International Journal of Physiology, Nutrition and Physical Education

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Prevalence of anemia among male athletes

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Abstract
Background: Athletes deserve an attention because; anemia is an important disease in athletes because the haemoglobin (Hb) concentration in the peripheral blood is strongly related to physical performance. Iron deficiency anemia, in particular, causes easy fatigability and decreased performance in athletes. The objective of the present study was to explore the prevalence of anemia among athletes who are undergoing regular athletic practices.
Materials and Methods: A total 52 male athletes between the ages of 15-31 years practicing in IG stadium and sports complex, Puducherry were included for the study by using purposive sampling method, A pre- test self administrable questionnaire was used to elicit information on socio-demographic profile, dietary and life style practices. Anthropometric measurement like, height, weight was taken and biochemical assessment using cynmethemoglobin to find out haemoglobin level.
Results: A study covers 52 Male Athlete population aged between 15-31 years, about 50.2% were founded to be an anaemic, of which 6% were severe anemic, 29.2% moderate and 14.9% with mild anemia, To mention about BMI nearly 57.7% were within under normal limits (18.5-24.9); 25% were underweight and 17.3% overweight. However, the Pearson Correlation reveals that there no statistical association seen between age, BMI and there haemoglobin level.
Conclusion: It can be concluded that one half of sample covered anemic (50.2%) out of which 35.2% were either with moderate or severe anemia which cannot be ignored, therefore there is crucial need for to conclude this situation with appropriate diet supplement and nutrition education to improve their field performance.

Keywords: anemia, athletes and prevalence

Introduction

Worldwide Anemia is the most prevalent nutritional problem, which defined as a low level of hemoglobin in the blood more than anything else due to iron deficiency [1]. Anemia is considered as one of the major public health problems all over the world; about 1.6 billion people are suffering from anemia [2]. Two billion people throughout the world are anemic due to iron deficiency. The highest commonness of anemia is from South Asia because of the high rates of malnutrition [3]. India is leading in IDA among the world, where it exacts a heavy toll in terms of mortality, disability, and lost productivity [2, 4]. Although most habitual diets contain seemingly adequate amounts of iron, only a small amount (<5%) is absorbed [5]. The major reason for iron deficiency is the lack of bioavailability of iron particularly [6].

This fact can be modified by proper iron supplementation to the vulnerable group [2]. There are many types of anemia but it is noted that ~50% is due to deficiency of iron in the diet (50%, 95%CI: 47–53%) [2]. Not only iron, other factors like vitamin B12 and folate deficiency and non-nutritional factors such as inflammation also remain as a contributor to the causes of anemia [7, 8].

Lower haemoglobin level is very common among athletes, this condition is because of regular physical activity is a "plasma builder" where the hemoconcentration from a workout, the body adds salt, water, and albumin to the blood, expanding baseline plasma volume and diluting down Hb level, in spite of no change in red cell mass [9]. Iron deficiency anemia is widely present among them which will reduce their performance may lead to fatigability it is reported that 3% of the united states athletes tend to have IDA [10].

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Micronutrients play major role in metabolic process, important for physical performance [11], athletes are in the high need of micronutrients since, their regular physical performance associated with several biochemical training adaptations like increased antioxidant enzymes or increased blood formation, endurance physical activity increase sweat and losses through urine, feces, and foot – strike hemolysis, they are having high need of several micronutrients majorly iron and zinc [12-14].

The present study is to deals with the prevalence of anemia among male athletes.

Materials and Methods
A total of 52 male athletes between the ages of 15-31 years practicing in IG stadium and sports complex, Puducherry were included for the study by using a purposive sampling method.

A pre-tested self administrable questionnaire was formulated and vetted by experts, which consist of basic information such as their personal and socio-demographic details like name, residential, date of birth, siblings, marital status, lifestyle practices, and dietary patterns. The questionnaire was filled by the participants themselves. The once who found it difficult (Illiterate) filled by direct interview method.

Measurements and Definition
Height was measured without shoes to the nearest 0.2 cm using a portable SECA stadiometer, weight was measured without shoes and overcoat to the nearest 0.1 kg on Tanita body composition analyzer.

BMI was calculated by weight (kg)/height (m)2.

Plasma Hb was determined by the cyanmethemoglobin determination method. The Cynmethemoglobin method was carried, were 2ml of venous blood was taken in the aseptic condition in EDTA vial to carried out cynmethemoglobin method which works on the principle of conversion of haemoglobin to cynmethemoglobin by the addition of potassium cyanide and ferricyanide whose absorbance is measured at 540 nm in a photoelectric calorimeter against a standard solution [15].

Ethics
All subjects provided written informed consent after the research protocols were carefully explained to them.

Results
A study covers 52 Male athletes population aged between 15-31 years, the participants included from both rural an ad urban areas where, in case of their food habit 5.5% belongs to vegetarians, 95.02% was non – vegetarian.

