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Systematic Review

Prevalence of anaemia among college going students in India: a systematic review

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ABSTRACT

Anaemia an important global health problem, which is categorized as one of the 10 most serious health problems by the World Health Organization. More than two billion people worldwide are estimated to have anaemia, with majority coming from the developing countries. Anaemia affects health of an individual varying from poor scholastic performance and cognitive impairment and even causes maternal mortalities. Percentage prevalence of anaemia among adolescent girls in the age group 15-19 years and in the older age group 20-29 years remains almost stagnant at 55.8% and 56.1% respectively. Young age period is formative years in life of an individual and crucial period for undertaking greater responsibilities including decision for study, to earn livelihood and healthy responsible parenthood. Protocol of study selection were prepared before the start of study and studies conducted in various states of India among college students and published between the year January 2000 to December 2021 were included. We searched Pubmed, Research gate, Google scholar for articles and 24 studies were included as per predesigned protocol. Analysis of reported studies shown high prevalence of anaemia among college students and more among female students. Subjects of most of the conducted studies were medical students. More studies should be conducted among Arts and Science college students. It is essential to conduct studies among college students to give not only awareness, but also warn them about health hazards and consequences affecting their day to day life.

Keywords: Anaemia, College students, Scholastic performance, Maternal mortality

INTRODUCTION

Anaemia is one of the most important global health problems, and more than two billion people worldwide are estimated to have anaemia, with majority coming from the developing countries.[1] It is also categorized as one of the 10 most serious health problems by the WHO.[2] According to the WHO 2021, prevalence of global anaemia in women aged 15-49 years was 29.9 and of children aged 6-59 months was 39.8%.[3] According to available literature inadequate nutrition, menstruation, socioeconomic status, personal hygiene and worm infestation are important risk factors which leads to anaemia.[4] A study among adolescent girls found that with the onset of menarche at puberty and in the absence of adequate dietary intake, young girls become highly susceptible to anaemia.[5] Anaemia at any age has significant negative impact on the health of an individual varying from poor scholastic performance and cognitive impairment in children to one of the major indirect causes of maternal mortalities.[6] It can even cause lack of concentration, irritability and impair academic performance of students.[7] Anaemia in adolescence

severely impairs the physical and mental development, weakens behavioural and cognitive development, reduces physical fitness, decreases the work performance, and even contributes to the adverse outcomes in pregnancy.[8]

Percentage prevalence of anaemia among adolescent girls in the age group 15-19 years and in the older age group 20-29 years remains almost stagnant at 55.8% and 56.1% respectively.[9] Young age period is very crucial since these are formative years in life of an individual when major physical, psychological and behavioural changes take place along with pubertal development. This is also the period of preparation for undertaking greater responsibilities including decision for study, to earn livelihood and healthy responsible parenthood.[10]

So we focussed to analyse a review study on prevalence of anaemia conducted among college going students as they are future promises of society.

METHODS

Protocol of study selection

The studies should be conducted in various states of India among college students. The main outcome should be prevalence rate of anaemia along with other parameters like body mass index (BMI), menstrual blood flow and socioeconomic status.

Procedure

The search was carried out on 2nd December 2021 and all studies including descriptive, cross-sectional, cohort and RCT (random clinical trials) were included. Studies published between the year January 2000 to December 2021 were included. We searched Pubmed, Research gate, Google scholar for articles and analysed number of participants, prevalence rate, method of haemoglobin estimation, and checked any other parameters rather than haemoglobin. We used combinations of medical subject headings (MESH) and free text words that included search terms related to the exposure [e.g., anaemia, Iron Deficiency Anaemia (IDA), anaemia among college students, anaemia among MBBS students, anaemia among health science students, prevalence rate]. Cross references of full papers also searched to collect further data. We identified articles eligible for further review by performing an initial screen of identified titles or abstracts, followed by a full-text review. A total of 58 studies were collected, 24 studies were included as per predesigned protocol. Figure 1 shows study inclusion methods. We analysed the title of research paper, sample size, place (name of college with district), atate, prevalence rate of anaemia, methods used for haemoglobin estimation and year of publication. Any other parameters examined (like body mass index, menstrual blood flow) rather than anaemia were also considered.

