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# Assessment of Nutritional status, Visual acuity and Psychological wellbeing among school students in South India

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## ABSTRACT

**Background:** School-age is a dynamic phase of active growth and mental development of childhood. School aged children were among the most at-risk groups for under nutrition, over weight and obesity. Good overall adjustment and a sense of psychological well-being are very crucial factors for the adolescent's positive contribution to the society.

**Aim & Objective:** To assess the nutritional status, visual acuity and psychological wellbeing among school students. **Methodology:** A descriptive cross-sectional survey was conducted among school students at selected schools in Chennai. A total of 1135 students studying IX standard to XII standard were included in the study. Researcher obtained formal permission from the Management and Principal of Schools. Written informed consent was obtained from the parents. Researcher collected demographic data, nutritional status assessed by BMI, visual acuity by Snellen chart and psychological well-being Scale by Ryff's followed by health education on balanced diet and mental hygiene given to them.

**Results:** In regard to nutritional status, 486(42.8%) of school students were healthy (BMI -18.5 to 24.9Kg/$m^2$) and 245(21.6%) of them had underweight (BMI-<18.5Kg/$m^2$). 485(42.7%) of students had normal vision and 650(57.3%) of them had impaired vision. 1040(91.6%) of students had moderate level of psychological wellbeing. There is a fair negative correlation between BMI and psychological wellbeing ($r= -0.374$, $p<0.001$).

**Conclusion:** The study reports that nearly half of the school students had normal weight and normal visual acuity (6/6). Majority of them had moderate level of psychological wellbeing. Researcher recommends that periodical screening of nutritional, vision and psychological problems are essential to detect and correct the problems among school students.

***Keywords:*** *Nutritional Status, Visual acuity, Psychological wellbeing, School students.*

## 1. INTRODUCTION

School-age is a dynamic phase of active growth and mental development of childhood.Therefore, this age group's nutritional needs are higher than the preschool years to sustain the approaching growth spurt, requiring diets high in macro and micronutrients. Due to the increased nutrient needs to sustain the requirement, malnutrition among this age group remains a significant public health problem in developing countries. Globally, more than 200 million school children are suffering from malnutrition, particularly stunting, and itis expected that the number will increase by five folds ifno intervention is made. (Saavedra JM, Prentice AM, 2023)

Studies suggest that school-aged children were among the most at-risk groups for under nutrition due to dietaryinadequacy, food inaccessibility, unequal household foodallocation, improper preparation and storage of food, and presence of infectious diseases. Thesefactors can be amplified by the interplay of different biological factors, economy, culture, environmental problems, and diseases. The interaction of these factors resulted in a higher prevalence of under nutrition amongschool-aged children. (Navaneethan, Palanisamy, et al 2011 & Verma M, Sharma P, 2021)

Adolescence is the period when child moves from dependency to autonomy, lessens his/her emotional dependence on their parents, developing a mature set of values and responsible self-direction and vocational identity. Good overall adjustment and a sense of psychological well-being are very crucial factors for the adolescent's positive contribution to the society. Psychological wellbeing signifies the presence of qualities like autonomy, self-acceptance, positive relations with others, and purpose in life, environmental mastery, and personal growth. Psychological wellbeing is attained by achieving a state of

balance affected by both challenging and rewarding life events. Psychological wellbeing refers to how people evaluate their lives. (Shalini S, Gupta SA, 2021)

Adolescence can definitely be looked upon as a time of more struggle and turmoil than that during childhood. It has been established that factors such as school connectedness, good relationships with others, liking family and peers, closeness to others, physical activity, or healthy eating habits can protect young people and increase their psychological well-being. (Blum RW, Lai J et al, 2021)

WHO estimates that approximately one in five young people under the age of 18 experiences some form of developmental, emotional or behavioral problem, and one in eight experiences a mental disorder. (WHO, 2021)

Vision is one of the main factors in the learning process and alterations in visual acuity can account for poor performance in school, especially low visual acuity which can hinder learning among school children. The promotion of health, particularly visual health, is essential and should include projects of preventive health in order to reach all children. Treatment and correction of visual disorders which lead to visual efficiency, create good conditions for better learning. (Alvarez-Peregrina C, Sanchez-Tena MA et al, 2020)

