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# NUTRITIONAL STATUS AND IMPACT OF OUTDOOR PLAY AMONG GOVERNMENT & PRIVATE SCHOOL CHILDREN: A CROSS-SECTIONAL STUDY IN URBAN MEERUT

Community Medicine

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## ABSTRACT

**Background:** Children spend much of their time in school, making their health crucial for educational success. As one-fifth of the population, they are the future of nations. Common health issues like malnutrition, vitamin deficiencies, and anaemia can hinder cognitive development and increase the risk of chronic diseases in later life.

**Objectives**

1. To assess the prevalence of malnutrition among government and private school children.
2. To explore the impact of outdoor play on nutritional outcome of school children.

**Material & Methods:** A community-based cross-sectional study was done in two schools of urban Meerut, Uttar Pradesh. 384 students aged 10–17 years, giving informed consent were selected by multistage random sampling. A pre-designed, semi-structured, closed-ended questionnaire was used including sociodemographic and anthropometric measurements. Chi-square tests were applied using Epi info 3.5.3. **Results:** Government school children had higher rates of underweight cases (63.6%), while private school children had higher rates of overweight/obesity (62.2%). A significant association was found between outdoor playtime and nutritional status. Children who played less than 1 hour per day were more likely to be overweight or obese, while those who played more than 1 hour had a higher likelihood of being of normal weight. **Conclusion:** The study found that government school children had more underweight cases, while private school children had higher rates of overweight and obesity. Playing outdoor games for less than 1 hour increased the likelihood of being overweight or obese.

## KEYWORDS

Nutritional Status, Outdoor Play, Overweight, School children, Underweight

## INTRODUCTION

Urbanization has led to lifestyle changes, with children increasingly engaging in sedentary activities like watching TV or using smartphones, reducing time spent in outdoor play. Outdoor play is crucial for physical activity, which directly affects a child's growth and prevents conditions like obesity. There has been an increase in the percentage of overweight and obese children in affluent urban families of India in the past decade .[1]

Children spend a significant portion of their time in school, making their health vital to educational success. As one-fifth of the global population, children represent the future of nations.[2] Common health issues such as malnutrition, vitamin deficiencies, and anaemia can impair cognitive development and increase the risk of chronic diseases later in life. Malnutrition, whether due to undernutrition or overnutrition, poses serious health risks, affecting both physical and cognitive growth, which in turn can impact a child's overall development and future potential.

This cross-sectional study aims to assess and compare the nutritional status of children in government and private schools and to explore the relationship between outdoor play and health outcomes.

## OBJECTIVES

- To assess the prevalence of malnutrition among government and private school children.
- To explore the impact of outdoor play on nutritional outcome of school children.

## MATERIAL AND METHODS

This cross-sectional study was conducted in two schools of urban Meerut from January 2023 to June 2023. The sample size was calculated using the formula $n = (Z^2 (1- \alpha /2) pq)/d^2$, with the prevalence of anaemia among 15-19 year old females in urban Uttar Pradesh from NFHS-5[(3)] taken as 53.4%, a 95% confidence interval, and 5% absolute precision, resulting in a total sample of 384 students (192 from each government and private school). A list of secondary schools was obtained from district inspector of school office, meerut and one government and one private school were randomly selected. From each school, 192 students were randomly chosen across 12 classes (including all the sections), selecting 16 students per class. If a student declined or did not meet the criteria, another was randomly chosen.

**Data Collection:**

A pre-designed, semi-structured, closed-ended questionnaire was self-administered by each participant. The questionnaire gathered information on various aspects, including socio-demographic profile, physical activity (such as daily exercise duration) and dietary history.

Anthropometric measurements were conducted by assessing height and weight using standardized equipment, with Body Mass Index (BMI) calculated accordingly. Weight was measured with a digital scale calibrated against a standard weight, recorded to the nearest 0.1 kg. Height was measured using a standardized stadiometer, recorded to the nearest 0.1 cm.

**Data Analysis:**

Data was entered in Microsoft Excel. Descriptive statistics was expressed in the form of number and Percentages. Inferential statistics was calculated using Epi info. Chi square test was done and p value less than 0.05 was taken as significant. WHO 2007 Growth reference for 5-19 years was used for classifying overweight and obesity using age and gender specific cut off points.[(4)]

## RESULTS:

**Table 1: Distribution Of School Children According To Nutritional Status**

| Nutritional status | Govt. School Children ($n_1$=192) | Pvt. School Children ($n_2$=192) | Total (n=384) |
|---|---|---|---|
| | No. (%) | No. (%) | No. (%) |
| Underweight | 28(63.6) | 16(36.4) | 44(11.5) |
| Normal | 147(49.8) | 148(50.2) | 295(76.8) |
| Overweight & Obese | 17(37.8) | 28(62.2) | 45(11.7) |
| Total | 192(50.0) | 192(50.0) | 384(100) |
| Statistical test | $\chi^2$ =5.96 | df=2 | p-value=0.05 |

In the above table, 11.5% of children were underweight, 76.8% had

normal weight, and 11.7% were overweight or obese. Government school children had a higher percentage of underweight cases, while private school children had a higher percentage of overweight/obese cases. The difference in nutritional status between the two groups was statistically significant ($\chi^2 = 5.96$, $p = 0.05$).

