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Effect of Educational Intervention on Nutritional Status of Children in Urban Slums of Lucknow

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Abstract

Background: Central to the sustenance of adequate nutrition and optimal growth during infancy and early childhood are the practices of complementary feeding. These practices, encompassing the introduction of solid foods alongside breastfeeding, play an influential role in laying the foundation for a child's nutritional status and developmental outcomes. This complex issue is influenced by a multitude of factors, including socioeconomic status, parental attitudes, hygiene practices, and child-feeding practices. The present research is done to study the impact of nutritional and educational intervention on the nutritional status of malnourished children in the urban slums of Lucknow District.

Methods- A quasi-experimental design was adopted for conducting the study. The purposive sampling method was used to collect samples for this study. A sample of 400 mothers included their 400 children aged 6 to 24 months from different urban slum areas of the community. 201 children were found to be malnourished among 400 children. The treatment group had 96 malnourished children and the control group had 105 malnourished children taken from 16 Anganwadi's. Educational nutritional intervention was given for duration of 6 months and pre and post-testing of nutritional status was done to see the impact of the intervention.

Results: After the intervention, the treatment group had a statistically significant improvement in weight and length Z- score (Standard deviation) and mid-upper arm circumference (MUAC) while the control group did not. The analysis highlights the effectiveness of the intervention in improving the nutritional status of malnourished children.

Key words: Complementary feeding, Malnutrition, Nutritional status, Urban Slum Children.

INTRODUCTION

The **WHO (2010)** defines malnutrition as deficiencies, excesses, or imbalances in nutrients. This global health concern holds significant implications, with approximately one-third of deaths among children under the age of five being directly or indirectly linked to undernutrition. Moreover, a considerable number of children in developing countries, who grapple with poverty, deprivation, and hunger, experience delayed physical and mental development due to malnutrition. In this context, it is imperative to explore the multifaceted aspects of malnutrition and its far-reaching consequences **(Elizabeth, 2010)**. There's a concerning cycle at play where a mother's poor nutritional status during pregnancy can lead to the birth of a low-weight baby. This, in turn, makes the child more vulnerable to infections, worsening their overall health. Surprisingly, it's observed that the family's per capita income doesn't always correlate strongly with the child's poor nutritional status. Instead, the lack of access to proper healthcare services emerges as a significant factor contributing to the child's malnutrition **(Bhutia et al., 2014).** **Complementary feeding** is the term used to describe the process that begins when a baby's nutritional needs cannot be adequately met by breast milk alone. At this stage, additional foods and liquids become necessary alongside continued breastfeeding to ensure the child receives the essential nutrients required for healthy growth **(PAHO, 2003).** The timing of introducing complementary food varies across different socioeconomic groups. In urban upper and middle-income groups, it typically starts at 3-5 months. However, in the urban lower-income group, this introduction is delayed, occurring between 7-9 months, and in rural areas, it's even further delayed, happening between 9-11 months (**NFSB,2013).** These variations in the timing of introducing complementary foods can impact a child's nutrition and overall growth and development.
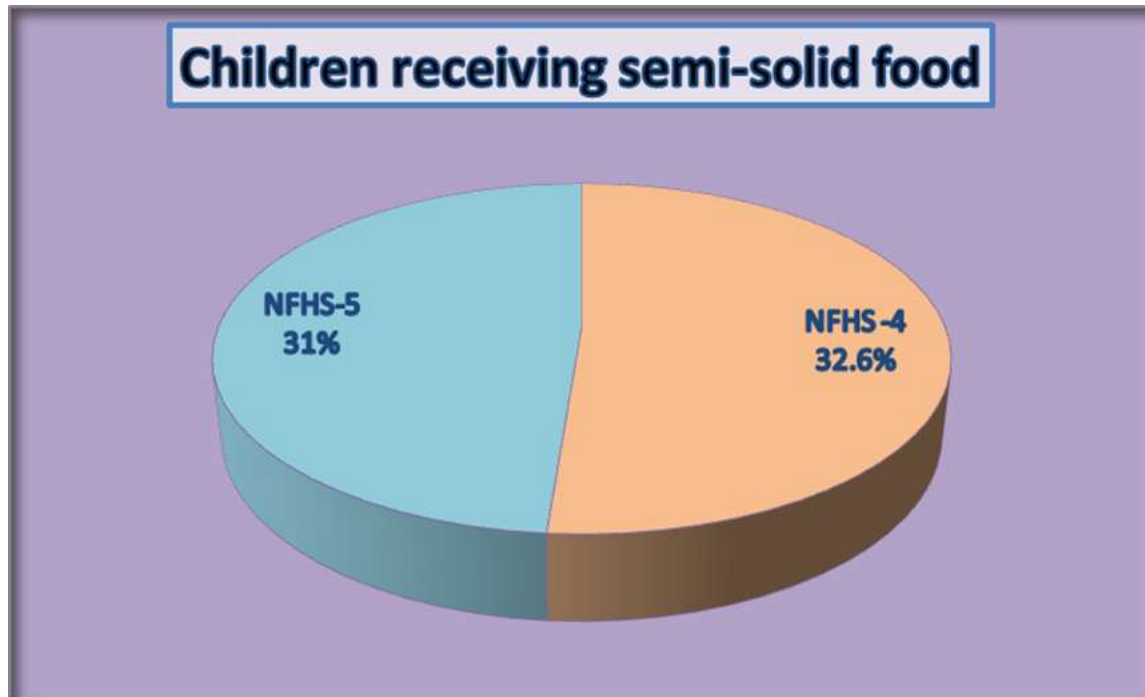
Figure 1-Complementary Feeding Introduction (Data Source, NFHS, 2020-21)