Prevalence of Anemia
In that total 52 male athletes, about 50% (26) was founded to be an anemic, of which
6% (3) were severely anemic, 29.2% (15) moderate and 14.9% (8) with mild anemia and 50% (26) participant was non-anemic as shown in figure 1 and table -1

Table 1: Prevalence of anemia among male athletes

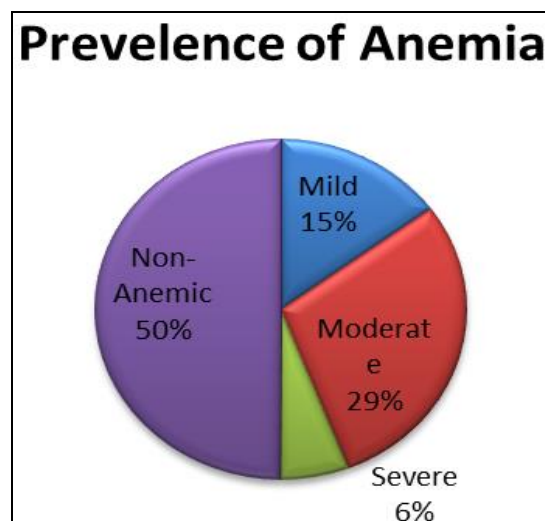| Anemia level	No. of Persons	Percentage
Mild	8	14.9%
Moderate	15	29.1%
Severe	3	6.0%
Non- Anemic	26	50%
Grand Total	52	100%

Fig 1: Prevalence of anemia among male athletes

BMI analysis
To mention BMI from that 52 male athletes, nearly 57.7% (30) were within under normal limits (18.5-24.9); 25% (13) were underweight and 17.3% (9) overweight as shown in table& figure 2.

However, the Pearson Correlation reveals that there no statistical association seen between age, BMI and there haemoglobin level seen in table – 3.

Table 2: BMI level among male athletes

BMI	No. of Persons	Percentage
Normal	30	57.7%
Underweight	13	25.0%
Overweight	9	17.3%
Grand Total	52	100%
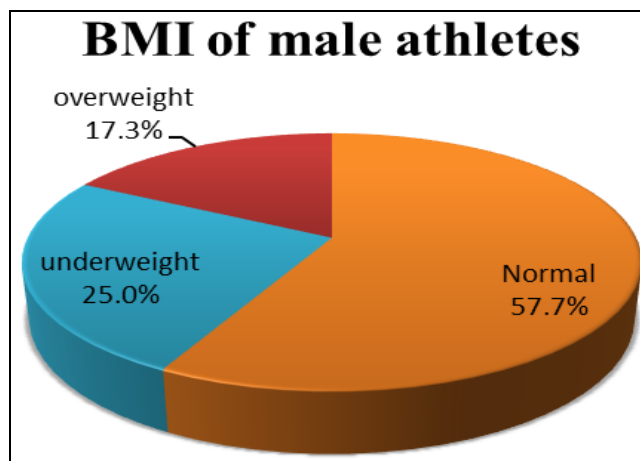
Fig 2: BMI level among male athletes

Table 3: Association between age, BMI and there HB level

HB level		
	Age	BMI
Pearson Correlation	-0.0297	0.0972
p-value	0.8342	0.4930

Discussion

There are many studies internationally stated that athletes are having higher prevalence to have many micronutrients deficiency since, their requirement is higher than the normal persons, in case of anemia they are having major risks which discussed as follows.

Coates A, in a year 2017 done a study with 38 elite Canadian runners and triathletes who were undergone routine blood tests over 7 years stated that, even on oral iron supplements, prevalence of iron deficiency anemia is very common, and for the first time ever reported in the sports medicine literature, iron deficiency anemia was more common in male than in female endurance athletes [16]

To support this study Kim JH et al. states that occurrence of cardiac arrest in marathons and half marathons was about 1 per 184,000 runners, higher in male than female and in a marathon than half marathons the mortality rate from these collapses was about 70% [17],

Another study by Roberts WO et al. agreed that risk for sudden cardiac arrest is greater in men than women [18], where our study has done exclusively for males to which found that about 30.2% has a higher risk to have less physical performance since, because of anemia.

Marni E. Shoemaker et al. has done a study on High Prevalence of Poor Iron Status Among 8- to 16-Year-old youth athletes in 2019 showed that approximately half (48%) of their sample was anemic, 53% of girls and 46% of boys [19]. Similarly, our study reviles that the prevalence of anemia is higher among regularly practicing athletes about 50% of the males aged between 15-31 are anemic.

Conclusion

To conclude, that prevalence of anemia is seen widely among athletes who were under regular practices, this condition is because of their high requirement for micronutrient especially iron, this need to be taken for serious notice which may reduce their performance level this can be overcome by proper supplementation, nutrition education and healthy lifestyle practices.

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https://doi.org/10.1080/07315724.2019.1621229