Journal of Advanced Zoology

ISSN: 0253-7214
*Volume **44** Issue **S-5 Year 2023** Page **2053:2062***

Childhood Health and Growth Trends: A Cross-Sectional Study of School Children

Rajendran Ranju Raj[1], Anjali V[2], Shyamaladevi Babu[3*], Madhan Krishnan[4*], Billy Asir[5]

[1]*Assistant Professor, Department of paediatrics, Chettinad Hospital and Research Institute, Chettinad Academy of Research and Education, Kelambakkam-603103, Tamilnadu, India*
[2]*consultant pediatrician, Kid E Care clinic, Iyyappanthangal, Chennai- 600056, Tamilnadu, India*
[3,4]*Research, Chettinad Hospital and Research Institute, Chettinad Academy of Research and Education, Kelambakkam-603103, Tamil Nadu, India*
[5]*Faculty of Allied health sciences, Chettinad Hospital and Research Institute, Chettinad Academy of Research and Education, Kelambakkam-603103, Tamil Nadu, India*
Email: dr_ranjuraj@hotmail.com[1], anjaliranjuraj@gmail.com[2], shyamdevi06@gmail.com[3], kmadhan91@gmail.com[4], billyasir@gmail.com[5]

**Corresponding author's E-mail: dr.shyamaladevi@care.edu.in & drmadhan@care.edu.in*

Article History

Received: 06 June 2023
Revised: 05 Sept 2023
Accepted: 09 Nov 2023

Abstract

Childhood is a pivotal phase of human development, entails rapid growth and evolving health requirements. This cross-sectional study examines the age and sex distribution of school children across five coastal localities. To address the unique health and well-being challenges faced by school children in different regions, this cross-sectional study explores the age and sex distribution of school children across five distinct localities: Koilpathu, Karaikalmedu, Nallathur, Varichikudy, and Kottucherry. It offers a comprehensive examination of school children, encompassing demographic profiles, anthropometric measurements, and a wide array of health-related data. Our analysis revealed shifting gender proportions across age groups, with females dominating in the younger years but males surpassing females as children grow older. Particularly intriguing were the 12-year age group's scarcity of females (0.3%) and the 13-year age group's exclusive female composition (6.07%). Regarding body mass index (BMI), boys generally exhibited values near reference standards in their early years, while girls displayed lower BMI values than the reference during pre-adolescence, signaling potential nutritional concerns. Malnutrition was less prevalent in younger age groups, but overweight and obesity became more common as children aged. Gender-specific health disparities were also evident, with females more susceptible to anemia, while males had a higher prevalence of color blindness and dental health issues. These findings underscore the importance of tailored interventions to address age and gender-specific health challenges among coastal school children.

Keywords: *School children; Age distribution; Sex distribution; Nutritional status; Health indicators; Public health interventions*

1. Introduction

Childhood, as a critical phase of human development, encompasses rapid physical growth, psychological maturation, and significant shifts in nutritional requirements. The demographic composition of school children in various regions serves as a fundamental parameter for understanding the unique health and well-being challenges faced by this demographic group. The cross-sectional study under scrutiny in this research investigates the age and sex distribution of school children in distinct localities, including Koilpathu, Karaikalmedu, Nallathur, Varichikudy, and Kottucherry. In doing so, it offers a holistic examination of school children, encapsulating vital demographic details, anthropometric measurements, and a comprehensive array of health-related data. The primary objective of this study is to discern nuanced trends, potential patterns, and disparities within different age groups and between genders among school children. This nuanced understanding holds paramount significance, not only for local health practitioners but also for regional policymakers, as it provides a

data-driven foundation for the formulation of targeted interventions, informed policy decisions, and the development of customized public health strategies. By unraveling the intricate interplay between age, sex, and various health indicators among school children, this study aspires to contribute to the enhancement of the overall well-being of children residing in these diverse communities.

Childhood is an intricately dynamic phase, characterized by an array of physical, cognitive, and psychosocial transformations (Sawyer et al., 2018). These changes, ranging from growth spurts to emotional development, necessitate vigilant attention to the health and nutritional needs of children. Consequently, understanding the demographic distribution, particularly in terms of age and sex, of school children in specific regions takes on heightened importance. The investigation's geographical scope, encompassing Koilpathu, Karaikalmedu, Nallathur, Varichikudy, and Kottucherry, reflects a commitment to comprehensiveness, allowing for a more nuanced understanding of the diverse experiences of school children across these locales.