Data from the National Family Health Survey-4 (NFHS-4) showed that 32.6% of children were introduced complementary feeds while continuing to breastfeed at the age of 6 to 8 months. However, in the subsequent NFHS-5 survey, this percentage slightly decreased to 31%.

The NFHS-5 survey also investigated the capability of complementary feeding practices, and the results were concerning. It revealed that only a small proportion, specifically 6.1%, of children aged between 6 to 23 months were receiving a diet that met the criteria for being considered adequate (**NFHS-5, 2020-21**). This finding underscores the need for improvement in complementary feeding practices to ensure that more children in this age group receive a nutritionally adequate diet for their growth and development.
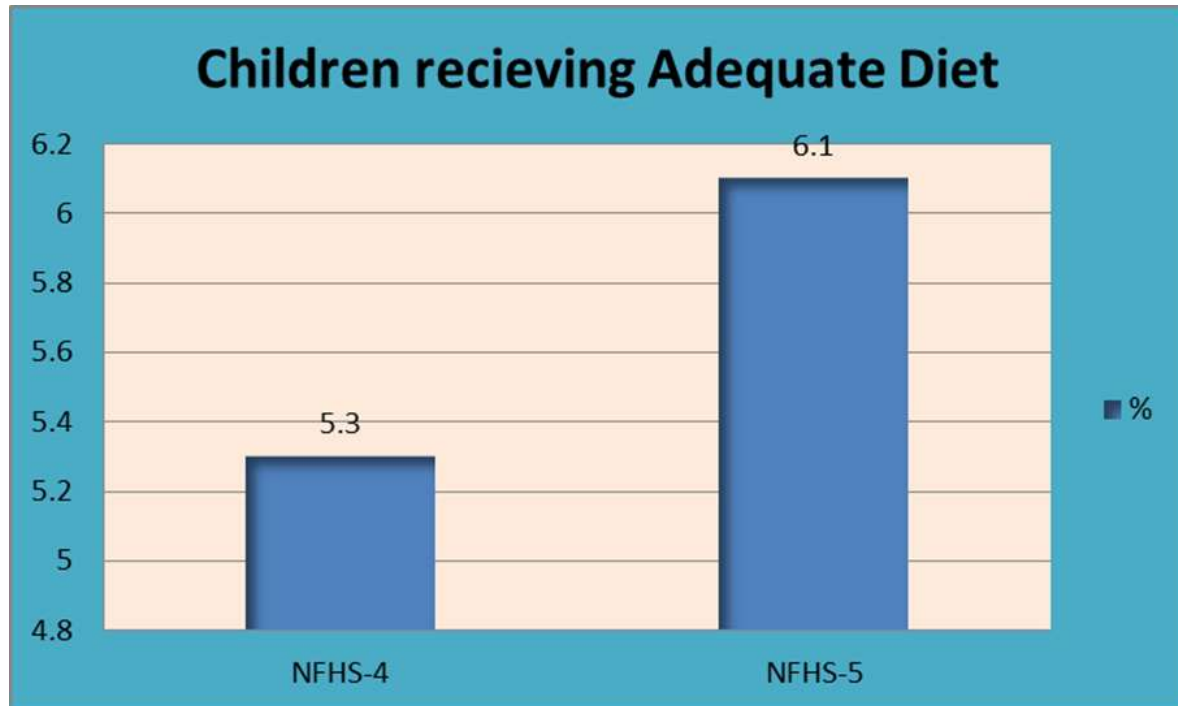
Figure -1.1 Complementary feeding Adequacy (Data source- NFHS-5, 2020-21 UTTAT PRADESH)

The "Integrated Child Development Services (ICDS)" scheme plays crucial role in the fight against under nutrition by providing essential services such as Complementary nutrition, health check-ups, and growth monitoring. However, despite being in operation for over three decades, the issue of under nutrition persists, and the reduction in its prevalence has been relatively slow. Efforts should be optimized across legislative, service, and educational domains to realize the vision of a malnutrition-free India **(MWCD, 2014).**

