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Research Paper

Association of Demographic Variables with Health Behaviors among Rural Primary School Children in Kanpur

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ABSTRACT

Health behaviors established during childhood lay the foundation for lifelong well-being. In rural settings, demographic factors such as age, gender, parental education, and socioeconomic status strongly influence children's hygiene, nutrition, and physical activity practices. To determine the association between selected demographic variables and health behaviors among rural primary school children in Kanpur, Uttar Pradesh. A quasi-experimental design was adopted, involving 500 primary school children aged 5–10 years. Data were collected using a structured questionnaire covering domains of hygiene, dietary habits, and physical activity. A nurse-led cognitive reading intervention was implemented for two weeks, and pre- and post-test assessments were conducted. Associations between demographic variables and health behaviors were analyzed using chi-square and one-way ANOVA at a 0.05 level of significance. Statistically significant associations were found between parental education and hygiene practices ($p < 0.05$), socioeconomic status and dietary habits ($p < 0.01$), and gender and physical activity ($p < 0.05$). Age was positively correlated with overall health behavior scores. Demographic characteristics substantially influence health behaviors among rural school children. Targeted health promotion strategies should prioritize parental education and gender-sensitive interventions to foster sustainable behavioral change in rural populations.

Keywords: *Health Behaviors, Rural Children, Demographics, Hygiene, Nutrition, Physical Activity*

Childhood represents a formative period in human development, during which physical growth, cognitive advancement, and psychosocial learning converge to shape lifelong health trajectories. Health behaviors learned and internalized during these years exert a profound influence on future well-being, resilience, and productivity (Sawyer et al., 2012). In low- and middle-income countries, including India, this developmental window is frequently jeopardized by structural inequities that manifest in poor nutrition, inadequate hygiene, and limited opportunities for physical activity (Patton et al., 2016). Rural children are especially vulnerable because they face an intersection of material deprivation, infrastructural deficits, and constrained educational support systems. For these children, establishing health-promoting behaviors early in life can act as a buffer

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against the cycle of disease and poverty, yet the determinants of these behaviors remain underexplored in regional contexts such as rural northern India. Health behaviors encompass a broad set of daily practices ranging from dietary choices and hygiene habits to activity levels and health-seeking patterns that collectively influence morbidity and mortality risks (Glanz, Rimer, & Viswanath, 2015). In childhood, key behaviors such as handwashing with soap, brushing teeth regularly, consuming a balanced diet, and engaging in daily physical activity are linked to the prevention of diarrheal disease, dental caries, stunted growth, anaemia, obesity and even long-term noncommunicable conditions like type 2 diabetes (WHO, 2020). However, whether a child successfully adopts such behaviors is rarely an individual choice alone; rather, it is mediated by demographic and contextual factors that define access, knowledge, and social modeling.

Among these demographic factors, age is a primary determinant. Younger children typically require parental reinforcement and school-based supervision to adhere to hygiene practices, while older children are better able to comprehend cause–effect relationships between behaviors and health outcomes (Walker et al., 2011). For example, studies in rural Nigeria demonstrated that older primary school students displayed significantly higher compliance with handwashing instructions compared to their younger peers, reflecting both cognitive maturity and habit consolidation (Okafor, Umeh, & Anyanwu, 2019). Similarly, a longitudinal investigation in India showed that older children demonstrated greater dietary diversity than younger siblings, attributable to increased autonomy in food selection and peer influence (Sharma, Singh, & Gupta, 2021). These findings underscore the importance of age stratification when assessing health behavior outcomes in childhood populations. Gender constitutes another demographic dimension exerting significant influence over child health behaviors. Cultural norms in South Asia frequently assign different roles, responsibilities, and freedoms to boys and girls, with implications for physical activity and dietary access. Evidence from Bangladesh and northern India suggests that boys are more likely to engage in outdoor play and organized sports, whereas girls often spend after-school hours assisting with domestic chores, leading to reduced physical activity levels (Rahman, Alam, & Chowdhury, 2020; Srivastava et al., 2019). Nutritional disparities are also documented, as some households prioritize sons in the allocation of protein-rich foods, resulting in higher rates of iron-deficiency anemia among girls (Agarwal, 2020). The intersection of gender with rural disadvantage thus compounds inequities in child health outcomes and warrants careful examination.

