AN ANALYSIS OF HEALTH PROBLEMS OF PRIMARY SCHOOL CHILDREN IN CUDDALORE DISTRICT OF TAMIL NADU

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Abstract

This study investigates the health problems faced by primary school children in selected schools of Cuddalore district, Tamil Nadu. Based on primary data collected from 313 students across eight Panchayat Union Primary Schools using simple random sampling, the findings reveal that common illnesses such as anaemia (25 cases), fever (20), cold (20), stomach pain (20), and skin infections (15) are widely prevalent, particularly in schools like PUPS Thotti and PUPS Thittagudi. The direct costs included medical fees, medicines, and diagnostic tests, while indirect costs involved travel expenses and parental wage losses. The study highlights that poor hygiene, malnutrition, and lack of access to basic healthcare are major contributors to these health issues. It concludes that strengthening school-level health interventions, especially anaemia prevention and regular medical check-ups, can significantly improve child health and reduce the financial burden on families.

Keywords: Primary school children, Health problems, Anaemia, simple random sampling.

1. INTRODUCTION

Health is a fundamental determinant of a child's overall development and academic performance. During the primary school years, children are at a critical stage of growth, requiring adequate nutrition, healthcare, and a disease-free environment to thrive. In India, despite efforts to improve child health through national programs like the School Health Programme and Mid-Day Meal Scheme, a significant proportion of primary schoolchildren continue to suffer from health problems (Government of India, 2021). These range from communicable diseases like respiratory infections and gastrointestinal illnesses to non-communicable issues like malnutrition, vision problems, and dental disorders. Poor health at this stage not only hinders educational outcomes but also imposes considerable financial stress on families. The economic burden of treating childhood illnesses is substantial, especially for low- and middle-income households (Bhat et., al.,). The cost of treatment includes both direct costs (such as consultation fees, medicines, diagnostic tests, and hospitalization) and indirect costs (including transportation, loss of parental wages, and school absenteeism) (WHO, 2017). These expenditures can be particularly burdensome for families in rural areas who have limited access to affordable healthcare services. Moreover, the out-of-pocket expenses incurred in managing even preventable health conditions highlight the need for a systematic evaluation of the financial implications associated with child health.

There exists a marked disparity in the health status of children in rural and urban areas, influenced by factors such as access to healthcare infrastructure, socioeconomic status, environmental conditions, and parental awareness. Urban children often benefit from better sanitation, nutritional choices, and timely medical intervention, whereas their rural counterparts may face delays in treatment, poor hygiene, and nutritional deficiencies. These differences are particularly pronounced in districts like Cuddalore in Tamil Nadu, which

presents a diverse mix of rural and urban populations with varying health indicators and service accessibility (National Family Health Survey [NFHS-5], 2021).

Cuddalore district, situated along the eastern coast of Tamil Nadu, is characterized by both industrialized urban centers and underdeveloped rural pockets. Despite being a focus of various state and central government health initiatives, the district continues to grapple with child health challenges, especially in its rural areas. The dual nature of development within the district makes it an ideal case for studying disparities in child health outcomes and treatment costs. Understanding the nature of health problems and the associated costs in both settings is crucial for designing localized interventions and policy recommendations. Given its socio-economic diversity, Cuddalore district offers a unique setting to examine the intersection of child health, access to care, and financial burden. While parts of the district enjoy relatively better urban healthcare infrastructure, many rural regions continue to lack adequate medical facilities, trained personnel, and preventive health services. Seasonal outbreaks, waterborne diseases, malnutrition, and poor sanitation remain pressing issues, particularly in the rural blocks (UNICEF, 2020). At the same time, the urban areas face emerging challenges like lifestyle-related ailments and overcrowded public health institutions.

