

Nutritional status and Anaemia among Female Medical Students of Oman Medical College

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Abstract

Background

Nutritional anaemia is of more concern in young female having high prevalence rate due to dietary iron deficiency. The medical students come under the vulnerable group that suffer anaemia because of having long schedule of studying in college, clinical postings, and other curriculum activities. The purpose of this study was to assess the association between BMI, eating habit with anaemia among medical students.

Methods

A cross sectional study conducted at OMC Sohar. This survey based study for which a structured questionnaire was designed incorporating demographics and nutritional assessment that were identified through an extensive literature search. All final year female medical students requested to fill a survey questionnaire. Statistical analysis was performed using SPSS (IBM SPSS Statistics 20.0).

Results

A total of 63 female students were participated in the study with age ranged from 23 to 27 years in which 50 (79.4%) were aged below 25 years. Majority of the participants were Omani national

(90.5%), residing in the hostel (87.3%) and were single (85.7%). More than half (57.1%) of the participants having 3 meals a day and 61.9% ingest dairy products such as milk, yogurt or cheese and 74.6% feed on legumes or eggs once in a day. More than half take in protein such as meat, chicken or fish (61.9%) and fruits and vegetables (58.7%) in a day. Mean serum haemoglobin of study participant was 11.95 ± 1.3 gm/dl. More than half (58.7%) participants found to have anaemia. Overall, statistically significant association was observed ($p < 0.05$) between fruits and vegetables intake in a day and haemoglobin.

Conclusion

The prevalence of anaemia in female medical students is significant in this study. Nutritional deficiency varies in different population and young females are at risk. Medical students spend their lives in a very high competitive and challenging environment; there is a need to have balanced nutrition and healthy life style.

Keywords: Anaemia, nutrition, obesity, BMI, eating habits, medical student

Background

Anaemia is a common public health and nutrition problem affecting mainly young female, with major consequences on human health [1]. The World Health Organization recently reported that 1.62 billion of the world population is anaemic. Nutritional anaemia is of more concern in the developing countries having high prevalence rate due to dietary iron deficiency [2]. Among the most important nutrients whose deficiency can lead to nutritional anaemia are iron, folic acid, vitamin B12, vitamin B6, vitamin C and protein. Iron deficiency anaemia is one of the most frequent health problems in the world [3].

The other causes of anaemia in female population are heavy menstrual blood loss, parasitic infections, acute and chronic infections, micronutrient deficiency, and haemoglobinopathies. Cause of iron-deficiency anaemia is loss of iron in blood due to significant menstruation or pregnancy. Iron-deficiency anaemia can also be caused by a poor diet/ inadequate iron intake, chronic blood loss or by certain intestinal diseases that affect the absorption like celiac disease or a combination of all these factors [4-5].

The condition is normally treated with iron supplements. Nutritional deficiencies of folate and vitamin B12 and other chronic diseases, may account for anaemia, in keeping with the literature, more than 50% of cases of anaemia in young children and pregnant women are related to iron deficiencies. Medical students are under high pressure of curriculum and exams and they usually skip their meal and most common cause is nutritional deficiency of iron [6-7].

The medical students come under the vulnerable group that suffer anaemia because of having long schedule of studying in college, clinical postings, and other curriculum activities. They are

living in the hostel or as day scholars away from parents and families was reflected upon their diet habits and had a significant reflection upon the prevalence of anaemia among the studied group, and appropriate nutrition requirements increase significantly during certain period [8]. The most common symptoms of anaemia include fatigue, apathy, irritability, reduced attention span and psychomotor deficiencies; which can affect medical students learning ability, more over change in body mass index is also correlated to the anaemia [9].

Medical students are the future doctors and they need adequate nutrition for better performance. Food quality in hostel must be maintained and supervised by respective authority of institute. Medical student should go for routine haemoglobin analysis annually and educational program should be included in curriculum. The main purpose of the study was to assess the association between BMI, eating habit with anaemia among medical students.