MATERIALS AND METHODS

Quasi-experimental design was used to study the impact of educational and nutritional intervention on mothers' knowledge of complimentary feeding and nutritional status of malnourished children in urban slums. **Survey Method Design** was used to examine measurements of anthropometry to examine the children's nutritional status, providing crucial

baseline data to analyze the situation. Around 400 children assessment was done and 201 children were found to be malnourished. **Quasi-Experimental Design** was used to evaluate the impact of an educational intervention on caregivers' complementary feeding behaviors and nutritional status on selected 94 malnourished children by giving intervention to these children constituting the experiment group. The control group consisted of 105 children and did not receive any intervention and served as a comparison group against which the impact of the intervention could be assessed. By comparing the post-intervention malnutrition status between the treatment and control groups, the study aimed to measure the effectiveness of the intervention.

 Locale of the study-The study employed a purposive sampling technique to select participants from urban slums in Lucknow, Uttar Pradesh, India focusing on the Aliganj and Alamnagar blocks of the city. T

Sample design-his approach was chosen due to the researcher's familiarity with these areas, which facilitated efficient and effective data collection. Within these blocks, four sectors from each were strategically selected to represent the diverse urban slum landscape. Anganwadi Centers (AWCs) in these sectors were identified as the focal points for participant recruitment. From the AWCs' records, 400 children aged 6-24 months and their 400 mothers were chosen as the sample population. This selection process ensured a comprehensive and representative sample, providing insights into healthcare and nutritional challenges in urban slums. The sample size was deemed sufficient to yield reliable and generalizable findings, with data drawn from ICDS records indicating a total population of 11,725 children within the specified age range across both blocks. The study included a thorough growth assessment and subsequent interventions to evaluate the nutritional improvements among the identified malnourished children over a six month period.

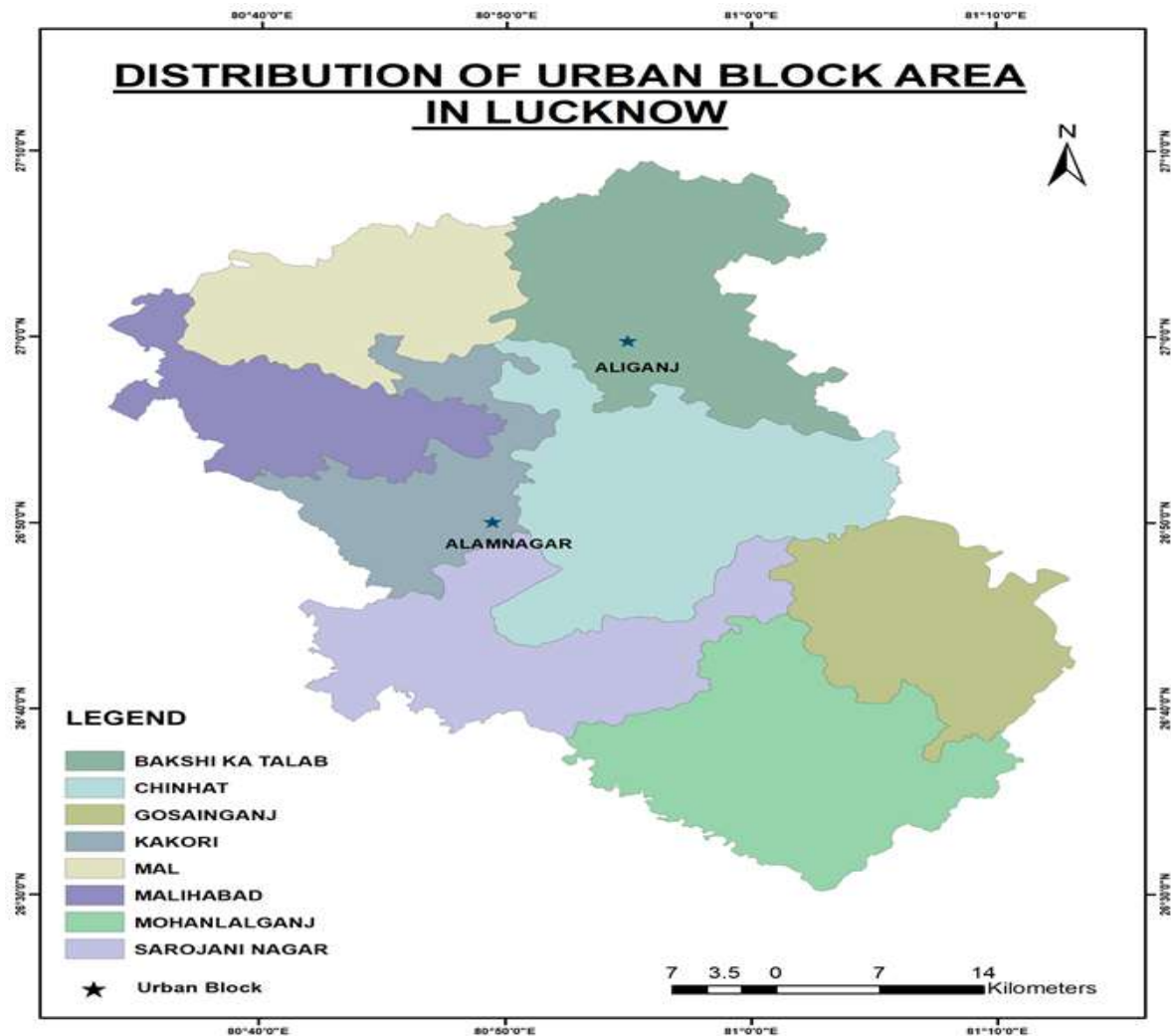**Figure: 1.2 Distribution of Urban Block Area in Lucknow**