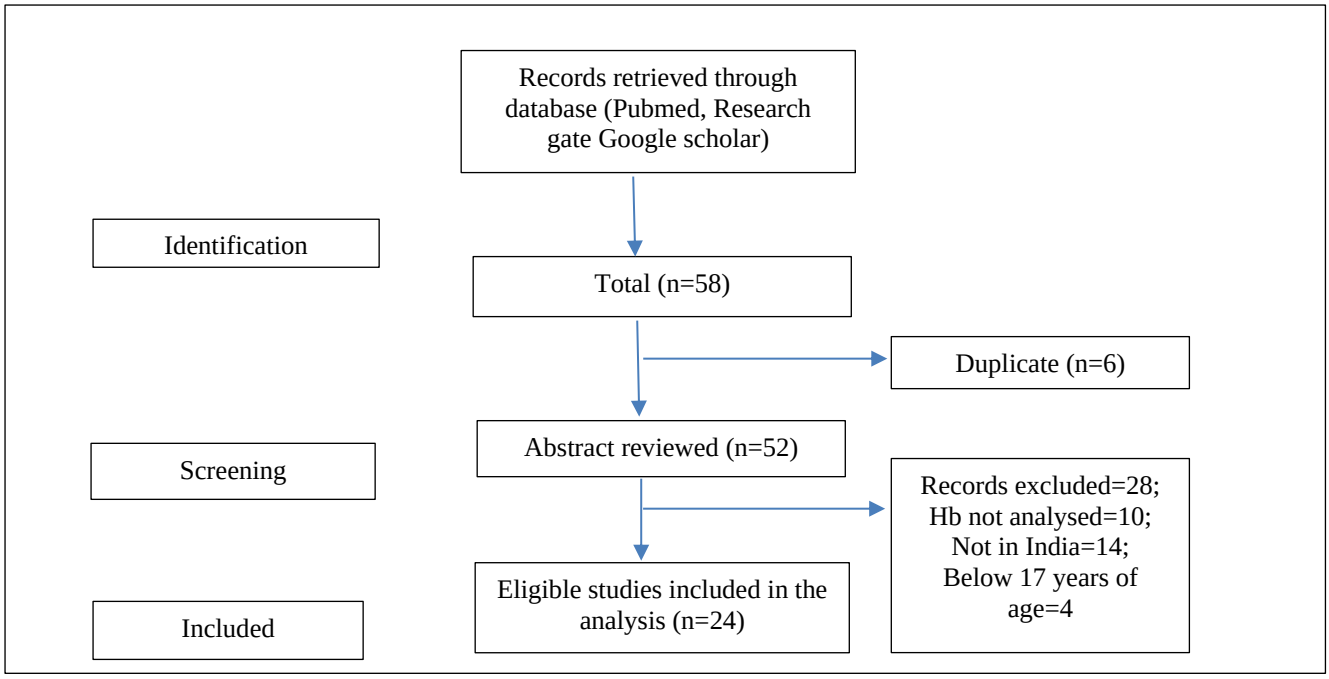

Figure 1: Selection of studies included in the review study.

RESULTS

High prevalence of anaemia was observed among medical students at Chattisgarh and Hariyana and anaemia was more common in female medical students as compared to male students.[11,12] A high prevalence of anaemia was observed among undergraduate medical students in Madya Pradesh.[13] A cross sectional study conducted among 3rd year medical students in Bilaspur, Chhattisgarh showed a prevalence of 30.20% and of severe, moderate and mild anaemia was 0.0%, 9.37% and 20.83% respectively.[14]

Study conducted among female medical students in Maharashtra indicated prevalence 28.6% and showed that female medical students are a vulnerable population affected by anaemia.[15] A study conducted among 109 medical and dental students of Northern Kerala, showed high incidence (48.6%) of anaemia, while a lower prevalence of 19% was reported in a Government Medical College in central part of Kerala.[16,17] High prevalence of 53% was reported among young adult female and male 1st year medical students.[18] Study conducted among health science students in South India, showed the prevalence of 43% [19] while studies conducted in Rural areas of North India showed prevalence of 73.81%, 43.76% and 60%.[7,20,21] High prevalence of 94% was reported among the nursing students in Punjab.[22]Studies among postgraduate medical students of Father Mullers college showed a prevalence of 44% and among this 21% belonged to 3rd year.[23] The details of the studies including the year with name of 1st author, study population, sample size and the technique used for haemoglobin estimation were compiled in Table 1. A lowest prevalence of 15.57% was observed in Karnataka, while a higher prevalence of 94.4% among nursing students.[22,24]

Table 1: Studies on prevalence of anaemia among college going students in India.

