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ASSESSMENT AND COMPARISON OF NUTRITIONAL STATUS OF GOVERNMENT AND PRIVATE SECONDARY SCHOOL CHILDREN OF GUJRANWALA DISTRICT PUNJAB, PAKISTAN

Muhammad Ikram[*1], Taqdees Manzoor[2], Hafiz Abdul Rauf Raufi[3], Mushtaq Ahmad[4], Liaqat Ali[5], Shehzadi Sanam Roohi Farooqi[6]

[*1,2,3,4]*Sports Sciences MPhil Scholar, Riphah International University, Faisalabad*
[5]*Department of Pharmacology, University of Health Sciences, Lahore*
[6]*Head of Department of Sports Sciences, Riphah International University, Faisalabad*

[*1]ikram.bhatti86@gmail.com, [2]taqdeesmanzoor199@gmail.com, [3]raufi1087@gmail.com, [4]mushtaq.5121427@gmail.com, [5]Liaqat.uhs@gmail.com

Corresponding Author: *
Muhammad Ikram
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ABSTRACT

Background:
Adequate nutrition during childhood and adolescence is essential for optimal physical growth, cognitive development, and long-term health. Poor dietary practices during teenage years, whether due to insufficient or excessive intake, can lead to malnutrition and increase the risk of chronic diseases later in life. In developing countries like Pakistan, school-going children face a dual burden of undernutrition and obesity, influenced by socioeconomic disparities and lifestyle factors.

Objective: *To assess and compare the nutritional status of government and private secondary school children in Gujranwala City, Punjab, Pakistan.*

Methods: *A school-based comparative cross-sectional study was conducted among secondary school students aged 11–19 years. One government and one private school were selected using random sampling techniques. A total of 2400 students were included, comprising 1200 students from private schools and 1200 from government schools. Data on sociodemographic characteristics, dietary habits, and physical activity were collected using a structured questionnaire. Information regarding parental education, occupation, and income was also obtained. Anthropometric measurements were recorded, and nutritional status was assessed using body mass index (BMI)-for-age percentiles based on CDC growth charts. Statistical analysis was performed using chi-square tests, with a significance level set at $p < 0.05$.*

Results: *Government school children demonstrated a significantly higher prevalence of undernutrition, with 21.25% classified as underweight, compared to 10.83% in private schools. Conversely, overweight (17.33%) and obesity (18.08%) were more prevalent among private school students than government school students (7.83% and 8.33%, respectively). The association between type of school and nutritional status was statistically significant ($p < 0.001$).*

Conclusion: *The study reveals a dual burden of malnutrition among secondary school children in Gujranwala, characterized by undernutrition in government schools and rising overweight and obesity in private schools.*

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Targeted school-based nutritional and physical activity interventions are urgently needed to address these contrasting public health challenges.
Keywords: *Malnutrition; Nutritional Status*

INTRODUCTION

A country's wealth relies on its healthy citizens. Childhood is the key time for building a strong future, and good nutrition is very important for this. Healthy physical and mental growth in children helps a country grow. Malnutrition can mean not getting enough food or eating too much. When children are malnourished, they can get many diseases as adults. The goal of checking nutrition in a community is to understand how big the problem of malnutrition is and where it happens, and to find out what causes it so that we can fix it. With this in mind, we looked at the nutrition of children in both government and private schools in Gujranwala.

Aims & Objectives

1. To assess the nutritional status of government and private school children.
2. To compare the nutritional status of private and government school children.
3. To correlate the nutritional status of children with selected socio demographic variable and risk factors.

