of child bearing age are suffering from anemia in Saudi Arabia. AlQuaiz conducted a hospital-based study and found 37% of women suffering from anemia in Riyadh, Saudi Arabia.[23]

A study on the prevalence of iron deficiency anemia among female elementary school children in Northern Jeddah, Saudi Arabia conducted by Alsharyufi et al .(2021) showed that the prevalence of iron deficiency and iron deficiency anemia in this study was 23.0%. Data showed that the majority of anemia cases in this study were normocytic type. Anemia was more prevalent among students of age 10-12 years as compared to younger age group [24]

Aboud, et al. (2019) conducted a hospital-based study and found 37% of women suffering from anemia in Riyadh, Saudi Arabia, many studies support the fact that anaemia is common among infants who fed on exclusive milk for longer duration due to relatively low iron contents in breast milk[25]. A study by Akhter, et al. (2021). Report that the prevalence of iron deficiency anemia among female elementary school children in Northern Jeddah, Saudi Arabia conducted [26] Baldassarre, et al.(2020) showed that the prevalence of iron deficiency and iron deficiency anemia in this study was 23.0%. Data showed that the majority of anemia cases in this study were normocytic type. Anemia was more prevalent among students of age 10-12 years as compared to younger age group [27].

According to the World Health Organization (WHO), the worldwide prevalence of anemia in pregnant women is 41.8% (95% CI 39.9-43.8); there are only few exception countries in the world where anemia is not at least a mild public health problem. Supplementation of diet with iron compounds during pregnancy has been recommended by international and local organizations for quite some time; intake of folic acid as a dietary supplement might have additional benefits (reduced risk of serious neural tube defects in the infant) for women of reproductive age [28]. Traditionally, women have been prescribed dietary supplements during pregnancy as a daily regimen. In recently times intermittent supplementation has been suggested, since it takes advantage of the turnover time of intestinal mucosal cells favoring iron absorption regulation and is more economical and safer from the public health perspective[29].

Rationale

Dietary deficiency plays a major role in causation of anemia. Dietary intake is influenced by cultural factors as well as perceived benefits of a particular diet. Studies on adult and adolescent reported that though they were aware that poor quality or lack of diet causes anemia, their knowledge regarding specific dietary elements in preventing anemia was limited. Economic constraints on dietary improvement were cited as the primary barrier to a food-based approach for alleviating symptoms of anemia. In many cases, respondents were also not aware of the serious consequences of anemia. However, there is limited information about the attitude and beliefs of adult population, especially men, regarding anemia and the role of various dietary factors in its causation. Hence, planned to assess the knowledge about general anemia

signs and symptoms among adult patient attending at Primary Health Care.

Aim of the study: To Assessment Knowledge about general anemia signs and symptoms among adult patient attending at Primary Health Care, Makkah Al-Mokarrama, Saudi Arabia 2022.

Materials and Methods

Study Design.

This cross-sectional study was conducted at PHCCs, Makkah Al-Mokarramah, chosen through simple random sampling using random number generator.

Study setting:

At the beginning of the selection, the researcher selected 3PHCCs (Al-ka'akyah, Kuday, Al-Eskan,) among 85 PHCCs inside Makkah Al-Mokarramah (source; Ministry of Health) to be subjected to randomization. These 85 PHCCs have available facilities and capable to conduct the hemoglobin at limited time in May to July 2022. Al-Khaldyah and Al-Ka'akyah PHCCs, which include several clinics such as chronic disease, general, antenatal, dressing, dietitian, dental, vaccination, are one of the modalities health care centers at the ministry of health (MOH) that provide PHC clinic services.

Study Population.

Adult patient attending at Primary Health Care Clinic who are visiting Al-Khaldyah and Al-Ka'akyah PHCCs for routine follow-up in the PHC clinic were selected through convenience sampling technique. Pregnant Women Attending Antenatal Clinic in the Second and Third Trimesters period adult patient attending at Primary Health ranges from 200 participant

Sample Size

The sample size was estimated to be (200) using Raosoft calculator, following the criteria of 95% confidence level and 5% margin error, and with the assumption from the literature that the prevalence of anaemia among Adult patient covering about 200 participant.

Sampling Techniques

Makkah City Regarding health care center selection, there are three health care sectors inside Makkah Al-Mokarramah which are Al-Ka'akya, Al-Zahir and Al-Adl. By using simple random sample technique (by using randomizer.org), health care sector was selected. health care sector which was enumerated from 1 to 12. Again, by using simple random sample technique primary

health care center was selected (by using randomizer.org website), at the ministry of health (MOH) that provide PHC services . PHC clinic works all week with a target population almost of 200 Adult patient participant. To collect data from sample size, the researcher needs nearly 20 patients per day to collect desired sample size. The researcher has been selecting every 3 th patient to cover the sample size during data collection period.

