

EATING BEHAVIOUR AND PHYSICAL ACTIVITY AS AN ESSENTIAL DETERMINANT OF NUTRITIONAL STATUS AMONG SCHOOL GOING CHILDREN

M.Karthika^{1*}, Dr.S.Uma Mageshwari²

^{1*}Research Scholar, Department of Food Service Management and Dietetics, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore

²Professor, Department of Food Service Management and Dietetics, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore.

*Corresponding Author: M. Karthika

*Email: karthikacnd@gmail.com.

Keywords	Abstract
Eating behaviour, Physical Activity, EAT-26 scale, IAP, Weight for Age and Height for age	Eating behaviour is a broad term that encompasses food choice and motives, feeding practices, dieting, and eating-related problems such as obesity, eating disorders, and feeding disorders. Eating habits regroup “conscious, collective, and repetitive behaviours, which lead people to select, consume, and use certain foods or diets, in response to social and cultural influences. The study is to assess the nutritional status, eating behaviour and physical activity patterns among selected school-going children and to identify the association between eating behaviour and physical activity among selected school-going boys and girls. Five hundred school-going children aged 11 to 13 years were selected from one school in the urban areas of the Coimbatore District by purposive sampling. Nutritional Status was assessed using standard procedures. The Physical activity of the selected children was assessed using the International Physical Activity Questionnaire (IPAQ) -2004, and The eating behaviour of the selected children was assessed using the Eating Attitude Test (EAT-26) scale. 37.7% and 36.7% among boys and 30.5% and 45.5% among girls, respectively. Physical activity levels of girls were significantly lower, with 56.5 per cent of the girls stating that they were not engaged in any physical activity compared to 39 per cent among boys. EAT scale 26. It was found that 18.4% of boys and 17.5% of girls were at risk of developing eating disorders. the effectiveness of these tools and recommends the inclusion of eating behaviour and physical activity assessment in the nutritional screening of children, particularly school-aged children, who are at an increased risk of disordered eating.

Introduction

Eating behaviour is a broad term that encompasses food choice and motives, feeding practices, dieting, and eating-related problems such as obesity, eating disorders, and feeding disorders. Eating habits regroup “conscious, collective, and repetitive behaviours, which lead people to select, consume, and use certain foods or diets, in response to social and cultural influences⁽¹⁾. Individuals who engage in more physical activity have a more self-determined regulation of their eating habits⁽²⁾ Physical activity (PA) has always been synonymous with well-being and health. Children who follow a healthy and active lifestyle build their healthy musculoskeletal system, reduce the risk of developing chronic disease, improve their mental processes and enhance their self-conception⁽³⁾. Physical activity is an integral component of a healthy lifestyle in today’s modern world. Physical activity by WHO is defined as any bodily movements produced by skeletal muscles that require energy expenditure. WHO recommendation for children of all ages requiring vigorous physical activity 3 times a week for 60 minutes⁽⁴⁾. Eating behaviour, particularly the consumption of nutrient-dense foods, and engagement in physical activity are closely interrelated and form part of the broader energy balance equation essential for maintaining a healthy weight and optimal health⁽⁵⁾. Physical activity has been shown to positively influence children’s dietary choices by promoting appetite regulation and encouraging healthier food consumption patterns⁽⁶⁾. Active children often exhibit higher intakes of fruits, vegetables, and water while reducing their consumption of energy-dense and nutrient-poor foods such as sugary snacks and beverages. Eating behaviours among children are shaped by a variety of factors, including parental influence, school environments, peer dynamics, and socioeconomic status⁽⁷⁾. Physical activity, on the other hand, serves as a

determinant of energy balance and overall health, influencing children’s metabolism, physical fitness, and mental well-being. ⁽⁸⁾

Objectives

- To assess the nutritional status, eating behaviour and physical activity patterns among selected school-going children.
- To identify the association between eating behaviour and physical activity among selected school-going boys and girls.

