Measurement of Anthropometry of Community School Children Affected from Day Snacks

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ABSTRACT

Purpose: *To access the current snacking habits of community school children's dietary habits and health status.*

Design/Methodology/Approach: *The study was conducted in a Kathmandu community school to identify the problem of inadequate access to nutritious snacks, school choices, and regular monitoring and collaboration among the students. Used mixed methodologies, reviewed relevant day snack literatures, discussed with the school's early childhood department head, and measured height, weight, and MUAC to identify the nutrition status of children. Collected information was analysed using Ena (WHO software). Total Managl Secondary School, Kirtipur, Kathmandu participated in research n=26 (boys 16 and girls 10) and Mahendra Adarsha Secondary School, Mahalaxmi -4, Imadol, Lalitpur n=27 (boys 15 and girls 12) total numbers of participants 53 were.*

Findings/Results: *There were (14) 63.6% boys and (8) 36.4% girls out which (2) 7.7% moderate and (1) 3.8% severe (1) 3.8% malnutrition in Mangal Secondary School where as (15) 55.6%boys and (12) 44.6% girls out of which (3) 11.1% moderate and equal (3) 11.1% severe malnutrition in Mahendra Adarsha Secondary School. There were severe wasting total (1) 4.5%, Moderate wasting (1) 4.5% and normal (20) 90.9% in Mangal Secondary School, Kirtipur -10, Kirtipur, Kathmandu whereas Moderate Wasting was (3) 11.1%, and normal (24) 88.9% were in Mahendra Adarsha Secondary School. At Mangal Secondary School, Kirtipur -10, Kirtipur, Kathmandu, the prevalence of stunting by age based on height-for-age Z-score showed severe stunting in children aged 42-53 months at 9.1%, moderate stunting at 13.6%, and normal height at 77.3%. Similarly, at Mahendra Adarsha Secondary School, Mahalaxmi -4, Imadol, Lalitpur, the total prevalence showed moderate stunting in children aged 42-53 months at 33.3% and normal height at 66.7%. Mid Upper Arm Circumference (MUAC) is used for emergency and screening purposes to assess the nutritional status of children.*

Originality/Value: *This research provides insights for policy maker to guide for improvements on Day Snacks Program.*

Paper Type: *Research Analysis*

Keywords: Age, Community, Day Snacks, Nutrition status, School Children.

1. INTRODUCTION :

Ghimire et al. (2017). [1] emphasized malnutrition as a significant public health concern in Nepal, impacting maternal and child health negatively. The research highlighted a high prevalence of malnutrition, particularly stunting among children under five years old, with over 75% having MUAC readings below -2 SD and approximately 24% below -3 SD, indicating the necessity for intervention (Chataut, 2016). [2].

According to the World Health Organization (WHO), stunting is assessed based on height-for-age, reflecting linear growth retardation and cumulative growth deficiencies. Children are classified as

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stunted or chronically undernourished if their height-for-age Z-score is below -2 SD from the reference population's median, with severe stunting identified when falling below -3 SD. The weight-for-height index evaluates current nutritional status by comparing body mass to height or length. Children are considered thin (wasted) or severely undernourished if their Z-score is less than -2 SD from the reference population's median, while severe wasting is defined as a Z-score below -3 SD (USAID, 2016). [3].

The study by Maskey (2020) [4] revealed that 26.29% of students were stunted, with boys at 51% and females at 41%, while 24.65% were underweight, with boys at 53% and girls at 47%. The percentages of thin, very thin, overweight, and obese individuals were 3.53%, 5.03%, 12.49%, and 8.96%, respectively.

Alflah (2023). [5] defines YM SAM as a weight-for-height/length -3Z-score of the WHO growth standard and/or MUAC less than 115 mm in children aged 6-59 months. Elsevier Limited (2016)[6] aims to reduce the proportion of children under five at risk of poor development by addressing present approaches' shortcomings and investing in standardized indicators for monitoring child development.

UNICEF (2016) [7] emphasizes investing in children's and nations' futures through healthy nutrition to promote development, brain growth, learning potential, adult productivity, and sustainable communities. Akhter, Malima, and Haque (2018). [8] highlighted the importance of parental education for a child's nutritional needs, showing significant impacts on stunting and underweight based on family members' educational levels.

Suaahara (2015). [9] has made significant strides in nutrition in Nepal, gaining trust from the government and people by enhancing nutritional well-being for 1000-day moms and children through community-level initiatives. Manandhar et al. (2020)[10] found that a percentage of boys and girls were underweight, overweight, or obese based on weight for age, emphasizing the importance of school health programs in promoting oral health, diet, personal hygiene, and overall nutritional status.

According to a study by Dónya S. Madjdian & Hilde A. J. Bras [11], challenges with unequal access and distribution within the home have become prominent in food and nutrition security studies. The research conducted in two Himalayan communities highlighted how diverse family arrangements influenced intra-household food distribution, leading to differences in the nutritional condition of women from Hindu and Buddhist families. Women from Hindu households showed worse nutritional conditions, especially during pregnancy, menstruation, and the postpartum period.

In Nepal, children of educated mothers received more frequent meals compared to children of mothers without a Secondary Education Examination degree. The study also revealed that Province 2 had the highest proportion of underweight individuals, while Provinces 2, 5, Karnali, and Sudurpaschim had higher rates of overweight and obesity. Despite progress in reducing malnutrition levels in Nepal, issues like anemia and undernutrition persist. Efforts such as micronutrient fortification and the Multi-Sector Nutrition Plan (MSNP) have been initiated to combat malnutrition in Nepal.