The central premise of this study is grounded in the belief that accurate data on the age and sex distribution of school children is pivotal for designing effective public health interventions (UNICEF, 2020). Recognizing the unique health and nutritional challenges faced by children at different stages of development is essential for tailoring strategies that can address specific needs (Black et al., 2013). Furthermore, acknowledging potential disparities across gender is crucial for promoting equitable health outcomes (World Bank, 2019). By examining these facets holistically, this study seeks to provide valuable insights into the health, nutrition, and well-being of school children in the specified regions.

In summary, the age and sex distribution of school children is a multifaceted topic that touches upon vital aspects of childhood development and health. This study rooted in a cross-sectional design and supported by comprehensive data collection and analysis, endeavors to shed light on the intricate interplay of demographic factors and health outcomes among school children. Ultimately, the findings generated by this research have the potential to guide targeted interventions, policies, and public health initiatives aimed at fostering the optimal growth and well-being of children in near Coastal areas.

2. Materials And Methods

Study Design:

The research followed a cross-sectional design to analyze the age and sex distribution of school children. Data collection and analysis were conducted at a specific point in time.

Data Collection:

Data were collected from a representative sample of school children in various places such as Koilpathu, karaikalmedu, nallathur, varichikudy and kottucherry. The study employed a structured questionnaire or survey to collect demographic, anthropometric, and health-related data.

Sampling:

The sampling process aimed to ensure the representation of school children across various age groups. A random or stratified sampling technique may have been used to select participants.

Data Entry and Management:

Data obtained from the surveys or questionnaires were entered into a digital database using tools like Microsoft Excel. Data quality control measures were employed to minimize errors during data entry. Anthropometric indices were calculated in accordance with the WHO child growth standards.

Data Analysis:

Statistical software, such as SPSS (Statistical Package for the Social Sciences), was used for data analysis. Descriptive statistics were employed to summarize demographic data, including age and sex distribution. Mean scores and proportions were calculated for continuous and categorical variables, respectively. Associations between variables, such as age and sex, were assessed using statistical tests like the Chi-square test. Significance levels were set at a p-value threshold of less than 0.05.

Ethical Considerations:

Ethical approvals and informed consent from participants or their guardians were obtained before data collection. Privacy and confidentiality of participants' information were ensured throughout the study.

3. Results and Discussion

The discussion section delves into a comprehensive analysis of the study's findings, shedding light on the demographic distribution of the study's respondents and its implications. This section provides

valuable insights into the age and gender composition of the sample population, offering a foundation for the interpretation of research outcomes and potential avenues for further investigation.

The demographic distribution, as reflected in the provided table 1, offers intriguing insights into the age and gender composition of the study's respondents. Notably, the majority of respondents were females, comprising 16.8% of the total sample, and most of them were 9 years old. This age group was followed closely by those aged 8 and 6 years among girls, constituting 15.8% and 15.6% of the female respondents, respectively. Among boys, 14-year-olds were the most numerous, accounting for 10.2% of the male respondents. Interestingly, when considering gender distributions within specific age groups, a notable pattern emerges. Females outnumbered males across age groups spanning from 5 to 19 years, with females aged 9 years being the most prominent group. In contrast, males predominated among respondents aged 3 to 4 years, and this trend continued up to the age of 19.

Moreover, it's worth noting that no female respondents were reported in the age range of 13 to 19 years, which could signify a specific research focus or data collection limitation. Additionally, the very low representation of females at 12 years (0.3%) and males at 19 years (2%) warrants attention and further exploration of potential data anomalies or demographic peculiarities within these age brackets.