Material & Methods

Study Design and Setting: A school-based comparative cross-sectional study was conducted in selected government and private secondary schools of Gujranwala City, Punjab, Pakistan. **Sampling Technique:** Stratified random sampling was used to select schools. A complete list of government and private secondary schools along with student enrolment figures was obtained from the District Education Office (DEO), Gujranwala. Schools were stratified into two categories: government and private. One school from each stratum was selected randomly. Within the selected schools, students were recruited using systematic random sampling. In the government school, every 20th eligible student was selected to ensure adequate representation. **Study Population and Study Unit:** The study population comprised students enrolled in grades 9 to 12 in the selected schools. Students aged 11–19 years who met the inclusion criteria were included as study participants. **Inclusion and Exclusion Criteria:** Students with known chronic illnesses, hormonal disorders, or physical disabilities affecting growth were excluded from the study. Additionally, students whose parents or guardians did not provide written informed consent, as well as those absent or ill during data collection, were excluded. **Sample Size:** A total of **2400 students** were included in the study, comprising **1200 students from private schools and 1200 students from government schools**. In private schools, all eligible students from grades 9 to 12 were included. In government schools, systematic sampling was employed from an estimated population of approximately 12,000 students to achieve the required sample size. **Ethical Approval:** Ethical approval was obtained from the institutional Ethical Review Committee and school administrations. Written informed consent was obtained from parents or guardians prior to data collection. **Data Collection Tools and Procedures:** Data were collected using a pre-tested structured questionnaire covering sociodemographic characteristics, dietary habits, junk food consumption, physical activity, outdoor play, screen time, and computer use. Parental information regarding education, occupation, and monthly income was obtained through take-home questionnaires. A pilot study involving 400 students was conducted to validate the tool. Anthropometric measurements, including height and weight, were recorded using standardized instruments. Body mass index (BMI) was calculated as weight (kg) divided by height squared (m^2).

Nutritional Assessment:

Nutritional status was classified using BMI-for-age percentiles according to the Centre's for Disease Control and Prevention (CDC) growth charts. Students were categorized as underweight (<5th

percentile), normal (5th–85th percentile), overweight (85th–95th percentile), or obese (≥95th percentile). **Socioeconomic Status:** Socioeconomic status was assessed using a modified classification system, taking into account parental income and occupation, with consideration of Pakistan's Consumer Price Index (CPI) trends reported by the Pakistan Bureau of Statistics.

Study Duration and Statistical Analysis:
The study was conducted over six months, from June 1, 2025, to November 30, 2025. Data were entered into Microsoft Excel and analyzed using Epi Info software. Descriptive statistics were expressed as proportions, and associations were assessed using the chi-square test with Yates' correction. A p-value of <0.05 was considered statistically significant.

Results

Table 1 presents the socio-demographic characteristics of the study participants. Among private school students (N = 1200), the majority (51.50%) were aged 11–14 years, whereas in government schools (N = 1200), most students (43.50%) were in the 14–17 years age group. In private schools, males constituted 55.83% of the sample, while females accounted for 44.17%. Similarly, in government schools, 61.50% of students were males and 38.50% were females. The majority of students in both school types belonged to the Islam religion. Private school students were predominantly from lower socioeconomic classes (Class I and II), whereas government school students represented a wider socioeconomic distribution, including higher classes (Class IV and V). Literacy rates among parents were higher in private schools, while illiteracy was observed among 37.50% of mothers and 19.08% of fathers of government school students.

Table 2, along with **Figures 1,2 and 3** illustrates the distribution of nutritional status among the study participants. Among private school students, 130 (10.83%) were underweight,208 (17.33%) were overweight, and 217 (18.08%) were obese. In contrast, government school students exhibited a significantly higher prevalence of underweight (255; 21.25%) compared to private school students. Overweight and obesity were markedly more prevalent among private school students than government school students (7.83% overweight and 8.33% obese). The association between type of school and nutritional status was statistically significant ($p < 0.001$).

Table 3 demonstrates the relationship between nutritional status and gender. A higher proportion of boys in private schools were obese (17.58%%), whereas underweight was more prevalent among girls in both private (17.78%) and government schools (30.97%). The association between gender and nutritional status was statistically significant in private schools but not in government schools.

Table 4 shows a significant association between junk food consumption and nutritional status. Among private school students, obesity was more common in those consuming junk food more than twice per week (20.18%) compared to those consuming it once per week (11.35%). A similar statistically significant pattern was observed among government school students.