Inclusion Criteria

Adult patient covering about 200 participant in PHC attending Al-Khaldyah and AL-Ka’akyah clinic for regular follow up was considered as the inclusion measure.

Exclusion Criteria .

Adult patient covering about 200 participant Attending PHC in the chronic or acute illness was set as the exclusion criteria.

Data Collection Tools and Techniques .

The study involved the use of questionnaire filled by the researcher through an interview with the adult patient participant attending Clinic. After the preparation by the researcher and modification by the supervisor, the questionnaire was tested for validity and reliability and was accepted as the result matched more than 80%. Furthermore, the result of hemoglobin was attached in the form weekly. The questionnaire was designed in English version and was translated to Arabic language, specifically the following sections: demographic data, determinants of anaemia, social part, dietitian and level of adult hemoglobin . For the collection

part, the researcher gave the official acceptance paper from health affairs to the manager of each PHC. The researcher filled out the questionnaire in the course of interview with the adult patient Attending Clinic .

Data Entry and Analysis .

Data were collected by hand then coded before entry. Afterwards, the data were entered using the statistical product and service solutions (SPSS version 24). Analysis was carried using descriptive and adult patient. The researcher classified the result of the hematological parameters of adult anaemic.

Pilot Study/Pretesting.

A pilot study was conducted at Al-Ka’akyah PHCC considering 10% of the sample size. The 10% of the total sample 200 was chosen and were not included in the main study. This was done to test the wording of the questionnaire and feasibility of the methodology.

Ethical Consideration .

Permission from the Makkah joint program of family medicine and Directorate of Health Affairs of the Holy Capital Primary Health Care were obtained. All information were kept confidential and results will be submitted to the department as feedback.

Budget : Self-funded.

Results

Table 1. Distribution of the Socio-demographic characteristics of respondents .

| | N | % |
|---------------------------|-----|----|
| Age | | |
| <25 | 50 | 25 |
| 25-30 | 68 | 34 |
| >30 | 82 | 41 |
| Marital status | | |
| Married | 146 | 73 |
| Single | 36 | 18 |
| Divorced | 18 | 9 |
| Level of education | | |
| None | 44 | 22 |
| Primary | 44 | 22 |
| Secondary | 90 | 45 |
| University | 22 | 11 |
| Nationality | | |
| Saudi | 154 | 77 |
| Non-Saudi | 46 | 23 |
| Occupation | | |

| | | |
|-----------------------------|-----|----|
| Self-employed (business) | 52 | 26 |
| Government/private employed | 84 | 42 |
| Housewife | 64 | 32 |
| Economic level | | |
| <5,000 | 110 | 55 |
| 5,000 to 20,000 | 74 | 37 |
| >20,000 | 16 | 8 |

Table 1 shows that most of the participants (41.0%) were in the age group >30 years follow by the (34.0%) were the age group 25-30 years, Regarding the Marital status the majority of participant Married were (73.0%) while single were(18.0%). Regarding Educational level the majority of participant are Secondary education were(45.0%) while non and primary were(22.0%),

also regarding Nationality the majority of participant are Saudi were(77.0%) while Non-Saudi were(23.0%). Regarding the Occupation the majority of participant Government/private employed were (42.0%) while Housewife were (32.0%). Regarding the Economic level the majority of participant <5.000 were (55.0%) while 5.000 to 20.000 were(37.0%)

Table 2. Distribution Anemia related general knowledge among adult patient attending Primary Health Care