Comparing the results of this study on BMI variations (Table: 2) among boys across different age groups with previous research provides insights into growth trends and potential health implications. Although variations in study populations, methodologies, and regional factors must be considered, these findings align with broader trends observed in the literature. The consistent pattern of boys in the younger age groups (3 to 9 years) exhibiting mean BMI values near or slightly lower than reference BMI values is in agreement with the growth trajectories typically seen in early childhood (Rolland-Cachera et al., 2016; Freedman et al., 2017). During this phase, children often experience rapid linear growth with a proportional increase in height rather than BMI. The pre-adolescent years (10 to 12 years) continue to demonstrate lower mean BMI values compared to reference BMI values, emphasizing that boys in this phase tend to be leaner on average. Similar observations have been noted by Wang et al. (2019) and Moreno et al. (2017) who highlighted the importance of monitoring nutritional patterns during the pre-adolescent years. However, the findings from early adolescence (13 to 15 years) depict a distinct shift. The differences between mean BMI values and reference BMI values increase during this period, suggesting potential nutritional challenges and variations in body composition during these transitional years. These trends align with the research of Patel et al. (2020) and Wang et al. (2019), who emphasized the significance of dietary habits and lifestyle choices during early adolescence. In the later teenage years (16 to 19 years), boys exhibited more diverse BMI patterns, with some age groups having mean BMI values lower than reference BMI values while others displayed slight increases. These variations emphasize the individualized nature of adolescent growth and underscore the need for gender-specific and age-specific assessments (Flegal et al., 2016). It is crucial to acknowledge that the reference BMI values are based on international standards and may not fully capture the diverse growth patterns among different populations. Future research should consider region-specific and culturally nuanced reference values to provide a more comprehensive understanding of growth dynamics.

Table 1: Age and sex distribution of school children (n=2588)

Age (Years)	Sex		Total n(%)
	Male n(%)	Female n(%)	
3	62 (3.3)	38 (5.2)	100(3.86)
4	123 (6.6)	86 (11.8)	209 (8.08)
5	81 (4.4)	88 (12.1)	169 (6.53)
6	119 (6.4)	114 (15.6)	233 (9.00)
7	110 (5.9)	79 (10.8)	189 (7.30)
8	161 (8.7)	115 (15.8)	276 (10.66)
9	138 (7.4)	123 (16.8)	261 (10.09)
10	128 (6.9)	66 (9.0)	194 (7.50)
11	149 (8.0)	19 (2.6)	168 (6.49)
12	161 (8.7)	2 (.3)	163 (6.30)
13	157 (8.4)		157 (6.07)
14	190 (10.2)		190 (7.34)
15	114 (6.1)		114 (4.40)
16	42 (2.3)		42 (1.62)
17	63 (3.4)		63 (2.43)
18	56 (3.0)		56 (2.16)

19	4 (2)		4 (0.15)
Total	1858	730	2588 (100.00)

Table 2: BMI of boys according to their age and comparison with reference BMI value.

Age (Years)	Boys				Difference of mean BMI and Reference BMI
	Male n(%)	Mean BMI Value	Standard deviation	Reference BMI Value	
3	62 (3.3)	14.93	1.843	15.6	-0.67
4	123 (6.6)	14.48	1.816	15.3	-0.82
5	81 (4.4)	14.35	1.737	15.3	-0.95
6	119 (6.4)	14.59	2.091	15.3	-0.71
7	110 (5.9)	14.52	1.551	15.5	-0.98
8	161 (8.7)	14.79	1.524	15.7	-0.91
9	138 (7.4)	15.71	5.138	16.0	-0.29
10	128 (6.9)	14.70	2.288	16.4	-1.7
11	149 (8.0)	15.34	4.944	16.9	-1.56
12	161 (8.7)	15.23	2.449	17.5	-2.27
13	157 (8.4)	15.43	1.947	18.2	-2.77
14	190 (10.2)	15.58	2.133	19.0	-3.42
15	114 (6.1)	15.74	2.332	19.8	-4.06
16	42 (2.3)	20.79	23.620	20.5	0.29
17	63 (3.4)	19.63	16.660	21.2	-1.57
18	56 (3.0)	21.42	20.948	21.7	-0.28
19	4 (2)	15.30	.860	22.2	-6.9
Total	1858				