Visual acuity provides an estimate of an observer's ability to perceive spatial detail and is the most commonly used measure of visual function in clinical practice. Tests of visual acuity provide information that can be used to determine the presence or absence of refractive error and pathology within the visual pathway. These tests are often considered to be amongst the most important measures of general visual function. (Hamilton R, Bach M et al, 2021)

Visual impairment has a drastic impact on school performance of school-aged children because 75%–90% of general classroom learning is wholly or partially through vision, any form of visual impairment may have a negative effect on learning and social interaction, which may affect the natural development of academic and social abilities in children. (Loh L, Prem-Senthil M, Constable PA, 2024)

Student's health is prime for their learning activities especially during their critical years of Education – high school and senior secondary. Researcher has done a school-based nutritional assessment, psychological wellbeing and VA screening among school students to promote both physical and cognitive activities of them.

## 2. METHODOLOGY

A descriptive cross-sectional survey was conducted among school students at selected schools in Chennai. Ethical approval was obtained from the Institutional Ethics Review Board. Formal permission was obtained formal from the Chairman and Principals of selected schools in Chennai. Prior to data collection written informed consent obtained from the parents and assent obtained from school students. The sample was recruited from five schools. A total of 1135 students studying IX standard to XII standard included in the study. Researcher collected demographic data, nutritional status assessed by anthropometric BMI, visual acuity by Snellen chart and psychological well-being by Ryff's psychological well-being scale followed by nutrition education on balanced diet and mental hygiene given to them.

Statistical analysis: Statistical analysis was performed using the Statistical Package for Social Sciences Programme (SPSS) version 17.0. Descriptive statistics was used to describe the demographic variables. Karl Pearson correlation coefficient test was used to find the relationship between nutritional status and psychological wellbeing among school students. Chi square test was used to find the association between the level of nutritional status, visual acuity, psychological wellbeing and the demographic variables.

## 3. RESULTS

350(30.8%) of children were aged 14 years, 582(51.3%) were boys, 332(29.3%) were studying 9$^{th}$ standard, 592(52.2%) of students father and 556(49%) of mothers had completed professional/ post graduate degree, 708(62.4%) of students father working in private sector, 670(59%) of students mothers were homemaker, 853(75.2%) student's parents had family monthly income of more than 20,000 rupees, 769(67.8%) of students belonged to nuclear family, 830(73.1%) students had one sibling and 883(77.8%) of them had 4-6 family members.

496(43.7%) of the students were non-vegetarian, 456(40.2%) of them had vision problem, 153(33.6%) of students had myopia and 413(36.4%) of students were using spectacles or contact lens. 379(33.4%) of them were practicing relaxation techniques such as yoga, meditation, zumba and aerobic exercises. 181(47.7%) were practicing yoga regularly. 323(28.5%) of family members had non-communicable diseases and 265(82%) of the family members had diabetes mellitus.467(41.1%) of girls had regular 28 days of menstrual cycle and 129(11.4%) of girls had irregular menstrual cycle. 83(64.3%) of girls got menstruation once in two months.

**Table 1: Assessment of nutritional status among school students. N = 1135**

| Level of Nutritional Status | Frequency | Percentage |
|---|---|---|
| Underweight (<18.5 Kg/m$^2$) | 245 | 21.6 |
| Healthy (18.5 – 24.9 Kg/m$^2$) | 486 | 42.8 |
| Overweight (25 – 29.9 Kg/m$^2$) | 222 | 19.6 |
| Obese (≥30 Kg/m$^2$) | 182 | 16.0 |