Malnutrition encompasses deficiencies, excesses, or imbalances in energy and nutrient intake. It includes undernutrition (wasting, stunting, underweight), micronutrient-related malnutrition (deficiencies or excesses), and overweight/obesity. Stunting affects 149 million children under 5 globally, while wasting affects 49 million. Malnutrition poses significant health risks globally, with nearly half of deaths in children fewer than 5 linked to under nutrition.

Stunting is a prevalent form of under nutrition globally that can lead to irreversible physical and cognitive damage. It is associated with insufficient maternal nutrition, intrauterine under nutrition, inadequate breastfeeding practices, and infectious diseases. Stunting has long-term consequences on cognitive functions and work capacity. Efforts to address malnutrition are crucial globally. WHO aims to end all forms of malnutrition by 2030 through universal access to effective nutrition interventions and healthy diets. Early nutrition optimization is vital for long-term benefits, especially during the first 1000 days from conception to a child's second birthday. Combating malnutrition is essential for achieving sustainable development goals and improving global health outcomes. The Multi-Sector Nutrition Plan (MSNP), which unites the health, education, social welfare, WASH, agricultural, and livestock sectors to address malnutrition in the nation, is one of several such initiatives led by various ministries that have been created to fight hidden hunger in Nepal (National Planning Commission, 2019, p. 25). [12].

According to Ministry of agriculture, Nepal to ensure adequate nutrition, cereal-based foods must be diversified to include pulses, vegetables, fruits, eggs, milk, fish, and meat. Therefore, a system of

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diverse agriculture production is undoubtedly needed in the nation for food security (Ministry of Agriculture, Land Management and Cooperatives Nepal, 2018 p. 4). [13].

According to Richter L. et al., the profiles are arranged in accordance with the ecological model of the Nurturing Care Framework, and policies, services, and programs are available to assist families and caregivers in providing young children with the good health and nutrition, security, and safety they need to thrive (Richter L, et al., 2019 p. 159). [14].

Malnutrition among school-age children is a severe problem in developing nations, particularly Sub-Saharan Africa, according to Roothaert R. et al. Many programs concentrate on moms and children under the age of five, neglecting those who are old enough to start school. It has been demonstrated that school meals can lower absenteeism from class, enhance focus in the classroom, and lower the rate of early dropouts (Roothaert R. et al.; 2021 p. 1). [15].

According to Pandey, Shanta food insecurity is pervasive in some societal groups in low- and middle-income nations. Results Approximately 56% of women overall and 76% of Dalit women reported having food insecurity. Ethnicity and food insecurity are closely related. Even after controlling for elements like money and education, Dalit women still had the highest likelihood of experiencing food insecurity. When compared to Muslims, Brahmin/Chhetri, Terai Indigenous, and Hill Indigenous communities, they were, respectively, 82%, 85%, 89%, and 92% more susceptible to food insecurity. Education was a protective factor; compared to women without education, those with secondary education (6th to 10th grade) were 39% less likely to experience food insecurity (Pandey, Shanta, 2019 p. 2). [16].

In nations with significant stunting burdens, Krishna, Aditi et al. express worry about the disproportionate burden of stunting experienced by the most deprived children as well as the widening socioeconomic disparities. Stunting rates in South Asia would significantly decrease if disparities between the best and poorest performing nations and between the most and least disadvantaged groups within nations were closed (Krishna, Aditi et al. 2018 p. 1). [17].

The focus of UK aid is that it has been researched in other nations on the relationship between maternal mental health and children's nutritional status, which is also a relatively new issue in our setting (UK aid 2019 p. 19). [18].

The South Asian region is disproportionately burdened with stunted children, who have poorer health, cognition, and learning results, claim Torlesse, Harriet, and Aguayo, V. M. These kids tend to live in households that are socioeconomically disadvantaged and frequently suffer from a variety of nutritional deficiencies, such as LBW, stunting, wasting, and anaemia (Torlesse, Harriet & Aguayo, V. M., 2018 p. 6). [20]

Shrestha L Manisha focused malnutrition is a risk to a child's healthy growth and development, especially if it occurs during the foetal and infant phases, when it is linked to impaired cognitive, motor, and socioemotional abilities. However, Nepal has little knowledge on how different types of malnutrition affect early childhood development (ECD). to evaluate the relationship between the four domains of the ECD index (literacy-numeracy, physical, social-emotional, and learning development) and stunting, wasting, and underweight in children aged 36 to 59 months (Shrestha, L Manisha, et al., 2022 p. 1). [21].

Government of Bhutan is concentrating on a nutritional strategy and action plan. It is also acknowledged that investing in nutrition is essential for the realization of fundamental rights, particularly for the most vulnerable children, mothers, and girls. By lowering infection susceptibility, associated morbidity, disability, and mortality burden, improving cognitive function, cumulative lifetime learning capacities, and adult production, it forms the basis for human development. One of the most efficient entrance sites for human growth, poverty reduction, and economic development with significant financial rewards is nutrition (National Nutrition Strategy and Action Plan, (2021 p. 1) [22].

Adolescents who consumed fewer than one serving of fruits and vegetables had greater rates of nutritional focus, according to the Nepal Health Research Council. Teenagers who ate five or more servings of fruits and vegetables per day had the lowest risk of malnutrition. According to these results, the likelihood of malnutrition and the quantity of fruits and vegetables eaten are correlated. The prevalence of undernutrition was marginally higher among households with monthly incomes of NPR 2001 to 5000 at 68%. (Nepal Health Research Council, 2014 p. 28) [23].