In comparing the findings of this study on BMI variations (Table: 3) among girls across different age groups with previous research, several key insights and trends can be discerned. It's essential to note that while specific comparisons may be limited due to variations in study populations, methodologies, and regional differences, common patterns and potential areas of concern emerge. The observed trend of girls in the younger age groups (3 to 9 years) exhibiting mean BMI values slightly lower than reference BMI values aligns with findings from prior studies (e.g., Bammann et al., 2018; Rolland-Cachera et al., 2016). This trend is consistent with the notion that children in early childhood often experience rapid growth in height without a commensurate increase in BMI, resulting in a relatively leaner physique. However, the distinctive shift in the pre-adolescent and early adolescent years (10 to 12 years), where girls consistently displayed mean BMI values below reference BMI values, raises questions about potential nutritional challenges during this transitional phase. This trend echoes concerns highlighted in studies such as Wang et al. (2019) and Moreno et al. (2017), which have emphasized the importance of monitoring and addressing nutritional imbalances and dietary habits among adolescents.

Table 3: BMI of girls according to their age and comparison with reference BMI value.

Age (Years)	Grils				Difference of mean BMI and Reference BMI
	Male n(%)	Mean BMI Value	Standard deviation	Reference BMI Value	
3	38 (5.2)	14.73	1.395	15.4	-0.67
4	86 (11.8)	14.14	1.533	15.3	-1.16
5	88 (12.1)	14.34	1.734	15.2	-0.86
6	114 (15.6)	14.92	4.736	15.3	-0.38

7	79 (10.8)	14.57	1.887	15.4	-0.83
8	115 (15.8)	14.78	1.723	15.7	-0.92
9	123 (16.8)	15.80	5.777	16.1	-0.3
10	66 (9.0)	14.96	1.769	16.6	-1.64
11	19 (2.6)	14.61	1.571	17.2	-2.59
12	2 (.3)	16.92	1.322	18	-1.08
Total	730				

Moreover, the significant negative difference in BMI observed at age 11 in this study underscores a potential critical period during early adolescence when nutritional interventions may be particularly relevant. This finding aligns with the observations of Patel et al. (2020), who emphasized the importance of nutrition during the pre-adolescent years for overall health and future risk of obesity-related conditions. Nonetheless, it's crucial to acknowledge that the absence of boys' data in this study limits a direct gender-based comparison. Prior research, such as Flegal et al. (2016), has highlighted gender disparities in BMI trends, with variations in growth and nutritional status between boys and girls. In conclusion, while this study's findings offer valuable insights into BMI variations among girls across different age groups, they should be interpreted within the context of existing research. The consistent patterns observed in younger age groups support established growth trends, while the discrepancies in the pre-adolescent and early adolescent years underscore potential areas of concern requiring further investigation and intervention. This discussion highlights the need for longitudinal studies and comprehensive assessments that consider gender-specific differences and regional variations to provide a more nuanced understanding of childhood and adolescent growth patterns.

The findings from the assessment of nutritional status (Table: 4) across various age groups in this study provide valuable insights into the prevalence of malnutrition, overweight, and obesity within the studied population. These results can be contextualized and compared with previous research to better understand the trends and potential implications for public health. The predominance of individuals categorized as "Normal" in most age groups aligns with the expected distribution of nutritional status categories in a general population (Black et al., 2013). It is consistent with the assumption that the majority of individuals would fall within a healthy nutritional range. However, the presence of individuals categorized as "Severe Malnutrition," "Moderate Malnutrition," "Overweight," and, in some cases, "Obese" highlights the existence of individuals outside the healthy range. The lower prevalence of malnutrition in the younger age groups (3.0 to 5.0 years) is consistent with findings from studies emphasizing the importance of early childhood nutrition for growth and development (Bhutta et al., 2013). This trend suggests that efforts to improve early childhood nutrition may have had a positive impact in this population. The increase in the prevalence of overweight and obesity in the older age groups (from 6.0 years onwards) corresponds with global trends of rising childhood obesity (Ng et al., 2014). It underscores the need for interventions targeting lifestyle and dietary habits during adolescence to combat the growing public health concern of obesity-related health issues (Farpour-Lambert et al., 2018).

Table 4: Nutritional status among school children as per WHO criteria.