| | Correct | | FALSE | |
|---|---------|----|-------|----|
| | N | % | N | % |
| 1. Do you know what is anaemia? | 136 | 68 | 64 | 32 |
| 2. Do you know what haemoglobin is? | 88 | 44 | 112 | 56 |
| 3. Do you know which of the blood cell when decreased causes anaemia? | 38 | 19 | 162 | 81 |
| 4. Do you know which mineral deficiency in the body causes anaemia? | 44 | 22 | 156 | 78 |
| 5. Do you know in anaemic female, the haemoglobin is? | 76 | 38 | 124 | 62 |
| 6. Do you know what is laboratory test to diagnose anaemia? | 90 | 45 | 110 | 55 |
| 7. Do you know Heavy blood loss due to menstruation can cause anaemia | 44 | 22 | 156 | 78 |
| 8. Can Anaemia be prevented? | 62 | 31 | 138 | 69 |
| 9. Does anaemic patient become breathless easily? | 24 | 12 | 176 | 88 |
| 10. Is anaemic patient more prone to repeated infections? | 22 | 11 | 178 | 89 |
| 11. Will anaemic patient suffer from lack of concentration? | 70 | 35 | 130 | 65 |
| 12. Does anaemic patient have pale eyes, pale tongue and pale nails? | 80 | 40 | 120 | 60 |
| 13. Can regular exercise prevent anaemia? | 46 | 23 | 154 | 77 |
| 14. Can anaemia be treated by iron tablets? | 112 | 56 | 88 | 44 |
| 15. What are the sources of Iron | 70 | 35 | 130 | 65 |
| 16. Avoiding consumption of tea, coffee after food can improve absorption of iron. Is this true | 44 | 22 | 156 | 78 |
| 17. Inclusion of Vitamin C helps in iron absorption? | 76 | 38 | 124 | 62 |
| 18. Is severe anaemia life threatening? | 92 | 46 | 108 | 54 |
| 19. If severe anaemia not treated on time, needs blood transfusion? | 64 | 32 | 136 | 68 |
| 20. Do you have any knowledge about Anaemia prophylaxis Programme? | 30 | 15 | 170 | 85 |

Table (2) show In anemia related knowledge assessment, regarding you know what is anaemia the majority of participant answer Correct were(68.0%) while answer false were (32.0%), regarding the you know what haemoglobin is the majority of participant answer false were(56.0%) while answer correct were (44.0%), regarding the do you know which of the blood cell when decreased causes anaemia, do you know which mineral deficiency in the body causes anaemia, do you know in anaemic female, the haemoglobin is, do you know what is laboratory test to diagnose anaemia, do you know Heavy blood loss due to menstruation can cause anaemia, can Anaemia be prevented, does anaemic patient become breathless easily, is anaemic patient more prone to repeated infections, will anaemic patient suffer from lack of concentration, does anaemic patient have pale

eyes, pale tongue and pale nails, can regular exercise prevent anaemia the majority of participant answer false respectively were(81.0%, 78.0%, 62.0%, 55.0%, 78.0%, 69.0%, 88.0%, 89.0%, 65.0%, 60.0%, 77.0%) while regarding the can anaemia be treated by iron tablets answer correct were (56.0%) but false were (44.0%). Regarding what are the sources of Iron, avoiding consumption of tea, coffee after food can improve absorption of iron. Is this true, inclusion of Vitamin C helps in iron absorption, is severe anaemia life threatening, if severe anaemia not treated on time, needs blood transfusion, do you have any knowledge about anaemia prophylaxis Programmed the most of participant answer false were (65.0%, 78.0%, 62.0%, 54.0%, 68.0%, 85.0%)

Table 3 . Distribution knowledge related Anaemia causes, signs and symptoms among adult patient attending Primary Health Care

| | N | % |
|--|-----|----|
| Anaemia is a health problem | | |
| Yes | 154 | 77 |
| No | 44 | 22 |
| Causes of anaemia | | |
| Pregnancies | 24 | 12 |
| Poor nutrition | 122 | 61 |
| Excessive bleeding | 42 | 21 |
| All of the above | 12 | 6 |
| Signs and symptoms | | |
| Pallor | 42 | 21 |
| Weakness | 66 | 33 |
| Don't know | 92 | 46 |
| Iron/folic acid supplementation | | |
| Yes | 150 | 75 |
| No | 50 | 25 |
| Anaemia prevention methods | | |
| Green leafy vegetables | 68 | 34 |
| De- worming | 44 | 22 |
| Iron tables | 24 | 12 |
| All of the above | 64 | 32 |
| Will visit to health centre if suspects anaemia | | |
| Agree | 144 | 72 |
| Disagree | 56 | 28 |
| Intake of green leafy vegetables | | |
| Agree | 68 | 34 |
| Disagree | 132 | 66 |
| Intake of iron tablets | | |
| Agree | 164 | 82 |
| Disagree | 18 | 9 |
| Neutral | 18 | 9 |
| Recognized anaemia by | | |
| Feeling of weakness | 84 | 42 |
| Blood test | 60 | 30 |

| | | |
|-------------------------------|-----|----|
| Don't know | 56 | 28 |
| Intake of iron tablets | | |
| Yes | 176 | 88 |
| No | 24 | 12 |

