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Nutritional Status of Children Attending Basic Schools Providing Mid-Day Meal A Comparative Study

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Abstract: ***World Health Organization has stated malnutrition as a condition where there is deficiencies, excesses, or imbalances in an individual's energy and/or nutrient consumption. In Nepal, the government school is mandatory to provide MDM to students up to basic school level. Education system consists of one year of pre-primary to grade 8 known as basic schools. This study aimed to find out the nutritional status of schoolchildren attending basic schools in rural and urban municipalities providing and comparing between those children having midday meal in school with those who are not having. .A cross - sectional, analytical study was designed, multistage sampling techniques were used , where the lottery method was used for the selection of municipalities and schools and simple random sampling technique for the selection of students by using a table of random numbers. A total 276 students were selected of both genders. Data collecting included of anthropometric measurement and structured questionnaire of dietary habit. Among 276 students mean age was 7.76 ±3.229. MUAC of aged 3-8 years was 14.84 ±1.35 and BMI of aged above 8 years old was 14.98 ±2.50. Among them 50.4% were male. 4.3% among 3-5 years group presented with SAM. Age and sex was significantly associated with nutritional status p-value 0.007 and 0.008 respectively. Both parents' education was associated with Nutritional status of child (p-value 0.001). Children not having MDM in school are more vulnerable of malnutrition (p-value 0.015). MDM is more significant for malnutrition (AOR: 0.364 CI: 0.139- 0.953, p-value 0.41). Nutritional status of those not having MDM in schools are likely to have malnutrition by 1.913times than those having MDM provided by schools (CI: 0.867-4.22, p-value 0.002). The prevalence of malnutrition is significantly associated with parents' education, consumption of EDNP, and MDM provided by schools.***

Keyword: MDM, Basic Schools, Malnutrition, Dietary Habit, Nutritional Status.

1. INTRODUCTION

Nutritional status is one of the strong markers of children's health and a good nutrition is very essential their overall growth and development [1]. The term "nutritional status" describes an

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individual's state of health as it relates to nutrient utilization. Only by correlating data from a thorough medical and nutritional history, a physical examination, and the proper laboratory testing will it be ascertained [2]. As growth is an important indicator of health and nutritional status, which is recurrent illnesses and a poor diet can result in delayed growth [3]. To survive and thrive healthily proper nutrition is essential for children. A healthy diet helps kids develop into robust adults who can withstand illness, natural catastrophes, and other world crises and it also helps them learn and flourish in their communities in future [4]. Among children under five years old, malnutrition during childhood, all-inclusive of underweight, overweight, wasting, and stunting, is a leading cause of death and morbidity worldwide [5]. Malnutrition among children is a serious issue in South Asian region where prevalence of wasting is higher than the crucial public health threshold of 15% [6]. But unfortunately, their nutritional status has been overlooked after the age of 5 which is great concern. There are very limited studies published which showed the concern on nutritional status of the young children and adolescents, which consists of mainly children attending basic schools.

2. RELATED WORK

According to World Health Organization (WHO) malnutrition refers to the status where there is an imbalance of vital nutrients that might be excesses or deficits in dietary intake, or poor nutrient use by the body itself [7]. Globally, 150.8 million children are stunted, 50.5 million are wasted and 38.3 million are overweight [8]. As per UNICEF, Nepal is among the ten countries in the world with the highest number of stunted children (Aryal, 2016).

In Nepal among children and adolescents (5-19 age group) 12.4% male and 8.4% are underweight, 19.2% male and 17.5% are overweight and obese males are 7.8% whereas females are 5.6% [8]. Basic School going children are those group of children who have started their preschool which might start from early of 2 years to 12 years of age group. In Nepal, the school education system consists of one year of pre-primary education as early childhood education development (ECED) and eight years is known as basic schools that is from grades 1-8 [9]. Across the globe 139 countries with at least 330.3 million children are receiving food through school meal programs [10].

After reform of Federal government and 2015 Constitution Act 2015, the community and government schools are getting funds from the government for Mid-day meal (MDM) to provide nutritious meal to children [11]. In Nepal, the midday meal program has several benefits, such as boosting student enrollment, attendance, and retention in the school, enhancing academic performance, as well as preserving the health of the young children [12]. The findings of this study will allow the researcher and audience to have a better understanding about role of MDM in nutritional status of the children attending basic schools and providing mid-day meals.

The aim of the study was to find out the nutritional status of schoolchildren attending basic schools in rural and urban municipalities. And to compare the nutritional status among children having Mid-day meal (MDM) in school and those who haven’t received the MDM.

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The study was based on the Conceptual Framework for cause of Malnutrition developed by UNICEF and revised in 2020.

