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Short Communication

Knowledge, Attitude and Practices of Iron Deficient and Iron Deficient Anaemic Adolescents in the Gaza Strip, Palestine

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Abstract

Background: Lack of knowledge concerning nutrition is one of the most significant reasons for nutritional problems and consequently, inappropriate nutritional practices can lead to numerous complications. **Objective:** The aim of this study was to describe the nutritional knowledge, attitude and practices regarding Iron Deficiency Anaemia (IDA) among female adolescents. **Materials and Methods:** In this cross-sectional study, 330 female adolescents aged between 15-19 years from five schools in five governorates in the Gaza Strip, Palestine were screened from September, 2015 to March, 2016. One hundred and thirty three iron deficient and iron deficient anaemic female adolescents were identified based on their complete blood count and serum ferritin levels using haemoglobin cut-offs at 12.0 g dL⁻¹ and serum ferritin cut-offs at 15 mg L⁻¹. The mean age of the iron deficient and iron deficient anaemic female adolescents was 16.41 years. **Results:** The results indicated that 84% of the adolescents could not tell if a person was having anaemia. About 81.3% of them were not aware of the consequences of IDA among pregnant women and 91.6% had no knowledge of the causes of IDA. Also, 89% did not know which iron-rich foods can be easily absorbed, while 74.8% did not know which foods reduce iron absorption. Furthermore, 81.7% of the adolescents usually consumed citrus fruits and 68% of them did not consume them on a daily basis. At the same time, 81.7% of the adolescents usually consumed tea and coffee, while 43.5% of them consumed these beverages daily. Also, 43.5% of the adolescents regarded anaemia as serious conditions, while 56.5% of them did not consider anaemia to be a serious condition or were unsure. In addition, 45.0% of the adolescents liked the taste of iron-rich food items. **Conclusion:** Most female adolescents have poor knowledge regarding anaemia, its causes, prevention and management. Nutrition education intervention should be implemented.

Key words: Iron deficiency anaemia, haemoglobin, ferritin, knowledge, attitude, practice, adolescents

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Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

Adolescents constitute about 20% of the total female population in the world¹. The population of adolescent individuals aged 10-19 years worldwide is 1.2 billion². Nutritional anaemia is one of the global nutritional problems that is prevalent among female adolescents aged 15-19 years³. In Palestine anaemia among female adolescents is a moderate public health problem⁴. The haemoglobin concentration cut-off at 12.0 g dL⁻¹ is used by the WHO to define anaemia in female adolescents^{5,6}. More than 50% of female adolescents aged 15-19 years are suffering from some form of anaemia and more than 39% are mildly anaemic, 15% of them are moderately anaemic, while 2% of them are suffering from severe anaemia⁷. In the Gaza Strip, it has been reported that the prevalence of anaemia among female adolescents aged 15-19 years is at 33.3%¹. As we are progressing towards the Millennium Development Goals (MDGs), it is essential to identify the scope of this micronutrient deficient disease, first, by assessing the Knowledge, Attitude and Practice (KAP) (i.e., the symptoms, sources, benefits, absorption enhancers and absorption barriers) of this important micronutrient, i.e., iron and then by spreading the word regarding its importance in the development of adequate iron stores. Difficulties related to the building of iron stores during pregnancy provide a strong rationale for screening the iron status of women before pregnancy and for establishing good levels of stored iron before pregnancy, if needed.

As far as is known to the researchers, no knowledge assessment questionnaire has been published on iron deficiency or anaemia so far in the Gaza Strip, Palestine. The necessity of this study was to create awareness in the community regarding the hidden hunger and the importance of this micronutrient (iron) deficiency, especially among the most vulnerable group comprised of female adolescents.

The objective of most of nutrition-related KAP studies is to assess the people's KAP relating to nutritional behavior, diet, foods and closely related health issues. The KAP studies have been used for two main purposes: (1) To collect key information during a situation analysis, which can then feed into the design of nutrition interventions and (2) To evaluate nutrition education interventions.