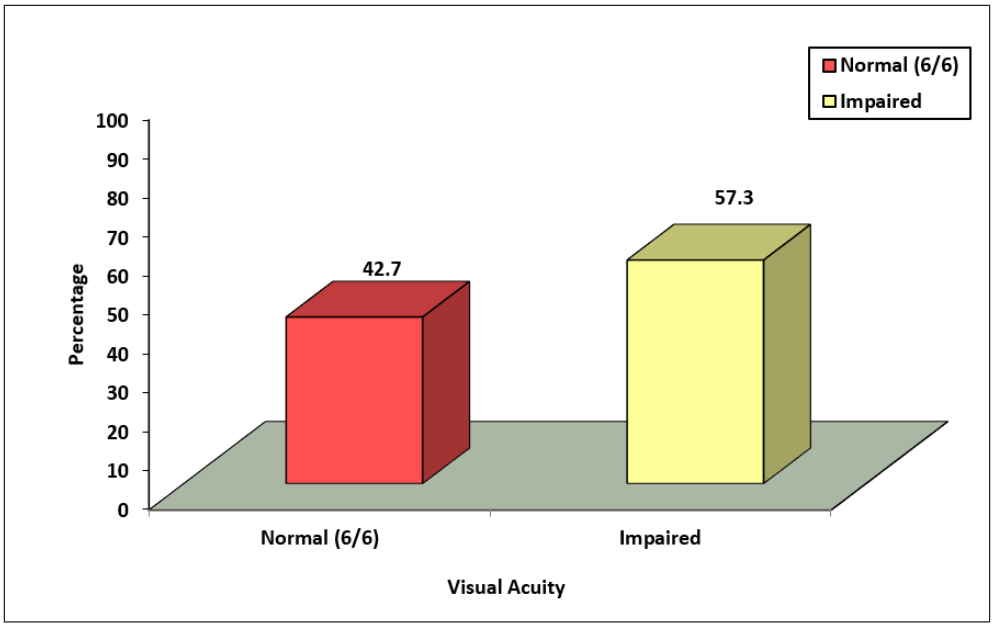


**Figure 1: Assessment of visual acuity among school students**

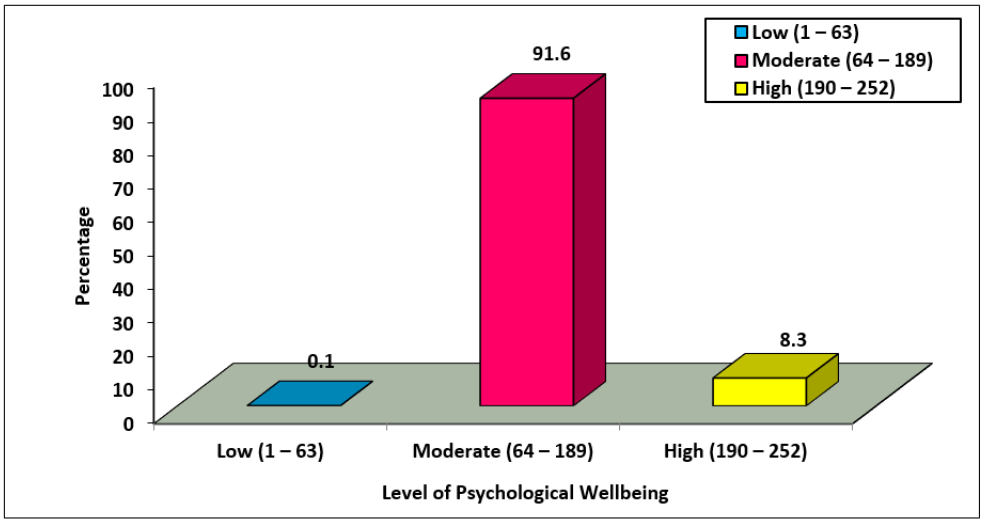


**Figure 2: Assessment of psychological wellbeing among school students**

**Table 2: Assessment of domains of psychological wellbeing among school student's N = 1135**

| Psychological Wellbeing | Minimum | Maximum | Median | Mean | S.D |
|---|---|---|---|---|---|
| Autonomy | 7.0 | 47.0 | 28.0 | 27.86 | 4.99 |
| Environmental mastery | 7.0 | 42.0 | 26.0 | 26.52 | 5.17 |
| Personal growth | 7.0 | 83.0 | 27.0 | 27.30 | 5.29 |
| Positive relations | 7.0 | 57.0 | 28.0 | 28.24 | 5.42 |
| Purpose in life | 7.0 | 42.0 | 26.0 | 25.58 | 4.91 |
| Self-acceptance | 7.0 | 42.0 | 27.0 | 27.39 | 5.12 |