Materials and Methods

The sampling technique used for the study was purposive sampling. Five hundred school-going children aged 11 to 13 years were selected from one school in the urban areas of the Coimbatore District, Tamilnadu. The sample comprised 300 boys and 200 girls, chosen based on specific inclusion and exclusion criteria. Children with special needs were excluded from the study. Necessary permissions were obtained from school authorities to carry out the research, and ethical approval (AUW/IHEC/FSMD-19-20/XPD-31) was obtained.

Nutritional status was assessed through standard procedures, and accordingly, height and weight were measured for all the selected 500 school-going children. Calculative indexes like body mass index (BMI) and Weight for Age (WFA) were determined using the Indian Academy of Paediatrics(IAP)⁽⁹⁾ Classification 2015. Height for age (HFA) was determined using the WHO Classification 2007⁽¹⁰⁾.

The Physical activity of the selected children was assessed using the International Physical Activity Questionnaire (IPAQ) -2004. The IPAQ is a frequently used measurement tool. It is an instrument designed primarily surveillance of physical activity among children across various socio-economic settings. A score of 0 indicates no physical activity, 1 represents low physical activity scores, 2-4 indicates medium physical activity, and a score of 5 indicates high physical activity ⁽¹¹⁾.

The eating behaviour of the selected children was assessed using the Eating Attitude Test (EAT-26) scale. The EAT-26 is a screening tool that helps to determine whether one is at risk for an eating disorder that requires professional attention. The EAT scale comprises 26 questions presented on a 6-point forced choice Likert scale ranging from 1(never) to 6(always). The EAT-26 scale was segmented into three subscales: 1) Dieting, 2) Bulimia and Food Preoccupation and 3) Oral control. (Garner, Rosen and Berry 1998) ⁽¹²⁾

The EAT -26 items from three subscales, namely dieting, bulimia and food preoccupation and oral control. Dieting questions assess the responses to high carbohydrate intake and their desire to be thinner. The bulimia and food preoccupation questions determine the tendency for purging food after meals and excessive food-related thinking. The oral control questions assess the determination of self-control in eating and perceived pressure from others to gain weight.

The association of physical activity and eating behaviour with nutritional status was statistically analysed among the children at risk for eating disorders and compared with normal children.

Results and Discussion

Table 1: Age and Gender of Selected School-Going Children

School Going Children N=500				
Age	Boys N=300	%	Girls N=200	%
11 years	77	25.6	48	24.0
12 years	113	37.7	61	30.5
13 years	110	36.7	91	45.5

Among the 500 selected school-going children, the highest proportions were found among 12- and 13-year-olds, with 37.7% and 36.7% among boys and 30.5% and 45.5% among girls, respectively. The children belonged to the grades 6th to 8th standard.

Table 2. Body Mass Index (BMI) of the Selected Children

Age (years)	Underweight		Normal		Overweight		Obesity		Chi-square	p-value
	N=27	%	N=275	%	N=123	%	N=75	%		

11	Boys	6	1.2	39	7.8	15	3.0	17	3.4	10.067	.018*
	Girls	5	1.0	23	4.6	11	2.2	9	1.8		
12	Boys	7	1.4	42	8.4	40	8.0	24	4.8		
	Girls	2	0.4	47	9.4	10	2.0	2	0.4		
13	Boys	4	0.8	67	13.4	28	5.6	11	2.2		
	Girls	3	0.6	57	11.4	19	3.8	12	2.4		

*IAP Classification (2015), * Significant at 0.05

Among the 500 children, 55% had a normal body mass index. Overweight was seen among 24.6% (123), while obesity was seen among 15 % (75) of the selected children. The underweight was seen among 5.4% (27) of selected children, respectively. The Prevalence of overweight and obesity was high among boys, which needs to be addressed by primary and secondary methods of prevention. Chi-square analysis among age and BMI categories among boys and girls showed significant differences ($p < 0.05$) between boys and girls, respectively.