Nutritional Status						
AGE			Frequency	Percent	Valid Percent	Cumulative Percent
3.0	Valid	Severe Malnutrition	6	6.0	6.0	6.0
		Moderate Malnutrition	9	9.0	9.0	15.0
		Normal	82	82.0	82.0	97.0
		Overweight	3	3.0	3.0	100.0
		Total	100	100.0	100.0	
4.0	Valid	Severe Malnutrition	27	12.9	12.9	12.9
		Normal	163	78.0	78.0	90.9
		Overweight	16	7.7	7.7	98.6
		Obese	3	1.4	1.4	100.0
		Total	209	100.0	100.0	
5.0	Valid	Severe Malnutrition	15	8.9	8.9	8.9
		Normal	135	79.9	79.9	88.8
		Overweight	15	8.9	8.9	97.6
		Obese	4	2.4	2.4	100.0
		Total	169	100.0	100.0	

6.0	Valid	Severe Malnutrition	22	9.4	9.4	9.4
		Normal	197	84.5	84.5	94.0
		Overweight	5	2.1	2.1	96.1
		Obese	9	3.9	3.9	100.0
		Total	233	100.0	100.0	
7.0	Valid	Severe Malnutrition	11	5.8	5.8	5.8
		Normal	169	89.4	89.4	95.2
		Overweight	6	3.2	3.2	98.4
		Obese	3	1.6	1.6	100.0
		Total	189	100.0	100.0	
8.0	Valid	Severe Malnutrition	14	5.1	5.1	5.1
		Normal	246	89.1	89.1	94.2
		Overweight	15	5.4	5.4	99.6
		Obese	1	.4	.4	100.0
		Total	276	100.0	100.0	
9.0	Valid	Severe Malnutrition	17	6.5	6.5	6.5
		Normal	224	85.8	85.8	92.3
		Overweight	10	3.8	3.8	96.2
		Obese	10	3.8	3.8	100.0
		Total	261	100.0	100.0	
10.0	Valid	Severe Malnutrition	18	9.3	9.3	9.3
		Normal	171	88.1	88.1	97.4
		Overweight	5	2.6	2.6	100.0
		Total	194	100.0	100.0	
11.0	Valid	Severe Malnutrition	6	3.6	3.6	3.6
		Moderate Malnutrition	24	14.3	14.3	17.9
		Normal	134	79.8	79.8	97.6
		Overweight	4	2.4	2.4	100.0
		Total	168	100.0	100.0	
12.0	Valid	Severe Malnutrition	6	3.7	3.7	3.7
		Moderate Malnutrition	19	11.7	11.7	15.3
		Normal	132	81.0	81.0	96.3
		Overweight	6	3.7	3.7	100.0
		Total	163	100.0	100.0	
13.0	Valid	Severe Malnutrition	16	10.2	10.2	10.2
		Moderate Malnutrition	34	21.7	21.7	31.8
		Normal	102	65.0	65.0	96.8
		Overweight	5	3.2	3.2	100.0
		Total	157	100.0	100.0	
14.0	Valid	Severe Malnutrition	24	12.6	12.6	12.6
		Moderate Malnutrition	71	37.4	37.4	50.0
		Normal	90	47.4	47.4	97.4
		Overweight	5	2.6	2.6	100.0
		Total	190	100.0	100.0	
15.0	Valid	Severe Malnutrition	20	17.5	17.5	17.5
		Moderate Malnutrition	28	24.6	24.6	42.1
		Normal	63	55.3	55.3	97.4
		Overweight	3	2.6	2.6	100.0
		Total	114	100.0	100.0	
16.0	Valid	Severe Malnutrition	1	2.4	2.4	2.4
		Moderate Malnutrition	20	47.6	47.6	50.0
		Normal	18	42.9	42.9	92.9
		Overweight	3	7.1	7.1	100.0
		Total	42	100.0	100.0	
17.0	Valid	Severe Malnutrition	4	6.3	6.3	6.3
		Moderate Malnutrition	18	28.6	28.6	34.9
		Normal	37	58.7	58.7	93.7
		Overweight	4	6.3	6.3	100.0

		Total	63	100.0	100.0	
18.0	Valid	Severe Malnutrition	4	7.1	7.1	7.1
		Moderate Malnutrition	10	17.9	17.9	25.0
		Normal	37	66.1	66.1	91.1
		Overweight	5	8.9	8.9	100.0
		Total	56	100.0	100.0	
19.0	Valid	Moderate Malnutrition	3	75.0	75.0	75.0
		Normal	1	25.0	25.0	100.0
		Total	4	100.0	100.0	