Methods

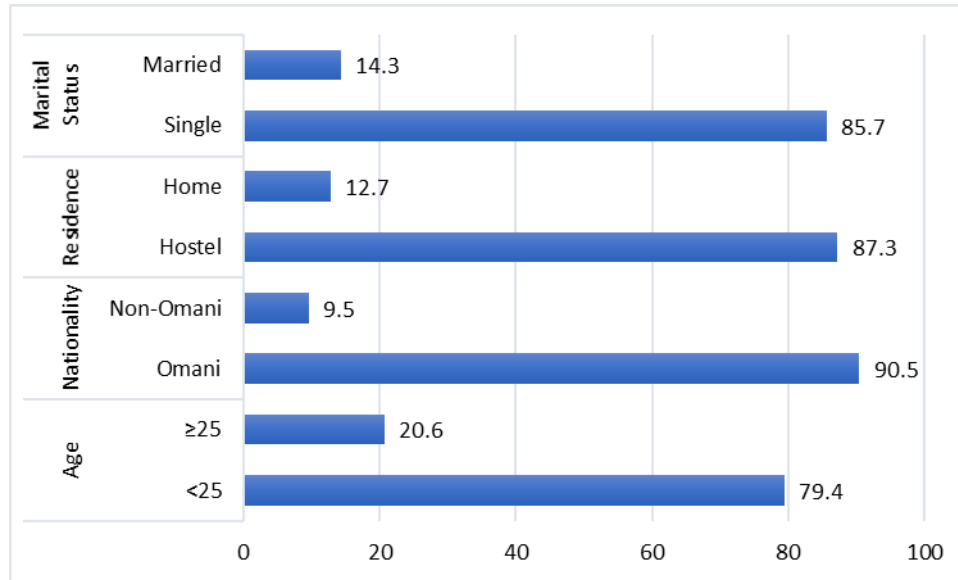
A cross sectional survey using a non-probability convenient sampling technique, was conducted from March 2016 to June 2017 at Oman Medical College (OMC) Sohar campus. This survey based study for which a structured questionnaire was designed incorporating demographics and nutritional assessment that were identified through an extensive literature search. Self-administrated specially designed questionnaire was reviewed and agreed on via several brain storming sessions and understanding by all research team members. A favourable ethical opinion was obtained from institutional review committee. All final year medical students requested to fill a survey questionnaire after taking consent. Survey questionnaire has three components. The first part of the questionnaire is about the demography which includes age, nationality, residence, marital status; Second part of the questionnaire is about nutritional intake and third part was about BMI and haemoglobin level. Complete blood count was performed as a routine test prior to their internship interview by MOH.

The severity of anaemia was categorized as per WHO criteria. A haemoglobin level below 12.1 gm/dl was considered anaemia. As per the definitions of the International Obesity Task Force (IOTF), underweight was defined as $BMI < 18.5 \text{ kg/m}^2$, overweight was defined as $BMI \geq 23.0 \text{ kg/m}^2$ but $< 25 \text{ kg/m}^2$, obesity was defined as $BMI \geq 25 \text{ kg/m}^2$. Cronbach alpha reliability test at 0.85 was used to test the internal consistency of the items. Content validity was tested by experts. Confidentiality of the information was strictly adhered to by assuring the participants that no details about their status were released and data were only used for research purpose. The collected data were recorded; coded, and statistical analysis was performed using SPSS (IBM SPSS Statistics 20.0). Descriptive statistics analyses (mean, SD for interval variables, and frequency with percentages for categorical variables) were performed for the study variables. χ^2 Tests were applied to test for associations between dependent and independent variables.

Results

A total of 63 female students were participated in the study with age ranged from 23 to 27 years in which 50 (79.4%) were aged below 25 years. Figure 1 showed majority of the study participants were Omani national (n=57; 90.5%), residing in the hostel (n=55; 87.3%) and were single (n=54; 85.7%).