Parental education, particularly maternal literacy, is consistently cited as a strong predictor of child health behaviors. Educated parents are better equipped to understand health information, recognize the importance of preventive practices, and enforce appropriate behaviors at home (Desai & Alva, 1998). In rural Uttar Pradesh, a study reported that children of literate mothers were twice as likely to practice daily handwashing and tooth brushing than those of illiterate mothers (Kumar et al., 2018). Similarly, a Nigerian survey demonstrated that parental education was positively associated with reduced consumption of sugary foods and improved oral hygiene practices (Okafor et al., 2019). The intergenerational transmission of health literacy through parental modeling emphasizes the crucial role of adult education in child health promotion.

Socioeconomic status (SES) exerts both direct and indirect influences on health behaviors by shaping access to nutritious foods, safe water, sanitation facilities, and opportunities for recreational activities. Children from wealthier households are more likely to have diverse

diets that include fruits, vegetables, and protein sources, while those from poorer families often subsist on calorie-dense, nutrient-poor staples (UNICEF, 2021). SES also determines whether households can afford soap, toothbrushes, or healthcare visits, thereby constraining hygiene and preventive care behaviors (Bhalotra & Venkataramani, 2015). A study conducted in Madhya Pradesh found that children from the lowest income quintile were three times more likely to skip breakfast before school compared to those from the highest quintile, directly affecting concentration and learning outcomes (Mishra & Singh, 2017). Thus, socioeconomic gradients manifest not only in material deprivation but also in behavioral disparities that reinforce cycles of disadvantage.

Global literature highlights that demographic disparities are not unique to India but reflect broader structural inequities. Studies in sub-Saharan Africa have revealed strong associations between parental literacy and child immunization uptake, school attendance, and hygiene behaviors (Fotso, 2006). In Latin America, socioeconomic inequalities correlate with dietary diversity and obesity prevalence among school-aged children (Rivera et al., 2014). The universality of these findings suggests that while cultural contexts differ, demographic factors remain powerful and consistent determinants of child health behaviors worldwide. In India, rural contexts present additional challenges that exacerbate the effects of demographic disparities. Rural schools often lack infrastructure for health promotion, such as clean water supplies, gender-sensitive toilets, or playground facilities (ASER Centre, 2020). Teachers, though influential, may be constrained by limited training in health education and competing curricular demands. Furthermore, parents in rural areas frequently have low literacy levels and precarious livelihoods, reducing their capacity to reinforce health-promoting behaviors at home. Against this backdrop, interventions targeting children's health behaviors must be sensitive to local demographic structures and resource constraints.

Kanpur district in Uttar Pradesh exemplifies these challenges. With a predominantly rural population, the district is characterized by socioeconomic inequality, variable school infrastructure, and high rates of childhood morbidity from preventable causes such as diarrhea, respiratory infections, and malnutrition (Government of Uttar Pradesh, 2022). Despite the presence of national programs such as the Mid-Day Meal Scheme and Swachh Bharat Abhiyan, gaps remain in implementation and monitoring, particularly in remote villages. Research evidence on the demographic determinants of child health behaviors in this region is scarce, leaving a knowledge gap that undermines the design of effective interventions.

School-based health promotion emerges as a critical strategy in this context. Evidence from both Indian and global settings demonstrates that structured health education interventions in schools can improve hygiene practices, dietary habits, and physical activity among children (Langford et al., 2014). However, the effectiveness of such programs often varies by demographic subgroup, with older children, boys, or those from higher socioeconomic strata benefiting disproportionately (Sharma et al., 2021). Understanding the demographic associations of health behaviors, therefore, is not only an academic exercise but also a prerequisite for tailoring interventions that reach the most disadvantaged children. This study seeks to contribute to the growing body of evidence by exploring how demographic variables, age, gender, parental education and socioeconomic status are associated with health behaviors among rural primary school children in Kanpur. By situating the analysis within the broader discourse on child health equity, the study underscores the need for

integrated, context-sensitive interventions that address both individual behaviors and the structural determinants that shape them. Ultimately, the findings are expected to inform educators, policymakers, and healthcare professionals about the pathways through which demographic variables influence child health practices, thereby guiding more equitable and effective health promotion strategies in rural India.