TECHNIQUE AND TOOLS USED

Interview schedule-To facilitate comprehensive data collection, an interview schedule was meticulously crafted after validation. This interview schedule was meticulously designed to gather detailed information from respondents, focusing on various aspects related to complementary feeding practices and growth of children.

Tools Used for Anthropometry

Electronic Weighing Machine: To ensure accurate measurements, a calibrated electronic weighing machine was employed in the study. During the weighing process, it was observed that children remained calmer when held in their mother's arms and were dressed in minimal clothing.

Infantometer: An infantometer equipped with a headboard and a sliding foot piece was utilized for precise length measurements. To make sure the kid was comfortable; the Shoes, socks, and any hair ornaments were removed if they hindered head positioning.

MUAC (Mid Upper Arm Circumference): The study incorporated use of MUAC measurements to screen for severe malnutrition, typically identifying cases with MUAC measurements less than 11.5 cm. This measurement was conducted using a simple colored plastic strip. Identify the child's midline between the shoulder (acromion) and elbow (olecranon) by flexing the elbow to 90 degrees. MUAC measurements were categorized into green (normal category), yellow (moderate malnutrition), and red (severe malnutrition) zones to determine the nutritional status.

Standard Deviation (SD-Score): In identifying severe malnutrition, an SD-score was calculated based on the child's weight and length / height. SD-scores provide a means of comparing a child's measurement, such as weight-for-length, to a population average. Interpretation of SD-scores included: -
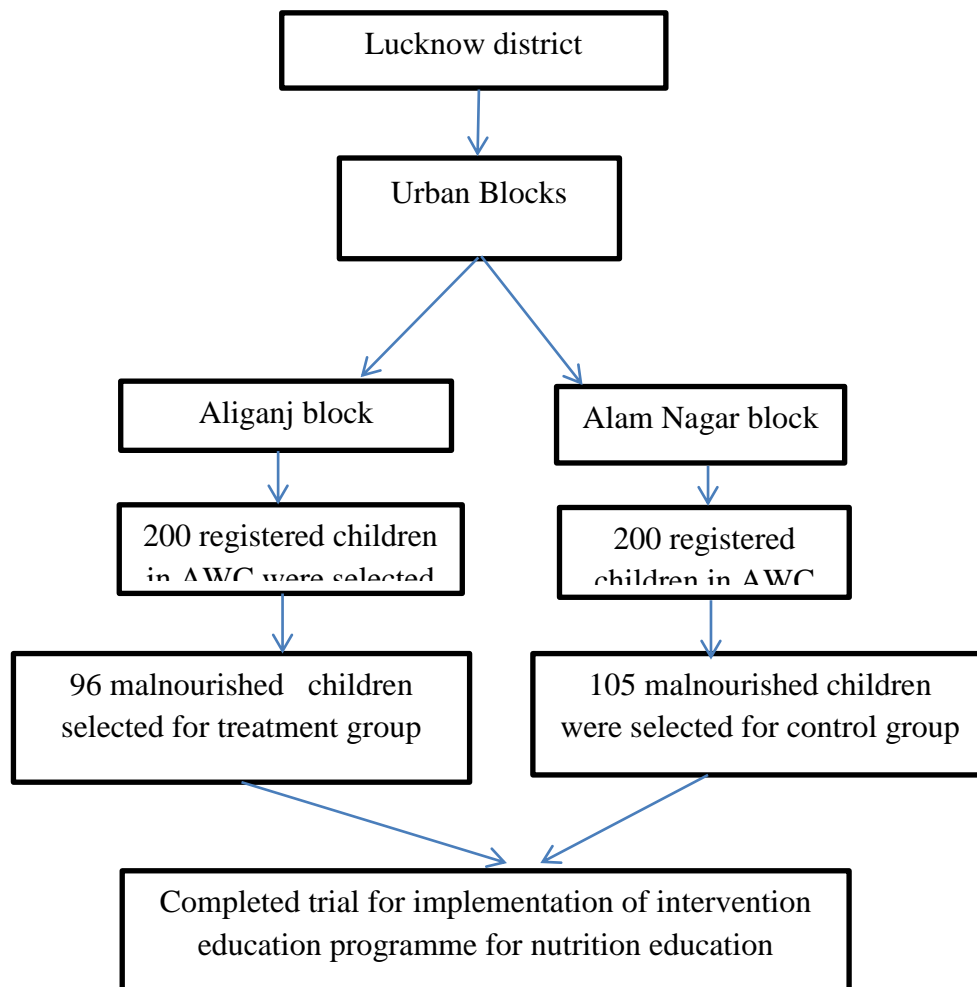
➢ **An SD-score of approximately -1 corresponded to the 90th percentile of the median weight-for-length.**