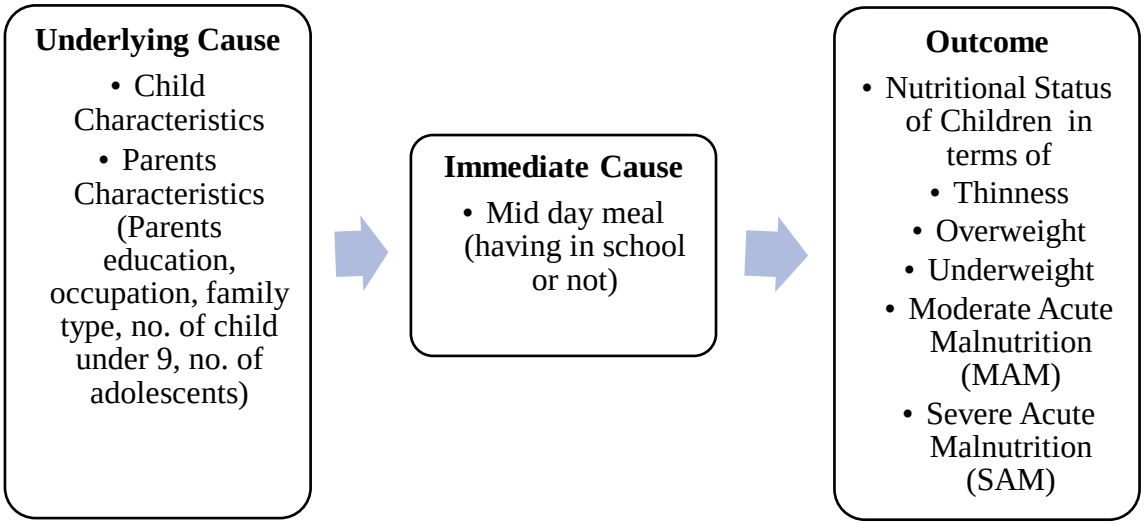

Fig 1. Adapted from Conceptual Framework on Maternal and Child Nutrition; UNICEF 2020

3. METHODOLOGY

A cross sectional, analytical study design was conducted. Multistage sampling techniques were used where the lottery method was used for the selection of municipalities and schools. A simple random sampling technique was used for the selection of students Where a table of random numbers was used to select the representative study population. For the selection of study area three different geographical regions were sorted Mountain, Hill and Terai region. And from each geographical region three third level of governance area was selected randomly; which were Indrawati Municipality from Mountain region Kathmandu Metropolitan city from Hill region and Kawasoti Municipality from Terai region. . And from each local government division; three basic schools were selected by lottery method. Only government schools providing mid-day meal were included for the study purpose. Study population was school children, with sampling unit 3-14 years old school going children attending government basic school providing mid-day meal. Sample size was calculated from infinite population with help of Cochran's formula [13] $n = \frac{z^2pq}{e^2}$. The prevalence of thinness is 20% among school children [14]. Thus, the final sample by keeping 10% response rate was 270 but total collected sample was 276. Data collection tools consisted of Equipment that was used in the study were Digital weighing machine, having capacity of 0-100 kg Height measuring scale (Stadiometer):- The height measuring tape of 5ft capacity (1 piece). The minimum measurement capacity was 0.1cm. MUAC: MUAC tape used which was designed by UNICEF, among two S0145620 MUAC, Child 11.5 Red/PAC-50 was used [15] . The questionnaires included of three sections which will be: A socio-demographic questionnaire, anthropometric measurement, and

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a food-related questionnaire. Anthropometric measurement was done under the guidelines provided by FANTA anthropometry guideline module 3 [16], and WHO Anthro plus (Anthropometric measurement and analysis process) [17]. Primary data was collected using semi-structured questionnaire and by anthropometric measurement. Interview was conducted with parents/ caretakers/ guardians available at that time. The height of children was measured using stadiometer placed on hard flat surface with line of sight perpendicular to the horizontal surface Weight was measured by an electronic digital weighing scale and read to the nearest 0.1 kg with minimal clothing and no shoes. For data analysis Univariate analysis was used to describe the percentages and number distributions, mean and std. dev of the respondents by socio-demographic characteristics and other relevant variables in the study. The nutritional status was measured by WHO Standards. Z-scores of height-for-age and BMI-for-age for each child were calculated based on the WHO criteria. Bivariate Analysis is done under which categorical association of underlying and immediate variables are done with Nutritional status by using inferential statistics like Chi-square, and linear by linear. Variables which had a significant association in bivariate analysis were further analyzed in multivariate analysis.

4. RESULTS AND DISCUSSION

A total of 276 students (3-14 years; 139 girls) with mean age 7.74 ± 3.229 years. Among them 236 received Mid day meal from the schools while only 40 students had meal out from the school. Among the receiver of MDM more than half of the students were male ie. 52.5% and among the non-receiver of MDM 47.5% were male. Among 40 students who had MDM out from the school the minimum age was 5 and maximum age was 14 with mean age 9.8 ± 3.27 years old. The MUAC was taken of only 93 students of age 3-5 among which 14 didn't received any MDM from the school. Table no.1 summarizes the demographic characteristics of the students

Table no.1 Anthropometric measurement comparison between those receiving MDM and non-receiving from school in all three basic schools of three areas.