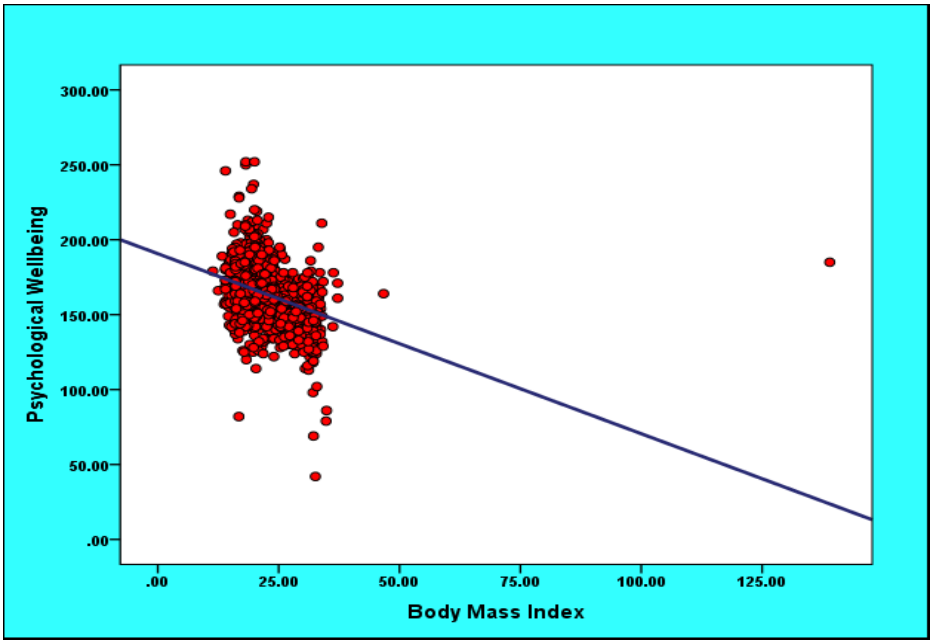


**Figure 3: Correlation between nutritional status and psychological wellbeing among school students (r= -0.374)**

## 4. DISCUSSION

School-going age is the foundation of human life. If the foundation is strong, future life will also be strong. In the present scenario, nutritional education has become an essential component in improving dietary habits and food choices among the public especially due to increasing health risk attributed to changing food habit and lifestyle. The negative impact of being underweight, overweight, or obese on health and development at adolescents can also extend into their adulthood increasing the risk of chronic health issues. With all this background the present study is taken up with an objective to assess the Body Mass Index (BMI) of adolescent students, to assess the Nutritional awareness level of student and to provide the nutritional education to the vulnerable group. (Krutika Chanda, 2019)

Nearly half of the school students 42% and 42.7% of them had normal weight and normal visual acuity (6/6). Majority 91.6% of them had moderate level of psychological wellbeing and 8.3% had high level of psychological wellbeing. 21.6%, 19.6% and 16% of them were undernourished, overweight and obese respectively.

Demographic variables such as age ($\chi^2$=28.749, p<0.017), education ($\chi^2$=23.835, p<0.021), fathers education ($\chi^2$=54.543, p<0.001), mothers education ($\chi^2$=43.017, p<0.001), fathers occupation ($\chi^2$=39.303, p<0.001), family monthly income ($\chi^2$=42.022, p<0.001), type of family ($\chi^2$=21.034, p<0.050), number of siblings ($\chi^2$=26.676, p<0.009) and number of family members ($\chi^2$=21.516, p<0.011) had significant association with nutritional status among school students.

Clinical variables such as dietary pattern ($\chi^2$=37.287, p<0.001), problems in vision ($\chi^2$=10.727, p<0.013), use of spectacles or contact lens ($\chi^2$=19.849, p<0.001) and practice of relaxation techniques ($\chi^2$=24.040, p<0.001) had significant association with nutritional status among school students.