Table 3 Height for Age (HFA) of the Selected Children

Gender	Height for Age								Chi-Square value	p-value
	Stunted N=142		Severely Stunted N=32		Normal N=276		Moderate N=50			
	No.	%	No.	%	No.	%	No.	%		
Boys	75	25.0	16	5.3	172	57.3	37	12.3	9.088	0.028**
Girls	67	33.5	16	8.0	104	52.0	13	6.5		

*Significant at 5% level

The table 3 presents the distribution of nutritional status of the selected boys and girls based on Height for age (WHO) classification. Among the 500 children assessed, 55.2 % had normal height for their age. However, 142 of 500 (28.4%) children were stunted, which was significant at a 5 per cent level among 75 boys and 67 girls. The number of children with severe stunting was the same, with 16 boys and 16 girls. Moderate stunting was significantly higher in 37 boys compared to 13 girls. Overall, the incidence of stunting and moderate stunting were greater in boys compared to girls. This shows that there is a significant association between gender and Height for age.

Table 4 Weight for Age(WFA) of the Selected Children

		Weight for Age								Chi-square	p-value
		Normal N=453		Grade 1 PEM N=33		Grade 2 PEM N=14		Grade 3 & 4 PEM N=Nil			
		No.	%	No.	%	No.	%	No.	%		
Gender	Boys	277	92.3	15	5.0	8	2.7	Nil	Nil	3.205	.201 ^{Ns}
	Girls	176	88.0	18	9.0	6	3.0	Nil	Nil		

*IAP Classification (2015) *Ns -Not Significant

The table 4 presents the distribution of the selected boys and girls based on Weight for age (IAP) classification. Among 500 children assessed, 90.6 per cent had normal weight for age, and there was no significant difference in the overall incidence of Grade 1 PEM with 6.6 per cent and Grade 2 PEM at 2.8 per cent, respectively. The results of Grade 1 PEM and Grade 2 PEM were comparable, with Grade 1 PEM being greater in 18 girls compared to 15 boys, whereas Grade 2 PEM was greater in 8 boys compared to 6 girls. This shows no significant association between gender and weight for age.

Table 5 : Physical Activity among Selected Children

Physical Activity		Boys (N=300)		Girls (N=200)		p-value
		N	%	N	%	

No Physical Activity	117	39.0	113	56.5	<.001**
Low Physical Activity	131	43.7	70	35.0	
Medium Physical Activity	48	16.0	17	8.5	
High Physical Activity	4	1.3	Nil	Nil	

** Significant at 1% level

Physical activity levels of girls were significantly lower, with 56.5 per cent of the girls stating that they were not engaged in any physical activity compared to 39 per cent among boys. The intensity of physical activity, such as low, moderate and high levels, significantly differed with 43.7 per cent, 16 per cent and 1.3 per cent among boys compared to 35 per cent, 8.5 per cent and no high-intensity levels among girls. According to a study on physical activity patterns among 100 school children by Kamdar et al. (2021)⁽¹³⁾, it was reported that 24 % had high physical activity, 64% were engaged in moderate physical activity, and 12% had low physical activity levels.

Table 6 EAT-26 Scores

Eating Scale Score *	Boys (N=300)		Girls (N=200)	
	N	%	N	%
Normal (<20)	245	81.6	165	82.5
At Risk (≥20)	55	18.4	35	17.5

Table 6 illustrates the score obtained by the children using the EAT scale 26. It was found that 18.4% of boys and 17.5% of girls were at risk of developing eating disorders. According to Shashank KJ et al.,2016⁽¹⁴⁾, 29.2% and 31.09% of subjects exhibited problematic eating attitudes and behaviours among college students.

