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# The Prevalence and Correlation of Refractive Errors and Anaemia in Young Adults: A Cross-Sectional Study

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**Abstract:** ***Objective: To study the prevalence of anaemia and refractive errors and the correlation between them in young adults. Methods: This is a cross-sectional study conducted at Government Medical College Srinagar, Kashmir, India. The study population comprised of 72 first year student which included both the genders comprising of 38 males and 34 females. After explaining all the objective, procedures and benefits of the study written informed consent was taken from each of the individuals and the study was proceeded. Haemoglobin estimation was done using Sahli Hemoglobinometer. Visual Acuty for near and far vision of each eye was determined by Snellen's test and Jaegar's test. The acquired data was statically analysed. Results: Among the study population 62.5 % where anaemic. Frequency of anaemia was more in females than in males. Myopia was the most common refractive error followed by hypermetropia. There was a positive correlation between the two as refractive errors were common in anaemic subjects rather than non-anaemic subjects. Conclusion: From this study we conclude that Students should be examined for refractive errors on a regular basis, and those with refractive defects should also be screened for anaemia, and vice versa.***

**Keywords:** Anaemia, Haemoglobin, Refractive Errors, Myopia, Hypermetropia, Young Adults, Prevalence, Correlation

## 1. Introduction

Vision is the ability to see and understand the world around us using light that enters our eyes. The human eye is an organ that plays a role, in the process of vision. Refractive error is widely known as a cause of vision problems that can be corrected affecting individuals of all ages, socioeconomic backgrounds and ethnicities.[1]

The World Health Organization (WHO) estimated that, globally, 285 million people were visually impaired, of whom 39 million were blind. According to the data from 2010, 80% of visual impairment, including blindness, is avoidable (it can be prevented or cured) [2]. Approximately 90% of visually impaired people live in developing countries. Vision impairment has been defined based on distance visual acuity only. Globally the major causes of visual impairment are: uncorrected refractive errors 43% (myopia, hyperopia or astigmatism alone), unoperated cataract 33% and glaucoma 2%[3].

Refractive error occurs when the eye cannot effectively focus rays, onto the retina resulting in a visual perception. To achieve vision it is important to correct these errors. There are three types of errors myopia (short or near sightedness), hypermetropia (far sightedness) and astigmatism (irregularly curved cornea).[4]

Uncorrected refractive error has an effect, on the development especially during adulthood when their intellect and psychological startsto growth. It is also one of the prevalent forms of visual impairment globally. [5][6][7]

Students having visual issues usually don't complain about it as most of them don't want to use spectacles .Most of them use compensatory tactics like changing their seats frequently in the classroom so as to see blackboard clearly, bringing books closer so as to read them clearly etc. .Such students are seen to be academically weaker as they are not able to fully concentrate and easily loose there focus. To give students the best opportunities to learn and develop, it is advised to screen them for early identification and intervention [8].

Haemoglobin (Hb) is widely known as the iron-containing protein in blood that is essential for $O_2$ transport in mammals. Despite many efforts and policies that the government have taken, the prevalence of anaemia in young children and adults continues to be over 70% across the majority of India. Anaemia is defined by the World Health Organization (WHO) as Hb less than 130 g/L in men older than 15years, 110 g/L in pregnant women, and less than 120 g/L in non-pregnant women older than 15 years [9].Anaemia is considered as silent morbidity in young adults as it can cause irreparable harm to the development of health, intellect, personality and knowledge [10].

Therefore, the goal of the current study was to determine the frequency of different refraction errors and haemoglobin and their correlation, among students enrolled in Government Medical College Srinagar. The information gathered from this study will assist raise awareness of anaemia and refractive errors and improve vision-related campaigns to lower them among students from all colleges, not only those studying medicine.

## 2. Methods

It's a cross-sectional study which was conducted over two months in a sample of 178 students from Government Medical College Srinagar.

The study population were 72 first year MBBS student and included both the genders. Age was recorded as number of completed years on the last birthday. The selected study population was explained the objectives of the study and a written consent form that stated the purpose, methods, risks, benefits, and the assurance of the confidentiality of the data was obtained from each student. Those subjects having history of blood transfusion prior four month, those having

history of chronic blood loss or history of eye injury resulting in defective vision were excluded from this study.

Haemoglobin Estimation was done using Sahli Hemoglobinometer (Hemometer) using capillary blood collected by the finger prick method.

Participants were screened for Refractive errors with both near and distance vision. The Visual Acuty of each eye was determined without spectacles, if any, for both distant and near vision. A single Snellen's test type was used to measure acuity for far vision. If the result was less than 6/6 in any of the eyes, the individual repeated the test with the current spectacles. Jaegar's chart was used to check the acuty for near vision. The participant repeated the test with his current spectacles if it was worse than N6 in any of the eyes. Visual Acuty for distance of 6/6 and near Visual Acuty of N6 in each eye were considered as normal.