➢ **An SD-score of approximately -2 corresponded to the 80th percentile of the median**

> **weight-for-length.**

> ➤ **An SD-score of approximately -3 corresponded to the 70th percentile of the median weight-for-length.**

These interpretations used WHO Growth Reference Values for weight-for-length to assess the child's nutritional status (Facility-Based Care of Severe Malnutrition, Ministry of Health and Family Welfare, India (2013).

FLOW CHART: DISTRIBUTION OF POPULATION

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                    ┌─────────────────────┐
                    │   Lucknow district  │
                    └──────────┬──────────┘
                               │
                    ┌──────────▼──────────┐
                    │    Urban Blocks     │
                    └──────────┬──────────┘
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        ┌──────────────────┐    ┌──────────────────┐
        │  Aliganj block   │    │ Alam Nagar block │
        └────────┬─────────┘    └────────┬─────────┘
                 ▼                       ▼
    ┌──────────────────────┐  ┌──────────────────────┐
    │ 200 registered       │  │ 200 registered       │
    │ children in AWC were │  │ children in AWC      │
    │ selected             │  │                      │
    └──────────┬───────────┘  └──────────┬───────────┘
               ▼                          ▼
    ┌──────────────────────┐  ┌──────────────────────┐
    │ 96 malnourished      │  │ 105 malnourished     │
    │ children selected    │  │ children were        │
    │ for treatment group  │  │ selected for control │
    │                      │  │ group                │
    └──────────┬───────────┘  └──────────┬───────────┘
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                            ▼
            ┌──────────────────────────────────────┐
            │ Completed trial for implementation of │
            │ intervention education programme for  │
            │ nutrition education                   │
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INTERVENTION PHASE

An educational intervention module was created to promote awareness and understanding of complementary feeding practices among caregivers. The intervention incorporated the use of **complementary feeding booklet** that covered essential knowledge related to complementary feeding, as well as other crucial topics such as breastfeeding, sanitation, hygiene, childcare during illness, and the significance of growth monitoring. Over the course of the intervention programme, these topics were addressed during weekly sessions. The number of malnourished children in the **treatment group (96)** and the **control group (105)** is the sample size of malnourished children selected for the intervention phase.

Intervention Components: - Educational Sessions: Weekly educational workshops were conducted for the treatment group caregivers. Each workshop covered essential topics related to complementary feeding and child nutrition such as safe food handling and preparation, importance of breastfeeding and complementary feeding, hygiene and sanitation practices, recognizing signs of malnutrition, growth monitoring and child health. **Resource Material** provided was a comprehensive **complementary feeding booklet** containing information on complementary feeding and child nutrition to each caregiver in the treatment group. This material served as a reference guide and was used at home. Training manual was developed following WHO and UNICEF guidelines.

Weekly nutrition and health education sessions-Mothers take part in regular meetings during the intervention phase where discussions cover complementary feeding practices and child health. These weekly meetings, which cover participants pertaining to their children's development and health, are scheduled on a regular basis which is as follows-

Ice-Breaking and Sanitation and Hygiene-The first week of the intervention programme served as an ice-breaking session. During this session, participants were introduced to the programme using child feeding-related pictures.

Importance of breastfeeding - Skin-to-skin contact with the mother immediately after birth, breastfeeding within an hour, good positioning, and attachment while breastfeeding, exclusive breastfeeding (no other food, water, or drink) for 6 months, and frequent breastfeeding day and night on demand were key messages, understanding the importance of foremilk and hind milk, and continuing breastfeeding up to 2 years of age.

Role of Complementary Feeding in child growth- The concept of complementary feeding was introduced. Key points covered included an explanation of what complementary feeding is and why it's important.

Importance of Food groups in complementary feeding - Participants were provided with illustrations of food groupings, including staples like cereals and millets, pulses and legumes, vitamin A-rich fruits and vegetables, other fruits and vegetables, animal-source foods such as milk and milk products, and fats and oils.