Table 7 Physical Activity and Risk Category of School Going Children

Variables	Boys				P value	Girls				P value
	At Risk		Normal			At risk		Normal		
	N=55	%	N=55	%		N=35	%	N=35	%	
No Physical Activity	16	14.5	25	22.7	0.451 ^{ns}	17	24.2	19	27.1	0.756 ^{ns}
Low Physical Activity	29	26.4	21	19.2		16	23.0	13	18.7	
Medium Physical Activity	8	7.2	8	7.2		2	2.8	3	4.2	
High Physical Activity	2	1.9	1	0.9		-	-	-	-	

ns-not significant

Table 7 shows that physical activity levels and eating risk categories did not differ significantly between children at risk of eating disorders and those without such risk, in both boys and girls. Among boys, 26.4 per cent of those at risk reported engaging in low physical activity, compared to 19.2 per cent of those without eating disorder risk. A similar pattern was observed among girls, with 23 per cent of the at-risk group reporting low physical activity, compared to 18.7 per cent of those without eating disorder risk.

Table 8 Comparison of No Physical Activity and EAT Score Among School Going Children

Variable	Boys		Girls		p-value
	Mean ±SD	t-value	Mean ±SD	t-value	
No Physical Activity	18.0 ±10.1	9.85	15.9±9.6	11.5	<.001**

** Significant at 1% level

The comparison of No Physical Activity and EAT scores among school-going children indicates that the average physical activity score for boys was 18.0 ± 10.1, while for girls, it was 15.9 ± 9.6. The t-test values

were 9.85 for boys and 11.5 for girls, which were statistically significant at the relationship between the lack of physical activity and EAT scores.

Table 9 EAT- 26 Subscale Scores

Details	Boys		t-value	p-value	Girls		t-value	p-value
	At Risk N=55	Normal N=55			At Risk N=35	Normal N=35		
Dieting	10.24±5.86	15.02±4.29	4.88	<.001**	4.31±4.25	4.09±3.70	-.240	.811 ^{ns}
Bulimia and Food Preoccupation	3.15±3.41	3.78±3.15	1.016	.312 ^{ns}	0.97±1.34	1.54±2.05	1.381	.172 ^{ns}
Oral Control	7.38±4.05	7.738±3.06	0.54	.615 ^{ns}	3.71±4.0	3.54±3.20	-.198	.844 ^{ns}

** Significant at 1% level

Table 9 shows that the mean score for dieting, bulimia and food preoccupation and oral control was higher among boys compared to girls. Among boys, dieting was the only subscale that showed a significant difference, with a mean score of 15.02±4.29 among boys without risk for eating disorders compared to 10.24±5.86 among boys who were at risk of eating disorders. There were no differences seen in the mean scores of subscales among girls with or without the risk for eating disorders. This finding points out that boys had a tendency towards dieting compared to girls.

Table 10 Comparison of Age, Height, Weight, BMI and Physical Activity Score among Selected Children

Variables	Boys		t-value	p-value	Girls		t-value	p-value
	At Risk N=55	Normal N=55			At Risk N=35	Normal N=35		
Age (years)	12.09±.86	12.09±.94	.210	.834 ^{ns}	12.3±.725	12.17±1.07	-.784	.436 ^{ns}
Height (cm)	150.9±8.17	149.6±11.3	-.671	.503 ^{ns}	150.4±.11.14	148.29±10.5	-.812	.420 ^{ns}
Weight (kg)	46.26±10.50	42.56±10.33	-1.86	.065 ^{ns}	43.6±8.12	42.5±8.82	-.526	.601 ^{ns}
BMI (kg/m ²)	20.2±3.95	18.9±3.69	-1.71	.089 ^{ns}	19.5±4.69	19.38±3.42	-.237	.813 ^{ns}
EAT score	26.4±5.537	10.00±5.79	-15.25	<.001**	25.2±5.312	8.77±6.40	-11.73	<.001**
Physical Activity Score	56.2±16.5	53.09±18.6	-.940	.349 ^{ns}	49.9±14.8	47.69±15.5	-.629	.532 ^{ns}

** Significant at 1% level, Not Significant

The comparison of age, height, weight, BMI, and Physical activity scores among school-going children showed there was no significant difference between those at risk and those in the normal group, but the EAT score between the groups showed a significant difference. For boys, the mean physical activity score was 53.9 ± 18.6 in the at-risk group and 56.2 ± 16.5 in the normal group, with a t-value of -.940, indicating no significant difference. Similarly, for girls, the mean physical activity score was 49.9 ± 14.8 in the at-risk group and 47.6 ± 15.5 in the normal group, with no significant association.

