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A Contrastive Study on Mental Health and Nutritional Status of Private and Government School Students in Srinivaspura, Kolar District, Karnataka, India

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ABSTRACT

Teenage is a critical developmental stage marked by rapid changes in one's physical, psychological, and social makeup. The purpose of this study was to evaluate and compare the mental health and nutritional status of teenagers in Srinivaspura, Kolar district attending government and private schools in the age range of 13–15yrs. 60 pupils (30 from each type of school, with an equal distribution of genders) were chosen using random sampling method. Anthropometric measurements (height, weight, BMI, MUAC, and waist-hip ratio), biochemical markers (calcium and haemoglobin), and dietary intake patterns were all included in the nutritional evaluation. The Depression, Anxiety, and Stress Scale (DASS) were used to assess mental health. These findings indicated that students attending private schools had better anthropometric profiles, with higher median values for height, weight, BMI, and MUAC, showing better physical development. Additionally, when assed in private and government school students, their haemoglobin levels were significantly higher (boys: 12.8 vs. 11.4 g/dL; girls: 12.7 vs. 10.0 g/dL; $p<0.05$) respectively, suggesting a lower risk of anaemia in private schools. However, pupils attending government schools reported consuming fruits, vegetables, and dairy products, but infrequently, indicating a more varied diet. Research on mental health revealed that children attending government schools, especially girls, were more likely to experience moderate to severe forms of stress, anxiety, and depression.

According to dietary behaviour study, children attending government schools had more consistent eating patterns and a greater inclination towards home-cooked meals, whereas students attending private schools showed greater rates of emotional eating and meal skipping. These findings point to a dual burden of malnutrition in government schools, where undernutrition and anaemia are prevalent, whereas in private school settings, dietary abnormalities and psychosocial stress are becoming more prevalent.

The results highlight the necessity of focused treatments, such as comprehensive nutrition instruction, mental health support services, and iron supplements in public schools. Improving general wellness requires addressing the socioeconomic determinants of teenagers' health through customised school-based initiatives.

Keywords: *Nutritional Status, Mental Health, Private Schools, Government Schools, Anaemia, Dietary Patterns, DASS.*

1. INTRODUCTION

Teenage is a transition period of development and transformation of life between child and adult covering the age between 13-19 years. Rapid changes in hormonal, physiological and neurological characteristics make this period crucial. In phase with physiological changes, psychological changes too are conjoined (1-3). Teenage and Adolescence stages are identified

as the period of "storm and stress". They encounter numerous psychological challenges including emotional and physical stress, anxiety, anger, frustration, and depression. These issues emerge due to the apprehensions concerning self-care, societal pressure, and other personal factors. (4) These alterations create a significant demand for optimal nutrition during this defining moment which impacts growth and development as well as mental wellbeing. Poor diet and malnutrition can precipitate to a range of nutritional deficiencies and disorders, and compromised cognitive development, impacting their academic attainment, productiveness, and efficiency (5).

In this context, this study aimed at assessing and comparing the mental health and nutritional status parameters of teenagers studying in private and government schools, providing insights into potential disparities between these educational settings influencing health outcomes and informing targeted interventions to address identified needs (1, 3).

2. METHODOLOGY

A cross-sectional contrastive study was carried out in Srinivaspura, Kolar district to evaluate the nutritional status, biochemical markers, and mental health of teenagers enrolled in government and private schools (6). Teenagers (of both sexes) between the ages of 13 and 15 made up the study population. A total of 60 pupils (30 from private schools and 30 from government institutions) were chosen at random. Male and female students in the teenage range were included in the inclusion criteria, however those out of this range were not considered. Data collection involved nutritional assessment, comprising anthropometric measurements (height, weight, waist circumference, hip circumference, skinfold thickness [SFT], and mid-upper arm circumference [MUAC]), BMI, waist-hip ratio), biochemical parameters (haemoglobin and calcium levels), and dietary evaluation (diet pattern, and food frequency questionnaire (7). Mental health assessment was conducted using the Depression, Anxiety, and Stress Scale (DASS) following the method of Lovibond & Lovibond, (1995)(8). Ethical considerations were strictly followed, with institutional ethical clearance obtained and informed consent acquired from both participants and their parents. The study aimed to compare the mental health and nutritional status of teenagers in different educational settings, providing insights into the disparities that may exist between private and government school students. The data was analysed using descriptive statistics. Non parametric methods of statistical analysis (Mann Whitney U-test) were used to compare the means of dependent and independent samples.