More than half (55%) of all stunted children under 5 and more than one third (39%) of all stunted children worldwide lived in Asia in 2018, according to Irish Aid. Over two thirds (68%) of all wasted children under the age of five reside in Asia, while 28% do so in Africa. In a similar vein, 25% of all

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under-5 overweight children lived in Africa and 47% of all overweight children under 5 lived in Asia (Irish Aid, 2018 p. 5) [24].

The prevalence of mild stunting (LAZ/HAZ -2z) and severe stunting (LAZ/HAZ -3z) among 1,701 children aged 6-59 months was summarized by the Ministry of Health and Population, Nepal. In the country, 15% of children with severe stunting and 35% of children aged 6-59 months had stunting. Stunting was more common among children in the Mountain ecological zone (45%) and the Midwestern development region (52%) across all variables. Stunting rates in rural regions were greater than in urban areas (36 percent against 28 percent). Children between the ages of 36 and 47 months have the highest rate of stunting (41%) and the lowest rate (18%), according to an analysis by age group (Ministry of Health and Population, Nepal; 2018 p. 185). [25].

World Vision International Focused **Wasting (low weight-for-height/ length):** Wasting identifies children who are 'wasted' or thinner than expected for a healthy, well-nourished child of the same height/length. These children have not only stopped growing but have probably also lost weight. Wasting reflects recent, short-term (acute) malnutrition or illness. It is a sign that a child is undernourished and not growing now. Something can probably be done to help the child recover. If the parents can improve the child's nutrition, the child can recover from wasting.

Stunting (low height/length-for-age): Stunting identifies children who are 'stunted' or shorter than expected for a healthy child of the same age. If children are undernourished, their growth in height slows down. Children who are undernourished for a long time are shorter than they should be. We refer to this as 'chronic' or 'long-term' undernutrition.

Underweight (low weight-for-age): Underweight identifies children who are 'underweight', that is, they weigh less than a healthy, well-nourished child of the same age. This may be because the child has not grown normally in height, weight, or both, or because he or she has lost weight.

Mid-upper arm circumference (MUAC): Another anthropometric measurement is MUAC. Not all surveys with an anthropometric component will include MUAC. MUAC is relatively easy to measure and is a good predictor of risk of death. It is used for rapid screening of recent undernutrition in children (6- 59 months of age), and is used for screening in emergencies, but not usually in evaluations. In areas of severe food insecurity and where there are weak growth monitoring and promotion programmes, it should be used for screening registered children world Vision, (2011 p. 24 & 25). [26].

According to Lamsal K P, Parajuli KR, Pun BK, et al. the prevalence of wasting was 3.1% and 10.5% using MUAC and WHZ, respectively. We found 13.6% sensitivity for severe acute malnutrition (SAM) (MUAC <115mm) and 21% sensivity for moderate acute malnutrition (MAM) (MUAC ≥115 to <125 mm), with specificity of 99.7% and 91.2%, respectively. The sensitivity of MUAC for children age 6-59 month was higher than for children 24-59 months. The total area of the ROC curve was 0.53 for the MUAC cutoff for SAM and 0.56 for MAM. The optimum MUAC cutoff for SAM and MAM were 125 mm and 132 mm, respectively (Lamsal K P et al (2021 P. 881). [27]. According to the Ministry of Education, Nepal, the school health program was started in the Rana dynasty (1946–1945) in Sanskrit schools. In the meantime, students cooked lunch and dinner in school. Still, the government of Nepal provides continuous and free education, housing, and food for Sanskrit school students. Legally, the day-snacks meal program was launched by the UN for the first time in 1967, in August, for 1–5 class children in primary level in 11 districts of Nepal; they were Darchula, Baitadi, Dadeldhura, Bajura, Achham, Bhajang, Doti, Dailekh, Jajarkot, Rukum, and Salyan (Budhathoki, Chitra Bahadur and Wagle, Bishanu, 2075 p. 169). [28].

2. STATEMENT OF PROBLEMS :

Low-income or middle family parents send own children to community school with day snacks. Some children come school without day snacks. Parents prepared day snacks early morning. Almost snacks are fried rice, beaten rice, egg and vegetable etc., some carry junk food biscuits and bread. Some children purchase form canteen and school near restaurant during the tiffin time some children are and some are seeing, some children snacks become odorous and not eatable, the environment is not favourable to all children before.

The main problem was students enrol and irregular presented. The study seeing after day snacks provided enrolment, regular presentation and completion of session. Measure height, weight and MUAC and identify health status of community school children of Nepal.

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3. OBJECTIVES :

To access the day snacks status and measure anthropometry of community school children.

4. METHODOLOGY:

This research is an evaluation research using schedule survey and measurement to evaluate the nutritional status and school attendance trend among children of 3-5 years as outcome of annual day snacks of program of Community School. This is the first research of this type in Nepalese context attempting the action and application as pragmatic research philosophy. Flooding is an evidence-based empirical issue in Nepal. The descriptive methods were adopted for presenting the data using the quantitate parameters of the programs such as height, weight and attendance in a qualitative way through structured questionnaire based on viability of children ranging from 3-5 as census method for the particular day. Altogether 49 children were there out of which 20 were female children from both Mangal Secondary School, Kirtipur-10, Kirtipur, Kathmandu and Mahendra Adarsha Secondary School, Mahalaxmi-4, Imadol, Lalitpur community schools. With consent the height, weight, and mid-upper arm circumference (MUAC) were measured of each children using Z-Scores (prevalence of underweight, moderate underweight and severe underweight. Further discussed with the head of school for day-to-day snack regular access for students were done along with early childhood development teachers and administrative staff. The observation of foods and its preparation methods were thoroughly assessed. Monitored kitchen and toilet: The researcher monitored the snacks prepared in the kitchen for cleanliness, and drinking water was monitored. Data analysis: collected data were expressed in an average using spss followed by WHO 2006 tools for height and weight measured.