**Table 2: Dietary Habits Between Government And Private School Children In Urban Meerut.**

| Diet | Govt. School Children ($n_1$=192) | Pvt. School Children ($n_2$=192) | Total (n=384) | P-value |
|---|---|---|---|---|
| Bakery Product intake | | | | |
| Once a Week | 131(60.4) | 86(39.6) | 217(56.5) | 0.001 |
| ≥Twice a week | 61(36.5) | 106(63.5) | 167(43.5) | |
| Junk food intake | | | | |
| Once a Week | 112(57.4) | 83(42.6) | 195(50.8) | 0.003 |
| ≥Twice a week | 80(42.3) | 109(57.7) | 189(49.2) | |

**(Chi square test was used to calculate p-value)**

Government school children were more likely to consume bakery products once a week (60.4%) compared to private school children (39.6%). However, private school children consumed bakery products more frequently, with 63.5% having them twice or more weekly (p=0.001). Similarly, junk food intake was higher among private school children, with 57.7% consuming it twice or more per week, compared to 42.3% of government school children (p=0.003).

**Table 3: Association Between Nutritional Status And School Children Playing Outdoor Games For Less Than 1 Hour Per Day (n=115)**

| Nutritional Status | Govt. School Children No. (%) | Pvt. School Children No. (%) | Total No. (%) |
|---|---|---|---|
| Underweight | 6(54.5) | 5(45.5) | 11(9.6) |
| Normal | 20(24.1) | 63(75.9) | 83(72.2) |
| Overweight & Obese | 10(47.6) | 11(52.4) | 21(18.2) |
| Total | 36(31.3) | 79(68.7) | 115(100.0) |
| Statistical Test | $\chi^2$ =7.3 df=2 p-value=0.02 | | |

Among children who played outdoor games for less than 1 hour per day, 9.6% were underweight, 72.2% had normal weight, and 18.2% were overweight or obese. The association between playing less than 1 hour per day and nutritional status was statistically significant ($\chi^2 = 7.3$, $p = 0.02$).

**Table 4: Association Between Nutritional Status And School Children Playing Outdoor Games For More Than 1 hr/day(n=269)**

| Nutritional Status | Govt. School Children No. (%) | Pvt. School Children No. (%) | Total No. (%) |
|---|---|---|---|
| Underweight | 22(66.7) | 11(33.3) | 33(12.3) |
| Normal | 127(59.9) | 85(40.1) | 212(78.8) |
| Overweight & Obese | 7(29.2) | 17(70.8) | 24(8.9) |
| Total | 156(58.0) | 113(42.0) | 269(100.0) |
| Statistical Test | $\chi^2$ =9.5 df=2 p-value=0.008 | | |

Among children who played outdoor games for more than 1 hour per day, 12.3% were underweight, 78.8% had normal weight, and 8.9% were overweight or obese. The association between playing more than 1 hour per day and nutritional status was statistically significant ($\chi^2 = 9.5$, $p = 0.008$).

## DISCUSSION:

This study found that 63.6% of underweight children were from government schools, while private schools had 62.2% of overweight and obese children. The distribution of children was evenly split between the two types of schools, with each comprising 50% of the total sample. Whereas study by **Jain Sharma S et al. (2018)**[5] in Muzaffarnagar, UP showed the prevalence of underweight, overweight and obesity among private school children was (9.18%), (14.08%), and (13.97%), respectively. Underweight prevalence was more in government school (21.94%) when compared with private school (9.18%). The overweight prevalence was more in private school (14.08%) than government school (2.45%) This association was statistically significant. Similarly, **Sehgal S et al. (2017)**[6] his study in Meerut city, UP stated that the prevalence of underweight, and overweight among private primary school children of was (19.4%), and (21.6%), respectively. The prevalence of underweight, and overweight among government primary school children of Meerut city was 140 (28%), and 96 (19%), respectively.

In the current study, private school children consume bakery products and junk food more frequently (63.5% and 57.7% respectively consume ≥twice a week) compared to government school children. In a study by **Jain Sharma et al. (2018)**[5] in Muzaffarnagar, UP it was found that among government school children, 71.8% consumed junk food once a week and 28.2% consumed it more than twice a week. For private school children, 51.7% consumed junk food once a week and 48.3% consumed it more than twice a week.

In our study, 58.0% of government school children played outdoors for more than an hour daily, compared to 42.0% from private schools. Conversely, 68.7% of private school children played outside for less than one hour, compared to 31.3% of government school children. On the contrary, study by **Jain Sharma S et al. (2018)**[5] in Muzaffarnagar, UP found that in private school 41.54% and in governments school 18.3% does aerobic exercise and in view of outdoor games in both private and government schools most of the children play for <1hr/day and remaining 53.6% play for >1hr/day, in government school 50.7% play for 1hr/day. A study by **Chingle MP et al. (2020)**[7] in the North Central Zone of Nigeria reported that 83.3% of private school children showed engagement in physical activity and 90.9% of government school children does physical activity.

## CONCLUSION:

- The study indicates that 76.8% of all students maintained a normal weight, but government school children had a higher prevalence of underweight (63.6%), while private school children exhibited higher rates of overweight/obesity (62.2%). This disparity may be attributed to differing dietary habits, as private school children consumed more bakery products and junk food, with significant differences noted (p<0.001 and p=0.003).
- Physical activity levels also varied, with 68.7% of private school children engaging in less than one hour of outdoor play daily, correlating with their higher rates of overweight/obesity (18.2%, p=0.02). In contrast, among those playing outdoors for more than one hour, government school children were more prevalent (58%), leading to better weight distribution, as evidenced by 78.8% maintaining a normal weight (p=0.008). These findings suggest a strong link between socioeconomic status, lifestyle habits, and nutritional outcomes.

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