



Research Article

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The Role of Iron in Well Being and Educational Performance among Girls



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Abstract

The present study attempts to explore the differences in Academic Achievement and Psychological Well Being and its components – Satisfaction, Efficiency, Sociability, Mental Health, and Interpersonal Relations in low and moderate level of hemoglobin of College female students. It also tries to find out how hemoglobin, Psychological well-being and academic achievement correlate to each other. For this study 200 (100 low hemoglobin level and 100 moderate hemoglobin level) college female students were selected by random sampling method. Psychological Well-Being Scale was used to collect the data. Students' academic achievement was collected through college record and hemoglobin level of female students was collected from project record. Data was analyzed by using independent 't' test and Pearson's correlation coefficient. The finding of the study revealed significant differences between low hemoglobin and moderate hemoglobin groups regarding efficiency and mental health. No significant difference was observed on satisfaction, sociability and interpersonal relations.

It is also found that there is significant difference between low hemoglobin and moderate hemoglobin groups on academic achievement. The study revealed positive correlation between hemoglobin and academic achievement and Psychological well-being and academic achievement. Moderate hemoglobin level creates more efficiency, better mental health and good academic achievement in female students. One could say that there is significant role hemoglobin plays in Psychological well being and academic achievement of college female students. Anemia is widely prevalent in all the states of India among all age groups. In India, college girls contribute major portion of population. It has been reported that 80% female population has hemoglobin deficiency, due to illiteracy of female, family structure, status of women, diet habits, gender discrimination and various superstitions. The deficiency of hemoglobin affects physical and mental health, general behavior and academic performance of students. This study is useful to educational managements, counselors, parents, students and Government also. In the development of student's personality physical as well as Psychological health is essential. These research findings will create awareness about physical and mental health among people and society.

Keywords: Academic Achievement; College female students; Hemoglobin; Psychological well-Being; Red blood cells that carries oxygen from lungs to the tissues

Introduction

In brief, anemia is manifested by decrease in the oxygen carrying capacity of blood. The anemia is mainly caused by poor nutrition. Hemoglobin deficiency is a major health problem affecting people of all age groups all over the world. Iron is a mineral that can be seen in every cell in the body. About 70% of the body's iron is in red blood cells (hemoglobin) and muscle cells (myoglobin). In India, school and college girls contribute major portion of population. It has been reported that, 80% of female population has hemoglobin deficiency, due to illiteracy of female, family structure, social status of women, diet habits, gender discrimination and various superstitions. The highest risk of iron deficiency anemia occurs during periods of rapid growth and nutritional demand, thus infants, early childhood, adolescence and pregnant women are the most affected [1].

Kumar Tarun et al. [2] conducted the study to assess the relationship between the level of hemoglobin content and the academic performance among adolescent girls. They found significant positive correlation between anemia and poor academic performance among the adolescent girls ($r = 0.6624$).

Psychological well-being has been described as the cornerstone of mental health. According to WHO [3], mental health is "a state of wellbeing in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community". Traditionally, Psychological wellbeing has been defined by lack of symptom distress (i. e., lack of depression, anxiety and other symptoms of mental disorders), over time, the term has taken on a more

positive definition [4,5] reported, Psychological well being is active engagement in a number of existential challenges. It is a multidimensional construct comprised of six areas of positive functioning: Autonomy, Positive Relations with Others, and Purpose in life, Personal growth, Environmental mastery, and Self-acceptance. Huppert [6] stated that, "Psychological well-being is about lives going well. It is the combination of feeling good and functioning effectively." An individual with high Psychological Well-Being is happy, capable, well-supported, satisfied with professional and personal life. The term "Psychological Well-Being" can be explained through two perspectives i.e. emotional well-being and the social well-being [7]. Research has taken place in both perspectives, making Psychological Well being.

Academic achievement or academic performance is the important outcome of education. Academic achievement is commonly measured by examinations or continuous assessment of the students. But there is no general agreement on how it is best tested. Academic achievement can be defined as excellence in all academic disciplines, in class as well as extracurricular activities. Several investigators [8-11] have used examination marks as indicator of achievement in some form or others. In the present research percentage of marks obtained in class XII th of Higher Secondary certificate (HSC) Board was used as the indicator of academic achievement. Mehadi Bostani et al. [12] concluded that the higher the mental health of the students, the better their educational performance. Asgari [13] found that there is no significant relationship between mental health and academic performance of male and female students. Anita Chawla [14] revealed that mental health score was positively associated with the academic achievement of the students Talawar and Das [15] explored that there is a positive relationship between academic achievement and mental health of secondary school tribal students of Assam. The study also found that there is a significant difference in the mental health of boys and girls, urban and rural secondary school tribal students of Assam.

Most of research on the behavioral effects of iron deficiency and anemia has focused on the cognitive function of pre- school children and adults. With some exceptions, little attention has been given to the role of hemoglobin in psychological wellbeing and academic achievement of college female students. Hence the present research attempts to investigate the differences in Academic Achievement and Psychological Well Being and its components – Satisfaction, Efficiency, Sociability, Mental Health, and Interpersonal Relations in low and moderate level of hemoglobin of College female students. Moreover it also tries to find out how hemoglobin, Psychological well –being and academic achievement correlate to each other.