Illustrations and demonstrations of complementary food consistency: Distinguishing between good and poor consistency using a cup and spoon, quality, accuracy, and thickness of complementary food.

Illustrations of complementary foods frequency-Starting with 2 to 3 meals and gradually increasing to 4-5 meals alongside frequent breastfeeding, measuring the quantity of food given and consumed with the help of a spoon and cup (250ml).

Others important topics covered under weekly health and nutrition education sessions - Introducing finger foods, sliced meals, and chopped-up family staples, boosting the calorie density of complementary food, and addressing prevalent misconceptions about complementary feeding, regular monitoring of children growth and its significance in identifying and addressing malnutrition, care of children during illness and included illustrations and discussions related to well health centres, children with various health issues like fever, diarrhoea, vomiting, undernourishment, refusal to eat, convulsions, and respiratory difficulties **(Farooqui et al., 2023)**.

Demonstration Session on Ready-to-Use Complementary Food from Local Available Foods: Practical cooking demonstrations were organised where caregivers learned to prepare nutritious, affordable, and culturally appropriate complementary foods. In the final week, a demonstration showed how to make complementary foods using local products. Mothers were taught to use nutrient-dense, locally available grains, and millets to prepare various food mixtures, including –

- Sprouted moong dal-Wheat Mixture

- Murmura-Dal Mixture

- Chiwda-Dal Mixture

- Rice-Dal Mixture

- Murmura-Gram Mixture

- Ragi-Dal Mixture

- Dal-Groundnut Mixture

The food items used in the recipe demonstration sessions were affordable, easily accessible locally, high in nutrients, and useful in helping mothers who were working save time when

preparing complementary foods by using the above ready-to-use mixtures, such as Daliya, Halwa, Vegetable Khichdi, Kheer, and other cereal-based food preparations.

Both the treatment and control groups were assessed pre- and post-intervention to evaluate the treatment. Feedback from caregivers and community health workers was regularly gathered to make necessary adjustments to the intervention programme. The comprehensive data collected during the pre- and post-intervention phases allowed for a thorough analysis of the changes in overall nutritional status of children to be carefully examined to gauge the positive outcomes resulting from the intervention.

RESULT AND DISCUSSION

I. Impact of the Intervention Programme on the Nutritional Status of the Malnourished Children:

The present study included 96 malnourished children for the intervention group in treatment group, and 105 malnourished children for the control group. After providing the educational nutritional education intervention regarding complementary feeding practices the post testing revealed improvements in the nutritional status of the children.

Table 1- Pre and Post Mean and Standard Deviation of Anthropometric Measurement of the Children in Treatment and Control Group

	Treatment				Control			
	Pre		Post		Pre		Post	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
WEIGHT	6.654	1.1	7.783	1.0	6.551	1.3	6.577	1.4
LENGTH	72.7	6.2	74.0	5.8	71.7	7.0	71.7	7.0

MUAC	11.7	0.8	12.6	0.6	11.4	0.9	11.4	0.9

The above table presents measurements and statistics for different variables (Weight for length, MUAC - mid-upper arm circumference) in a study for both the treatment and control groups, before (Pre) and after (Post) a certain intervention. The treatment group's mean weight before the intervention (Pre) was 6.654 kg, and it climbed to 7.783 kg after the intervention (Post). The standard deviation (SD) for weight reduced from 1.1 to 1.0 following the intervention, demonstrating a reduction in variability. The treatment group's mean length before the intervention (Pre) is 72.7 cm, increasing marginally to 74.0 cm after the intervention (Post). The length standard deviation (SD) was reasonably steady, showing continuous variability in length measurements. The average MUAC of those who received treatment went from 11.7 cm before (Pre) to 12.6 cm after (Post). The standard deviation (SD) for MUAC remained very stable, indicating that MUAC data were subject to persistent fluctuation. Both the mean weight and MUAC of the treatment group have decreased since the treatment programme began, since both values increased after the intervention. The mean length increased somewhat as well, indicating possible growth benefits. The SD for weight, length, and MUAC were reasonably stable for both groups, indicating similar variability in these parameters throughout the trial. To establish the success of the intervention, additional analysis and comparison with the control group are required. Monitoring these anthropometric parameters is critical for determining the effectiveness of interventions, particularly in the context of child health and nutrition.