METHODOLOGY

Research Design

The present study adopted a quasi-experimental design with a one-group pre-test post-test approach. Quasi-experimental designs are frequently used in educational and public health research when randomization of participants is either not feasible or ethically inappropriate, yet there remains a need to evaluate the effectiveness of an intervention (Harris et al., 2006). In this design, a single group of participants is measured before and after an intervention, allowing researchers to examine the extent of change attributable to the intervention while considering external influences. Although quasi-experiments have inherent limitations, such as lack of random allocation, they remain valuable for field-based studies in real-world school settings where controlled trials may not be practical (Cook & Campbell, 1979). The current study's choice of this design was based on its suitability for school populations, where ethical concerns prevent withholding interventions from control groups and where logistical issues limit randomized controlled trials.

Setting

The study was conducted in rural government primary schools in Kanpur district, Uttar Pradesh, India. Kanpur is among the largest districts in the state, with a substantial rural population dependent on agriculture and small-scale labor (Government of Uttar Pradesh, 2022). Rural government schools in this region often face infrastructural constraints, including inadequate sanitation facilities, limited access to clean drinking water, and scarcity of health education resources (ASER Centre, 2020). These factors make them an appropriate setting to study the health behaviors of children, who are particularly vulnerable to preventable illnesses such as diarrhea, respiratory infections, and malnutrition. Schools also provide an organized and structured environment for implementing and evaluating health interventions, as children spend a significant proportion of their day in classrooms and are influenced by both teachers and peers (Langford et al., 2014).

Sample and Sampling Technique

The study sample consisted of 500 children aged 5–10 years. A multistage sampling technique was employed to ensure representativeness. In the first stage, rural primary schools were selected purposively, based on accessibility, willingness to participate, and existing infrastructural conditions. In the second stage, children were selected through stratified random sampling, with stratification by age and gender to ensure proportionate representation across demographic groups. Stratified sampling enhances the accuracy of estimates by reducing sampling error and ensuring that subgroups are adequately represented (Lohr, 2010). The sample size of 500 was considered adequate based on similar school-based health behavior studies conducted in India and Nigeria, which have shown that large samples increase statistical power and allow for robust subgroup analysis (Okafor et al., 2019; Sharma, Singh, & Gupta, 2021).

Inclusion and Exclusion Criteria

The inclusion criteria were: (a) children aged between 5 and 10 years, (b) those enrolled in rural government primary schools, (c) children present during the data collection period, and (d) children whose parents provided informed consent and who themselves assented to participate. These criteria ensured that the sample was age-appropriate, relevant to the rural school context, and ethically compliant.

The exclusion criteria were children with chronic illnesses or physical/mental disabilities that restricted participation in the intervention. Excluding such children minimized potential confounders, as chronic illness may independently influence health behaviors and outcomes (Walker et al., 2011). Ethical considerations also guided this exclusion, as participation in the intervention might have imposed undue burden or risks on these children.

Tool for Data Collection

Data were collected using a structured questionnaire developed by the researchers and validated by a panel of subject experts, including pediatricians, public health specialists and education professionals. The tool assessed three major domains of child health behaviors: hygiene practices, dietary habits, and physical activity. Items included daily handwashing, brushing teeth, frequency of fruit and vegetable consumption, avoidance of junk food, time spent in outdoor play, and daily screen time. Each domain was scored, with higher scores reflecting healthier behaviors. The questionnaire was pretested on a pilot group of 50 children from a neighbouring district to ensure clarity, cultural appropriateness, and age-level comprehension. Reliability was tested using Cronbach's alpha, yielding a value of 0.82, which indicates strong internal consistency (Tavakol & Dennick, 2011). Valid and reliable tools are critical in behavioral studies, as they enhance measurement accuracy and reduce bias in self-reported or proxy-reported behaviors.

Intervention

The intervention comprised a nurse-led cognitive reading program delivered over a period of two weeks. Nurses with training in community health and pediatric education facilitated interactive sessions using illustrated storybooks designed to engage children through visual learning and narrative storytelling. Storybooks focused on three themes: personal hygiene (e.g., importance of handwashing and tooth brushing), healthy diet (e.g., benefits of fruits and vegetables, harms of junk food), and physical activity (e.g., outdoor play and reduced screen time). The use of storytelling as a pedagogical tool is well-supported in child health education, as narratives enhance comprehension, retention, and motivation to adopt behaviors (Green, 2006). Storybooks with colorful illustrations also ensure engagement among younger children who may have limited reading skills. Nurse-led delivery was chosen because nurses are trusted community figures with both health expertise and communication skills, and their involvement in schools has been associated with improved child health outcomes globally (Vessey & McGowan, 2006).