Table 5 highlights the relationship between physical activity and nutritional status. Obesity was more prevalent among private school students who engaged in outdoor games for less than one hour per day (19.73%) compared to those who played for more than one hour (12.24%). A comparable significant association between reduced physical activity and obesity was also observed among government school students.

Discussion

The present study revealed significant differences in the nutritional status of children attending government and private schools in Punjab, Pakistan. The higher prevalence of underweight among government school children may be attributed to lower socioeconomic status, limited access to nutritious food, and reduced parental awareness regarding balanced diets. Similar findings have been reported in Pakistani studies where undernutrition was more common in government schools than private institutions (Khan et al., 2017; Ateeq et al., 2019). These results highlight the need for targeted nutritional

interventions and school-based feeding programs in government schools.

The higher rate of overweight among private school children may be linked to increased consumption of energy-dense foods, sedentary lifestyles, and greater access to fast food outlets. Previous research in Pakistan has similarly reported a higher prevalence of overweight and obesity in private school students, largely due to higher socioeconomic status and unhealthy dietary practices (Anwar et al., 2014; Tanveer et al., 2024). These findings emphasize the importance of promoting physical activity and healthy eating habits, particularly in private school settings.

The increased prevalence of obesity in private school children may be associated with excessive junk food consumption, reduced physical activity, and increased screen time. These findings are consistent with earlier studies conducted in Pakistan, which reported higher obesity rates among children from affluent backgrounds (Anwar et al., 2014; WHO, 2023). This underscores the urgent need for obesity prevention strategies, including dietary education and regular physical activity programs, especially in private schools.

Sedentary behaviors, including prolonged television viewing or computer use exceeding three hours per day, were associated with higher rates of overweight, consistent with the current findings. While this study did not find a direct link between junk food and undernutrition, other research in Lahore indicated that bakery and snack items often provide calories without essential nutrients. Gender differences in nutritional status may be influenced by varying levels of physical activity, dietary preferences, and sociocultural.

Conclusion

The study demonstrated a clear disparity in nutritional intake between children attending government and private schools. Many children in government schools were found to be undernourished, primarily due to insufficient access to food, reflecting the impact of poverty. In contrast, children in private schools, often from wealthier families and urban areas, frequently consumed excess calories, contributing to overweight and obesity. These findings underscore the influence of socioeconomic status and urban residency on nutritional outcomes, highlighting poverty as a key determinant of inadequate nutrition among government school children.

Recommendation

The findings of this study indicate that overweight and obesity are prevalent in affluent communities, particularly among children with sedentary lifestyles. Physical inactivity combined with high-calorie dietary intake significantly increases the risk of overweight. These results highlight the urgent need for interventions that promote healthier lifestyles among schoolchildren, including education on balanced diets and recommended levels of physical activity. Given that malnutrition has multifactorial causes, addressing it requires coordinated efforts at multiple levels—family, school, community, national, and international—through comprehensive health education programs. Parents, teachers, and students should be supported and guided to adopt healthy behaviour's, such as engaging in regular physical activity, minimizing prolonged sedentary behaviors (e.g., excessive television viewing or video gaming), and limiting consumption of junk food. Conversely, undernourished children, particularly those in government schools, should be encouraged to consume balanced, nutrient-rich diets that provide adequate calories and protein while remaining affordable.

Authors Contribution.

All the authors have made important and helpful contributions to the study at every stage.