2. REVIEW OF LITERATURE

Wang, et., al., (2004) The objective of this study is to estimate direct and indirect costs of asthma in school-age children. Using data from the 1996 Medical Expenditure Panel Survey, we estimated direct medical costs and school absence days among school-age children who had treatment for asthma during 1996. We estimated indirect costs as costs of lost productivity arising from parents' loss of time from work and lifetime earnings lost due to premature death of children from asthma. All costs were calculated in 2003 dollars. In 1996, an estimated 2.52 million children aged five to 17 years received treatment for asthma. Direct medical expenditure was $1009.8 million ($401 per child with asthma), including payments for prescribed medicine, hospital inpatient stay, hospital outpatient care, emergency room visits, and office-based visits. Children with treated asthma had a total of 14.5 million school absence days; asthma accounts for 6.3 million school absence days (2.48 days per child with asthma). Parents' loss of productivity from asthma-related school absence days was $719.1 million ($285 per child with asthma). A total of 211 school-age children died of asthma during 1996, accounting for $264.7 million lifetime earnings lost ($105 per child with asthma). Total economic impact of asthma in school-age children was $1993.6 million ($791 per child with asthma).

Dickson et., al., (2009) The study is the first within trial cost analysis of direct versus indirect and individual versus group modes of speech-and-language therapy for children with primary language impairment. To compare the short-run resource consequences of the four interventions alongside the effects achieved measured by standardized scores on a test of expressive and receptive language. The study design was a cost analysis integrated within a randomized controlled trial using a 2×2 factorial design (direct/indirect versus individual/group therapy) together with a control group that received usual levels of community-based speech-and-language therapy. Research interventions were delivered in school settings in Scotland, UK. Children aged between 6 and 11 years, attending a mainstream school, with standard scores on the Clinical Evaluation of Language Fundamentals (CELF-III^{UK}) of less than −1.25 standard deviation (SD) (receptive and/or expressive) and non-verbal IQ on the Wechsler Abbreviated Scale of Intelligence (WASI) above 75, and no reported hearing loss, no moderate/severe articulation/phonology/dysfluency problems or otherwise requiring individual work with a speech-and-language therapist. The intervention involved speech-and-language therapists and speech-and-language therapy assistants working with individual

children or small groups of children. A therapy manual was constructed to assist the choice of procedures and activities for intervention. The cost analysis focused on the salary and travel costs associated with each mode of intervention. The cumulative distribution of total costs arising from the time of randomization to post-intervention assessment was estimated. Arithmetic mean costs were compared and reported with their 95% confidence intervals. The results of the intention-to-treat analysis revealed that there were no significant post-intervention differences between direct and indirect modes of therapy, or between individual and group modes on any of the primary language outcome measures. The cost analysis identified indirect therapy, particularly indirect group therapy, as the least costly of the intervention modes with direct individual therapy as the costliest option. The programme cost of providing therapy in practice over 30 weeks for children could represent between 30% and 75% of the total gross revenue spend in primary school per pupil, depending on the choice of assistant led group therapy or therapist-led individual therapy.

Biswas & Paul (2015), The objective of the study was to examine the status of body mass index level of primary school children of class 1st age ranging from 5 to 6 years which can show the nutritional status and indicate the body composition in early childhood level. For the study purpose 4 schools have been selected and from every school 50 girls and boys of each group were selected. The village culture prevailed having some higher socioeconomic condition based on agriculture and the caloric intake capacity flattened with mid-day meal. Body mass index was calculated using very well-known formula. The results indicate that the body mass index level was very poor which indicated the poor nutritional status among the respondents. The findings also show that no significant differences were found in case of boys and girls indicated by the p value. The analysis of the data also show that no discriminations were found in case of boys and girls considering their health and body perspective.

Ramamani & Suganya (2018) the research was planned to determine whether Waist height ratio, which is an effective tool in measuring the visceral adiposity, has any relationship with the body mass index, in assessing the nutritional status. The research was a cross-sectional study carried out among 980 school going adolescent girls, studying in class 6th to 12th classes, in the schools present in urban field practice area of Tagore Medical College and Hospital. Anthropometric assessment was done for the respondents. Body mass index and WHTR was also calculated to assess the nutritional status, and also the relationship between BMI and WHTR was found. The study results reveals that the mean age of the participants was 14±2.9 years. Number of participants, who were normal, underweight, overweight, obese based on body mass index values were 227, 5, 301, 447 respectively According to the WHTR, 560 (57% per cent) of them were obese, while 420 (43 per cent) were non-obese. The results also shows that there exists a moderate correlation between BMI and WHtR, with r = 0.68. The study suggested that preference of WHtR over BMI should be encouraged, as it also helps in measuring the visceral adiposity, which, is a potent risk factor for various metabolic and cardiovascular diseases.