Data Collection Procedure

The study employed a pre-test and post-test assessment using the structured questionnaire. At baseline, demographic data (age, gender, parental education, socioeconomic status) and health behavior scores were collected. Following the two-week intervention, the same tool was administered again to measure changes in health behaviors. Teachers and parents were informed in advance, and sessions were scheduled during regular school hours to minimize disruption to academic activities. Data collection was conducted under the supervision of the

principal investigator with assistance from trained research assistants fluent in Hindi and familiar with the rural cultural context. To minimize social desirability bias, children were assured that responses would remain confidential and would not affect their grades or teacher perceptions. Ethical clearance for the study was obtained from the Institutional Ethics Committee, and written consent was obtained from parents, with verbal assent from children.

Data Analysis

Data were analyzed using Statistical Package for the Social Sciences (SPSS) software. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize demographic variables and pre-/post-test health behavior scores. To determine associations between demographic factors and health behaviors, chi-square tests were applied for categorical variables such as gender and parental education, while one-way ANOVA was used for continuous variables such as age and socioeconomic status. A significance level of $p < 0.05$ was considered statistically significant, consistent with conventional thresholds in health research (Field, 2013). Effect sizes were also calculated to provide information on the practical importance of the findings, beyond mere statistical significance. This combination of descriptive and inferential statistics allowed for both a comprehensive overview of the data and a rigorous test of hypotheses regarding demographic influences on child health behaviors.

RESULTS

Demographic Profile of the Participants

A total of 500 rural primary school children aged between 5 and 10 years participated in the study. The mean age of the participants was 7.4 years (SD ± 1.5). The sample was nearly balanced by gender, comprising 52% boys and 48% girls. With regard to parental education, 36% of parents were illiterate, 42% had primary-level education, and 22% had attained secondary or higher education. Socioeconomic status (SES), measured through household income and assets, indicated that a majority of children (58%) belonged to lower-income households, while the remaining were distributed across middle- and higher-income categories. These demographic characteristics highlight the vulnerable context in which children's health behaviors were shaped.

Table 1. Demographic Characteristics of Participants (N = 500)

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	Mean ± SD = 7.4 ± 1.5	–	–
Gender	Boys	260	52.0
	Girls	240	48.0
Parental Education	Illiterate	180	36.0
	Primary	210	42.0
	Secondary & above	110	22.0
Socioeconomic Status	Low-income households	290	58.0
	Middle-income households	150	30.0
	High-income households	60	12.0

The demographic analysis reveals that the majority of children came from disadvantaged backgrounds, with 36% of parents being illiterate and an additional 42% with only primary education. This distribution highlights limited parental capacity to provide health guidance at home, which is consistent with studies showing that parental literacy is a strong

determinant of child health behaviors in rural India (Kumar et al., 2021). Additionally, the predominance of low-income households (58%) reflects restricted access to adequate nutrition, hygiene resources (e.g., soap, toothpaste), and opportunities for structured physical activity. The nearly balanced gender distribution ensures comparability between boys and girls in subsequent analyses. These demographic characteristics suggest that the study population is highly vulnerable to health inequalities, making school-based interventions particularly critical in such rural settings.

Association of Parental Education with Hygiene Practices

Parental education was found to have a statistically significant association with children's hygiene practices. Children of secondary or higher educated parents reported the highest mean hygiene scores in both pre- and post-tests, followed by those with primary-educated parents. Children of illiterate parents consistently scored the lowest. Chi-square analysis indicated a significant difference ($p < 0.05$), suggesting that parental education contributes positively to reinforcing hygiene behaviors such as handwashing and daily tooth brushing.

Table 2. Association Between Parental Education and Hygiene Practices

Parental Education	Mean Hygiene Score (Pre-test) ± SD	Mean Hygiene Score (Post-test) ± SD	p-value
Illiterate	4.8 ± 1.2	6.1 ± 1.4	<0.05
Primary	5.6 ± 1.3	7.2 ± 1.5	<0.05
Secondary & above	6.3 ± 1.1	8.0 ± 1.3	<0.05

The results clearly indicate that higher parental education is associated with better hygiene practices among children. Children of secondary-educated parents achieved the highest hygiene scores both pre- and post-test, while those with illiterate parents scored the lowest. This gradient suggests that parental knowledge and attitudes play a pivotal role in modeling and reinforcing hygienic practices at home. For instance, educated parents are more likely to emphasize daily toothbrushing, handwashing with soap, and bathing routines (Singh & Gupta, 2020). The post-test improvement across all groups indicates that the nurse-led cognitive intervention was effective, but the sustained superiority of children with educated parents reflects the reinforcing influence of home environments. Thus, while educational interventions can bridge some gaps, parental literacy remains a critical determinant of sustained hygiene behavior.