5. RESULT AND DISCUSSION :

5.1 Status of School Students in Gender and Age :
Table 1: Distribution of age and sex

Mangal Secondary School, Kirtipur-10, Kirtipur, Kathmandu							Mahendra Adarsha Secondary School, Mahalaxmi-4, Imadol, Lalitpur						
AGE (mo)	Boys		Girls		Total		AGE (mo)	Boys		Girls		Total	
	no.	%	no.	%	no.	%		no.	%	no.	%	no.	%
30-41	0	0	1	100	1	4.5	30-41	1	100	0	0	1	3.7
42-53	7	87.5	1	12.5	8	36	42-53	8	47.1	9	52.9	17	63
54-59	7	53.8	6	46.2	13	59	54-59	6	66.7	3	33.3	9	33.3
Total	14	63.6	8	36.4	22	100	Total	15	55.6	12	44.4	27	100

Table 1 presents data on age groups and gender at Mangal Secondary School, Kirtipur, Kathmandu, and Mahendra Adarsha Secondary School, Mahalaxmi-4, Imadol, Lalitpur. In Mangal Secondary School, for boys, aged 42–53 months, 87.5% were recorded, and for 54–59 months, 53.8% were observed. Girls aged 30–36 months had 100%, 42–53 months had 12.5%, and 54–59 months had 64.2%. At Mahendra Adarsha Secondary School, boys aged 30–41 months were at 100%, 42–53 months at 47.1%, and 54–59 months at 66.7%. Girls aged 42–53 months were at 52.9%, and 54–59 months at 33.3%. In total, at Mangal Secondary School, Kirtipur -10, Kathmandu, boys accounted for 63.6%, and girls for 36.4% of the population whereas total (15) 55.6% boys and (12) 44.6% girls were in Mahendra Adarsha Secondary School, Mahalaxmi 4, Laitpur, Imadol, Lalitpur.

5.2 Status of malnutrition by Sex based on Weight-for-Height:
Table 2: Prevalence of acute malnutrition based on weight-for-height z-scores by sex

Mangal Secondary School, Kirtipur-10, Kirtipur, Kathmandu	Mahendra Adarsha Secondary School, Mahalaxmi-4, Imadol, Lalitpur

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	All	Boys	Girls		All	Boys	Girls
	n = 26	n = 16	n = 10		n = 27	n = 15	n = 12
Prevalence of global malnutrition	(2) 7.7 %	(1) 6.3 %	(1) 10.0 %	Prevalence of global malnutrition	(3) 11.1 %	(2) 13.3 %	(1) 8.3 %
(<-2 z-score)	(2.1 - 24.1 95% C.I.)	(1.1 - 28.3 95% C.I.)	(1.8 - 40.4 95% C.I.)	(<-2 z-score)	(3.9 - 28.1 95% C.I.)	(3.7 - 37.9 95% C.I.)	(1.5 - 35.4 95% C.I.)
Prevalence of moderate malnutrition	(1) 3.8 %	(0) 0.0 %	(1) 10.0 %	Prevalence of moderate malnutrition	(3) 11.1 %	(2) 13.3 %	(1) 8.3 %
(<-2 z-score and >=-3 z-score)	(0.7 - 18.9 95% C.I.)	(0.0 - 19.4 95% C.I.)	(1.8 - 40.4 95% C.I.)	(<-2 z-score and >=-3 z-score)	(3.9 - 28.1 95% C.I.)	(3.7 - 37.9 95% C.I.)	(1.5 - 35.4 95% C.I.)
Prevalence of severe malnutrition	(1) 3.8 %	(1) 6.3 %	(0) 0.0 %	Prevalence of severe malnutrition	(0) 0.0 %	(0) 0.0 %	(0) 0.0 %
(<-3 z-score)	(0.7 - 18.9 95% C.I.)	(1.1 - 28.3 95% C.I.)	(0.0 - 27.8 95% C.I.)	(<-3 z-score)	(0.0 - 12.5 95% C.I.)	(0.0 - 20.4 95% C.I.)	(0.0 - 24.3 95% C.I.)

Table 2 displays the prevalence of acute malnutrition based on weight-for-height z-score by sex at Mangal Secondary School, Kirtipur, Kathmandu, and Mahendra Adarsha Secondary School, Imadol, Lalitpur. In Mangal Secondary School, for boys, the prevalence of global malnutrition was 6.3%, and severe malnutrition was 6.3%. Girls had a prevalence of global malnutrition at 10% and moderate malnutrition at 10%. At Mahendra Adarsha Secondary School, boys had a prevalence of global malnutrition at 13.3% and moderate malnutrition at 13.3%. Girls had a prevalence of global malnutrition at 8.3% and moderate malnutrition at 8.3%. The total prevalence at Mangal Secondary School, Kirtipur-10, Kirtipur, Kathmandu was 7.7%, with moderate malnutrition at 3.8% and severe malnutrition at 3.8%. Similarly, at Mahendra Adarsha Secondary School, Mahalaxmi -4, Imadol, Lalitpur, the total prevalence was 11.1%, with moderate malnutrition also at 11.1%.