Conclusion

Eating habits and physical activity directly influence children's nutritional status, with issues like eating disorders significantly affecting their overall well-being. Early risk assessment using standardized simple tools such as EAT-26 and the International Physical Activity Questionnaire (IPAQ-2004) is essential for identifying children at risk of eating disorders and enabling timely interventions. This study highlights the effectiveness of these tools and recommends the inclusion of eating behaviour and physical activity assessment in the nutritional screening of children, particularly school-aged children, who are at an increased risk of disordered eating.

Acknowledgement

The author's acknowledge the UGC-Single Girl Child Scholarship for the financial support.

References

- 1) Alashmali S (2024) Differences in eating habits, physical activity, and sleep patterns among high school students and their parents before and during the COVID-19 pandemic. *Front. Public Health.* 12:1408145. doi: 10.3389/fpubh.2024.1408145
- 2) Fernandes, V., Rodrigues, F., Jacinto, M., Teixeira, D., Cid, L., Antunes, R., Matos, R., Reigal, R., Hernández-Mendo, A., Morales-Sánchez, V., & Monteiro, D. (2023). How Does the Level of Physical Activity Influence Eating Behavior? A Self-Determination Theory Approach. *Life (Basel, Switzerland)*, 13(2), 298. <https://doi.org/10.3390/life13020298>
- 3) Latino, F.; Tafuri, F. Physical Activity and Academic Performance in School-Age Children: A Systematic Review. *Sustainability* 2023, 15, 6616. <https://doi.org/10.3390/su15086616>.
- 4) Pearson, N., Atkin, A. J., Biddle, S. J. H., & Gorely, T. (2009). Family correlates of fruit and vegetable consumption in children and adolescents: A systematic review. *Public Health Nutrition*, 12(2), 267-283.
- 5) Ng, M., Fleming, T., Robinson, M., Thomson, B., Graetz, N., Margono, C., et al. (2020). Global, regional, and national prevalence of overweight and obesity in children and adults 1980–2013: A systematic analysis. *The Lancet*, 384(9945), 766–781.
- 6) <https://www.who.int/news-room/fact-sheets/detail/physical-activity> June 26 2024
- 7) Janssen, I., & LeBlanc, A. G. (2010). Systematic review of the health benefits of physical activity and fitness in school-aged children and youth. *International Journal of Behavioral Nutrition and Physical Activity*, 7(1), 40.
- 8) Chaput, J.P.; Tremblay, A. Obesity and Physical Inactivity: The Relevance of Reconsidering the Notion of Sedentariness. *Obes. Facts* 2009, 2, 249–254.
- 9) <https://iapindia.org/iap-growth-charts/> Indian Academic Paediatrics 2015.
- 10) <https://www.who.int/tools/growth-reference-data-for-5to19-years/indicators/height-for-age> World Health Organization 2007.
- 11) The Physical Activity Questionnaire for Older Children (PAQ-C) and Adolescents (PAQ-A) Manual, August 2004 College of Kinesiology University of Saskatchewan 87 Campus Drive Saskatoon, SK, Canada S7N 5B2
- 12) Garner, D. M., Olmsted, M. P., Bohr, Y., & Garfinkel, P. E. (1982). *Eating Attitude Test--26 (EAT-26)* <https://doi.org/10.1037/t07770-000>
- 13) Kamdar, A., & Prajapati, H. (2021). Level of physical activity in rural and urban elementary school children: An observational study.2021;8(3):286-289. DOI: <https://doi.org/10.22271/kheljournal.2021.v8.i3e.2097>
- 14) Shashank KJ, Gowda, P. ., & Chethan TK. (2016). A Cross-sectional Study to Assess the Eating Disorder Among Female Medical Students in A Rural Medical College of Karnataka State. *National Journal of Community Medicine*, 7(06), 524–527. Retrieved from <https://njcmindia.com/index.php/file/article/view>.