## 3. Results

**Table 1:** Distribution of Subject according to Gender

| Gender | No of Subjects | Total No of Subjects | % |
|---|---|---|---|
| Male | 38 | 72 | 52.77 |
| Female | 34 | | 47.22 |

This study was carried out on 72 study subjects who included both the genders. Male subjects comprised of 38 subjects (52.77 %) of the total study population, while as female subjects comprised of 34subjects (47.22 %) as illustrated in table 1.

**Table 2:** Frequency of Anaemia in Study Population

| Gender | Anaemic (%) | Non Anaemic (%) | Total |
|---|---|---|---|
| Male | **18** (47.36 %) | **20** (52.63%) | **38** |
| Female | **27** (79.41 %) | **7** (20.5%) | **34** |
| Total | **45** ( 62.5 % ) | **27** (37.5%) | **72** |

Among the study population **62.5%** where anaemic. **47.36%** of the male subjects were anaemic where as **79.41%** of the female subjects had anaemia as shown in table 2.

**Table 3:** Frequency of Refractive ErrorsIn Study Population

| Gender | Myopia | Hypermetropia | Astigmatism | Total |
|---|---|---|---|---|
| Male | 11(28.94%) | 2 ( 5% ) | 0 | 13 |
| Female | 16 ( 47% ) | 1 ( 2.9% ) | 0 | 17 |
| | 27(37.5%) | 3 ( 4.1 % ) | 0 | 30 |

Among the study population Myopia was the most frequent refractive error comprising of 37.5 % of the study population followed by Hypermetropia 4.1%, no case of astigmatism was found in the study population .Almost half of the female population (47 %) suffered from myopia.

**Table 4:** Frequency of refractive errors in Anaemic Subjects

| Gender | Myopia | Hypermetropia | Astigmatism | Total |
|---|---|---|---|---|
| Male | 7 (38.88 %) | 1 (5.55 %) | 0 | 8 (44.44%) |
| Female | 15 (55.55%) | 1 (3.70 %) | 0 | 16 (59.25 ) |
| | 22 (48.88 %) | 2 (4.44 %) | 0 | 24 (53.33 %) |

Among the anaemic subjects the most common refractive error was myopia comprising of about **48.88 %** .Females **(55.55%)** were more affected than males **(38.88%)**. In comparison to the anaemic subjects **(53.33%)** refractive errors were not so common in non-anaemic (22.22%) subjects.

**Table 5:** Frequency of refractive errors in Non Anaemic Subjects

| Gender | Myopia | Hypermetropia | Astigmatism | Total |
|---|---|---|---|---|
| Male | 4 (20 %) | 1 ( 5% ) | 0 | 5 (25%) |
| Female | 1 (14 %) | 0 | 0 | 1 (14.28%) |
| | 5 (18.5 %) | 1 ( 3.7 % ) | 0 | 6(22.22 %) |

## 4. Discussion

Anaemia is the primary cause of nutritional challenges globally, with its prevalence being significantly higher in developing nations due to lower socioeconomic status and restricted healthcare access.

Learning begins in young age, and correct vision can have a significant impact on a child's learning potential. Visual impairment in children has been shown to have a substantial impact on their academic achievement, as well as their social interaction and development.

This study was conducted on 72 students from first year of Government Medical College Srinagar, Kashmir and the data showed an increased incidence of errors of refraction among them. The majority of them were affected by myopia followed by Hypermetropia. Our results are fully supported by the previous study conducted in Singapore medical students, which showed the occurrence rate of the myopic condition more than 82% as compared to the frequency of other errors of refraction [11]. Not only have these, but our study is also supported by another study conducted on medical students of Malaysia, where myopia was also found to be higher as compared with other errors of refraction[12]. Another study conducted on Medical Students of Qassim University, Saudi Arabia also showed that myopia is found to be a common error of refraction in young adults [13].

In this study we found that anaemia is more prevalent in young adults **a**nd were more frequently found in girls. Our finding was supported by study conducted by Abilash Sasidharannair Chandrakumari et al. among adolescent girls in a rural area of Tamil Nadu.[14] .A study conducted by Kumar B. Shill et al. in University Students in Noakhali Region, Bangladesh also supports that the prevalence of anaemia was more among young adults[15].Another study by Dr. Sulabha S. Lalsare et al. present study revealed that anaemia is a major health problem among the college going girls in Nashik District, Maharashtra, India. The prevalence of anaemia was high [16].

This study showed that refractive errors were positively associated with anaemia, as they appeared more frequent in anaemic subjects than in non-anaemic subjects. There is no data to compare the outcomes because there has been very little study published on the relationship between anaemia and refractive error. The relation should be further studied on a larger study group.

## 5. Conclusion

In conclusion, this study highlights the significant prevalence of anaemia and refractive errors among young adults, with a positive correlation between the two conditions. The findings underscore the importance of regular vision examinations for students and the need for screening for both refractive errors and anaemia. Early identification and intervention can contribute to better academic performance and overall well-being among this population. Further research is warranted to explore this relationship on a larger scale and across different demographics.