MATERIALS AND METHODS

This study was conducted on 330 female adolescents aged 15-19 years from five governorates in the Gaza Strip from mid-September, 2015 to mid-March, 2016. The

preliminary screening for iron deficiency and iron deficiency anaemia (Haemoglobin <12 g dL⁻¹ and ferritin <15 µg L⁻¹) was carried out on vein blood samples. Those who were identified as suffering from iron deficiency or iron deficiency anaemia were then invited to participate in this study after obtaining their informed consent. The female adolescents were eligible for the study if they were single. The participants were excluded if they had severe anaemia (Hb <8 g dL⁻¹ based on CBC analysis), suffering from acute or chronic infections that can affect their haemoglobin and ferritin levels at the time of the blood sampling and had taken nutritional supplements or medication. After the screening phase, 131 participants were identified as being iron deficient and iron deficient anaemic. Permission was obtained from the relevant committees and institutions (approval letter from FSK-UKM, reference: UKM1.5.3.5/244/NN-025-2015, ethical approval from Helsinki Committee, a signed consent form was obtained from parents and an approval letter from the Ministry of Education). An interview was conducted among the adolescents to assess their knowledge, attitude and practices toward iron deficiency anaemia.

A Knowledge, Attitude and Practices (KAP) questionnaire is a tool for identifying what a population already knows (Knowledge), how they feel (Attitude) and what they are doing (Practices) regarding a particular issue⁸. The adolescents in this study were interviewed by iron deficiency anaemia KAP questionnaire that had been adapted according to FAO guidelines⁹. The questionnaire was translated into Arabic from the original English version. Also, the questions on attitude and practices related to IDA were used to identify the level of the correct attitude and practices toward health⁹. The KAP questionnaire by the FAO provided information on what people know about IDA symptoms, the ability to diagnose, the necessity for intervention and the risk behaviour. Also, the KAP data demonstrated what the people felt about IDA, whether they were willing to protect themselves against IDA and whether the study sample was aware of the danger of IDA. The section in the KAP questionnaire containing questions on practices provided an idea on how adolescents can protect themselves against IDA and whether the study sample was engaged in any risk behaviour.

The KAP questionnaire consisted of 17 questions (multiple-choice questions). The questionnaire was divided into three parts, namely knowledge (8 questions), attitude (6 questions) and practices (3 questions). The questions in the knowledge part were multiple-choice questions. Part one in the KAP questionnaire contained 8 questions related to knowledge. The answers to each question were initially

analysed as 'know' or 'do not know'. Part two in the KAP questionnaire, which was the practice part, contained three main subsections. The first subsection was related to the heme iron intake. The second subsection was related to whether the participants usually consumed citrus fruits, whereby the participants were required to answer two questions in case their answer to the first question was "Yes". In contrast, if their answer to the first question was "No", the participants were asked to skip the two questions. Meanwhile, the aim of the third part of the KAP questionnaire, which comprised six questions was to identify the attitude of the participants towards an ideal or desired nutrition.

Validity and reliability of KAP questionnaire: The aim of the face validity was to determine the respondents' opinion on the suitability of the questions in the questionnaire¹⁰. After the determination of the content validity by an expert, the KAP questionnaire on iron deficiency anaemia was pretested among 35 female adolescents in a remedial class to determine its face validity. First, the KAP questionnaires were distributed among the female adolescents. The respondents were asked to complete the KAP questionnaire and were encouraged to ask questions on those items that they could not understand. These items were then improved. A test-retest of the reliability was carried out to determine the stability of the tool in different situations and over a period of time¹¹. The reliability of the KAP questionnaire was tested during the pre-test to make sure that the adolescents understood the questions. The feedback from the pre-test was integrated into the KAP questionnaire before the start of the field work. The data were analysed using the IBM Statistical Package for Social Sciences (SPSS) version 21. The data, including variables such

as age, height, weight, haemoglobin, ferritin, knowledge, attitude and practice were presented in the form of frequencies and percentages.

RESULTS

The age of the female adolescents ranged from 15.0-18.7 years and the median age was 16.3 years. The mean height and weight of the adolescents were 159.78 cm and 56.93 kg, respectively. Moreover, the mean haemoglobin and ferritin levels were 11.56 g dL⁻¹ and 9.6 mg L⁻¹, respectively, as shown in Table 1.

Response of participants to the questions on knowledge:

When the participants in the current study sample were asked about their knowledge, 84% of them were unable to tell if someone was suffering from anaemia and 81.3% of the adolescents did not know about the consequences of IDA among pregnant women. Out of the study population, 91.6% were unaware of the causes and 78.6% did not know about the prevention of IDA. Also, 89% of the participants did not know which iron-rich foods can be easily absorbed, while 74.8% did not know which foods decrease iron absorption, as illustrated in Table 2.