Table (3) show knowledge related Anaemia causes, signs and symptoms among adult patient attending Primary Health Care regarding Anaemia is a health problem the majority of participant answer Yes were(77.0%) followed by No were (22.0) while regarding Causes of anaemia the majority of participant answer Poor nutrition were(61.0%), followed by Excessive bleeding were (21.0%) , regarding Signs and symptoms the majority of participant don't know were (46.0%) followed wweakness were (33.0%), regarding Iron/folic acid supplementation the majority of participant Yes were (75.0%) followed by No were (25.0%), regarding the Anaemia prevention methods the majority of participant Green leafy vegetables were (34.0%) followed by all of the

above were (32.0), regarding Will visit to health centre if suspects anaemia the majority of participant agree were(72.0%), followed by disagree were (28.0%), regarding Intake of green leafy vegetables the majority of participant disagree were (66.0%) followed agree were (34.0%), regarding Intake of iron tablets the majority of participant Agree were (82.0%), regarding the Recognized anaemia by the majority of participant ffeeling of weakness were (42.0%) followed by all of the Blood test were (30.0), regarding Intake of iron tablets the majority of participant Yes were(88.0%), followed by No were (12.0%).

Table 4 Distribution general knowledge and knowledge about Anaemia causes, signs and symptoms among adult patient attending Primary Health Care

| | knowledge | | Score | |
|---|-----------|----|-------|--------------|
| | N | % | Range | Mean±SD |
| General knowledge | | | | |
| Weak | 134 | 67 | 5-14. | 10.244±3.045 |
| Average | 46 | 23 | | |
| High | 20 | 10 | | |
| knowledge about Anaemia causes, signs and symptoms | | | | |
| Weak | 62 | 31 | 3-9. | 6.277±2.115 |
| Average | 110 | 55 | | |
| High | 28 | 14 | | |

Table 3 Regarding distribution of the general knowledge the most of participant with weak knowledge and followed by average were (23.0%) while Range(5-14)and Mean±SD(10.244±3.045), regarding knowledge about Anaemia causes, signs

and symptoms the majority of participant with average were(55.0%) followed by weak were (31.0%) while Range(3-9) and Mean±SD (6.277±2.115).

Figure 1: Distribution general knowledge among adult patient attending Primary Health Care .

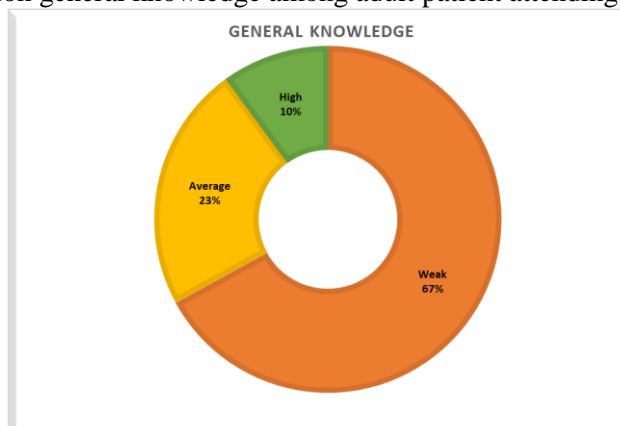


Figure 2 Distribution knowledge about Anaemia causes, signs and symptoms among adult patient attending Primary Health Care .

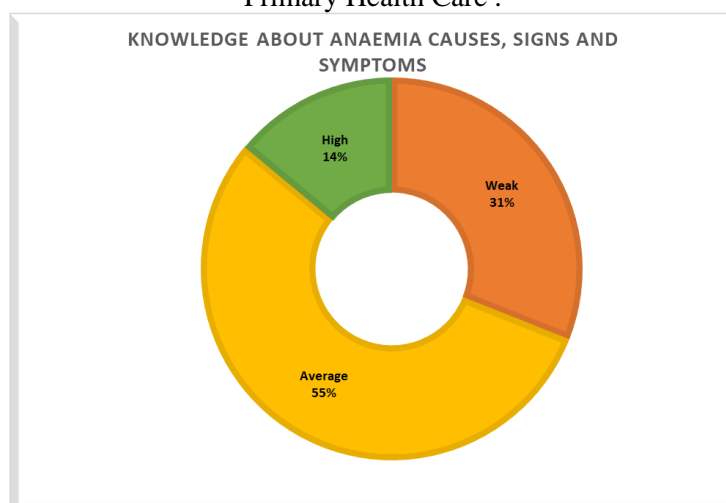


Table 5 Distribution of the relationship of the Socio-demographic characteristics and general knowledge and knowledge about Anaemia causes, signs and symptoms among adult patient attending Primary Health Care