Table -2 Pre and Post Children's Nutritional Status in Intervention and Control Group:

Nutritional Status	Treatment group				Control group			
	Pre		Post		Pre		Post	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Normal	0	0.0	77	80.2	0	0.0	0	0.0
Moderate Malnutrition	41	42.7	15	15.6	49	46.7	57	54.3
Severe Malnutrition	30	31.3	4	4.2	31	29.5	21	20.0
Very Severe Malnutrition	25	26.0	0	0.0	25	23.8	27	25.7
Test	x^2 = 133.954; df = 3; p < 0.001 [S]				x^2 = 2.604; df = 2; p = 0.272 [NS]			
Total	96	100.0	96	100.0	105	100.0	105	100.0

x^2 =chi-square test, [S]=significant, [NS]=not significant, df = degree of freedom

The above table revealed the distribution of nutritional status for both the treatment and control groups before (Pre) and after (Post) a specific intervention. During the nutrition education intervention programme, treatment group had a similar distribution, with slightly higher rates of moderate malnutrition. Post-intervention, the treatment group showed a significant improvement **(p< 0.001)** in nutritional status, particularly in the percentage of children classified as 'Normal category of nutritional status. The control group also showed improvement, but not statistically significant. The nutritional status of the intervention group significantly improved, reducing malnutrition, and increasing the percentage of 'Normal' status. The findings underscore the importance of targeted nutritional interventions in improving children's nutritional status. In the present study nearly half of the population

(48.5%) comes under the different categories, 23.8% were moderate acute malnutrition, 15.3% were severe acute malnutrition and 12.5% were very severe malnutrition. Children less than five years old who visited the Urban Primary Health Centre in Fatehpur participated in a descriptive cross-sectional study **(Goel et al., 2022)**. According to World Health Organization standards, 24.5% of children were underweight, with 24.1% classified as extremely underweight. **70%** of the study population was underweight, and nearly a third (28.1%) was extremely underweight. Around 45% of people didn't pass the anthropometric test.

Almost half (45%) of child deaths include from malnutrition as a contributing factor, especially in poor socioeconomic areas of developing nations. The present rate of progress is insufficient to meet the worldwide aim set by the World Health Organisation to reduce malnutrition by 40% by 2025, even with advancements made in lowering the prevalence of malnutrition **(Amare et al., 2016).** Child malnutrition remains a serious global public health issue, regardless of whether the country is advanced or developing, such as India. Planning the actions to reduce the problem's burden requires accurate problem estimation **(Goyal et al., 2023)**. Among children in India under the age of five, 35.5 percent were stunted, 19.3 percent were overweight, 7.7 percent were severely overweight, and 32.1% were underweight, according to NFHS-5 data (**NFHS-5, 2020-21**). The prevalence of stunted children under the age of five in Uttar Pradesh was 39.7%, while the prevalence of wasted children was 17.3%, severely wasted children was 7.3%, and underweight children was 32.1% **(NFHS-5 2020-21).** On the basis of some other studies, it is concluded that present study showed a positive impact on the educational intervention programme on nutritional status of the children as in Andhra Pradesh 600 mother-child dyads, divided into control, complementary feeding, and responsive complementary feeding and play groups. The study

found that community-based educational interventions enhanced complementary food consumption **(Vazir, 2013).** An interventional study in Pondicherry showed that community-based follow-up health education effectively increased protein intake, calorie intake, and weight gain in malnourished children **(Pavitra et al., 2019).** In Delhi's urban slums, peer counselors taught appropriate complementary feeding techniques. The nutritionist- and peer-counseled intervention groups had a considerably higher rate of exclusive breastfeeding at six months, continued complementary feeding at six months **(Vandana and Jain, 201**4). In Chandigarh, a study involving nutrition education interventions and digitized child under nutrition tracking modules for health workers improved complementary feeding practices **(Sharma and Gupta, 2020).**

II. Impact of the Intervention Programme on the Mid Upper Arm Circumference (MUAC) of Malnourished Children:

A major public health challenge for children is the double burden of malnutrition. Mid-upper arm circumference (MUAC) measurement is an efficient and precise method to screen for nutritional status and allows for the rapid evaluation of large populations in epidemiological field research. MUAC has historically been used as a useful substitute indicator of under nutrition, particularly severe acute malnutrition in young children and infants **(Shinsugi C. et al.,2020).**

Table -3 Comparison between Pre and post mean value and standard deviation value of MUAC of malnourished children in Intervention and control group

	No.	Mean	Std. Dev	S.E Mean	t* value	Df	Sig. (two tailed)
Treatment group							
MUAC pre		11.68	0.81	0.08	-17.415	95	**<0.001**

MUAC post	96	12.63	0.61	0.06			
Control group							
MUAC pre		11.40	0.91	0.09	-0.600	104	0.550
MUAC post	105	11.41	0.92	0.09			

From above table 3, a paired sample t test showed that the significance difference between pre (mean=11.68, SD=0.81) and post (mean=12.63, SD=0.61) value of MUAC in intervention group with p value is <0.001, it means the nutrition education programme about complementary feeding has made positive impact. While in control group there is no difference between pre and post value of MUAC measurements of malnourished children. An education programme was found to have a considerable positive effect on complementary feeding in children with malnutrition. The mean MUAC of the intervention group increased significantly, suggesting enhanced nutritional status. The intervention caused a more uniform rise in MUAC among the test subjects. No improvement in nutritional status was observed in the control group as measured by MUAC before and after the intervention. The study highlights the importance of targeted nutrition educational interventions in addressing malnutrition and improving MUAC measurements.