Slowik et. al., (2019) The main aim of this study was to evaluate nutritional status among children and adolescents with different levels of physical activity. The total sample has been collected as 1013 (boys and girls) ranging from 7 to 18 years of ag from elementary and post-primary schools (general and sports profile) in Siemianowice Slaskie. The findings from the analysis revealed that, the crude body mass index (BMI) values ranged from 12.78 to 35.3. In total, overweight was found in 194 subjects (19.2 per cent) and obesity in 75 subjects (7.4 per cent). Body mass within the limits of arbitrary standard referred to 70 per cent of the

examined group, overweight or obesity was found in over 25 per cent. Percentage of body fat values ranged from 5.7 to 45.2 per cent.

Lizano et., al., (2021) This study aimed to conduct a systematic review of the indirect costs associated with SSTIs in children. The search was conducted in PubMed, SCOPUS, and Web of Science up to January 2020. Thirteen search strategies were designed combining MeSH terms and free terms. SSTIs were defined as bacterial or viral infections, dermatomycoses, and parasitic infestations. Only primary studies were included. All analyzed costs were converted to 2020 Euros. Thirteen of the identified publications presented indirect costs of SSTIs in children and were conducted in Argentina, Australia, Brazil, Hungary, New Zealand, Poland, Spain, Taiwan, and the USA. Nine studies described indirect costs associated with infection of *Varicella-zoster virus*: lost workdays by outpatient caregivers ranged from 0.27 to 7.8, and up to 6.14 if caring for inpatients; total productivity losses ranged from €1.16 to €257.46 per patient. Three studies reported indirect costs associated with acute bacterial SSTIs (community-associated methicillin-resistant *Staphylococcus aureus*) in children: total productivity losses ranged from €1,814.39 to €8,224.06 per patient, based on impetigo, cellulitis, and folliculitis. One study of parasitic infestations (*Pediculus humanus capitis*) reported total indirect costs per patient of €68.57 (formal care) plus €21.41 due to time lost by parents in purchasing treatment.

3. OBJECTIVE OF THE STUDY

The present study aims to examine the prevalent health problems among primary school children in the Cuddalore district of Tamil Nadu.

4. RESEARCH DESIGN

The study is based on primary data collected through a well-defined interview schedule. The present study is designed to assess the health problems of primary school children and their direct and indirect costs of treatment in the Cuddalore district of Tamil Nadu. This section outlines the detailed methodology followed, including the selection of the study area, sampling techniques, sample size determination, and respondent selection.

4.1 Selection of the Study Area and Primary Schools

In the initial stage, Cuddalore district was selected as the study area. The choice of this district was primarily based on the researcher's familiarity and native connection with the region, which enabled easier access to schools, respondents, and local administrative units. Cuddalore district comprises 13 administrative blocks. For the purpose of this study, two blocks — Cuddalore and Mangalore — were purposively selected in the second stage, based on their level of development. While Cuddalore block is considered relatively developed, Mangalore block is categorized as underdeveloped, allowing for a meaningful comparison of the health and nutritional status of schoolchildren across different developmental settings.

In the third stage, eight government-run primary schools were chosen, with four from each block. The selected schools from Mangalore block include:

1. Panchayat Union Primary School, Thittagudi
2. Panchayat Union Primary School, Orangur
3. Panchayat Union Primary School, Mo. Podaiyar
4. Panchayat Union Primary School, Avinangudi

The selected schools from Cuddalore block are:

1. Panchayat Union Primary School, Varakalpattu
2. Panchayat Primary School, Thotti
3. Panchayat Primary School, V. Kattupalayam

4. Panchayat Union Primary School, Crunamangalam

These schools were selected based on the highest number of student enrolments in primary grades, and all are located in rural areas, ensuring the study focuses on rural public health conditions.