Method

Participants

A sample of 200 college female students who studying in B.A. and B. com. Part I, and participated in the research. For this study

200 (100 low hemoglobin level and 100 moderate hemoglobin level students) college female students were selected by random sampling method. Their age range was 18 to 20 years.

Measures

- Psychological Well-Being Scale (PWBS) [16]: The scale was developed by Sisodia and Choudhari. The scale comprised of 50 statements with a view to measure five aspects of well-being like Satisfaction, Efficiency, Sociability, Mental Health, and Interpersonal Relations. All 50 statements are positive manner. Each statement have five alternatives from strongly agree to strongly disagree. Respondents have to select one of them. Score range was from 50 to 250. High score indicates high level of well-being.
- Hemoglobin level: The hemoglobin content of the subjects was estimated by expert physician by Cyanmethemoglobin method. The hemoglobin level is expressed as the amount of hemoglobin in grams (gm) per deciliter (dl) of whole blood. Normal range of hemoglobin depend on age and gender of the person. Normal range of adult women is 12 to 16 gm/dl. In present study range of Hb 9.1 to 11 gm /dl is considered moderate level and Hb 8.9 to 7 gm/dl has been considered low level hemoglobin.
- Academic Achievement: In the present study academic achievement constitutes the aggregate marks obtained by the subjects in their 12th class HSC examination.

Procedure

At early stage first of all 200 (100 moderate level Hb and 100 low level Hb students) college female students selected by random sampling method. These selected students were administered the Psychological well-being scale in a small groups. Before administering the scale rapport was established with the subjects. To fill the scale subjects were given general instructions. Data were obtained by using particular scoring pattern of the scale. To obtain academic achievement of the subject's annual aggregate marks of HSC examination were collected from the college office record.

Data Analysis

Statistical analysis was done by using independent "t" test and Pearson's product moment correlation test.

Results

Table 1, Indicates the comparisons between level of hemoglobin and psychological well-being and its five dimensions (i.e. Satisfaction, Efficiency, Sociability, Mental Health and Interpersonal Relations). The mean score on satisfaction of low hemoglobin (Hb) group is 39.41 with a standard deviation (S.D) of 4.59, whereas moderate Hb group's mean score is 39.88 with S.D .6.19; and ' t' value is 0.61. Statistically it is not significant even at 0.05 level (P> 0.05). The same manner calculated 't' values for hemoglobin differences on Sociability (1.21), Interpersonal

Relations (0.76) and total Psychological Well-being (1.69) are not significant. But dimensions of Psychological well-being i.e. Efficiency (3.30; $p < 0.01$) and Mental Health (2.75; $p < 0.01$) shows significant difference on 0.01 level of hemoglobin.

Table 1: Means, SDs and 't' values of low and moderate hemoglobin (Hb) groups of female students on Psychological Well being and its five dimensions.

Dimen. Of PWB	HB Groups	N	Mean	SD	t
SAT.	Low HB	100	39.41	4.58	.61
	Mod HB	100	39.88	6.19	
EFF	low HB	100	38.19	5.93	3.3**
	Mod HB	100	40.73	4.90	
SOCI	Low HB	100	39.27	4.83	1.208
	Mod HB	100	40.07	4.52	
MH	Low HB	100	33.31	6.65	2.754
	Mod HB	100	35.90	6.64	
IPR	Low HB	100	43.01	4.43	.757
	Mod HB	100	42.47	5.58	
PWB	Low HB	100	1.91	25.24	.689
	Mod HB	100	1.97	27.70	

Table 2 shows the difference between level of hemoglobin and academic achievement. The mean score of low Hb group is 63.25 with S.D.9.38, whereas moderate Hb group have mean score 66.82 with S.D. 10.06 and 't' value is 2.59 on academic achievement. The difference between means are statistically significant on (2.59; $P < 0.01$) 0.01 level. It means that those moderate Hb groups of female students have higher academic achievement than low Hb group of female students.

Table 2: Means, SDs and 't' values of low and moderate hemoglobin (Hb) groups of female students on Academic Achievement.

	HB Groups	N	Mean	SD	't'	Sign
Academic Achievement	Low HB	100	63.25	9.38	2.59	.01
	Moderate HB	100	66.82	10.06		

Table 3 depicts the correlation coefficient between hemoglobin and Psychological Well-being, hemoglobin and academic achievement and Psychological well-being and academic achievement. There is significant and positive correlation found between level of hemoglobin and academic achievement ($r = 0.166$, $P < 0.05$). It is also seen that Psychological well-being significantly and positively correlated to academic achievement ($r = 0.333$, $P < 0.01$). It means that when increases the level of hemoglobin, academic achievement also increase accordingly. Significant and positive correlation was observe between Psychological well-being and academic achievement of female students. It means when psychological well-being is healthier, then students' academic achievement is better. It is also revealed that there is no significant correlation between hemoglobin and Psychological well being of female students.