Association of Socioeconomic Status with Dietary Habits

Socioeconomic status exhibited a strong association with dietary behaviors. Children from higher-income households reported more frequent fruit and vegetable consumption and lower junk food intake compared to those from low-income households. The difference across SES groups was statistically significant ($p < 0.01$), reflecting the role of economic capacity in food choice and nutritional adequacy.

Table 3. Association Between Socioeconomic Status and Dietary Habits

Socioeconomic Status	Mean Diet Score (Pre-test) ± SD	Mean Diet Score (Post-test) ± SD	p-value
Low-income	5.0 ± 1.4	6.3 ± 1.5	<0.01
Middle-income	5.7 ± 1.3	7.1 ± 1.4	<0.01
High-income	6.5 ± 1.2	8.0 ± 1.3	<0.01

Socioeconomic status was strongly linked to dietary practices, with children from high-income households reporting significantly better diet scores compared to their low-income peers. The disparity can be attributed to economic capacity, as higher-income families can afford fruits, vegetables, milk, and protein-rich foods, whereas lower-income households often rely on calorie-dense but nutrient-poor staples (World Bank, 2020). Post-test improvements were seen in all SES groups, demonstrating that school-based health education increased awareness and possibly short-term behavior change. However, the persistent differences highlight that awareness alone cannot overcome economic barriers to healthy eating. This supports global evidence that nutrition behaviors are shaped by affordability and access, underscoring the need for policy-level interventions such as mid-day meal enhancements or subsidized fruit/vegetable programs in rural schools.

Association of Gender and Age with Physical Activity and Overall Health Behaviors

Gender differences were apparent in physical activity patterns. Boys reported significantly higher levels of outdoor activity, while girls exhibited higher levels of sedentary behavior such as increased screen time and reduced sports participation. Chi-square analysis confirmed that these differences were statistically significant ($p < 0.05$). In terms of age, older children (9–10 years) demonstrated better comprehension and adherence to health behaviors than younger children (5–7 years). One-way ANOVA indicated a significant association ($p < 0.05$), with older children showing greater improvement in post-test scores across hygiene, diet, and physical activity domains.

Table 4. Association of Gender and Age with Health Behaviors

Variable	Category	Mean Health Behavior Score (Pre-test) ± SD	Mean Score (Post-test) ± SD	p-value
Gender	Boys	16.2 ± 2.8	19.0 ± 2.5	<0.05
	Girls	15.4 ± 2.7	17.2 ± 2.6	<0.05
Age Group	5–7 years	15.0 ± 2.6	17.0 ± 2.5	<0.05
	8–9 years	15.8 ± 2.7	18.2 ± 2.4	<0.05
	9–10 years	16.5 ± 2.9	19.5 ± 2.6	<0.05

Gender and age both showed significant associations with health behaviors. Boys consistently engaged in more outdoor activities compared to girls, who were more sedentary. This difference may reflect sociocultural norms in rural India, where girls are often expected to stay indoors, take part in household chores, or have limited opportunities for sports participation (Patel et al., 2019). Such disparities underline the importance of designing gender-sensitive school-based physical activity programs. Age was also a significant determinant of health behaviors. Older children (9–10 years) achieved higher overall health behavior scores, both pre- and post-test, compared to younger children (5–7 years). This finding likely reflects greater cognitive maturity, enabling older children to understand and apply health messages more effectively. The results suggest that while interventions should target all age groups, younger children may require more visual, play-based, and repetitive approaches to reinforce behavior change.

DISCUSSION

The present study assessed the association of demographic variables with health behaviors among rural primary school children in Kanpur, India, and compared outcomes before and after a nurse-led cognitive intervention. The findings align with a broad body of research

demonstrating that parental education, socioeconomic status, gender, and age are influential determinants of children's health behaviors.

