

Prevalence of Anemia among Adolescent Girls.

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Abstract

Anemia is widely spread nutritional problem in world. Low BMI value (Underweight condition) and anemia are associated and together it's a big problem in developing countries like India. Anemia among adolescent girls is problem not limited to any region, and caste but a problem faced across the world. By the help of present study we tried to investigate and understand about the prevalence of Anemia among adolescent students especially in females.

Keywords: Anemia; BMI; Adolescent; Females; Underweight

Introduction

Anemia is a major health problem globally, approximately two billion people are affected by (Tiruneh *et al.*, 2020) [25]. Morbidity is majorly caused by nutritional deficiency in all age groups and it affects 1 to 2 billion people worldwide (Tiruneh *et al.*, 2020). According to WHO as hemoglobin (Hgb) <13.0 g/dl in men and <12.0 g/dl in women (WHO, 2011) [27] it affects both developing and developed countries with major consequences for human health and their social and economic development (WHO 2005) [26].

Mukherjee and Ghosh (2012) [16] reported that Anemia may be due to the various defects in red blood cells such as production defect (aplastic Anemia), maturation defect (megaloblastic Anemia), defects in haemoglobin synthesis (iron deficiency Anemia), genetic defects of haemoglobin maturation (thalassaemia) or due to the synthesis of abnormal haemoglobin (haemoglobinopathies, sickle cell Anemia and thalassaemia) and physical loss of red cells (haemolytic Anemia's). In middle and low income countries, the risk of is higher due to a wide range of factors such as inadequate diet, haemoglobinopathies, and infections such as HIV, malaria, and parasitic infestation (McLean *et al.*, 2018; Balarajan *et al.*, 2011) [12, 3].

According to Soundarya and Suganthi (2016), [24] different types of Anemia **(a)** Iron-Deficiency Anemia, (body has too little iron in the bloodstream) and symptoms associated with it are Tiredness, lethargy, feeling faint and becoming breathless easily, headaches, irregular heartbeats (palpitations), altered taste, sore mouth and ringing in the ears (tinnitus). Anemia in pregnancy increases the risk of complications in both mother and baby such as low birth weight baby, preterm (premature) delivery and postnatal depression. Low iron reserves in the baby may also lead to Anemia in the newborn baby (Pasricha *et al.*, 2010), [17] **(b)** Pernicious Anemia (n cause of Vitamin B12 deficiency), symptoms associated with it are psychological problems like depression, confusion, difficulty with memory or even dementia and nervous problems like numbness, pins and needles, vision changes and unsteadiness (Soundarya and Suganthi, 2016), [24] **(c)** Haemolytic Anemia RBCs destroyed and removed from the bloodstream before their normal lifespan is up), symptoms of this type of are Jaundice, Pain in the upper abdomen, Leg ulcers and pain, severe reaction to a blood transfusion, **(d)** Sickle cell Anemia (sickle-shaped ("C"-shaped) red blood cells) symptoms include Fatigue, Shortness of breath, Dizziness, Headache, Coldness in the hands and feet, Pale skin, Chest pain, **(e)** Thalassaemia (body make fewer healthy RBC symptoms may be slowed growth and delayed

puberty, bone problems and an enlarged spleen, **(f)** Aplastic Anemia (bone marrow doesn't make enough new blood cells), The most common symptoms of aplastic Anemia are Fatigue, Shortness of breath, Dizziness, Headache, Coldness in hands or feet, Pale skin, gums and nail beds (Soundarya and Suganthi, 2016) [24].

The rate of Anemia is higher in developing countries, because of low socioeconomic status and poor access to the healthcare services (Chandrakumari *et al.*, 2019) [6]. In India, iron deficiency is the most frequent cause of nutritional Anemia in women (WHO, 2017; Rai *et al.*, 2018), [28, 19] approximately 13.7 mg/day per person among women in India (aged ≥ 18 years) and 51-83% of pregnant women are deprived of the recommended daily allowance of iron of 15-18 mg/day (Shankar *et al.*, 2017) [21]. Women in India get iron mainly from grains, plants, cereals, lentils and vegetables; and, to a small extent, from iron supplements and iron-fortified foods, as compared to sources of haem iron such as meat and fish, which have a higher rate of absorption (Deaton A, Drèze, 2009; Mehta *et al.*, 2017), [7, 13] thus, globally India has the maximum number of anemic women (Rai *et al.*, 2018) [19]. Mosiño *et al.*, [15] (2020) reported that as children from low-income families are more likely to be anemic.

Adolescence is characterized by rapid growth and development with a significantly increased need for macro and micronutrients (Gebreyesus *et al.*, 2019) [8]. Nutritional Anemia is the common difficulty among adolescent girls in most of the developing countries and its prevalence in low and middle income countries ranges from 13.4 to 62.9% (WHO, 2011; Yasutake *et al.*, 2013) [27, 29]. Female adolescents has a high risk for Anemia as compared to their male counterparts (Pattnaik *et al.*, 2013; Sinha *et al.*, 2012) [18, 23]. As mentioned above, Anemia among adolescent girls is multi-factorial and the most notable factor is the one that is related to heavy menses. For instances, there are studies that documented girls who started menarche with excessive menstrual bleeding are more likely to develop Anemia (Pattnaik *et al.*, Rati *et al.*, 2014) [18, 20].

The aim of present study was to analyze and interpret the relation between Anemia and gender of students. For this, samples of participants were tested between 17 and 19 years of age during the year 2018 to 2020. Furthermore, our database provides information on that allowed us to deliver further insights with respect to the existing literature.