This study finding were consistent with the study conducted by Navaneethan P, et al., among 806 school-going students of Vellore, Tamil Nadu belonging to age group 11-18 years, showed that 83% of students were underweight for their age as per WHO's international standards. Only 16% of the students were in the normal range (BMI 18.5-24.9), and of the rest, 0.39% and 0.06% were in the BMI range of 25-29.9 (overweight) and 30-35.9 (obese) respectively. This regression model showed that age, sex, and father's occupation significantly affect their BMI.

Secondary data analysis was done by Madhur Verma, et al. and evaluated the nutritional status of children and adolescents in the 5-18 years, age group, under the 'Rashtriya Bal Swasthya Karyakram' in the District Fatehgarh Sahib of Punjab. A total of 897 children's data were included in the study. Out of 352 children in the 5-9 years, age group 58.8% were severely underweight, 37.4% were stunted and 31.8% of the children were thin. In the age group of 10-18 years, 19.4% were severely stunted and 26.9% were severely thin.

Demographic variables such as age ($\chi^2$=61.225, p<0.001), education ($\chi^2$=13.726, p<0.008), fathers education ($\chi^2$=23.608, p<0.001), mothers education ($\chi^2$=27.592, p<0.001), mothers occupation ($\chi^2$=13.838, p<0.008), family monthly income ($\chi^2$=41.302, p<0.001), type of family ($\chi^2$=32.555, p<0.001), number of siblings ($\chi^2$=18.020, p<0.001) and number of family members ($\chi^2$=43.206, p<0.001) had significant association with visual acuity among school students.

Clinical variables such as dietary pattern ($\chi^2$=20.072, p<0.001), problems in vision ($\chi^2$=359.21, p<0.001), use of spectacles or contact lens ($\chi^2$=320.21, p<0.001), practice of relaxation techniques ($\chi^2$=29.998, p<0.001), family history of non-communicable diseases ($\chi^2$=25.506, p<0.001) and history of menstrual cycle ($\chi^2$=7.368, p<0.025) had significant association with visual acuity among school students.

This study finding were consistent with the study conducted by Prabhu AV, Ve RS et al on Prevalence of visual impairment in school-going children. A cross-sectional study across eleven schools from both urban and rural parts of Udupi taluk, Karnataka was conducted to report the magnitude of visual impairment among the school children. Complex survey design was used in allocating the sample size through stratification and clustering. Totally 1784 schoolchildren between the age groups of 5 and 15 years participated in the study. Results revealed that visual impairment was found to be 4.32% (95% confidence interval: 3.38%, 5.26%). The prevalence rate was significantly higher among students from urban area (5.6%) compared to those from rural area (3.6%) ($P$ = 0.011).

Another study conducted by Subhiksha Rangavittal, Sruthi Sree Krishnamurthy et al on prevalence of visual impairment, refractive errors and other ocular problems among school children from the public schools of South India between 2011 and 2015. A cross-sectional study covering 296 schools in the three districts of Tamil Nadu. The school eye screening included visual acuity assessment, external eye examination, objective and subjective refraction, and direct ophthalmoscopy. A total of 91545 children were included in the study. Results revealed that the prevalence of vision impairment was found to be 5.67% (95%CI 5.53–5.83) and spherical equivalent refractive error was 4.42% (95%CI 4.29–4.56). The prevalence of myopia, hyperopia, and 'other refractive errors' was found to be 3.57% (95%CI 4.01–4.27), 0.03% (95%CI 0.02–0.04), and 0.82% (95%CI 0.76–0.88) respectively. In the rural region the prevalence of the refractive errors and the ocular problems were 2.92% and 2.32%, respectively. The study concluded that lower prevalence of refractive errors and myopia in this population, much lesser compared to other reported studies from India.

None of the demographic and clinical variables had significant association with psychological wellbeing.

## 5. CONCLUSION:

The study reports that nearly half of the school students had normal weight and normal visual acuity (6/6). Majority of them had moderate level of psychological wellbeing. Half of them were undernourished, overweight and obese respectively. Researcher gave nutrition education and mental hygiene in order to promote physical and mental health among school students. Researcher recommends that periodical screening of nutritional, vision and psychological problems are essential to detect and correct the problems among school students. Further, researcher is also recommended to encourage the active involvement of parents, communities and local government in the implementation of intensified school nutrition and school mental health program.

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