Parental Education and Hygiene Practices

Our study found a strong positive association between parental education and children's hygiene behaviors. Children of parents with secondary or higher education consistently scored better in both pre- and post-tests compared to those of illiterate parents. This finding mirrors results from Bhatia and Singh (2019), who observed that parental literacy in rural Uttar Pradesh significantly influenced children's handwashing and toothbrushing practices. Similarly, Choudhury et al. (2020) in Assam reported that mothers' education was directly linked to improved sanitation practices among school-aged children. Internationally, Gebre et al. (2018) in Ethiopia also found that children of educated parents were twice as likely to practice safe hygiene behaviors compared to those of illiterate parents. These studies reinforce that parental education not only enhances knowledge but also fosters supportive home environments for healthy routines.

Socioeconomic Status and Dietary Habits

Socioeconomic status was strongly associated with dietary behaviors in the present study, with higher-income households reporting significantly greater fruit and vegetable intake. This aligns with Ranjan et al. (2021), who reported that low-income rural households in Bihar consumed fewer micronutrient-rich foods, relying heavily on rice and wheat. Similarly, Patel and Desai (2018) found that dietary diversity was significantly lower among children from economically disadvantaged households in Gujarat. Globally, Vollmer et al. (2017) found that low-SES children across 38 low- and middle-income countries were at higher risk of stunting and micronutrient deficiencies due to restricted diet quality. These findings confirm that economic constraints remain a major barrier to nutritional adequacy, and awareness interventions alone cannot overcome affordability gaps.

Gender and Physical Activity

Gender differences were evident, with boys reporting more outdoor play and girls exhibiting higher sedentary behavior. This is consistent with Sharma et al. (2020), who found that rural girls in northern India spent significantly less time in physical activity due to cultural restrictions and household responsibilities. Similarly, Nagar and Kumar (2019) reported that girls in Rajasthan were more engaged in household chores, leading to limited participation in outdoor games. Internationally, Harrison et al. (2019) observed gender disparities in physical activity across multiple countries, with boys more likely to participate in sports while girls favored sedentary leisure activities. These consistent findings highlight that sociocultural norms continue to shape gender-specific patterns in child health behaviors, especially in rural settings.

Age and Health Behaviors

Older children in our study (9–10 years) demonstrated better comprehension and adherence to health behaviors compared to younger peers (5–7 years). This is in line with Mishra et al. (2018), who observed that older primary school children in Madhya Pradesh showed greater improvement in hygiene knowledge following health education programs compared to younger cohorts. Similarly, Onyango et al. (2020) in Kenya reported that older children were more receptive to dietary interventions due to higher cognitive maturity. These results support the premise that age-related cognitive development plays a key role in children's

ability to understand and practice health behaviors, necessitating age-appropriate interventions.

CONCLUSION AND FUTURE DIRECTIVES

This study highlights that demographic variables exert a profound influence on the health behaviors of rural primary school children in Kanpur. Parental education was found to be a decisive factor in shaping hygiene practices, socioeconomic status strongly influenced dietary habits, gender determined patterns of physical activity, and age contributed to differences in comprehension and adherence to health messages. While the nurse-led cognitive intervention led to measurable improvements across all domains, the persistence of disparities after the program suggests that structural barriers such as poverty, low parental literacy, and sociocultural norms continue to constrain children's ability to adopt and sustain healthy practices. These findings reinforce the notion that school-based interventions, although effective, must be complemented by strategies that extend to the family and community.

Looking ahead, the results call for a more comprehensive approach that integrates parental involvement in health promotion, ensuring that even illiterate or semi-literate parents can support their children's learning and practices at home. Policy-level measures are needed to strengthen existing schemes such as the Mid-Day Meal Program to address dietary inequalities among low-income groups, while schools must develop gender-sensitive activities that encourage equal participation of girls in physical exercise. Health education also needs to be tailored to developmental stages, with younger children engaged through play-based and visual approaches and older children through interactive and peer-led strategies. Future research should adopt longitudinal designs to track whether the gains observed through interventions are sustainable over time, and comparative studies across regions of India would provide further insight into how cultural and socioeconomic contexts interact with health behaviors. Ultimately, the study underscores the necessity of multi-sectoral collaboration between education, health, and community stakeholders to create an enabling environment that supports lifelong healthy habits among rural children.

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Conflict of Interest

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