Table 1: Descriptive of female adolescent in the study

| Parameters | Min | Max | Mean ± SD |
|-----------------------------------|-------|--------|----------------|
| Age (years) | 15.0 | 18.74 | 16.30 ± 0.860 |
| Height (cm) | 147.0 | 187.00 | 159.78 ± 5.860 |
| Weight (kg) | 40.3 | 98.10 | 56.93 ± 10.61 |
| Haemoglobin (g dL ⁻¹) | 8.5 | 13.70 | 11.56 ± 1.020 |
| Ferritin (mg L ⁻¹) | 2.0 | 14.70 | 9.60 ± 3.180 |

Table 2: Knowledge questions answer characteristics

| Characteristics | | n | % |
|---|------------|-----|------|
| K.1 Have you heard about iron-deficiency anaemia? | Yes | 94 | 71.8 |
| | No | 37 | 28.2 |
| K.2 How you can recognise someone who has anaemia? | Know | 21 | 16.0 |
| | Don't know | 110 | 84.0 |
| K.3 Consequences of iron-deficiency anaemia for infants and young children? | Know | 70 | 53.4 |
| | Don't know | 61 | 46.6 |
| K.4 Consequences of iron-deficiency anaemia for pregnant women? | Know | 24 | 18.3 |
| | Don't know | 107 | 81.7 |
| K.5 Causes of iron-deficiency anaemia? | Know | 11 | 8.4 |
| | Don't know | 120 | 91.6 |
| K.6 Prevention of anaemia? | Know | 28 | 21.4 |
| | Don't know | 103 | 78.6 |
| K.7 Iron-rich foods-easily absorbed? | Know | 14 | 10.7 |
| | Don't know | 117 | 89.3 |
| K.8 Foods that decrease iron absorption? | Know | 33 | 25.2 |
| | Don't know | 98 | 74.8 |
| K.9 Foods that increase iron absorption? | Know | 84 | 64.1 |
| | Don't know | 47 | 35.9 |

Table 3: Practice questions answer characteristics

| Characteristics | | n | % |
|--|--------------------|-----|------|
| P.1 Heme iron-intake yesterday? | Yes | 62 | 47.3 |
| | No | 69 | 52.7 |
| P.2 Consumption of vitamin C rich fruits usually? | Yes | 107 | 81.7 |
| | No | 24 | 18.3 |
| If yes in P.2 question | | | |
| P.2.1 Consumption of vitamin C rich fruits daily? | Yes | 18 | 13.7 |
| | No | 88 | 67.2 |
| | Don't know | 1 | 0.8 |
| P.2.2 When do you usually eat fresh citrus fruits? | Before meal | 6 | 4.6 |
| | During meal | 9 | 6.9 |
| | After meal | 34 | 26.0 |
| | Other | 47 | 35.9 |
| | Don't know | 10 | 7.6 |
| P.3 Consumption of tea/coffee usually? | Yes | 107 | 81.7 |
| | No | 24 | 18.3 |
| If yes in P.3 question | | | |
| P.3.1 Consumption of tea/coffee daily? | Yes | 57 | 43.5 |
| | No | 50 | 38.2 |
| | Don't know | 3 | 2.3 |
| P.3.2 When do you usually drink tea/coffee? | 2 h before meal | 9 | 6.9 |
| | Direct before meal | 7 | 5.3 |
| | During meal | 17 | 13.0 |
| | Direct after meal | 17 | 13.0 |
| | 2 h after meal | 22 | 16.8 |
| | No time | 30 | 22.9 |
| | Don't know | 9 | 6.9 |

Table 4: Attitude questions answer characteristics

| Characteristics | | n | % |
|--|---------------|----|------|
| A.1 How likely do you think you are to be iron deficient/anaemic? | Not likely | 27 | 20.6 |
| | Not sure | 73 | 55.7 |
| | likely | 31 | 23.7 |
| A.2 How serious do you think iron deficiency/anaemia is? | Not serious | 16 | 12.2 |
| | Not sure | 58 | 44.3 |
| | serious | 57 | 43.5 |
| A.3 How good do you think it is to prepare meals with iron-rich foods? | Not good | 34 | 26.0 |
| | Not sure | 30 | 22.9 |
| | Good | 67 | 51.1 |
| A.4 How difficult is it for you to prepare meals with iron-rich foods? | Difficult | 40 | 30.5 |
| | So-so | 61 | 46.6 |
| | Not-difficult | 30 | 22.9 |
| A.5 How confident do you feel in preparing meals with iron-rich foods? | Not-confident | 14 | 10.7 |
| | OK/So-so | 87 | 66.4 |
| | Confident | 13 | 22.9 |
| A.6 How much does you like the taste of iron-rich food item? | Dislike | 22 | 16.8 |
| | I am not sure | 50 | 38.2 |
| | Like | 59 | 45.0 |

Response of participants to the questions on practices:

Table 3 illustrates the results of the practice questions. When the participants were asked about practice, 47.3% said they consumed some type of heme iron the previous day, while the rest did not consume any type of heme iron. Also, 81.7% of the participants in the study sample said they usually consumed citrus fruits and 68% of them said they did not consume citrus fruits daily. Meanwhile, 81.7% of the participants reported that they usually consumed tea and coffee, while 43.5% of them consumed these beverages daily.