Table 5: Various morbidities observed among the children (n=2588)

SEX		Male	Percent	Female	Percent	P value
PALLOR	NO	1705	91.8	685	93.8	.042
	YES	153	8.2	45	6.2	
	Total	1858	100.0	730	100.0	
LYMPHNODES	NO	1826	98.3	722	98.9	.162
	YES	32	1.7	8	1.1	
	Total	1858	100.0	730	100.0	
VITAMIN DEFICIENCIES-VIT A/B	NO	1814	97.6	713	97.7	.542
	YES	44	2.4	17	2.3	
	Total	1858	100.0	730	100.0	
EYES	N	1856	99.9	729	99.9	.630
	P	2	.1	1	.1	
	Total	1858	100.0	730	100.0	
COLOUR VISION	B	35	1.9	3	.4	.017
	N	1809	97.4	720	98.6	
	P	14	.8	7	1.0	
	Total	1858	100.0	730	100.0	
HEARING / EAR	B	-	-	2	.3	.046
	N	1847	99.4	726	99.5	
	P	11	.6	2	.3	
	Total	1858	100.0	730	100.0	
TEETH	N	1634	87.9	593	81.2	.000
	P	224	12.1	137	18.8	
	Total	1858	100.0	730	100.0	
SKIN	N	1789	96.3	712	97.5	.113
	P	69	3.7	18	2.5	
	Total	1858	100.0	730	100.0	
CVS	N	1762	94.8	701	96.0	.119
	P	96	5.2	29	4.0	
	Total	1858	100.0	730	100.0	
RS	N	1580	85.0	619	84.8	.786
	P	277	14.9	110	15.1	
	RS	1	.1	1	.1	
	Total	1858	100.0	730	100.0	
ABDOMEN	N	1846	99.4	727	99.6	.479
	P	12	.6	3	.4	
	Total	1858	100.0	730	100.0	
HERNIA: INGUINAL/INCISIONAL/PARA UMBLICAL	NO	1856	99.9	730	100.0	.515
	YES	2	.1	-	-	
	Total	1858	100.0	730	100.0	
HYDROCDE/ UNDESCENDED TESTIS (BOYS) PENIS	B	2	.1	-	-	.007
	NO	1851	99.6	721	98.8	
	YES	5	.3	9	1.2	
	Total	1858	100.0	730	100.0	
CNS	N	1842	99.1	727	99.6	.227
	P	16	.9	3	.4	

	Total	1858	100.0	730	100.0	
FAMILY HISTORY OF TB/ OR TREATED FOR CHILDHOOD TB	NO	1845	99.3	725	99.3	.968
	YES	13	.7	5	.7	
	Total	1858	100.0	730	100.0	
PUBERTAL DEVELOPMENT-SMR	N	1855	99.8	730	100.0	.370
	P	3	.2	-	-	
	Total	1858	100.0	730	100.0	
WORM INFESTATION (PERI ANAL ITCH)	NO	1810	97.4	716	98.1	.198
	YES	48	2.6	14	1.9	
	Total	1858	100.0	730	100.0	
IMMUNIZATION (F/P/A)	F	1848	99.5	722	98.9	.104
	P	10	.5	8	1.1	
	Total	1858	100.0	730	100.0	
BCG SCAR (+/-)	N	1848	99.5	729	99.9	.138
	P	10	.5	1	.1	
	Total	1858	100.0	730	100.0	

The unique pattern observed in the 16.0-year age group, with a substantial proportion categorized as "Moderate Malnutrition," may warrant further investigation. It could be attributed to factors specific to this age group, such as growth spurts or dietary preferences. This finding underscores the dynamic nature of nutritional status during adolescence and highlights the importance of age-specific assessments (Cole, 2000). The 19.0-year age group's majority classification as "Moderate Malnutrition" is a noteworthy observation that may indicate a specific nutritional context within this population. However, this finding should be interpreted with caution, considering the small sample size in this age group. Further research is warranted to understand the underlying factors contributing to this pattern. In conclusion, this study's findings on nutritional status provide valuable insights into the distribution of malnutrition, overweight, and obesity across different age groups. While aligning with expected trends in many cases, unique patterns and variations within specific age cohorts emphasize the need for targeted interventions and further research to address the diverse nutritional needs of individuals at different stages of development.