4.2 Sampling Size and Technique

This research adopts a cross-sectional study design. The study population comprises all primary school students enrolled in the selected eight schools within the Cuddalore and Mangalore blocks. To ensure scientific accuracy in sample selection, the Taro Yamane (1967) formula was applied to calculate an appropriate sample size from the total student population of 1,434 across all eight schools.

4.3 Taro Yamane Formula Application

The Taro Yamane (1967) formula has been used to calculate the sampling size in the selected primary schools. The formula for determining the sampling size is as

$n = N/1+N(e)^2$

n = Sample Size

N = population Size (1434)

e = sampling error (0.05)

$$n = \frac{1434}{1+1434(0.05)^2}$$

$$n = \frac{1434}{1+1434(0.0025)}$$

$$n = \frac{1434}{1+3.585}$$

$$n = \frac{1434}{4.585}$$

$$n = 312.75$$

Thus, the **s**ample size was rounded to 313.

4.4 Selection of the Respondents

Once the sample size was determined, a simple random sampling technique was employed to select 313 respondents from the total student population. The respondents were children aged 6 to 10 years, covering the key developmental stages within primary schooling.

4.5 statistical tools and techniques

After the fieldwork, the data has been carefully analysed and edited to ensure accuracy, consistency and completeness. The data has been analysed by using SPSS and EXCEL Software's. frequency distribution has been used to analyse the data related to health problems of children.

5. RESULTS AND DISCUSSIONS

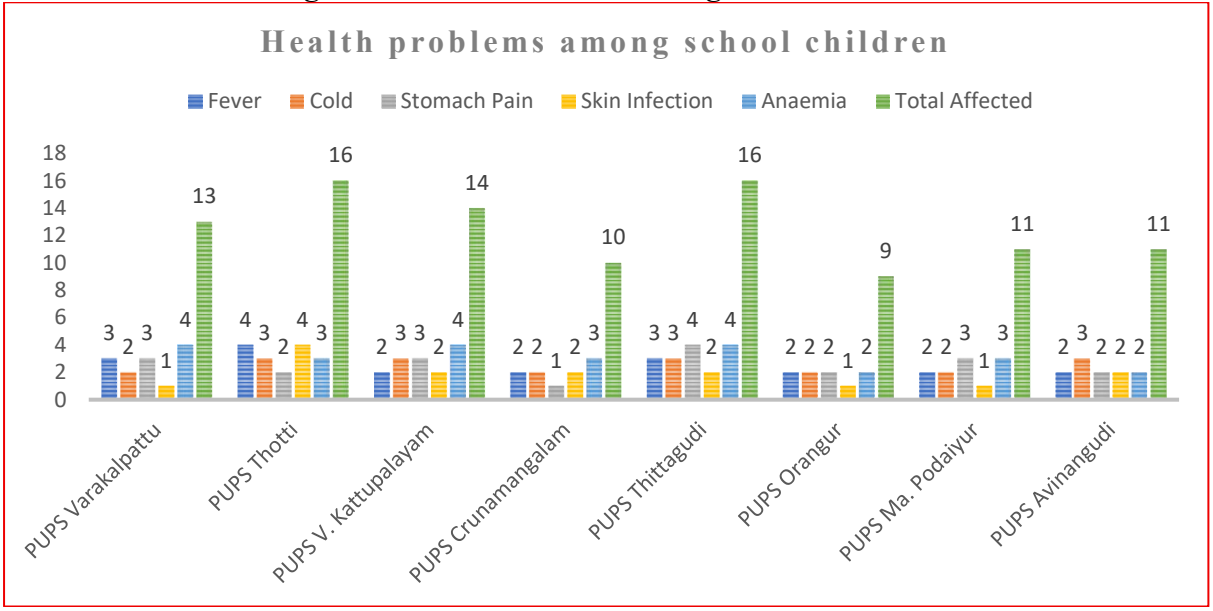
Table 5.1. School-wise Frequency of Health Problems