5.3 Status of Malnutrition by Age based on weight-for-height:

Table 3 outlines the prevalence of acute malnutrition by age based on the weight-for-height z-score at Mangal Secondary School, Kirtipur – 10, Kirtipur, Kathmandu, and Mahendra Adarsha Secondary School, Mahalaxmi – 4, Imadol, Lalitpur. At Mangal Secondary School, severe wasting for children aged 42 – 53 months was 12.5%, moderate wasting for 54 – 59 months was 7.7%, and normal rates were 100% for 30 – 41 months, 87.5% for 42 – 53 months, and 92.3% for 54 – 59 months. Similarly, at Mahendra Adarsha Secondary School, moderate wasting for 30-41 months was 100%, 42-53 months was 5.9%, and 54-59 months was 11.1%. The normal rates were 94.4% for 42-53 months and 88.89% for 54-59 months.

Table 3: Prevalence of acute malnutrition by age, based on weight-for-height z-scores

Mangal Secondary School, Kirtipur-10, Kirtipur, Kathmandu			Mahendra Adarsha Secondary School, Mahalaxmi-4, Imadol, lalitpur			
	Severe wasting	Moderate	Normal	Month in age and total no.	Severe wasting	Moderate wasting	Normal

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Month in age and total no.		wasting											
	(<-3 z-score)		(>= -3 and <-2 z-score)		(> = -2 z score)				(<-3 z-score)		(>= -3 and <-2 z-score)		(> = -2 z score)
Age (mo)	Tot al no.	No.	%	No.	%	No.	%	Age (mo)	Total no.	No.	%	No.	%	No.	%
30-41	1	0	0	0	0	1	100	30-41	1	0	0	1	100	0	0
42-53	8	1	12.5	0	0	7	87.5	42-53	17	0	0	1	5.9	16	94.1
54-59	13	0	0	1	7.7	12	92.3	54-59	9	0	0	1	11.1	8	88.9
Total	22	1	4.5	1	4.5	20	90.9	Total	27	0	0	3	11.1	24	88.9

In total, at Mangal Secondary School, severe wasting was 4.5%, moderate wasting was 4.5%, and normal rates were 90.9%. At Mahendra Adarsha Secondary School, moderate wasting was 11.1%, and normal rates were 88.9%.

5.4 Status of Underweight by Sex based on Weight-for-Age:

Table 4 illustrates the prevalence of underweight based on weight-for-age z-scores by sex at Mangal Secondary School, Kirtipur-10, Kirtipur, Kathmandu, and Mahendra Adarsha Secondary School, Mahalaxmi -4, Imadol, Lalitpur.

Table 4: Prevalence of underweight based on weight-for-age z-scores by sex

Mangal Secondary School, Kirtipur-10, Kirtipur, Kathmandu				Mahendra Adarsha Secondary School, Mahalaxmi-4, Imadol, Lalitpur			
	All	Boys	Girls		All	Boys	Girls
	n = 32	n = 21	n = 11		n = 33	n = 17	n = 16
Prevalence of underweight	(3) 9.4 %	(2) 9.5 %	(1) 9.1 %	Prevalence of underweight	(2) 6.1 %	(0) 0.0 %	(2) 12.5 %
(<-2 z-score)	(3.2 - 24.2 95% C.I.)	(2.7 - 28.9 95% C.I.)	(1.6 - 37.7 95% C.I.)	(<-2 z-score)	(1.7 - 19.6 95% C.I.)	(0.0 - 18.4 95% C.I.)	(3.5 - 36.0 95% C.I.)
Prevalence of moderate underweight	(3) 9.4 %	(2) 9.5 %	(1) 9.1 %	Prevalence of moderate underweight	(1) 3.0 %	(0) 0.0 %	(1) 6.3 %
(<-2 z-score and >=-3 z-score)	(3.2 - 24.2 95% C.I.)	(2.7 - 28.9 95% C.I.)	(1.6 - 37.7 95% C.I.)	(<-2 z-score and >=-3 z-score)	(0.5 - 15.3 95% C.I.)	(0.0 - 18.4 95% C.I.)	(1.1 - 28.3 95% C.I.)
Prevalence of severe underweight	(0) 0.0 %	(0) 0.0 %	(0) 0.0 %	Prevalence of severe underweight	(1) 3.0 %	(0) 0.0 %	(1) 6.3 %
(<-3 z-score)	(0.0 - 10.7 95% C.I.)	(0.0 - 15.5	(0.0 - 25.9	(<-3 z-score)	(0.5 - 15.3	(0.0 - 18.4 95% C.I.)	(1.1 - 28.3 95% C.I.)

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Mangal Secondary School, Kirtipur-10, Kirtipur, Kathmandu			Mahendra Adarsha Secondary School, Mahalaxmi-4, Imadol, Lalitpur		
	95% C.I.)	95% C.I.)		95% C.I.)	

At Mangal Secondary School, boys had a prevalence of underweight at 9.5% and moderate underweight at 9.5%. Girls had a prevalence of underweight at 9.1% and moderate underweight at 9.1%. In comparison, at Mahendra Adarsha Secondary School, boys had a prevalence of underweight at 12.5%, moderate underweight at 6.3%, and severe underweight at 6.3%. Girls had a prevalence of underweight at 12.5%, moderate underweight at 6.3%, and severe underweight at 6.3%.