| | | N | General knowledge | | P-value | knowledge about Anemia causes, signs and symptoms | | P-value |
|---------------------------------|-----------------------------|-----|-------------------|---------|---------|---|---------|---------|
| | | | Mean | ± SD | | Mean | ± SD | |
| Age ^F | <25 | 50 | 7.540 | ± 1.619 | <0.001* | 4.640 | ± 1.274 | <0.001* |
| | 25-30 | 68 | 10.603 | ± 2.754 | | 6.471 | ± 2.269 | |
| | >30 | 82 | 10.854 | ± 2.001 | | 6.720 | ± 1.336 | |
| Marital status ^F | Married | 146 | 10.863 | ± 2.209 | <0.001* | 6.712 | ± 1.718 | <0.001* |
| | Single | 36 | 8.111 | ± 1.720 | | 4.778 | ± 1.376 | |
| | Divorced | 18 | 6.111 | ± 1.278 | | 3.944 | ± 1.110 | |
| Level of education ^F | None | 44 | 6.545 | ± 0.926 | <0.001* | 4.250 | ± 1.542 | <0.001* |
| | Primary | 45 | 9.422 | ± 1.901 | | 5.911 | ± 1.635 | |
| | Secondary | 89 | 11.022 | ± 1.692 | | 6.820 | ± 1.450 | |
| | University | 22 | 13.409 | ± 0.734 | | 7.409 | ± 1.894 | |
| Nationality ^T | Saudi | 154 | 9.416 | ± 2.624 | <0.001* | 5.779 | ± 1.869 | <0.001* |
| | Non-Saudi | 46 | 11.696 | ± 1.562 | | 7.239 | ± 1.537 | |
| Occupation ^F | Self-employed (business) | 51 | 10.510 | ± 1.701 | <0.001* | 6.373 | ± 1.264 | <0.001* |
| | Government/private employed | 84 | 11.857 | ± 1.577 | | 7.381 | ± 1.396 | |
| | Housewife | 65 | 7.015 | ± 1.340 | | 4.277 | ± 1.352 | |
| Economic level ^F | <5,000 | 110 | 9.136 | ± 2.414 | <0.001* | 5.600 | ± 1.813 | <0.001* |
| | 5,000 to 20,000 | 73 | 10.521 | ± 2.346 | | 6.507 | ± 1.725 | |
| | >20,000 | 17 | 12.647 | ± 2.448 | | 7.765 | ± 1.888 | |

T: T-test

F: ANOVA test

Table (5) show that is a significant relation between General knowledge and knowledge about Anemia causes, signs and symptoms with demographic data regarding age the general knowledge and knowledge about Anemia causes, signs and symptoms have significant relation were P-value=0.001, F test increase in >30 years

were respectively (Mean± SD 10.854±2.001 and 6.720 ± 1.336), Regarding the Marital status is a significant relation between the general knowledge and knowledge about Anemia causes, signs and symptoms have significant relation were P-value=0.001, F test increase in Married were respectively (Mean± SD 10.863 ± 2.209 and 6.712 ±1.718). Regarding the Educational level a significant relation between general knowledge

and knowledge about Anemia causes, signs and symptoms heave were P-value=0.001, F test increase in University were respectively (Mean± SD 13.409 ± 0.734 and 7.409 ± 1.894). Regarding the Nationality a significant relation between general knowledge and knowledge about Anemia causes, signs and symptoms heave were P-value=0.001, T test increase in Non-Saudi were respectively (Mean± SD 11.696 ± 1.562 and 7.239 ± 1.537). Regarding the Occupation a significant relation between general knowledge and knowledge about Anemia causes, signs and symptoms heave were P-value=0.001, F test increase in Government/private employed were respectively (Mean± SD 11.857 ± 1.577 and 7.381 ± 1.396). Regarding the Economic level is a significant relation between general knowledge and knowledge about Anemia causes, signs and symptoms heave were P-value=0.001, F test increase in >20,000 were respectively (Mean± SD 12.647±2.448 and 7.765±1.888).