Table -4 Pre and Post Children's Nutritional Status (Mid Upper Arm Circumference) in Intervention and Control Group:

	Treatment group				Control group			
	Pre		Post		Pre		Post	
MUAC	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Normal	13	13.5	46	47.9	3	2.9	4	3.8
Moderate	33	34.4	48	50.0	58	55.2	60	57.1

Malnutrition								
Severe Malnutrition	50	52.1	2	2.1	44	41.9	41	39.0
Test	p < 0.001 [S]				p = 0.272 [NS]			
Total	96	100.0	96	100.0	105	100.0	105	100.0

The distribution of MUAC for the treatment and control groups is shown in the above table both before (pre) and after (post) a particular intervention shows the greater rates of severe malnutrition in treatment group's distribution during the intervention. Following the intervention, the treatment group's MUAC status significantly improved (p<0.001), especially in terms of the proportion of children placed in the "Normal and Moderate category of MUAC." Although there was very small percentage of improvement in the control group as well, it was not statistically significant. The intervention group's MUAC significantly increased, decreasing malnourishment and raising the proportion of children in "Normal" and "Moderate" MUAC classification of malnutrition. The results highlight how important targeted nutritional interventions are to improving children's nutritional status. India accounts for more than half of the world's under-5 mortality rate due to poor nutrition. In most parts of the country, combating malnutrition is a top priority. With the primary goal of eradicating malnutrition by 2030, Global Nutrition Targets for six malnutrition indicators were set by the WHO and the UN Sustainable Development Goals for 2025. The UN's 2016–25 Decade of Action on Nutrition has raised awareness of worldwide malnutrition efforts ("India State-Level Disease Burden Initiative Malnutrition Collaborators, 2019") **(Bhadoria, 2023).**

In the present study a nutrition education programme was found to have a considerable positive effect on complementary feeding in children with malnutrition. Paired sample t test

showed that the significance difference between pre (mean=11.68, SD=0.81) and post (mean=12.63, SD=0.61) value of MUAC in intervention group with p value is <0.001, it means the education programme about complementary feeding has made positive impact. While in control group there is no difference between pre and post value of MUAC measurements of malnourished children. Study conducted by **Tigga et al. (2015)** Boys had an average mid-upper arm circumference (MUAC) of 126.1–142.5 mm and girls 126.9–136.4 mm, depending on age. Wasting was common in boys and girls (62.3% and 63.3%). The MUAC-for-age assessment showed that children were malnourished. To improve child nutrition, nutritional intervention programmes are needed. **Kashyap et al. (2022)** evaluated the nutritional benefits of Spirulina Chikki supplementation among 6-month-to-6-year-old children in Tumkur District covering 106 villages (108 Anganwadi Centers in nine circles). Both boys and girls improved in stunting, wasting, and underweight. **MUAC** also improved substantially. Food supplementation as nutrition intervention programmes may reduce malnutrition.

Several national initiatives, such as the Poshan Abhiyan, the Maternal, Newborn, Child and Adolescent Health strategy, the Integrated Child Development Services (ICDS), and reproductive and child health programmes, have been implemented with components with the goal of strengthening the nutritional status of the children. **(Fatima S. and Suryavanshi P.,2021)**.A tool like the UNICEF Complementary Feeding Bowl and Spoon can help caregivers provide a diverse and nutrient-dense diet for their children **(UNICEF Nutrition Strategy 2020-2030).** Additionally, actions to protect, promote, and support breastfeeding, such as provisions for extended maternity leave and supportive health services, can lead to improved exclusive and continued breastfeeding practices over time **(WHO, 2021)**

CONCLUSION

Through this comprehensive intervention, the study has not only identified key areas of concern but has also taken concrete steps to bridge the gaps in complementary feeding knowledge and practices. The transformation observed in the post-intervention phase underscores the potential for positive change and highlights the significance of targeted educational initiatives. It is evident that with the right guidance and support, caregivers in resource-constrained urban settings can be instrumental in enhancing child nutrition and, consequently, the overall health and well-being of their communities. These findings hold valuable insights for both academia and policymakers, offering tangible evidence of the effectiveness of education and interventions in tackling child malnutrition. Consequently, the implications drawn from this study offer a path forward, advocating for comprehensive educational initiatives, culturally sensitive approaches, gender-inclusive strategies, and a relentless commitment to the timely initiation of complementary feeding to improve the lives of children residing in the challenging urban slum environments of Lucknow.

Ethical Considerations: Informed consent was taken from all participating mothers regarding their responses, their children's nutritional health assessments, and the subsequent interventions provided.

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