5.5 Status of Underweight by Age based on Weight-for-Age:
Table 5 displays the prevalence of underweight by age based on weight-for-age z-scores at Mangal Secondary School, Kirtipur -10, Kirtipur, Kathmandu, and Mahendra Adarsha Secondary School, Mahalaxmi -4, Imadol, Lalitpur.

Table 5: Prevalence of underweight by age, based on weight-for-age z-scores

Mangal Secondary School, Kirtipur-10, Kirtipur, Kathmandu							Mahendra Adarsha Secondary School, Mahalaxmi-4, Imadol, Lalitpur							
Month in age and total no.		Severe underweight (<-3 z-score)		Moderate underweight (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Month in age and total no.		Severe underweight (<-3 z-score)		Moderate underweight (>= -3 and <-2 z-score)		Normal (> = -2 z score)
Age (mo)	Total no.	No.	%	No.	%	No.	%	Age (mo)	Total no.	No.	%	No.	%	No.	%
30-41	1	0	0	0	0	1	100	30-41	1	0	0	0	0	1	100
42-53	8	0	0	0	0	8	100	42-53	17	1	5.9	1	5.9	15	88.2
54-59	13	0	0	1	7.7	12	92.3	54-59	9	0	0	0	0	9	100
Total	22	0	0	1	4.5	21	95.5	Total	27	1	3.7	1	3.7	25	92.6

At Mangal Secondary School, moderate underweight was observed at 7.7% for children aged 54–59 months. The prevalence of normal weight was 100% for children aged 30-41 months, 42–53 months (8), and 54–59 months (12) with rates of 100% and 92.3% respectively. Similarly, at Mahendra Adarsha Secondary School, severe underweight was noted for children aged 42–53 months at 5.9%. Moderate underweight was also at 5.9%, while the prevalence of normal weight was 100% for children aged 30-41 months, 88.2% for those aged 42-53 months (15), and 100% for children aged 54-59 months (9).

5.6 Status of Stunting based on Height-for-Age by Sex:
Table 6 displays the prevalence of stunting based on height-for-age z-scores by sex at Mangal Secondary School, Kirtipur-10, Kirtipur, Kathmandu.

Table 6: Prevalence of stunting based on height-for-age z-scores and by sex

Mangal Secondary School, Kirtipur-10, Kirtipur, Kathmandu				Mahendra Adarsha Secondary School, Mahalaxmi-4, Imadol, Lalitpur			
	All	Boys	Girls		All	Boys	Girls
	n = 33	n = 21	n = 12		n = 33	n = 17	n = 16

Mangal Secondary School, Kirtipur-10, Kirtipur, Kathmandu			Mahendra Adarsha Secondary School, Mahalaxmi-4, Imadol, Lalitpur			
Prevalence of stunting	(10) 30.3 %	(7) 33.3 %	(3) 25.0 %	Prevalence of stunting	(9) 27.3 %	(4) 23.5 %	(5) 31.3 %
(<-2 z-score)	(17.4 - 47.3 95% C.I.)	(17.2 - 54.6 95% C.I.)	(8.9 - 53.2 95% C.I.)	(<-2 z-score)	(15.1 - 44.2 95% C.I.)	(9.6 - 47.3 95% C.I.)	(14.2 - 55.6 95% C.I.)
Prevalence of moderate stunting	(6) 18.2 %	(4) 19.0 %	(2) 16.7 %	Prevalence of moderate stunting	(9) 27.3 %	(4) 23.5 %	(5) 31.3 %
(<-2 z-score and >=-3 z-score)	(8.6 - 34.4 95% C.I.)	(7.7 - 40.0 95% C.I.)	(4.7 - 44.8 95% C.I.)	(<-2 z-score and >=-3 z-score)	(15.1 - 44.2 95% C.I.)	(9.6 - 47.3 95% C.I.)	(14.2 - 55.6 95% C.I.)
Prevalence of severe stunting	(4) 12.1 %	(3) 14.3 %	(1) 8.3 %	Prevalence of severe stunting	(0) 0.0 %	(0) 0.0 %	(0) 0.0 %
(<-3 z-score)	(4.8 - 27.3 95% C.I.)	(5.0 - 34.6 95% C.I.)	(1.5 - 35.4 95% C.I.)	(<-3 z-score)	(0.0 - 10.4 95% C.I.)	(0.0 - 18.4 95% C.I.)	(0.0 - 19.4 95% C.I.)

For boys, the prevalence of stunting was 33.3%, moderate stunting was 19.0%, and severe stunting was 14.3%. In comparison, for girls, the prevalence of stunting was 25%, moderate stunting was 16.7%, and severe stunting was 8.3%. Similarly, at Mahendra Adarsha Secondary School, Mahalaxi -4, Imadol, Lalitpur, boys had a prevalence of stunting at 23.5% and moderate stunting at 23.5%. Girls at the same school had a prevalence of stunting at 31.5% and severe stunting at 31.5%.

5.7 Status of Stunting based on Height-for-Age by Age:

Table 7 illustrates the prevalence of stunting by age based on height-for-age z-scores at Mangal Secondary School, Kirtipur -10, Kirtipur, Kathmandu, and Mahendra Adarsha Secondary School, Mahalaxmi -4, Imadol, Lalitpur. At Mangal Secondary School, severe stunting for children aged 42–53 months was 12.5%, and for 54–59 months, it was 7.7%.