Discussion

The evaluation of the respondent's knowledge level was done using a questionnaire comprised of total 40 questions, 6 questions based on Socio-demographic data, 20 on anemia knowledge and 11 on food habits. in our study shows that most of the participants (41.0%) were in the age group >30 years follow by the (34.0%) were the age group 25-30 years, Regarding the Marital status the majority of participant Married were (73.0%) while single were (18.0%). Regarding Educational level the majority of participant are Secondary education were (45.0%) while non and primary were (22.0%), also regarding Nationality the majority of participant are Saudi were (77.0%) while Non-Saudi were (23.0%). Regarding the Occupation the majority of participant Government/private employed were (42.0%) while Housewife were (32.0%). Regarding the Economic level the majority of participant <5.000 were (55.0%) while 5.000 to 20.000 were (37.0%) (See table 1)

Despite, anemia in among adult patient attending at Primary Health Care at the national level in Saudi Arabia is classified by WHO as severe public health problem [15], yet, the estimated in our study Knowledge about general anemia signs and symptoms indicates that the problem in urban Makkah is of moderate public health importance based on the same WHO classification [21]. This Knowledge about general anemia signs and symptoms is also weak than the global Knowledge and symptoms and of Eastern Mediterranean countries [30]. Compared to the Knowledge reported in other regions in Saudi Arabia, the

estimate for Hail is slightly higher than the Knowledge reported in Asir region (31.9%) [28], but lower than the Knowledge reported in Makkah (39.0%) [18], Al-Khobar (41.3%) [31] and much lower than the prevalence reported from Al-Ahsa (73.3%) [26]. The present study showed that the Knowledge about general anemia signs and symptoms was weak according to WHO classification of the public health importance of anaemia, it is a severe public health problem [31]. This finding is slightly higher than the Kenya national Knowledge about general anemia signs and symptoms. It is also much higher than to the study carried out in Kakamega County (Kenya) reported at 40% [32] This variation can be due to the fact that the participants of this study did not include adult as anaemia is more common. However, the figure is relatively comparable to other studies conducted in African countries such as Nigeria at 54.5% and Ethiopia at 56.8% [33]. But it is lower than the findings from Uganda at 63.1% and Egypt at 62.2% and higher than Tanzanian finding at 47.4% [34]. Our study highlighted the importance of nutritional factors as important risk factors associated with in anemia in adult. This finding is consistent with other studies in which adult who frequently eat red meat had higher hemoglobin concentrations [20]. Red meat is an important dietary source of heme iron [23] distribution of the general knowledge the most of participant with weak knowledge and followed by average were (23.0%) while Range(5-14) and Mean ± SD (10.244±3.045), regarding knowledge about Anaemia causes, signs and symptoms the majority of participant with average were (55.0%) followed by weak were (31.0%) while Range(3-9) and Mean ± SD (6.277±2.115). (See table 4)

in our study the relationship of the Socio-demographic characteristics and general knowledge and knowledge about Anaemia causes, signs and symptoms among adult patient attending Primary Health Care show that is a significant relation between General knowledge and knowledge about Anemia causes, signs and symptoms with demographic data regarding age the general knowledge and knowledge about Anemia causes, signs and symptoms heave significant relation were P-value=0.001, F test increase in >30 years were respectively (Mean± SD 10.854±2.001 and 6.720 ± 1.336), Regarding the Marital status is a significant relation between the general knowledge and knowledge about Anemia causes, signs and symptoms heave significant relation were P-value=0.001, F test increase in Married were respectively (Mean± SD

10.863 ± 2.209 and 6.712 ± 1.718). Regarding the Educational level a significant relation between general knowledge and knowledge about Anemia causes, signs and symptoms have were P-value=0.001, F test increase in University were respectively (Mean± SD 13.409 ± 0.734 and 7.409 ± 1.894). (See table 5)

similar a comparatively higher prevalence in relation to the current study was reported earlier from a study done in Eastern Region of Saudi Arabia (41.3%) [26], and in Egypt (43%) . However, quite similar prevalence (24.9%) . Similar to our finding, a recent national study in Qatar [18] showed a prevalence of 23.5% using a cut-off point of haemoglobin as <11.1 g/dL. Other studies in Arab countries like Erbil and Iraq showed prevalence of anaemia and iron deficiency anaemia among infants aged 12–24 months to be 53% and 30%, respectively [11].

Conclusions

“In Makkah Al-Mokarramah region, Saudi Arabia, anemia among adult was weak and public health problem. Low income, bigger family size, higher parity and the sign of clinical anemia (pallor), were found to be significantly associated with anemia. These findings give insight to healthcare providers about the importance of early detection and management of anemia in adult. Further research utilizing of Prevalence and Factors Associated with Anaemia among adult Attending Clinic in the primary health care centers at Makkah ”need health education about anaemia in adult.