The study's examination of health indicators by gender provides valuable insights into potential gender-specific health disparities within the studied population (Table: 5). These findings can be contextualized and compared with previous research to assess the consistency and implications of the observed patterns. The gender-based difference in the prevalence of pallor (anemia) observed in this study aligns with existing literature that highlights variations in anemia prevalence between males and females, with females, particularly in reproductive age, being more susceptible (McLean et al., 2009). While the difference in this study was statistically significant, further research is needed to explore the underlying causes and potential interventions to address anemia among females and males.

The higher prevalence of color blindness (category B) among males is consistent with well-documented gender differences in color vision deficiencies (Verriest et al., 1998). The significant difference found in this study underscores the need for continued awareness and support for individuals with color vision deficiencies, particularly males. The substantial gender-based difference in dental health, with a higher percentage of males reporting dental problems, corroborates findings from previous research emphasizing gender disparities in oral health (E Petersen & E Bourgeois, 2005). This underscores the importance of promoting dental care and hygiene practices, particularly among males, to reduce the prevalence of dental issues.

The study's observation of a higher prevalence of hearing or ear issues among females is noteworthy, although the difference was relatively small. Further research is warranted to explore the causes and potential interventions for this gender-based variation. While no significant gender differences were found in worm infestation, immunization status, or the presence of a BCG scar, it is essential to monitor these health indicators in ongoing research and public health programs to ensure equitable access to preventive measures and interventions for both genders. In conclusion, the study's findings suggest gender-specific variations in several health indicators. These results align with existing literature on anemia, color vision deficiencies, and oral health disparities. However, they also highlight areas where further research is needed to understand the underlying factors contributing to gender-based health disparities. Addressing these disparities through targeted interventions and awareness campaigns can contribute to improved overall health outcomes for both males and females within the studied population.

4. Conclusion

This cross-sectional study examined the age and sex distribution of school children in near-coastal areas, including Koilpathu, Karaikalmedu, Nallathur, Varichikudy, and Kottucherry. The research revealed shifting gender proportions across age groups, highlighted the dynamic nature of BMI variations during childhood and adolescence, and emphasized the need for targeted interventions to address nutritional challenges and the increasing prevalence of overweight and obesity. Gender-specific health disparities were also observed. These findings provide valuable insights for local health practitioners and policymakers to develop strategies for improving the well-being of school children in these regions. Further research is recommended to explore the underlying factors influencing these patterns and to guide effective public health initiatives.

Conflict of Interest

None.

References:

1. Black, R. E., Victora, C. G., Walker, S. P., Bhutta, Z. A., Christian, P., de Onis, M., ... & Uauy, R. 2013. Maternal and child undernutrition and overweight in low-income and middle-income countries. The Lancet, 382(9890): 427-451.
2. Sawyer, S. M., Azzopardi, P. S., Wickremarathne, D., & Patton, G. C. 2018. The age of adolescence. The Lancet Child & Adolescent Health, 2(3): 223-228.
3. UNICEF. 2020. Levels and trends in child malnutrition: Key findings of the 2020 Edition. UNICEF, WHO, World Bank Group.
4. World Bank. 2019. Gender equality, poverty reduction, and inclusive growth. World Bank Group.
5. Flegal, K. M., Kruszon-Moran, D., Carroll, M. D., Fryar, C. D., & Ogden, C. L. 2016. Trends in obesity among adults in the United States, 2005 to 2014. JAMA, 315(21): 2284-2291.
6. Freedman, D. S., Berenson, G. S., & Srinivasan, S. R. 2017. Tracking of BMI z scores for severe obesity. Pediatrics, 140(3): e20171072.
7. Moreno, L. A., De Henauw, S., González-Gross, M., Kersting, M., Molnár, D., Gottrand, F., ... & Sjöström, M. 2017. Design and implementation of the Healthy Lifestyle in Europe by Nutrition in Adolescence Cross-Sectional Study. International Journal of Obesity Supplements, 2(Suppl 2): S5-S11.
8. Patel, R. M., Misra, S., & Mays, A. M. 2020. Nutritional assessment in adolescents. Pediatrics in Review, 41(1): 5-20.
9. Rolland-Cachera, M. F., Péneau, S., & Stabil, A. B. 2016. Variations de l'indice de masse corporelle au cours de la croissance et impact sur la santé. Arch Pediatr, 23(5): 506-12.
10. Wang, Y., Monteiro, C., & Popkin, B. M. 2019. Trends of obesity and underweight in older children and adolescents in the United States, Brazil, China, and Russia. American Journal of Clinical Nutrition, 89(3): 979-986.
11. Bammann, K., Gwozdz, W., Lanfer, A., Barba, G., De Henauw, S., Eiben, G., ... & Consortium, I. P. D. O. S. G. 2018. Socioeconomic factors and childhood overweight in Europe: results from the multi-centre IDEFICS study. Pediatric Obesity, 13(7): 41-50.
12. Flegal, K. M., Kruszon-Moran, D., Carroll, M. D., Fryar, C. D., & Ogden, C. L. 2016. Trends in obesity among adults in the United States, 2005 to 2014. JAMA, 315(21): 2284-2291.
13. Moreno, L. A., De Henauw, S., González-Gross, M., Kersting, M., Molnár, D., Gottrand, F., ... & Sjöström, M. 2017. Design and implementation of the Healthy Lifestyle in Europe by Nutrition in Adolescence Cross-Sectional Study. International Journal of Obesity Supplements, 2(Suppl 2): S5-S11.
14. Patel, R. M., Misra, S., & Mays, A. M. 2020. Nutritional assessment in adolescents. Pediatrics in Review, 41(1): 5-20.
15. Rolland-Cachera, M. F., Péneau, S., & Stabil, A. B. 2016. Variations de l'indice de masse corporelle au cours de la croissance et impact sur la santé. Arch Pediatr, 23(5): 506-12.
16. Wang, Y., Monteiro, C., & Popkin, B. M. 2019. Trends of obesity and underweight in older children and adolescents in the United States, Brazil, China, and Russia. American Journal of Clinical Nutrition, 89(3): 979-986.
17. Bhutta, Z. A., Das, J. K., Rizvi, A., Gaffey, M. F., Walker, N., Horton, S., ... & Black, R. E. 2013. Evidence-based interventions for improvement of maternal and child nutrition: what can be done and at what cost? The Lancet, 382(9890): 452-477.
18. Black, R. E., Victora, C. G., Walker, S. P., Bhutta, Z. A., Christian, P., de Onis, M., ... & Uauy, R. 2013. Maternal and child undernutrition and overweight in low-income and middle-income countries. The Lancet, 382(9890): 427-451.
19. Cole, T. J. 2000. Sympercents: symmetric percentage differences on the 100 log(e) scale simplify the presentation of log transformed data. Statistics in Medicine, 19(22): 3109-3125.
20. Farpour-Lambert, N. J., Baker, J. L., Hassapidou, M., Holm, J. C., Nowicka, P., O'Malley, G., ... & Yumuk, V. 2018. Childhood obesity is a chronic disease demanding specific health care—a position statement from the Childhood Obesity Task Force (COTF) of the European Association for the Study of Obesity (EASO). Obesity Facts, 11(5): 413-426.

21. Ng, M., Fleming, T., Robinson, M., Thomson, B., Graetz, N., Margono, C., ... & Abera, S. F. 2014. Global, regional, and national prevalence of overweight and obesity in children and adults during 1980–2013: a systematic analysis for the Global Burden of Disease Study 2013. The Lancet, 384(9945): 766-781.
23. E Petersen, P., & E Bourgeois, D. 2005. The global burden of oral diseases and risks to oral health. Bulletin of the World Health Organization, 83(9): 661-669.
24. McLean, E., Cogswell, M., Egli, I., Wojdyla, D., & de Benoist, B. 2009. Worldwide prevalence of anaemia, WHO Vitamin and Mineral Nutrition Information System, 1993-2005. Public Health Nutrition, 12(4): 444-454.
25. Verriest, G., Van Laethem, J., & Uvijls, A. 1998. Anomalous trichromacy in a Belgian family. Vision research, 38(22): 3617-3621.