Assessment of Prevalence of Malnutrition among Preschool Children (Under 5 years) in Western UP (India)

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ABSTRACT

Background: *Initial 6 years of child's life are critical in terms of growth, development and health. Uttar Pradesh is the largest Indian state in term of population size and contributes approx. 16.4% of country's population. According to NFHS-5 in Uttar Pradesh, 32.1% children are under weight and 17.3% are wasted in U5 category. The present study focused on the prevalence of malnutrition in U5 children*
Objective: *To assess the prevalence of malnutrition among preschool children (U5 years) in western UP..*
Materials & Methods: *A study was carried out at selected schools of Meerut city (UP). A sample of 268 preschool children (under 5 years) was investigated with prior signed consent from their parents for participating in the study.*
Results: *Out of 268 children, 39.99% were males (24.63% of 3 – 4 years and 14.93% of 4.1 – 5 years) and 60.45% were females (41.04% of 3 – 4 years and 19.4% of 4.1 – 5 years). 65.67% children were recorded normal and the prevalence of grade – I was highest (22.01%), followed by grade – II (9.7%), grade – III (2.61%) and no prevalence of grade – IV. Regarding wasting, most children (82.46%) were well-nourished, 17.54% were suffering from MAM and no prevalence of SAM among investigated children.*
Conclusions: *The status of malnutrition among 3 - 5 years children is a serious health concern, contributing to the whopping crisis of malnutrition in children, especially of grade – I malnutrition and wasting in U5 children, and needs effective strategies to be prevented.*

Keywords: assessment, children, malnutrition, prevalence, under 5 years

Abbreviations: NFHS – National Family Health Survey, U5 – Under 5 years, MDDs – Micronutrient Deficiency Diseases, MUAC – Mid Upper Arm Circumference, WHO – World Health Organization, WAZ – Weight for Age, SAM – Severe Acute Malnutrition, MAM – Moderate Acute Malnutrition, VAD – Vitamin A Deficiency, IDD, Iodine Deficiency Disease, IAP – Indian Academy of Pediatrics

I. INTRODUCTION

The initial six years of life are critical for the child's growth, development and health as it is said that during these years, 40% of physical growth and 80% of mental development take place.[1] According to NFHS-5 in Uttar Pradesh, 32.1% children are under weight in U5 category, among which 28.2% are in urban area and 33.1% are in rural. And total 17.3% U5 children were wasted, including 18.7% from urban area and 17% from rural area. Comparative to NFHS – 4 these rates has gone down, still the levels of malnourished children are on higher side.[2] Indicators of nutritional status like levels of wasting, stunting, low birth weights and nutrient deficiencies like VAD, IDD, etc. are still more prevalent in India than in countries like US and China.[3]

Uttar Pradesh is the largest state in term of population size among all Indian states accounting approx. 16.4% of India's total population with 84.4% in urban and 78.2% in rural as per NFHS-5 data.[2, 4] Malnutrition encompasses Undernutrition, over nutrition and MDDs. Thus, malnutrition causes longer- term and deep rooted health damages in both physical & metal terms. More than 50% of child deaths are preventable through better & sustainable nutrition & feeding

practice. As the under 5 child population makes huge populas percentage in UP, specifically the urban populas, it needs effectively assessed and addressed.[5]

Hence, the present study was conducted to gather the information and evidences on malnutrition status of U5 children. The study focused on the prevalence of malnutrition in U5 children in western UP (India).

II.   OBJECTIVE OF STUDY

To assess the prevalence of malnutrition among preschool children (under 5 years) in western UP.

III.   STUDY DESIGN

School-based pre-experimental one group pre and post test design was adopted.

IV.   STUDY AREA AND POPULATION

The investigations for the study were done in Meerut city area of western UP (India). Preschool children of 3 – 5 years of age were investigated and assessed for their nutritional statuses who were studying in the selected schools during the time of study.

V.   SAMPLE SIZE & TECHNIQUE

Purposive random sampling was used to select the sample of 268 preschool children for the study purpose.

VI.   INCLUSION CRITERIA

1. Preschool children of 3 - 5 yrs. age of upper, middle & lower income groups of every religion.
2. Preschool children (3-5 years) who were studying in the selected schools during the study period and whose parents signed the informed consent form for the participation & successful completion of the study.