References

1. Chaparro, C. M., & Suchdev, P. S. (2019). Anemia epidemiology, pathophysiology, and etiology in low-and middle-income countries. *Annals of the new York Academy of Sciences*, 1450(1), 15-31.
2. Ndegwa, S. K. (2019). Anemia & its associated factors among pregnant women attending antenatal clinic at Mbagathi county hospital, Nairobi county, Kenya. *African Journal of Health Sciences*, 32(1), 59-73.
3. Smith, M. R., & Myers, S. S. (2018). Impact of anthropogenic CO2 emissions on global human nutrition. *Nature Climate Change*, 8(9), 834-839.
4. Schoretsanitis, G., Nikolakopoulou, A., Guinart, D., Correll, C. U., & Kane, J. M. (2020). Iron homeostasis alterations and risk for akathisia in patients treated with antipsychotics: a systematic review and meta-analysis of cross-sectional studies. *European neuropsychopharmacology*, 35, 1-11.
5. Safiri, S., Kolahi, A. A., Noori, M., Nejadghaderi, S. A., Karamzad, N., Bragazzi, N. L., ... & Grieger, J. A. (2021). Burden of anemia and its underlying causes in 204 countries and territories, 1990–2019: results from the Global Burden of Disease Study 2019. *Journal of hematology & oncology*, 14(1), 1-16.
6. Giustina, A., Adler, R. A., Binkley, N., Bollerslev, J., Bouillon, R., Dawson-Hughes, B., ... & Bilezikian, J. P. (2020). Consensus statement from 2nd International Conference on Controversies in Vitamin D. *Reviews in Endocrine and Metabolic Disorders*, 21(1), 89-116.
7. Tehsin, F., Almutawah, F. H., Almutawah, H. K., Alwabari, M. E., AlSultan, Z. M., & Buawadh, H. S. (2021). Preimplantation Genetic Testing: A Perceptual Study From the Eastern Province, Saudi Arabia. *Cureus*, 13(12).
8. Sundararajan, S., & Rabe, H. (2021). Prevention of iron deficiency anemia in infants and toddlers. *Pediatric Research*, 89(1), 63-73.
9. Melku, M., Alene, K. A., Terefe, B., Enawgaw, B., Biadgo, B., Abebe, M., ... & Melku, T. (2018). Anemia severity among children aged 6–59 months in Gondar town, Ethiopia: a community-based cross-sectional study. *Italian journal of pediatrics*, 44(1), 1-12.
10. Chaparro, C. M., & Suchdev, P. S. (2019). Anemia epidemiology, pathophysiology, and etiology in low-and middle-income countries. *Annals of the new York Academy of Sciences*, 1450(1), 15-31.
11. Rahali, W., Almaghrabi, M., Babkier, A., Bukhari, S., & Shatla, M. (2021). The Acceptance, Concerns, and Obstacles related to COVID-19 Vaccination among the General Society in Saudi Arabia: COVID-19 vaccination perception among the public. *Saudi Medical Horizons Journal*, 1(1), 14-25.
12. Madeghe, B. A., Kogi-Makau, W., Ngala, S., & Kumar, M. (2021). Nutritional factors associated with maternal depression among pregnant women in Urban Low-Income Settlements in Nairobi, Kenya. *Food and Nutrition Bulletin*, 42(3), 334-346.
13. Alraheili, R., Al-Alawi, Y., Alalawi, B., Karam, A., Manqu, M., & Alraheili, A. (2021). Prevalence and predictors of type II