3. RESULTS

Table 1: Genderwise age distribution of the study participants

(Private Vs Government School)

Gender	**Private school (n=30)** **Age in years**	**Govt school (n=30)** **Age in years**
	Med (Q1-Q3)	
Boys (15)	14(13-14)	14(13-15)
Girls (15)	14(13-13)	14(14-15)

Sixty teenagers participated in the study. Participants were equally distributed between private and government schools with equal gender characterization (15 Boys and 15 Girls). The median age of participants was 14 years (early teenage) across both school types with a nominal variation in interquartile ranges. This age is marked by significant cognitive, emotional, and social development, making it ideal for studying school-based interventions or behavioural trends (9) (Table: 1).

Table 2: Anthropometric measurements of the study participants

(Private Vs Government School)

Parameters	**Anthropometric measurements of Private School Children**		**Anthropometric measurements of Govt School Children**	
	Boys (Med Q1-Q3)	**Girls (Med Q1-Q3)**	**Boys (Med Q1-Q3)**	**Girls (Med Q1-Q3)**
Height (cms)	155 (150.5 -158.5)	152 (148-154)	149 (144.5 -156)	150(148.5-156.5)
Weight (kgs)	45.2 (40.2-50.5)	40.9 (37.3 – 44.6)	39 (32.5-43.5)	38 (34.5 – 45.5)

Waist circumference(cm)	67 (62.5 – 72.5)	65 (60 – 65)	61 (54 – 64.5)	59 (57 – 62)
Hip circumference (cm)	75 (70-77.5)	70 (65 -75)	70 (63-73.5)	73 (70 -75.5)
SFT(mm)	12 (6.5- 15)	11 (9 – 14)	9 (7.5- 10)	10 (9 – 14.5)
MUAC (cms)	22 (20.5 -24)	21 (19- 22)	21 (19.5 -22.5)	20 (19- 23.5)
BMI (kg/mt^2)	17.9 (16.7 – 20.4)	18.2 (16.6 – 20.1)	16.4(14.75 – 18.2)	16.2 (15.1 – 18)
Waist hip ratio	0.93 (0.9 -0.94)	0.92 (0.87 – 0.93)	0.87 (0.84 -0.89)	0.82 (0.80 – 0.83)

Anthropometric data (Table:2) revealed that private school students largely demonstrated higher median values for anthropometric measurements - height, weight, waist circumference, hip circumference, Mid upper arm circumference (MUAC), skin fold thickness, and composite indices- Body Mass Index and Waist Hip Ratio compared to government school students. This indicates better overall growth and nutritional status among private school teenagers. These findings are consistent with several published studies. Recently, Mehboob *et. al*., in 2021 and others have reported that underweight prevalence was significantly higher in government school students, while private school students were potentially overweight or predisposed to obesity (4 & 5, 10-12). This trend exhibits the dual burden malnutrition i.e. under nutrition among lower socioeconomic groups (often attending government schools) and over nutrition (overweight/obesity) among more upscale groups, typically in private schools (13).

Table 3: Biochemical parameters of the study participants (Private Vs Government School)

Gender	**Biochemical parameters of private school Children**		**Biochemical parameters of Govt school Children**	
	Hb (g/dl)	**Ca (mg/dl)**	**Hb (g/dl)**	**Ca (mg/dl)**
Boys	12.8 (12.1 – 13.6)	9.4 (9.3 – 9.6)	11.4 (10.65 – 11.75)	9.15 (8.8– 9.5)
Girls	12.7 (11.95 – 12.95)	9.34 (9.12 – 9.5)	10 (9.5 – 10.95)	9.49 (8.99 – 9.61)

Based on the above data (Table: 3), reveals that private school students have higher median haemoglobin (Hb) levels than government school students, indicating better iron status and a lower risk of anaemia. Specifically, boys in private schools had a median Hb of 12.8 g/dL compared to 11.4 g/dL in government schools, and girls showed a similar trend (12.7 g/dL vs. 10 g/dL). The Calcium (Ca) levels were slightly higher in private school boys but marginally better in government school girls. These results suggest a greater burden of iron deficiency anemia among government school students (Table: 3).

A study by P S Rakesh et al., in 2018 (14), revealed that anaemia prevalence is consistently higher among girls. The 65.3% of females were anaemic compared to 52.2% of males. This gender gap is reflected in our data, where government school girls had the lowest median Hb (10 g/dL), highlighting their heightened vulnerability for anaemia. Findings by Jhansi R P& Elizabeth B in 2017 (15), revealed that 64.7% of government school students were anaemic, compared to 48.2% in private schools. This aligns with our observation of lower median Hb in government school students (16).