Figure 1. General characteristic of study participants



More than two third of the study participant’s (81%) had no any history of illness. However, small number of participants were having history of iron deficiency anaemia (5%), sickle cell anaemia (5%), glucose-6-phosphate dehydrogenase deficiency anaemia (3%), thalassemia (1%) and stress and anxiety (5%). Participants were asked multiple questions regarding daily nutritional intake (Table 1). Nearly two third (69.8%) of the participants were physically not active and dine cafeteria food (77.8%) most of the days. More than half (57.1%) of the participants have 3 meals a day and 31.7% have meal twice a day. 61.9% of the participants ingest dairy products such as milk, yogurt or chees and 74.6% feed on legumes or eggs once in a day. More than half take in protein such as meat, chicken or fish (61.9%) and fruits and vegetables (58.7%) in a day. Majority of the participants (85.7%) does not take any medicine. Mean serum haemoglobin of study participant was 11.95 ± 1.3 . When reading table 1, no statistically significant ($p > 0.05$) association was observed between independent factors and haemoglobin. However, an association ($p < 0.05$) was observed between fruits and vegetables intake in a day and haemoglobin.

Table 1. Independent Factors and Haemoglobin-n (%)

	Total	Hb \leq 12.1	Hb $>$ 12.1	P-value
	63 (100)	37 (58.7)	26 (41.3)	
Daily physical activity				0.57
Yes	19 (30.2)	11 (29.7)	8 (30.8)	
No	44 (69.8)	26 (70.3)	18 (69.2)	
Meal in last 3 months				0.32
Home made food most of the days	14 (22.2)	7 (18.9)	7 (26.9)	
Cafeteria food most of the days	49 (77.8)	30(81.1)	19 (73.1)	
Numbers of meals in a day				0.33
1 meal	1 (1.6)	0 (0)	1 (3.8)	
2 meals	20 (31.7)	12 (32.4)	8 (30.8)	
3 meals	36 (57.1)	23 (62.2)	13 (50)	
>3 meals	6 (9.5)	2 (3.2)	4 (6.3)	
Dairy products (milk/yogurt)				0.45
0 serves in a day	2 (3.2)	2 (5.4)	0 (0)	
1 serves in a day	39 (61.9)	24 (64.9)	15 (57.7)	
2 serves in a day	19 (30.2)	10 (27)	9 (34.6)	
3 serves in a day	3 (4.8)	1 (2.7)	2 (7.7)	
Legumes/eggs				0.26
0 serves in a day	5 (7.9)	4 (10.8)	1 (3.8)	
1 serves in a day	47 (74.6)	29 (78.4)	18 (69.2)	
2 serves in a day	10 (15.9)	4 (10.8)	6 (23.1)	
3 serves in a day	1 (1.6)	0 (0)	1 (3.8)	
Meat, fish, or chicken				0.44

0 serves in a day	1 (1.6)	0 (0)	1 (3.8)
1 serves in a day	39 (61.9)	25 (67.6)	14 (53.8)
2 serves in a day	18 (28.6)	10 (27)	8 (30.8)
3 serves in a day	5 (7.9)	2 (5.4)	3 (11.5)
Fruits and vegetables			0.05
0 serves in a day	3 (4.8)	1 (2.7)	2 (7.7)
1 serves in a day	37 (58.7)	27 (73)	10 (38.5)
2 serves in a day	19 (30.2)	7 (18.9)	12 (46.2)
3 serves in a day	4 (6.3)	2 (5.4)	2 (7.7)
Number of dates in a day			0.63
<3	13 (20.6)	9 (24.3)	4 (15.4)
3-5	40 (63.5)	23 (62.2)	17 (65.4)
>5	10 (15.9)	5 (13.5)	5 (19.2)
Current medications			0.29
None	54 (85.7)	30 (81.1)	24 (92.4)
NSAIDS	3 (4.8)	3 (8.1)	0 (0)
Iron Supplement	1 (1.6)	1 (2.7)	0 (0)
Folic Acid	1 (1.6)	0 (0)	1 (3.8)
Other	4 (6.3)	3 (8.1)	1 (3.8)
BMI (Kg/m²)			0.81
<18.5	9 (14.3)	5 (13.5)	4 (15.4)
18.5-22	28 (44.4)	15 (40.5)	13(50)
23-24	16 (25.4)	10 (27)	6 (23.1)
≥ 25	10 (15.9)	7 (19)	3 (11.5)