VII.   EXCLUSION CRITERIA

1. Preschool children with severe disease condition or long term medication.
2. Preschool children of single parents.
3. Children whose parents did not signed the consent form.

VIII.   DATA COLLECTION PROCEDURE & METHODS

The study was conducted in the area of Meerut (South) of western UP. 10 schools were randomly selected from the study area. All the children of 3 – 5 years of age were purposefully randomly selected based on inclusion & exclusion criteria of the study. All the concerned school authorities & parents whose children were investigated were briefed out for about the study objectives and purpose.

The duely signed consent forms from all the concerned parents were obtained by the investigator mentioning all necessary details regarding the study before the conduction of nutritional status assessment session for children. All the selected school authorities were asked by the investigator to pre-inform the selected parents for the session day allotted for assessment of nutritional status of children so that no parent remains un-informed and no selected child remains absent during the data collection session. All the nutrition assessments of preschool children were done in the presence of their parents during the session. The data collection was done using pre-tested and calibrated tools (digital weighing scale, standiometer, Shakir tape). The date of birth of child was used to calculate the age of child to the nearest birth month. After collecting the general information and socio-demographic profile like religion, gender, age, food habit, residential area, type of family, etc. selected children were assessed through anthropometric assessment method. The data collection of the present paper was over a period of 1 month.

Weight of the subject was measured using a digital floor weighing machine. The scale was calibrated to zero level every time before measuring each subject. Each subject was asked to wear minimum clothing and remove shoes before weight measurement. The zero error of the weighing machine was checked before taking the subject's weight and was corrected as

required. Height was measured through a portable standiometer. The standiometer reading was recorded to nearest 1 mm. MUAC of the subjects was measured using Shakir tape. . Estimation of midpoint of left arm was made and shakir tape was placed at the midpoint of the arm to record the measurement of the subject. The measurement was recorded to nearest 0.1 cm in present study.

IX.   DATA ANALYSIS

WHO Anthro calculator was used to calculate WAZ%. The tabulation of data was done in MS-Excel 2007 version. The statistical analysis of the data was done using the IBM SPSS Advanced Statistics 29.0 (5725-A54) Version.

X.   RESULTS

Total 268 children of 3 – 5 years of age were included in the study. Among them 176 (44%) children were between 3 – 4 years and 92 (23%) children were between 4.1 – 5 years of age. Among all children 162 (60.45%) were Hindu, 48 (17.91%) were Muslim and 58 (21.64%) were others, with majority of 233 (86.94%) living in urban area and 35 (13.06%) living in rural area. The majority of 156 (58.21%) of preschool children were living in nuclear families and 112 (41.79%) were living in joint families. Regarding socio-economic status, a majority of 154 (57.46%) were from middle income status, followed by 74 (27.61%) from lower income status and 40 (14.93%) were from upper income status.

Table 1: Description of gender wise distribution of age groups of preschool children (3 – 5 years)

Gender	Age Group		Total
	3 - 4 years	**4.1 – 5 years**	
Male	66 (24.63%)	40 (14.93%)	106 (39.55%)
Female	110 (41.04%)	52 (19.4%)	162 (60.45%)

Table 1, presents the description of gender wise distribution of age groups of preschool children. It reveals that, a majority of 60.45% was females and 39.55% was males. Among them, 24.63% males were of 3 – 4 years and 14.93% were from 4.1 – 5 years. While 41.04% females were of 3 – 4 years and 19.4% were of 4.1 – 5 years.

Table 2: Description of malnutrition levels among preschool children (3 – 5 years) based on WAZ %

Degree of Malnutrition (WAZ %) (IAP Classification)	Malnutrition Levels	
	Frequency	%
Normal (>80 %)	176	65.67
Grade – I (71 – 80 %)	59	22.01
Grade – II (61 – 70 %)	26	9.7
Grade – III (51 – 60 %)	7	2.61
Grade – IV (<50 %)	0	0
Total	268	100

WAZ: Weight-for-Age, IAP: Indian Academy of Pediatrics

Table 2, presents the description of malnutrition levels based on WAZ % according to IAP classification. It reveals that, a majority of 65.67 % children were normal, which is followed by the major (22.01%) prevalence of grade – I malnutrition, 9.7 % of grade – II malnutrition, 2.61 % of grade – III malnutrition and no prevalence of grade – IV malnutrition.