## References

[1] Chia EM, Wang JJ, Rochtchina E, Smith W, Cumming RR, Mitchell P. Impact of bilateral visual impairment on health-related quality of life: the Blue Mountains Eye Study. Invest Ophthalmol Vis Sci. 2004 Jan;45(1):71-6. doi: 10.1167/iovs.03-0661. PMID: 14691156.

[2] WHO Universal eye health: a global action plan 2014-2019. Available at: http://wwwwhoint/blindness/actionplan/en/.

[3] WHO Visual impairment and blindness.Availableat: http://www.whoint/mediacentre/factsheets/fs282/en/ Updated August 2014; Fact Sheet N°282.

[4] Williams KM, Verhoeven VJ, Cumberland P, Bertelsen G, Wolfram C, Buitendijk GH, Hofman A, van Duijn CM, Vingerling JR, Kuijpers RW, Höhn R, Mirshahi A, Khawaja AP, Luben RN, Erke MG, von Hanno T, Mahroo O, Hogg R, Gieger C, Cougnard-Grégoire A, Anastasopoulos E, Bron A, Dartigues JF, Korobelnik JF, Creuzot-Garcher C, Topouzis F, Delcourt C, Rahi J, Meitinger T, Fletcher A, Foster PJ, Pfeiffer N, Klaver CC, Hammond CJ. Prevalence of refractive error in Europe: the European Eye Epidemiology (E(3)) Consortium. Eur J Epidemiol. 2015 Apr;30(4):305-15. doi: 10.1007/s10654-015-0010-0. Epub 2015 Mar 18. PMID: 25784363; PMCID: PMC4385146.

[5] Dandona L, Dandona R. Estimation of global visual impairment due to uncorrected refractive error. Bull World Health Organ. 2008 Aug;86(8):B-C; author reply C. doi: 10.2471/blt.08.053652. PMID: 18797601; PMCID: PMC2649479.

[6] Pratt C, Bryant P. Young children understanding that looking leads to knowing (so long as they are looking into a single barrel). Child Dev. 1990 Aug;61(4):973-82. PMID: 2209200.

[7] Packwood EA, Cruz OA, Rychwalski PJ, Keech RV. The psychosocial effects of amblyopia study. JAAPOS. 1999 Feb;3(1):15-7. doi: 10.1016/s1091-8531(99)70089-3. PMID: 10071896.

[8] Baltussen R, Naus J, Limburg H. Cost-effectiveness of screening and correcting refractive errors in school children in Africa, Asia, America and Europe. Health Policy. 2009 Feb;89(2):201-15. doi: 10.1016/j.healthpol.2008.06.003. Epub 2008 Jul 14. PMID: 18621429.

[9] Reshmarani, Shilpa N., SubhashChimkode. (2019). A Study of Correlation Between Blood Groups and Anemia in Young Adults. *International Journal of Physiology*, *7*(4), 199–202.

[10] Kotecha PV. Nutritional anemia in young children with focus on Asia and India. Indian J Community Med. 2011 Jan;36(1):8-16. doi: 10.4103/0970-0218.80786. PMID: 21687374; PMCID: PMC3104701.

[11] Chow YC, Dhillon B, Chew PT, Chew SJ. Refractive errors in Singapore medical students. Singapore Med J. 1990 Oct; 31(5):472-3. PMID: 2259947.

[12] Gopalakrishnan S, Prakash MVS, Jha K, Ranjit . A Study of Refractive Errors among Medical students in AIMST University, Malaysia 2011. Indian Medical Journal. 105. 365-367.

[13] Al-Rashidi SH, Albahouth AA, Althwini WA, Alsohibani AA, Alnughaymishi AA, Alsaeed AA, Al-Rashidi FH, Almatrafi S. Prevalence Refractive Errors among Medical Students of Qassim University, Saudi Arabia: Cross-Sectional Descriptive Study. Open Access Maced J Med Sci. 2018 May 19;6(5):940-943. doi: 10.3889/oamjms.2018.197. PMID: 29875876; PMCID: PMC5985887.

[14] Chandrakumari AS, Sinha P, Singaravelu S, Jaikumar S. Prevalence of Anemia Among Adolescent Girls in a Rural Area of Tamil Nadu, India. J Family Med Prim Care. 2019 Apr;8(4):1414-1417.doi: 10.4103/jfmpc.jfmpc_140_19. PMID: 31143731; PMCID: PMC6510068.

[15] Shill KB, Karmakar P, Kibria MG, Das A, Rahman MA, Hossain MS, Sattar MM. Prevalence of iron-deficiency anaemia among university students in Noakhali region, Bangladesh. J Health PopulNutr. 2014 Mar;32(1):103-10. PMID: 24847599; PMCID: PMC4089078

[16] Dr.Sulabha S. Lalsare ,M.V.P Samaj'sPrevalence Of Anaemia In College Going Girl Students 2018 Ijcrt; Volume 6, Issue 1 January 2018; ISSN: 2320-2882.