School Name	Fever	Cold	Stomach Pain	Skin Infection	Anaemia	Total Affected
PUPS Varakalpattu	3	2	3	1	4	13
PUPS Thotti	4	3	2	4	3	16
PUPS V. Kattupalayam	2	3	3	2	4	14
PUPS Crunamangalam	2	2	1	2	3	10
PUPS Thittagudi	3	3	4	2	4	16

PUPS Orangur	2	2	2	1	2	9
PUPS Ma. Podaiyur	2	2	3	1	3	11
PUPS Avinangudi	2	3	2	2	2	11

Source: computed from primary data

Fig. 5.1. Health Problems among school children



The table 5.1 and graph 5.1 provides a detailed school-wise distribution of common health problems affecting primary school children in the Cuddalore district of Tamil Nadu. A total of 100 health-related cases were reported across 8 Panchayat Union Primary Schools (PUPS). The most frequently reported health issues include anaemia (25 cases), fever (20 cases), cold (20 cases), stomach pain (20 cases), and skin infections (15 cases). Among the schools, PUPS ThottI and PUPS Thittagudi reported the highest number of affected students (16 cases each), which may be attributed to their larger student population or possibly more vulnerable health conditions. In contrast, PUPS Orangur (9 cases) and PUPS Crunamangalam (10 cases) had the lowest number of affected children, which may suggest relatively better health conditions, smaller enrolment, or limited reporting.

Among all reported illnesses, anemia is the most widespread, with high incidence seen in PUPS Varakalpattu, Thittagudi, and V. Kattupalayam (4 cases each). This indicates a serious nutritional deficiency, likely caused by inadequate iron intake, poor dietary diversity, or worm infestation—all of which are prevalent in rural areas with limited access to balanced diets. The high number of fever and cold cases (20 each) across the schools suggests seasonal illnesses and viral infections, exacerbated by poor ventilation in classrooms and lack of protective clothing. Stomach pain, observed uniformly (20 cases), is often linked to poor sanitation, unclean drinking water, and irregular meal consumption, which can be common among children from low-income households. Skin infections (15 cases), though fewer in number, may point to unhygienic living conditions, limited access to bathing water or soap, and overcrowded households.

The clustering of health issues in certain schools may reflect deeper structural and socio-economic problems. For example, PUPS ThottI and Thittagudi, which top the list in terms of health issues, may be facing infrastructural deficits such as lack of clean toilets, midday meal quality issues, and inadequate healthcare access. These schools might also be located in villages with low maternal literacy, poor health-seeking behavior, or limited awareness of hygiene practices among families. Additionally, frequent absenteeism due to untreated or recurring illnesses could contribute to learning setbacks, reduced participation,

and ultimately, lower academic performance. These patterns underscore the need for school-based health interventions, routine medical check-ups, nutrition programs (especially for anaemia), and awareness campaigns to address both the direct health issues and their broader social determinants.

5. CONCLUSION

The study clearly indicates that a considerable number of primary school children in the Cuddalore district of Tamil Nadu suffer from a range of health issues such as anaemia, fever, stomach pain, cold, and skin infections, with anaemia being the most prevalent across nearly all schools. These health problems not only affect the physical well-being and academic performance of the children but also place a significant economic burden on their families through both direct costs (like doctor fees, medicine, and transportation) and indirect costs (such as loss of wages for accompanying parents and missed school days). The variations in disease prevalence among schools suggest that underlying factors such as nutritional deficiency, poor hygiene, lack of health awareness among parents, and inadequate access to healthcare services contribute to the problem. To mitigate this, a strong recommendation is to implement regular, school-based health screening and awareness programs with nutritional support and referral services, especially in rural areas, to enable early detection and treatment of common ailments. Such a step would not only improve children's health outcomes but also reduce the financial stress on economically disadvantaged households, ultimately contributing to better educational participation and performance.

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