Table 3: Description of malnutrition levels (wasting) among preschool children (3 – 5 years) based on MUAC cut – off points

Degree of Malnutrition (MUAC Cut Off Points)	Malnutrition Levels (N = 268)	
	Frequency	%
SAM (<115 mm)	0	0
MAM (115 – 125 mm)	47	17.54
Well Nourished (>125 mm)	221	82.46
Total	268	100

MUAC: Mid Upper Arm Circumference

Table 3, presents the description of malnutrition levels (wasting) based on MUAC cut-off points by WHO. It reveals a majority of 82.46% children were well nourished, 17.54% children were suffering from MAM (Moderate Acute Malnutrition) and no child was suffering from SAM (Severe Acute Malnutrition).

XI.   DISCUSSION

In the present study, the prevalence of malnutrition levels were assessed among preschool children (3 – 5 years) based on WAZ % (Weight-for-Height %) according to IAP classification and MUAC (Mid Upper Arm Circumference) cut-off points. The present study was conducted in the Meerut city of western Uttar Pradesh.

Preschool years are the early developmental years and thus are very crucial of child health. Nutritional issues like malnutrition in all forms like under & over weight, anemia, VAD, etc. are the major epidemics affecting large proportion of childhood population. [6]

In present study out of total 268 children of 3 – 5 years were investigated and among them females (60.45%) were more in comparison to males (39.55%). It revealed that among all investigated children, 22.01% were suffering with grade – I malnutrition which was recorded as the highest prevalent form of malnutrition among all according to WAZ% as per IAP classification, 9.7% were suffering from grade – II and 2.61% were suffering from grade – III. Regarding wasting levels, among 268 children, 17.54% were recorded with MAM (moderate acute malnutrition) and have MUAC in the range of 115 – 125 mm (11.5 – 12.5 cm) and while 82.46% were well – nourished/ normal with MUAC > 125 mm (> 12.5 cm). Similar findings were reported by *Hazarika, Dr. Bidisha et al. (2022)* in urban slums of Guwahati where 27.91% were recorded underweight and 21.22% recorded with wasting with MUAC <125 mm (12.5 cm).[7] *Goyal, M. et al (2023)* reports similar findings in urban area of south Delhi, where 24.5% children were underweight and 17.8% were recorded wasted. The anthropometric failure was recorded to be 45%.[8] A study by *Pandey. G. et al. (2022)* which was conducted in urban areas of Meerut also revealed that out of 152 children, 34.2% were underweight and 19.7% were wasted. The study also mentioned that among all investigated children majority of 46.1% were in the age group of 3 – 6 years of age, comparative to 25.3% in 0 – 3 years of age.

The present study reveals that among all malnutrition grades, grade – I is most prevalent form in children of 3 – 5 years of age. The study also reveals that most of the investigated children under 5 years were not wasted and had well-nourished subcutaneous fat & muscle mass, but 17.54% children were in a state of concern suffering from MAM.

This study also reflects that no prevalence of grade – IV malnutrition and SAM among children of 3 – 5 years in Meerut.

This study also indicates the higher prevalence of malnutrition in females comparative to male children of 3 – 5 years of age of same study area.

XII.   CONCLUSION

As recorded in the present study, the status of malnutrition among 3 - 5 years children is a serious health concern and is contributing to the whopping crisis of malnutrition in children of early developmental years, which is also making childhood malnutrition a nutritional epidemic, especially of grade – I malnutrition. Status of wasting in U5 children is also at risk stage and equally needs attention to be prevented. Malnutrition needs effective strategies to be prevented in all forms.

RECOMMENDATION

1. Improving nutritional knowledge among parents, caregivers and schools is the urgently needed.
2. Designing and implementation of effective interventions can bring great change in the nutritional status of children of early developmental & preschool years.
3. Time-to-time practical sessions, workshops and other nutrition related activities should be conducted at community and school levels for developing on-ground and better understanding and feeding practices.

CONFLICT OF INTEREST

There is no conflict of interest.

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