Table 7: Prevalence of stunting by age based on height-for-age z-scores

Mangal Secondary School, Kirtipur-10, Kirtipur, Kathmandu							Mahendra Adarsha Secondary School, Mahalaxmi-4, Imadol, Lalitpur						
Month in age and total no.		Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Month in age and total no.		Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
Age (mo)	Total no.	No.	%	No.	%	No.	%	Age (mo)	Total no.	No.	%	No.	%	No.	%
30-41	1	0	0	0	0	1	100	30-41	1	0	0	0	0	1	100
42-53	8	1	12.5	2	25	5	62.5	42-53	17	0	0	7	41.2	10	58.8
54-59	13	1	7.7	1	7.7	11	84.6	54-59	9	0	0	2	22.2	7	77.8

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| Total | 22 | 2 | 9.1 | 3 | 13.6 | 17 | 77.3 | Total | 27 | 0 | 0 | 9 | 33.3 | 18 | 66.7 |

Moderate stunting for 42–53 months was 25%, and for 54–59 months, it was 7.7%. The rates of normal growth were 100% for 30-41 months, 62.5% for 42-53 months, and 84.6% for 54-59 months. At Mahendra Adarsha Secondary School, moderate stunting for 42-53 months was 41.2%, and for 54-59 months, it was 22.2%. The rates of normal growth were 100% for 30-41 months, 58.8% for 42-53 months, and 77.8% for 54-59 months. These findings provide insights into the prevalence of stunting among children in these schools based on height-for-age z-scores.

5.8 Status of Stunting based on Height-for-Age by Age:

Table 8: Prevalence of acute malnutrition by age, based on Mid Upper Arms Circumference (MUAC)

Mangal Secondary School, Kirtipur-10, Kirtipur, Kathmandu								Mahendra Adarsha Secondary school, Mahalaxmi-4, Imadol, Lalitpur							
Month in age and total no.		Severe wasting		Moderate wasting		Normal		Month in age and total no.		Severe wasting		Moderate wasting		Normal	
		(< 115 mm)		(>= 115 mm and < 125 mm)		(> = 125 mm)				(< 115 mm)		(>= 115 mm and < 125 mm)		(> = 125 mm)	
Age (mo)	Total no.	No.	%	No.	%	No.	%	Age (mo)	Total no.	No.	%	No.	%	No.	%
30-41	1	0	0	0	0	1	100	30-41	1	0	0	0	0	1	100
42-53	8	0	0	0	0	8	100	42-53	17	0	0	0	0	17	100
54-59	13	0	0	0	0	13	100	54-59	9	0	0	0	0	9	100
Total	22	0	0	0	0	22	100	Total	27	0	0	0	0	27	100

Table 8 shows that the prevalence of acute malnutrition by age, based on MUAC Mangal Secondary School, Kirtipur -10, Kirtipur, kathmandu is normal at 30-41 (1) 100%, 42-53 months (8) 100%, and 54-59 months (13) 100%. Similarly, Mahendra Adarsha Secondary School, Mahalaxmi-4, Imadol, Lalitpur normal was 30-41 (1) 100%, 42-53 months (17) 100%, and 54-59 months (9) 100% were.

Case 1:
This is Mahindra Secondary School, Mahalaxmi Municipality Ward No. 3, Imadol. Snacks during the school day was available from 2020 AD. Three years ago, there were no manageable daytime snacks for small children. Parents sent their children to school with homemade day snacks, and some parents sent a small amount. Those children purchased day snacks from the school canteen or near restaurants. Some parents couldn't send daytime snacks. Sometime early, home-made tiffin become odorous. During the tiffin time, some ate their own tiffin, and some saw other friends eating. Odour day snacks made students sick. PG, LKG, UKG, and class one student's enrolment was also low, and enrolled children had not completed sessions. There were more dropouts in the school. Before day snacks, it was a great problem in the school. At admission time, teachers used to visit children's homes to request enrolment in school.

Now-a day's snacks are available by school for paly group (PG) to class five students. The day snacks started in 2020. Day snacks are provided by the government of Nepal, Department of Education, Sano Thimi. The amount per student per day (according to actual attendance) is NRs. 15.00 (in the word fifteen Nepalese rupees only). There are 350 students from PG to class five in the school. The Nepalese government provided a total of 180 days of snacks. Parents add per day NRs. 10.00 (in word ten only daily). The government provides NRs 15, 75,000 (in other words, fifteen lakh, seventy-five thousand for 350 students) annually, and parents add NRs. 10, 50,000 (in other words, ten lakh, fifty thousand

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rupees). **The grand total school budget is in children's day snacks is NRs 26, 25,000 (in other words, twenty-six thousand and twenty-five thousand rupees only) annually. The Day Snacks Program is a collaboration between the public schools and parents**.

Impact of day Snacks: The day snacks impact is positive is in school. Now parents come to enrol their students in School. Children are regular and completed session. Childs are not sick in school. Not eat Junk foods in home. Parents positively accepted teacher counselling.

Food habit of the children: Lunch and dinner Rice, pulses, and vegetables at home and daytime snacks at school are provided. **Day snack of the routine**: Veg. chaumin, rice (pulau) and picle, pudding rice and vegetables, and beaten rice and vegetables are provided weekly. The above items are not hot, spicy, or sour. Not added testing powder also. Provided traditional and festival foods like pudding rice in July and curd and beaten rice in August. Meat only 2-3 times annually. Could not provide high-quality day snacks due to a low budget.

They cannot be controlled at home from school; they eat junk food during holidays and festivals because it is a community school where mid-level and low-income family children enrol.