Table 4: Comparison of mental health of participants from private and government school

	Mental health data of private school Boys (n=15), Girls(n=15)						**Mental health data of govt school Boys (n=15), Girls(n=15)**					
	Depression		**Anxiety**		**Stress**		**Depression**		**Anxiety**		**Stress**	
	Boys	**Girls**	**Boys**	**Girls**	**Boys**	**Girls**	**Boys**	**Girls**	**Boys**	**Girls**	**Boys**	**Girls**
Normal	10(66.7)	14(93.3)	8(53.3)	3(20.0)	8 (53.3)	6(40.0)	5(33.3)	2(13.3)	9(60.0)	5(33.3)	8(53.3)	3(20.0)

Mild	4(26.7)	1(6.7)	3(20.0)	3(20.0)	4 (26.7)	7(46.7)	7(46.7)	11(73.3)	2(13.3)	1 (6.7)	7(46.7)	8(53.3)
Moderate	1(6.7)	-	4(26.7)	7(46.7)	3(20.0)	2(13.3)	2(13.3)	2(13.3)	4(26.7)	9(60.0)	-	2(13.3)
Severe	-	-	-	2(13.3)	-	-	1(6.7)	-	-	-	-	-

The mental health evaluation using the DASS revealed that private school students had a higher proportion of normal scores across depression, anxiety, and stress domains compared to government school students. Notably government school girls showed a higher prevalence of moderate anxiety and mild stress, including a greater mental health burden in this subgroup (Table: 4).

A study conducted by Singh, *et. al.* in 2017 (17), on prevalence and factors associated with depression among school going teenagers in Chandigarh, North India, revealed that the proportion of students with depression was more in government schools compared to private schools. This difference was explained to be linked to the socio-economic difference between the students of two types of schools (18).

Comparative Analysis:

Table 5: Comparison of Anthropometric and Biochemical parameters between government and private school boys and girls

	Boys Median (Q1-Q3)	**Z value**	**P value**	**Girls Median (Q1-Q3)**	**Z value**	**P value**
Height(cms)	Pvt- 155 (150.5 -158.5)	-1.721	0.854	Pvt- 152 (148-154)	0.414	0.681
	Govt-149 (144.5 -156)			Govt-150(148.5-156.5)		
Weight(kgs)	Pvt- 45.2 (40.2-50.5)	-1.887	**0.058**	Pvt- 40.9 (37.3 – 44.6)	-0.622	0.535
	Govt- 39 (32.5-43.5)			Govt- 38 (34.5 – 45.5)		
BMI(kg/mt^2)	Pvt- 17.9 (16.7 – 20.4)	-1.513	0.131	Pvt- 18.2 (16.6 – 20.1)	-1.679	0.092
	Govt -16.4(14.75 – 18.2)			Govt -16.2 (15.1 – 18)		
Hb(%)	Pvt- 12.8 (12.1 – 13.6)	-3.67	**0.0002**	Pvt- 12.7 (11.95 – 12.95)	-4.645	**<0.0001**
	Govt- 11.4 (10.65 – 11.75)			Govt- 10 (9.5 – 10.95)		
Ca(mg/dl)	Pvt- 9.4 (9.3 – 9.6)	-1.638	0.101	Pvt- 9.34 (9.12 – 9.5)	0.891	0.373
	Govt- 9.15 (8.8– 9.5)			Govt- 9.49 (8.99 – 9.61)		

The statistical comparison of anthropometric and biochemical parameters between private and government school students presented in table 5, revealed significant difference in Haemoglobin levels for both boys (p=0.0002) and girls (p <0.0001). The median values of other parameters showed difference, however, the differences were not statistically significant.

Another study by Somali Surabhi revealed that majority of the study participants were malnourished (19). Surprisingly, larger number of respondents from private schools was underweight. In addition to that, more than half % of the participants had anaemia, with girls experiencing higher rates of anaemia (58.2%) than boys. This suggests that the Triple Burden of Malnutrition. Notably, no discernible difference in the prevalence of malnutrition existed between the sexes (20-21).

Table 6: Comparison of foods consumption pattern between government and private school boys and girls

Food groups	**Private schools**		**Govt schools**	
	Boys n(%)	**Girls n(%)**	**Boys n(%)**	**Girls n(%)**
Cereals & pulses	15(100)	15(100)	15(100)	15(100)

Vegetables & fruits	10(66.66)	9(60)	12(80)	11(73.33)
Milk and milk products	8(53.33)	9(60)	13(86.66)	15(100)
Snacks	14(93.33)	14(93.33)	13(86.66)	14(93.33)
Fresh juices	13(86.66)	12(80)	9(60)	10(66.66)
Sweets	12(80)	14(93.33)	9(60)	13(86.66)
Beverages	15(100)	13(86.66)	10(66.66)	9(60)

As observed here, all the students (100%) consumed cereals and pulses across both school types. Students of government schools exhibited higher consumption in following food groups-dairy products (government school boys: 86.66%, girls: 100% vs private schools: 53.33-60%) and vegetables/fruits (government: 80%-73.33 vs private: 66.66 – 60%). These findings negate assumptions about private school nutritional advantages. Prominent differences appeared, mainly in government school beverage consumption where girl showed lower intake (60%) compared to other groups (80-100%). Snack consumption remained consistently high (93.33%) across all groups, indicating widespread availability regardless of school type. On contrary, some research reports, reveals that government school students had a better nutritional diversity than private school students in certain categories, particularly dairy and fresh produce (22).