Discussion

Anaemia is a common health problem worldwide. Anaemia in young female frequently occurs due to inadequate iron intake, chronic blood loss or disease, malabsorption, or a combination of all these factors [10]. In this study more than half of participants have lower than desire haemoglobin. The regional estimates of WHO indicate that the highest proportion of population with nutritional anaemia is in Africa (47.5%–67.6%) whereas the greatest number of individuals affected are in South East Asia [11]. Literature search showed anaemia in 33.4% and 55.6% were overweight [12]. Nora et al reported (64%) students were found to be anaemic, 39% from the medical college were reported to have haemoglobin less than 12 g/dL. Out of the anaemic students, 81% showed microcytic (MCV <80 fL) and 1.6% had macrocytic (MCV >96 fL) variety [13].

Literature also reported that most common type of anaemia is because of iron deficiency. Shams et al reported iron deficiency in female university students aged 18–25 years 40.9%. Medical students usually do not have time for proper meal because of their hectic schedule. The most common nutrient deficient in the diet is iron in take [14-15]. In this study nearly two third of the participants were not active physically and dine cafeteria food most of the days. Less than one third of the participants have meal twice a day. Protein and calcium intake by participants were adequate, however fruits and vegetable intake was not appropriate. There is a significant association (p-0.05) observed between fruits and vegetables intake in a day and haemoglobin. Researcher also reported poor eating habits in young students due to social and psychological factors affecting their food intake [16]. The prevalence of iron deficiency also varies greatly according to a host of factors such as age, gender, physiological causes, pathological causes, nutritional factors, environmental factors, and socioeconomic conditions. These factors effecting the nutritional status as well as body mass index [17-18].

In this study those who have anaemia 25.4% has over weight BMI 23-24, and obesity in 15.9% of students. Manjeet has reported 45.7% girls and 1.7% boys were found to have anaemia with haemoglobin levels <12 g%. 18% were underweight, and 29% were overweight. Correlation of haemoglobin with different grades of BMI, with positive correlation [19-20]. One study conducted by Al-Sharbatti et al. show negative correlation (statistically significant) between BMI and haemoglobin concentration in Iraqi adolescents girls [21-22].

This study has highlighted the problem of anaemia in medical students. Anaemia among medical students might also affect the efficiency and cognitive dysfunction. Literature reported that those individuals who had lower haemoglobin had relatively lesser cognitive function scores when compared to those with higher haemoglobin levels. Medical students are future physicians who will counsel their patient regarding adequate nutrition needs to become an appropriate role model having balanced nutrition and appropriate weight [23-24]. Future doctor of our community should have healthy life style and adequate nutrition for the better performance. Students residing in hostel should take care of their diet and they should be encouraged to eat balanced

meal .There should be some nutritional assessment and management program to full fill their nutritional requirement [25].

Conclusion

Nutritional anaemia was found to be prevalent in medical students, even in those who had access to the nutritive diet in a good, healthy environment. Medical education is becoming very competitive and challenging, there is an urgent need for improving overall nutritional status of medical students through nutrition education, community awareness. The quality of food in hostel mess must be maintained and supervised by respective authority of institute. Medical student should go for routine haemoglobin analysis to keep track on their haemoglobin level. Further studies should be conducted on a larger sample size to evaluate the cause and to eradicate this problem,

Declaration of interests: None.

Disclaimer: None.

Funding disclosure: None.

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