Method

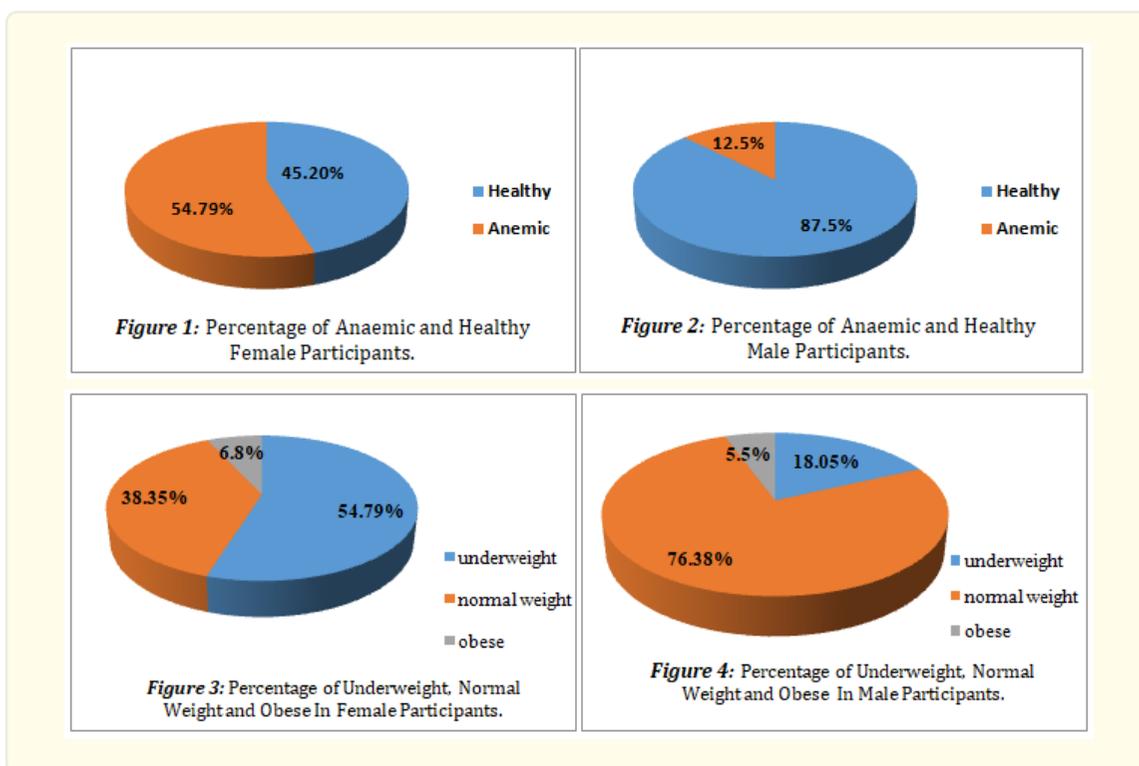
This study was conducted at the V.K. Krishna Menon College, Mumbai, Maharashtra, India. During the year 2018 to 2020. A total of 145 students were selected. Participants were categorized on the gender basis. Information about the participant's age, body weight, education, religion, socio economic status, income of parents, family structure, dietary habits, exercise were included. Weight was recorded without shoes on a weighing machine. Body Mass Index (BMI) was calculated by the formula: $BMI = \text{weight (kg)} / \text{height (m}^2\text{)}$. Questions related to menstruation, like age at menarche, length of cycle, duration of bleeding period, blood loss/ cycle were recorded. Copper sulfate gravimetric method was used for the detection of Anemia. If the specific gravity of blood is higher than the solution, the drop will sink or else it will remain suspended for some time. By this method we can calculate Hb within ~ 0.5 g/dL, which is comparable to a coefficient of variation (CV) of 2% (Cable, 2003).

Result and Discussion

Current study comprised of 145 students (73 female and 72 male) of age 17 to 19 years. was observed Anemia in 49 (33.78%) students out of total 145 students. 54.79% female 12.5% male were observed anemic, whereas 45.20% female students and 87.5% male student were observed healthy. In present study, 54.79% female students and 18.055% male students were found underweight. On further analysis of anemic student's we found a correlation with BMI in our study. It was observed that underweight students are more prone to be anemic as compared to students of normal weight. These finding are accordance with the findings of Khan *et al.*, (2018) [10]. Figure 1 shows percentage of anemic and healthy female participants and figure 2 shows percentage of anemic and healthy in male participants. Healthy female students had an average of 5-7 days of monthly menstrual cycle, while anemic female students has it for an average of more than 7 days with heavy bleeding. Students from low family income are found to be more anemic, whereas

these cases are low in middle class and upper class family. The high percentage of Anemia was observed in vegetarian as compared to non-vegetarian students.

Meal skipping, snacking, and fast food consumption lead to dietary deficiencies (Kurubaran *et al.*, 2012) [11]. Students like to eat fast food due to its flavor, aroma, and taste (Aziz *et al.*, 2017) [2]. We observed that most of the students don't want to eat green leafy vegetables for prevention. A similar finding was observed by Hadaye *et al.* (2019) [9]. Heavy menstrual blood loss in female students is an important risk factor for iron. The mean menstrual iron loss, averaged over the entire menstrual cycle of 28 days, is about 0.56 mg/day (Chandra *et al.*, 2017) [5]. In present study we found that female student are more anemic than male students. The results are supported by the study of Khan *et al.*, (2018) [10] and Mosiño *et al.*, (2020) [15]. Shanti *et al.*, (2015) [22] reported that leading cause of nutritional Anemia in female is inequitable distribution of health resources within household and society.



Conclusion

The findings of our study indicated that prevalence of Anemia in 33.79% of the study population. In which, high rate of Anemia is evident in female students (54.79%) as compared to males (12.5%). Simultaneously, anemic condition was more common in underweight students. Thus, this study highlights that female students are a susceptible population for Anemia and there is a critical need for educational programs on nutrition and Anemia at colleges.

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