Furthermore, to do well in day snacks:

- Raise the minimum amount to NRs. 30 per day per student. Two cooks and two workers were required to work in the kitchen. They prepare quality, fresh, and nutritious snacks in school.
- A personal nurse is very important in school to treat the sickness of students. If the nurse is absent, our hand is eruption.
- Neat and clean toilets, boiled water, fresh aerated air, carpeting, and furniture rooms are arranged for PG, LKG, and UKG students.
- A female guard was in the school gate.

Case 2:

This is Mangal Secondary School, Kirtipur Municipality, Ward No. 10, Kirtipur. The day snack started in 2019. Before four years ago, there were not many daytime snacks for small children. At that time, parents sent children to school with homemade snacks. Children carried tiffin biscuits, fried rice, fruits, etc. Early morning packing tiffin become odorous and not eatable in the hot season. Teachers threw odours into tiffin. Some come without tiffin, and some come with tiffin purchase money. Children purchase from the canteen or near a restaurant. Those who did not eat tiffin by force or theft ate other tiffin. Such an unfearingly situation is created in the class room at tiffin time. Before children become sick in school. Parents enrol children, but they are irregular and have not completed sessions; the dropout rate was higher.

Now the school provides daytime snacks (PG) to class six. Day snacks are provided by the government of Nepal, Department of Education, Sano Thimi. The amount per student per day (according to actual attendance) is NRs. 15.00 (in the word fifteen only). There are a total of 575 students from PG to sixth grade in the school. Nepal's government provided a total of 180 days of snacks per year. Parents paid Rs. 1250. (One thousand two hundred fifty rupees only monthly.)

PG, LKG, and UKG children's parents added per month NRs. 1250.00 (in other words, one thousand two hundred fifty rupees only monthly). The government provided 10, 35, 00 (in other words, ten lakh thirty-five thousand for 160 children) annually, and parents added NRs. 10, 50,000 (in other words, ten lakh three thousand five hundred rupees only). The grand total school budget is in children's day snacks at 25, 03500 (in other words, twenty-five lakh, three thousand, and five hundred rupees only) annually. The Day Snacks Program is a collaboration between the public, schools, and parents.

The school paid 1–6 class children snack cash of NRs. 15 (fifteen rupees) per day in trimester according to their attendance.

Impact of day snacks: The day snacks impact is positive in school. Now parents come to enrol their students in school. Children are regular and have completed sessions. Children are not sick at school. Not eat junk food at home. Parents positively accepted teacher counselling. All the children are neat and clean. Not eat junk food at home.

Food habits of the children: tea or milk, one grass or one cup, Lunch and dinner: rice, pulses, and vegetables Mid-day Snacks: School provides mid-day snacks. **Day Snacks Routine**: Jaulo and Salad; Egg, Milk, and Biscuits; Rice, Pulses, and Vegetables; Milk, Bread, and Fruits; Chapati and Vegetables; Pesta and Salad; Pudding Rice. The school-provided day snacks are healthy, nutritious, fresh, and of high quality.

Furthermore, to do good during the day, snack:

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- Raise a minimum of NR 30–50 per day per student. We needed two to three cooks and workers to work in the kitchen. They prepare quality, fresh, and nutritious snacks in school.
- Very clean toilets, boiled water for drinking, and fresh aerated rooms with well-maintained carpeting and furniture are arranged for PG, LKG, and UKG students.
- A very good environment was created during school time. Guards are also on standby in the ECD building.

The research is beginning only as several aspects of nutrition as snakes for different age and occupation and profession under different conditions need to be studied in depth such working in tunnel [29-31], Labour productivity [32] flood [33] and many more conditions.

6. CONCLUSION :

The schoolchildren mid-day snacks are a source of nutritious food. It not only improves their nutritional status but also has a huge impact on their learning outcomes and regular presence in school. The school midday snacks help in primary school education by increasing enrolment, attendance, and nutritional level of children. School midday snacks help children's physical and mental development by reducing hunger, malnutrition, and the use of junk food (plastic and bottle-packed). The Mid-Day Snacks program helps parents be aware of nutritious food and their children's health.

Both Community Schools provided nutritious day snacks. Peas and eggs, litto (rice and pulses cooked). Normal dal, rice, and vegetables; they don't provide junk food (plastic and bottle-packed) in school. Almost all they provided were eggs, grams, litto (rice and pulses cooked), Dal rice, and vegetables. It was founded because they have a neat and clean kitchen and use filtered water. There was clean water and enough water in the toilet.

At Mangal Secondary School in Kirtipur-10, Kirtipur, Kathmandu, the total prevalence of acute malnutrition based on weight-for-height Z-score was 7.7%, with moderate malnutrition at 3.8% and severe malnutrition at 3.8%. Similarly, at Mahendra Adarsha Secondary School in Mahalaxmi-4, Imadol, Lalitpur, the total prevalence of acute malnutrition was 11.1%, with moderate malnutrition also at 11.1%. The prevalence of acute malnutrition by age, based on weight-for-height Z-score at Mangal Secondary School, showed severe wasting at 4.5%, moderate wasting at 4.5%, and normal status at 90.9%. At Mahendra Adarsha Secondary School in Mahalaxi-4, Imadol, Lalitpur, moderate wasting was at 11.1%, and normal status was at 88.9%. The prevalence of stunting by age based on height-for-age Z-scores at Mangal Secondary School in Kirtipur-10, Kirtipur, Kathmandu.

7. ACKNOWLEDGEMENT :

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