Authors	Year	Total sample	Name of College/ University	State	Prevalence (%)	Method of Hb estimation
Thamban et al[16]	2018	109	Pariyaram Medical college	Kerala	48.62	Sahli's method
Manjula et al[17]	2014	424	Medical college Kottayam	Kottayam, Kerala	19.13	Automated
Subramaniyan et al[19]	2016	568	SRM University	Tamilnadu	43	Automated
Mary et al[23]	2017	100	Father Mullers College	Mangalore Karnataka	44	Automated
Asha et al[24]	2015	289	Adichuncha-nagiri Institute of Medical Sciences	Karnataka	15.57	Automated
Kannan et al[31]	2017	149	SMV Medical College	Puducherry	43	Automated
Nupura et al[15]	2019	300	Medical college	Karad, Maharashtra,	28.6	Spectrophotometric method
Sangeeta et al[11]	2017	80	Medical college	Ambikapur, Chattisgarh	46.5	Sahli's method
Pandey et al[14]	2013	100	Medical college	Bilaspur, Chhattisgarh	30.20	TALLQVIST
Ajay et al[36]	2017	344	Rohilkhand Medical College	Bareilly, Uttar Pradesh	29.07	Cyanmethemoglobin method
Joglekar et al[37]	2015	178	Government college	Raipur Chattisgarh	63.34	Digital hemoglobin meter
Soumika et al[18]	2020	100	Medical College & Hospital ,	Kolkata,- West Bengal	53	Automated
Kumar et al[7]	2020	168	Commerce College	Udaipur Rajasthan	73.81	Sahli's method
Arisha et al[13]	2017	100	PCMSRC	Bhopal M P	45	Automated
Jain et al[38]	2020	678	Maitreyi College, Delhi University	Delhi	54.7	Digital haemoglobin meter
Verma et al[20]	2013	1227	Govern-ment colleges women	Hariyana	43.76	Cyanmethemoglobin method
Verma et al[21]	2014	139	Government College for women	Hariyana	60.96	Cyanmethemoglobin method
Dube et al[12]	2019	100	MAMC Hisar	Hariyana	54	Not mentioned

Continued.

Authors	Year	Total sample	Name of College/ University	State	Prevalence (%)	Method of Hb estimation
Mehta et al[39]	2015	120	JCDAV College,	Hoshiarpur, Punjab	70.83	Sahli's method
Kaur et al[25]	2015	300	SGRDIMSAR	Amritsar Punjab	47.4	Sahli's method
Babita et al[22]	2014	320	Nursing students	Punjab	94.4	Sahli's method
Rumi et al[26]	2016	139	MBBS students RIMS	Imphal Manipur	56	Automated
Acharya et al[40]	2018	232	MKCG Medical College	Berhampur, Odisha	34.6%	Automated
Saxena et al [35]	2011	200	HIMS Dehradun	Uttarakhand	17%	Sahli's method

Note: Sample size, methods of Hb estimation, college/university and state, along with name of first author and year of publication is mentioned above.

DISCUSSION

Subjects of most of the conducted studies were medical students, may be due to easy availability of data. Medical students also come under the vulnerable group that suffer from anaemia because of having long schedule of studying in college, clinical postings, and other curriculum activities, Their living in the hostel 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 also appropriate nutrition requirements increase significantly during certain period of life, thus placing individuals during these periods at greater risk of iron deficiency.[14]

Though this population is ideally supposed to have a better awareness and access to anaemia diagnosis and treatment compared to general population, high prevalence was observed.[26] Studies among postgraduate medical students[23] suggested that despite increased awareness through education, experience, and being self-sufficient, future doctors do not take necessary measures to maintain an optimum haemoglobin levels. Hectic work schedule, academic pressure might have made them to neglect their nutritional needs.

High prevalence of anaemia in females is shown in most of studies due to increased iron demands during puberty, menstrual losses, and limited dietary iron intake.[11,12,26,27] Meal skipping, eating away from home, snacking and fast food consumption predispose them to dietary deficiencies.[28,29]

Most of the studies found significant correlation of anaemia with BMI (body mass index) as high prevalence in underweight students.[12,17,30] Analysis of socioeconomic status were also done in many studies along with BMI.[12,17,23] These studies does not reveal state wise or urban or rural difference in prevalence rate. Two studies conducted in Kerala among medical students showed high difference in prevalence rate. Prevalence of 19.1% in Kottayam Medical College, while a prevalence of 48.62% in Pariyaram Medical College.[16,17]

Health consequences of anaemia include increased risk of maternal and foetal mortality in pregnant women, preterm labour, low birth-weight, and infant mortality.[31] Iron deficiency may impair cellular responses and immune functions and increase susceptibility to infections.[17] Inadequate nutrition during adolescence can have serious consequences throughout the reproductive years of life and beyond.[32] Even mild anaemia can adversely affect the productivity and is also known to reduce the immune competence.[33]

It is highly significant to control anaemia among this group, as they are at reproductive age and also major contributors for the development of society. Scholastic performance of anaemic undergraduate medical students was lower and lesser MMSE (Mini Mental State Examination) scores when compared to those with higher haemoglobin levels.[24,34] A study by Patel et al showed the relevance of informative and educable intervention, definitely has a positive effect on awareness levels which would eventually encourage expansion of knowledge and positive health habits.[11]

CONCLUSION

The current prevalence of anaemia among college going students are very high in India. Though, haemoglobin estimation methods are different, prevalence of anaemia in our country is very high. It was found that very few studies among arts and science college students. More studies should be conducted among them as high percentage of students belongs to arts and science colleges. It is essential to conduct studies among college going students not only to give awareness, but also to warn them about health hazards and consequences affecting their day to day life.

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