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Tables

TABLE 1 DISTRIBUTION OF STUDY SUBJECTS ACCORDING TO BIO-SOCIAL CHARACTERS

Bio-social character	Private school (N=1200)		Government school (N=1200)	
	Number	Percentage	Number	Percentage
Age (Years)				
11-14	618	51.50%	288	24.00%
14-17	453	37.75%	522	43.50%
17 and above	129	10.75%	390	32.50%
Total	1200	100%	1200	100%
Sex				
Male	670	55.83%	738	61.50%
Female	530	44.17%	462	38.50%
Total	1200	100%	1200	100%
Religion				
Muslims	930	77.50%	820	68.33%
Christians	215	17.92%	344	28.67%
Qadiyani	35	2.92%	22	1.83%
Other	20	1.67%	14	1.67%
Total	1200	100%	1200	100%
Socio-economic status				
I	754	62.84%	450	37.50%
II	226	18.83%	280	23.33%
III	100	8.33%	250	20.83%
IV	80	6.67%	170	14.67%
V	40	3.33%	50	4.67%
Total	1200	100%	1200	100%
Education status of mother				
Illiterate	220	18.33%	450	37.50%
Literate	980	81.67%	750	62.50%
Total	1200	100%	1200	100%
Education status of father				
Illiterate	120	10.00%	229	19.09%
Literate	1080	90.00%	971	80.91%
Total	1200	100%	1200	100%
Occupation of mothers				
House wife	810	67.50%	1021	85.08%

Professional	390	32.50%	179	14.92%
Total	1200	100%	1200	100%
Occupation of fathers				
Job/service	540	45.50%	1020	85.00%
Business	660	55.50%	180	15.00%
Total	1200	100%	1200	100%
Type of diet				
Vegetarian	856	71.33%	650	54.17%
Non-vegetarian/Mixed	344	28.67%	550	45.83%
Total	1200	100%	1200	100%
Junk food				
Once/week	677	56.42%	804	67.00%
>Twice/week	523	43.58%	398	33.00%
Total	1200	100%	1200	100%
Physical activity				
i.Aerobics				
Yes	506	42.17%	380	31.67%
No	694	57.83%	820	68.33%
Total	1200	100%	1200	100%
ii. Out-door games				
>1 hour	516	43.00%	396	33.00%
<1 hour	684	57.00%	804	67.00%
Total	1200	100%	1200	100%
Watching TV				
<1hour	423	35.25%	639	53.25%
>1hour	777	64.75%	561	46.75%
Total	1200	100%	1200	100%

TABLE 2 DISTRIBUTION OF STUDY SUBJECTS ACCORDING TO NUTRITIONAL STATUS

Nutritional status	Private school		Government school		Statistical test
	Number	Percentage	Number	Percentage	
Under-weight	130	10.84%	255	21.25%	X2=48.401 DF=1 P<0.0001
Normal	645	53.75%	751	62.69%	X2=19.241 DF=1 P<0.0001
Over weight	208	17.33%	94	7.83%	X2=68.601 DF=1 P<0.0001
Obese	217	18.08%	100	8.33%	X2=73.421 DF=1 P<0.0001
Total	1200	100.0%	1200	100.0%	

TABLE 3UTRITIONAL S OF STUDY CTS RELATION TOSOCIAL CHARA ERS
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Variable	Private school					Government school				
Sex	UW	Normal	OW	Obese	Total	UW	Normal	OW	Obese	Total
Male	46 6.96%	395 59.85%%	103 15.61%%	116 17.58%	660 100%	127 16.98%	534 71.39%%	42 5.61%%	45 6.02%%	748 100%
Female	96 17.78%	276 51.11%	87 16,11%	81 15.00%	540 100%	140 30.97%	243 53.76%	34 7.53%	35 7.74%	452 100%

Total	142	671	190	197	1200	215	721	24	20	1200
X2	$\chi2$ = 33.381, df = 3, p = 0.0001					$\chi2$ = 173.351, df = 3, p = 0.0001				

TABLE 4TIONAL OF Y TS INELATION TO NUTRI STATUS STUD SUBJEC R DIET

Variable	Private school					Government school				
Junk food	UW	Normal	OW	Obese	Total	OW	Normal	Ow	Obese	Total
Once/week	74 11.99%	383 62.07%	90 14.59%	70 11.35%	617 100%	134 16.46%	624 76.66%	28 3.44%	28 3.44%	814 100%
>Twice/week	76 13.03%	288 49.39%	100 17.40%	119 20.18%	583 100%	141 36.53%	153 39.64%	48 12.44%	44 11.39%	386 100%
Total	150	671	190	189	1200	275	777	76	72	1200
$\chi2$ = 24.631, df = 3, p =0.0001						$\chi2$ = 164.832, df = 3, p =0.0001				