Table 7: Comparison of Dietary habits between government and private school boys and girls

		Private school (Boys)n(%)	**Private school (Girls)n(%)**	**Govt school (Boys)n(%)**	**Govt school (Girls)n(%)**
Food preference	Vegetarian	0	1(6.66)	5(33.33)	0
	Non-vegetarian	15(100)	14(93.33)	10(66.66)	15(100)
Food allergy	Yes	0	0	0	0
	No	15(100)	15(100)	15(100)	15(100)
Food preferred	**Home cooked**	10(66.66)	3(20)	15(100)	15(100)
	Outside food	5(33.33)	12(80)	0	0
Food intolerance	**Yes**	0	0	0	0
	No	15(100)	15(100)	15(100)	15(100)
Skipping meals	**Breakfast**	2(13.33)	0	2(13.33)	0
	Lunch	3(20)	7(46.66)	0	0
	Dinner	4(26.6)	5(33.33)	1(6.66)	0
	Never	6(40)	3(20)	12(80)	15(100)
Emotional eaters	**Yes**	0	3(20)	0	0
	No	15(100)	15(100)	15(100)	12(80)
Water consumption	**< 1ltr**	0	0	3(20)	0
	1-2ltrs	11(73.33)	12(80)	7(46.66)	12(80)
	>3ltrs	4(26.66)	3(20)	5(33.33)	3(20)

Fact fully, majority of the students preferred non-vegetarian diet across both school types and private school girls showing minimal vegetarian preference (6.66%). Interestingly, no food allergies were reported across all groups. Home-cooked meals (100%) were preferred by Government school students while private school students showed mixed preferences - boys chose

to eat outside food (66.66%) over home-cooked food (33.33%), while, girls preferred home-cooked meals (80% vs 20% outside food). Skipping breakfast was minimal across groups (0-13.33%). However, skipping of lunch showed notable variation with private school girls having the highest rate (46.66%). Dinner skipping was consistently low (0-16.66%). Private school students reported higher emotional eating behaviors (boys: 40%, girls: 20%) compared to government school students (0%), indicating potential stress-related eating patterns. Most students consumed 1-2 litters of water daily (66.66-80%) with adequate hydration levels across the students from both school types.

Some of the studies reveal that government school students demonstrate more stable eating patterns with consistent home-cooked meal preferences and lower emotional eating. Private school students show greater dietary versatility, higher meal skipping rates, and stress-related eating behaviours, possibly reflecting different lifestyle pressures (23-24).

4. CONCLUSION

This constrastive study of 60 teenagers (13-15 years) from private and government schools in Srinivaspura, Kolar district, revealed notable disparities in nutritional status and mental health parameters between educational settings. Superior anthropometric measurements including higher median values for height, weight, BMI, and MUAC were noted in private school students indicating better overall growth and nutritional status. However, government school students showed better food consumption patterns for dairy products (86.66-100% vs 53.33-60%) and vegetables/fruits. Higher haemoglobin levels (boys: 12.8 vs 11.4 g/dL, $p=0.0002$; girls: 12.7 vs 10.0 g/dL, $p<0.0001$) were noticed among private school students indicating lower prevalence of iron deficiency anemia compared to government school students. Government school students, particularly girls, exhibited higher prevalence of moderate to severe anxiety, depression, and stress compared to private school students, suggesting greater psychosocial burden requiring targeted mental health interventions. Government school students demonstrated more stable eating patterns with consistent home-cooked meal preferences (100%) and lower emotional eating behaviours, while private school students showed greater dietary variability and higher meal skipping rates.

The study reveals a complex dual burden of malnutrition - undernutrition among government school students though they have better dietary diversity patterns, contrasted with better anthropometric status but potentially problematic eating behaviours in private school students. These findings underscore the critical need for:

- Targeted iron supplementation programs in government schools
- Mental health support services for government school students
- Comprehensive nutritional interventions addressing both undernutrition and emerging lifestyle-related dietary issues
- Evidence-based public health policies considering socioeconomic determinants of adolescent health

These results highlight that educational setting significantly influences teenagers' health outcomes, necessitating tailored interventions to address specific vulnerabilities in each school type.

For government schools: The high prevalence of underweight and stunting underscores the need to strengthen nutritional interventions, improve the quality and quantity of school meals, and address broader socioeconomic determinants of health.

For private schools: The rising trend of overweight and obesity calls for targeted health education, promotion of physical activity, and regulation of unhealthy food environments.

Policy focus: Addressing both extremes of malnutrition requires integrated strategies that consider dietary quality, physical activity, and the social determinants of health.

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