In addition, only 23.7% of the participants who consumed tea and coffee drank these directly (2 or more hours before or after meals), while the rest (77.3%) consumed these directly before or after meals or at no fixed time.

Response of participants to the questions on attitude:

Table 4 indicates that when it came to the questions regarding the positive or negative attitude of the participants in the current study, 43.5% of the participants considered anaemia and IDA as serious conditions, while 56.5% of them

considered anaemia as a condition that is not serious or they were unsure. Also, 45.0% of the study sample liked the taste of iron-rich food items, while the rest disliked or were unsure about the taste of iron-rich food.

DISCUSSION

Out of the 131 female adolescents, 71.8% of them had heard about anaemia and this percentage was higher than the percentage (12.1%) in an Indian study¹². In contrast, this result was lower than the percentage in a recent study, where 91% of the female adolescents had heard about anaemia⁴.

In this study, 16% of the participants knew how to identify a person with anaemia and this result was consistent with the result obtained by Angadi and Ranjitha² (12%). However, this percentage was lower than the observation reported in a study by Kotecha *et al.*¹² (44.2%) and Chakma *et al.*¹³ (38%). The current study concluded that 43.5% of the iron deficient and iron deficient anaemic female adolescents knew that anaemia was a serious health problem, while 73% of the female adolescents in a study conducted in India knew that anaemia was a health problem⁴.

About 90% of the study sample did not know which foods were rich in iron and this result was consistent with a recent study conducted in Sudan, which concluded that 73.4% of the participants aged 18-24 years did not know the sources of iron¹⁴. However, it was reported in this study that about 25% of the study sample knew that tea and coffee reduced iron absorption and this result was inconsistent with the result obtained by Angadi and Ranjitha² (43%). On the other hand, 64.1% of the participants in the current study answered that vitamin C enhanced iron absorption and this result was consistent with a study conducted by Angadi and Ranjitha² (74.1%) but was inconsistent with the result reported by Kotecha *et al.*¹² (37.3%).

A recent study conducted in 2015 concluded that 17.0% of the female adolescents knew about the prevention of anaemia and this result is consistent with the finding of this study (21.4%)¹⁵. About 35.9% of the participants in the current study knew that iron absorption could be increased through the intake of food. However, this result was inconsistent with a recent study conducted in India, which concluded that 59.0% of female adolescents aged 15-17 years knew that food intake increased iron absorption¹⁵.

Regarding iron sources, the current study found that 10.7% of the iron-deficient female adolescents knew which foods were rich sources of iron compared to 30% of female adolescents in another study conducted in India¹⁵. The difference may have been due to the fact that the participants in this study sample comprised only iron-deficient female adolescents.

CONCLUSION

Anaemia remains a very common health problem among female adolescents and leads to high morbidity and mortality rates among females. Most female adolescents are lacking in knowledge regarding anaemia, its causes, prevention and management. The current study was an attempt to gauge the knowledge regarding iron deficiency anaemia among female adolescents. The overall findings of the study show that the attitude and practices of female adolescents are moving in an undesirable direction. The behavioural and physiological development in adolescents must be efficiently addressed. There is a need to improve healthcare services, facilities and more importantly, knowledge among adolescents on topics related to anaemia and its prevention. More and more workers at the grassroots level should be trained in this area so that they can provide services at the primary level before the onset of illness. Comprehensive nutritional education knowledge regarding healthy dietary habits should be broadcast. Further, more and more studies should be carried out in different countries to get an exact picture of anaemia and based upon that a practical approach should be adopted to eliminate the problem.

SIGNIFICANT STATEMENTS

To the best of the author's knowledge, the current study is the first to explore the KAP in Gaza, Palestine. It helps to understand the significance of the knowledge transfer to adolescents and how the change in knowledge, attitude and practices can improve bad dietary habits. Moreover, it allows the respondents to understand the importance of iron to the body and other important issues related to a positive attitude and practices.

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