- diabetes mellitus in heart failure patients with reduced left ventricular ejection fraction, Madinah, Saudi Arabia.
14. Dhaliwal, S. S., Sharma, V., Shukla, A. K., Kaur, J., Verma, V., Singh, P., ... & Hossain, A. (2021). Enrichment of zinc and iron micronutrients in lentil (*Lens culinaris* Medik.) through biofortification. *Molecules*, 26(24), 7671.
 15. Braun, V., Clarke, V., Boulton, E., Davey, L., & McEvoy, C. (2021). The online survey as a qualitative research tool. *International Journal of Social Research Methodology*, 24(6), 641-654.
 16. Chaparro, C. M., & Suchdev, P. S. (2019). Anemia epidemiology, pathophysiology, and etiology in low-and middle-income countries. *Annals of the new York Academy of Sciences*, 1450(1), 15-31.
 17. Raju, K. R., Ajithkumar, V. T., Ashraf, T. P., Riyaz, A., Cherian, N. C., Rajagopalan, K. C., ... & Govindraj, G. (2021). Anganwadi based nutritional survey of children in Attappadi. *International Journal of Contemporary Pediatrics Raju KKR et al. Int J ContempPediatr*, 8(1), 77-81.
 18. Pasricha, S. R., Tye-Din, J., Muckenthaler, M. U., & Swinkels, D. W. (2021). Iron deficiency. *The Lancet*, 397(10270), 233-248.
 19. Romero, A. M., Ramos-Alonso, L., Alepuz, P., Puig, S., & Martínez-Pastor, M. T. (2020). Global translational repression induced by iron deficiency in yeast depends on the Gcn2/eIF2 α pathway. *Scientific reports*, 10(1), 1-11.
 20. Cappellini, M. D., Musallam, K. M., & Taher, A. T. (2020). Iron deficiency anaemia revisited. *Journal of internal medicine*, 287(2), 153-170.
 21. Rakanita, Y., Sinuraya, R. K., Suradji, E. W., Suwantika, A. A., Syamsunarno, M. R. A., & Abdullah, R. (2020). The Challenges in Eradication of Iron Deficiency Anemia in Developing Countries. *Systematic Reviews in Pharmacy*, 11(5).
 22. World Health Organization. (2019). *The state of food security and nutrition in the world 2019: safeguarding against economic slowdowns and downturns* (Vol. 2019). Food & Agriculture Org..
 23. AlQuaiz, A. M., Gad Mohamed, A., Khoja, T. A., AlSharif, A., Shaikh, S. A., Al Mane, H., ... & Hammad, D. (2013). Prevalence of anemia and associated factors in child bearing age women in Riyadh, Saudi Arabia. *Journal of nutrition and metabolism*, 2013.
 24. Alsharyufi, A. M. (2021). *Prevalence of Red Blood Cell Alloimmunization among Thalassemia and Sickle Cell Patients in Al-Madinah, Saudi Arabia* (Doctoral dissertation, KING ABDULAZIZ UNIVERSITY JEDDAH).
 25. About, S. A. E. H., El Sayed, H. A. E., & Ibrahim, H. A. F. (2019). Knowledge, Attitude and Practice Regarding Prevention of Iron Deficiency Anemia among Pregnant Women in Tabuk Region. *International Journal of Pharmaceutical Research & Allied Sciences*, 8(2).
 26. Akhter, M. S., Hamali, H. A., Iqbal, J., Mobarki, A. A., Rashid, H., Dobie, G., ... & Laghbi, O. S. (2021). Iron Deficiency Anemia as a Factor in Male Infertility: Awareness in Health College Students in the Jazan Region of Saudi Arabia. *International Journal of Environmental Research and Public Health*, 18(24), 12866.
 27. Baldassarre, M. E., Panza, R., Farella, I., Posa, D., Capozza, M., Mauro, A. D., & Laforgia, N. (2020). Vegetarian and vegan weaning of the infant: how common and how evidence-based? A population-based survey and narrative review. *International Journal of Environmental Research and Public Health*, 17(13), 4835.
 28. Göktaş, P. (2020). *Development of an Experimental Image Processing Tool and Flow-Cytometry Based Electromagnetic Scattering Analysis for Medical Diagnosis of Red Blood Cell Pathology* (Doctoral dissertation, Bilkent Universitesi (Turkey)).
 29. Li, H., Xiao, J., Liao, M., Huang, G., Zheng, J., Wang, H., ... & Wang, A. (2020). Anemia prevalence, severity and associated factors among children aged 6–71 months in rural Hunan Province, China: a community-based cross-sectional study. *BMC public health*, 20(1), 1-13.
 30. World Health Organization. (2009). *Towards a strategy for cancer control in the Eastern Mediterranean Region* (No. WHO-EM/NCD/060/E).
 31. Preka, E., Bonthuis, M., Harambat, J., Jager, K. J., Groothoff, J. W., Baiko, S., ... & Bakkaloglu, S. A. (2019). Association between timing of dialysis initiation and clinical outcomes in the paediatric population: an ESPN/ERA-EDTA registry study. *Nephrology Dialysis Transplantation*, 34(11), 1932-1940.

32. Kounnavong, S., Vonglokham, M., Kounnavong, T., Kwadwo, D. D., & Essink, D. R. (2020). Anaemia among adolescents: assessing a public health concern in Lao PDR. *Global Health Action*, 13(sup2), 1786997
33. Miller, J. D., Collins, S. M., Omotayo, M., Martin, S. L., Dickin, K. L., & Young, S. L. (2018). Geophagic earths consumed by women in western Kenya contain dangerous levels of lead, arsenic, and iron. *American Journal of Human Biology*, 30(4), e23130.
34. AlZaben, F. N., Sehlo, M. G., Alghamdi, W. A., Tayeb, H. O., Khalifa, D. A., Mira, A. T., ... & Koenig, H. G. (2018). Prevalence of attention deficit hyperactivity disorder and comorbid psychiatric and behavioral problems among primary school students in western Saudi Arabia. *Saudi medical journal*, 39(1), 52