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Variable	Private school					Government school				
O.D.G.	Uw	Normal	OW	Obese	Total	UW	Normal	OW	Obese	Total
> 1 hour	112 21.09%	285 53.67%	69 13.00%	65 12.24%	531 100%	159 19.14%	599 72.08%	39 4.69%	34 4.09%	831 100%
<1 hour	26 3.89%	382 57.10%	129 19.28%	132 19.73%	669 100%	104 28.18%	174 47.15%	45 12.20%	46 12.47%	369 100%
Total	138	667	198	197	1200	263	773	84	80	1200
	$\chi2$ = 91.991, df = 3, p = 0.0001					$\chi2$ = 39.952 df =3, p= 0.0001				

Figures:

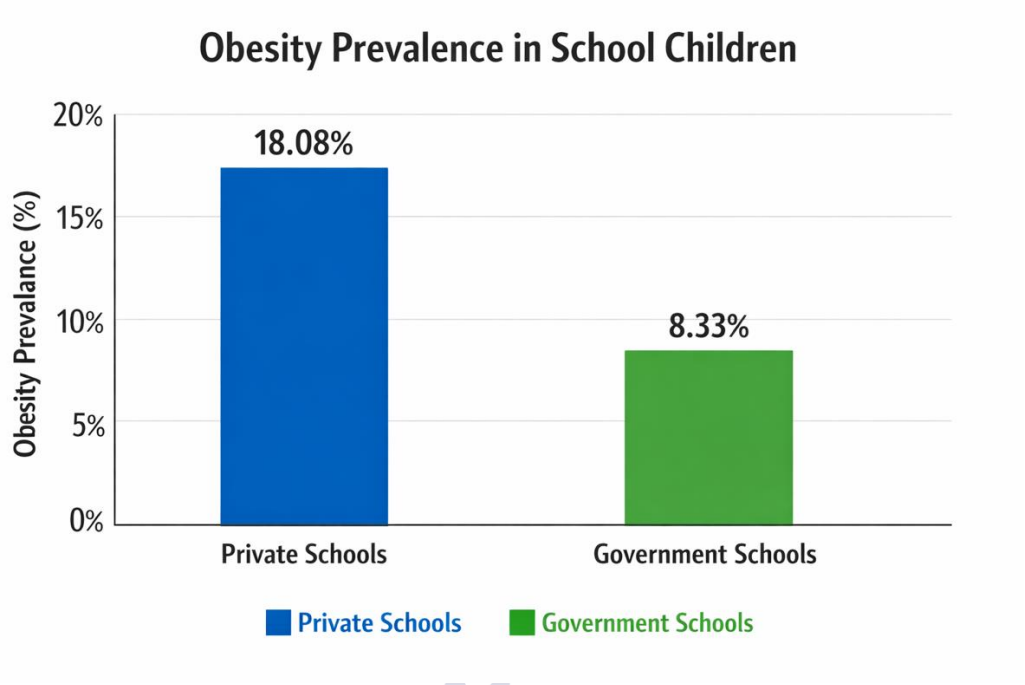

FIGURE 1 COMPARISON OF OBESITY IN GOVERNMENT AND PRIVATE SCHOOL CHILDREN

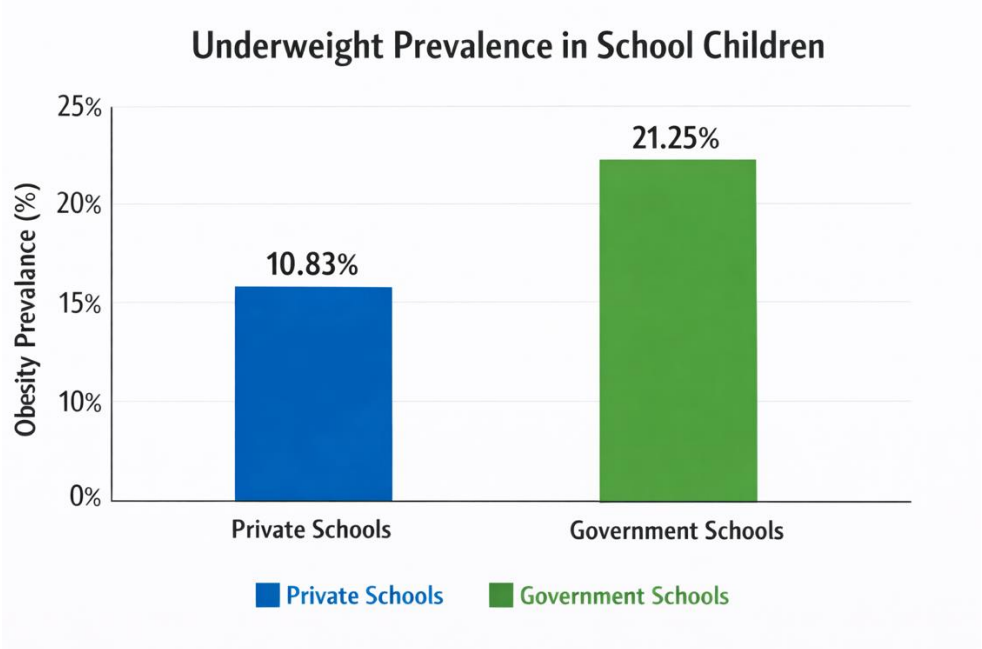

FIGURE 2 COMPARISON OF PERCENTAGE OF UNDERWEIGHT STUDENTS IN GOVERNMENT AND PRIVATE SCHOOL CHILDREN

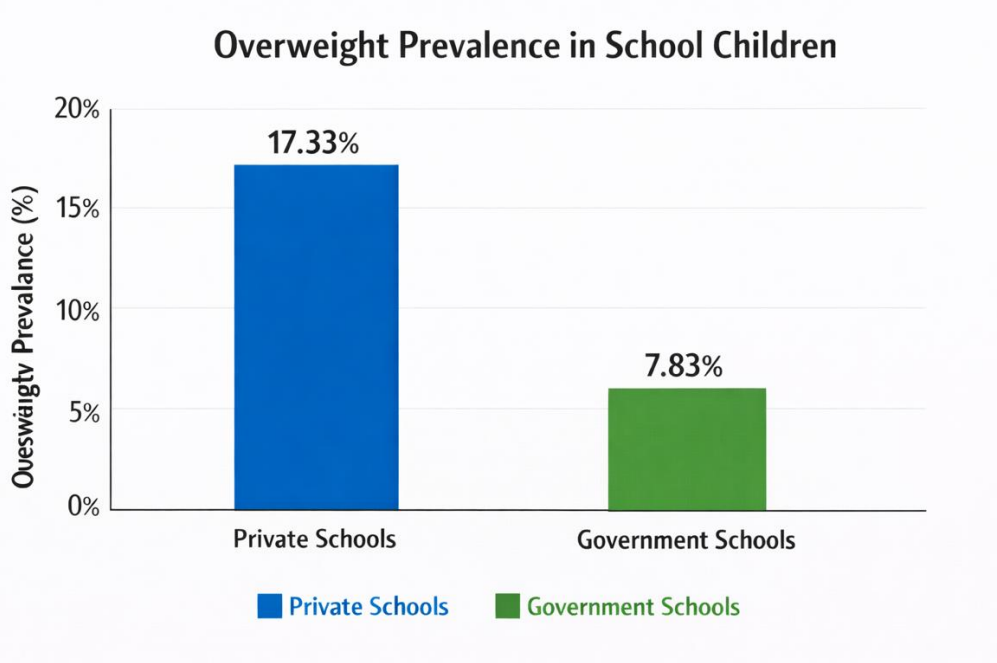

FIGURE 3 COMPARISON OF PERCENTAGE OF OVERWEIGHT STUDENTS IN GOVERNMENT AND PRIVATE SCHOOL CHILDREN