Variables	MDM receiving in among 236 in %	Non -MDM receiving among 40 in %
Age	9.0 ± 3.05	9.8 ± 3.27
Height (cm)	125.3 ± 18.0	129.22 ± 19.35
Weight (kg)	25.3 ± 10.4	29.65 ± 15.4
BMI (kg/m^2)	13.24 ± 6	14.28 ± 7.0
MUAC (cm)	14.9±1.42	13.8 ± 1.49

Further, the anthropometric measurement was analyzed with WHO Anthro plus to rule out the percentage of malnutrition and stage of malnutrition. Table no 2 shows the status of malnutrition among students in terms of BMI-for-Age among age group 5-14, whereas severity of malnutrition in terms of SAM, MAM among age group 3-5 through MUAC. Table no. 2.1 and 2.2 gives a view on nutritional status of students.

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Table no 2.1 Nutritional Status Related Characteristics of under 5 Age Group.

Age	Malnutrition (SAM)	Moderate acute malnutrition (MAM)	Normal nutritional status
3-5 years	**< 115 mm**	**≥ 115 to < 125 mm**	**≥ 125 mm**
Percent	4.3%	6.5%	89.2%

Table no 2.2 Nutritional Status Related Characteristics of Age Group 5-14

		Z-score						
Nutritional Status	**Age**	**<-3**	**≥3 to <-2**	**≥-2 to <-1**	**≥ -1 to ≤ +1**	**>+1 to ≤+2**	**>+2 to ≤+3**	**>+3 above**
BMI-for -Age Thinness Overweight/obesity	5-14	Severe thinness	Moderate Thinness	Normal		Over weight	Obesity	
		9.3	48.4	40.9		1.3	___	
Height-for- age	5-14							
Male			47.9	52.6				
Female			39.3	60.7				

Among those students receiving MDM from schools 5.1% were suffering from acute malnutrition in either form whereas, among who were not receiving MDM from school 21.4% were having either form of malnutrition i.e MAM or SAM.

As for those whose BMI was analyzed , among those not receiving MDM in schools 60 % were suffering from mild thinness to severe thinness, whereas students who received MDM only 13.8% were suffering from mild to severe thinness.

To establish the association between MDM and nutritional status of the student's bivariate analysis was performed. The Chi- Square test revealed that there is a significant association between age and sex with Malnutrition status of students under age 5 with p value 0.007 and 0.008 respectively. Similarly, MDM also played a vital role in nutritional status of students of age 3- 5 with p value 0.015.

Among the age group 5-14 various factors showed association with their nutritional status. To check the association the age group 5-14 was sub categorized to age group 5-9 and above 9, where it showed that age also played crucial role in maintenance of better nutritional status of student with p value 0.001. Both mother and father's education were significantly associated with nutritional status of children with p value 0.001 both, as well as MDM also showed significant association with nutritional status of the students.

Furthermore, multivariate analysis was done to explore more on cause of malnutrition among the students. Where it showed that students receiving MDM in school have been 1.913 (CI: 0.867-4.22) times better than those are not receiving MDM in schools with p value 0.002. Parents education also played a crucial role in nutritional status of the students. The nutritional status of students increased by 2.616 (CI: 1.073- 6.378) when father is educated and by 3.259(CI: 1.406-7.553) times when mother is educated, with p values 0.035 and 0.006 respectively.

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Discussion

Nutritional status is one of the most used and accurate method which measures a child's health and overall growth and development which significantly depend on healthy eating habit. There are various studies which revealed the nutritional status of children but very few had addressed the relation between mid day meal and nutritional status of children. As MDM is very important part of school going children that has directly or indirectly relation with nutritional status of a child [18].

In a report published by to global Nutrition report 2022 it indicated that the prevalence of thinness among male child and adolescents was 12.4% which is in contrast with present study where prevalence of thinness among male is 65.7 %. Similarly, the prevalence of thinness among females is much higher than the national report i.e. 65.5% in the present study but 8.4% as presented by the Global Nutrition report in the country profile: Nepal. And in national report overweight is 1% which is similar to this study where overweight is seen among 1.3% of the students. Among all only 85.5% students were receiving MDM in schools, this might be because there disparities between all three schools on getting incentives from government sector for MDM in school.

In the present study the there is significant association between MDM and the nutritional status of students is with a p-value of 0.015, which is similar to study done in Ghana in 2018 where school feeding program was significantly associated with nutritional status of child with p value 0.028.

While exploring all the factors related to nutritional status of students MDM along with mother and father education was also significantly associated . In availability of all three condition i.e. receiving MDM, parents' literacy the student's chance of having better nutritional status is increased by 1.9 times to 3.2 times.

5. CONCLUSION

Conclusively, the author can say that nutritional status of a child is directly or indirectly affected by the parent's education more of mother education, meal they are having in schools, unhealthy eating habits and age as well. A well-established nutrition education in an educational setting can help to address this problem to fulfill the Sustainable development goal target of Zero Hunger, Good Health and Well-being to combat poverty in long run.
A similar study can be done in private school setting where MDM is not provided and can be done in senior classes as well to establish a better view on children and adolescents' nutritional status.

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