Table 3: Summary of inter correlation analysis for hemoglobin, Psychological Well being and Academic achievement of College female students.

	Hemoglobin	Psychological Well being	Academic Achievement
Hemoglobin	1	.059	.166*
Psychological Well being		1	.333**
Academic Achievement			1

* Correlation is significant at the 0.05 level

** Correlation is significant at the 0.01 level

Discussion

The main objectives of the study were, to find out the differences between low and moderate hemoglobin (Hb) groups of college female students on psychological wellbeing and its five components (i.e., Life satisfaction, Efficiency, Sociability, Mental Health and Interpersonal Relations) and to examine, the inter correlations between level of hemoglobin, Psychological Well-being and academic achievement of college female students.

It was assumed that there will be significant difference on Psychological Well-being and its five components (i.e., Life satisfaction, Efficiency, Sociability, Mental Health and Interpersonal Relations) between low and moderate hemoglobin groups of college female students. By observing the results, there is no significant difference found between level of Hb (low and moderate Hb) and dimensions of Psychological well-being i.e. satisfaction, sociability and interpersonal relations. Results also show that there is significant difference between level of Hb and dimensions of Psychological well being i.e. efficiency and mental health.

Comparing the efficiency of low and moderate level of Hb groups of student's moderate group is more efficient than low level Hb group of students. It means without adequate iron, blood is unable to efficiently transport oxygen contributing to fatigue, lethargy and poor physical functioning. So low Hb affects on efficiency this finding supported by Madhi Khanlo's research [17]. He reported that iron deficiency in all stages of life can reduce the power of perception and learning. The present study findings confirm the results of previous studies [18-20].

College female students are one of the most sensitive strata of society, many of them will become the future's teachers, executives, managers, lawyers and planners, and the mental health of the society is contingent upon their mental health. Hence, healthy personality needs healthy mental health. Present study indicate that moderate Hb group of students showed higher mental health than low Hb group of students this finding supported by Nachvak and Razaei's research [21]. They observed differences in students with iron deficiency compared with healthy students in terms of doing homework, sensory abilities, physical abilities, attention and concentration, learning ability

and memory capacity. Jianhua Su et al. [22] stated that there is an inverse association between hemoglobin levels and later behavioral problems of children. Children in the lower Hb group at age four had more problems in both attention and aggression at age six.

Academic achievement has been considered as an important factor in the educational life of students. It is associated with self-esteem and self-confidence of students. It leads to better adjustment in school and society. Academic achievement increases the self-actualization, self-improvement and some degree of competitiveness [23]. In the present study academic achievement and hemoglobin positively and significantly correlated. This finding supported by Nader and Abbaszadeh [24]. They found significantly positive relationship between hemoglobin and academic achievement. Sungthong, et al. [25] showed that children with IDA consistently had poor cognitive scores and below average scores for mathematics and Thai language. Non anemic iron deficient pupils had high IQ and above average language and mathematics scores. M. Lakshmi et al. [26] found a positive correlation between IDA and performance in life skills and languages and is associated with poor school performance. Halterman et al. [27] reported that children with iron deficiency had more than twice risk of scoring below average in math than those with normal iron.

Psychological well-being has been described as the cornerstone of mental health. College life can frequently be perplexed and full of psychological stress. According to Chao [28] college students' stresses have increased tremendously over the past decade. Academic achievement can influence the future education and career choices of children and adolescents [29] so Psychological well-being is important in the life of a college student. In the present study found positively high correlation between psychological well-being and academic achievement in college female students. This finding confirms some previous research findings i.e. Shashi Kala Singh [30] revealed that high achiever group was mentally healthy than low achiever group. Mental health was positively related with academic achievement. Gall et al. [31] opined that students with mental health problems had a much higher rate of absenteeism, tardiness and lower grades than those without mental health problems. Asgari [32] concluded that there is no significant relation between mental health and academic performance among male and female students. Shari [33] reported a significant relation between mental health and academic performance. Mehdi Bostani et al. [34] concluded that the higher the mental health of the students, the better their educational performance.

Conclusion

The finding of the study revealed significant differences between low hemoglobin and moderate hemoglobin groups regarding efficiency and mental health. No significant difference was found on sociability, satisfaction, and interpersonal

relations. Moreover, it is also seen that there is significant difference between low hemoglobin and moderate hemoglobin groups on academic achievement. The positive inter correlation among hemoglobin, academic achievement and Psychological well-being is seen in the present investigation. Moderate level of hemoglobin creates high efficiency and better mental health as well as better academic achievement in female students. One could say that there is significant role hemoglobin plays in Psychological well-being and academic achievement of college female students. The deficiency of hemoglobin affects physical and mental health, general behavior and academic performance of students. This study is useful to school counselors, students and parents, academic institutions and Government also. In the development of student's personality physical as well as Psychological health is essential. These research findings will create awareness about physical and mental health among people and society.

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