

Age-Appropriate Feeding Practices and Nutritional Status of Slum-Dwelling Young Children in Kolkata during COVID-19 Pandemic: A Cross-Sectional Study

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Abstract

Introduction: COVID-19 pandemic was postulated to affect the infant and young child feeding (IYCF) practices and their nutritional status. This study was planned to assess IYCF practices and nutritional status of infant and young children residing in slum areas and their association with selected background characteristics. **Materials and Methods:** A community-based, cross-sectional study was conducted in slums of Kolkata Municipal Corporation among 161 mother–child dyads from October to December 2020. After obtaining informed consent, mothers were interviewed to collect information about their socioeconomic status, hardship faced during pandemic, and IYCF practices of their children using indicators proposed by the World Health Organization and Government of India. Weight and height were measured using the standard operating protocol. The proportion was used to express descriptive statistics. Binary logistic regression models were used for calculating the adjusted odds ratio (AOR) using PSPP (v 1.20). **Results:** Only 64 (39.8%) children received age-appropriate feeding; 73 (45.3%) had single/multiple anthropometric failure(s). Reduction of family income was reported by 142 (88.2%) respondents. Children aged 6–8 months (AOR = 17.08, 6.43–45.42) were more likely to not have appropriate feeding. Association of female gender (AOR = 2.00, 1.01–4.00), maternal education less than middle class (AOR = 2.58, 1.22–5.46), and lack of appropriate feeding (AOR = 2.57, 1.08–6.12) were statistically significant with the presence of anthropometric failure. **Conclusions:** The study revealed a dismal scenario of child feeding and nutritional status of young children in the urban slums of Kolkata. Pandemic and imposed restrictions hit the families hard by reducing income and increasing food-related costs.

Keywords: Breastfeeding, COVID-19, diet, feeding behavior, growth disorders, infant, infant and young child feeding practices, nutritional status, poverty areas, young child

INTRODUCTION

India, like rest of the world, is going through the pandemic of severe acute respiratory syndrome coronavirus-2 virus. The World Health Organization (WHO) declared the pandemic in March 2020, and the Government of India (GoI) followed suit. Following the declaration of the pandemic, GoI implemented stringent restrictions from March 25, 2021.^[1] Stringent restrictions in a country where around 80% of the workforce are involved in the informal sector implied a substantial slowdown of economy.^[2]

Urban slum dwellers are among the most vulnerable population groups and face high mortality and undernutrition.^[3] Maternal and child undernutrition are disproportionately high among urban poor.^[4] The COVID-19 pandemic and subsequent restrictions hit slum-dwelling population the hardest. The fragile social and financial state of this population group who mainly depends on day labor and casual work cannot cope with the crisis and had a tremendous impact on their health and nutritional well-being.^[5]

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It was noted that at least one person of nearly 80% households in slums of two cities of Uttar Pradesh lost their job and a substantial proportion had a reduction in income.^[6] It was noted in a survey across 12 states that more than 80% of the urban population consumed less food than before.^[7] Similar study showed that pandemic restrictions had impacted the eating pattern of the children of almost one-third of families.^[7,8] In a statement by WHO, it was hypothesized that loss of wage of the earning member might lead to difficulty in feeding the family members.^[9]

Infants and young children (<2 years of age) are a vulnerable group of the society. In addition, any changes in feeding practices are likely to be rapidly evident in this group. Disruption of the food intake is likely to affect the feeding practices initially and, if not corrected, might result in the poor nutritional status.^[10] Literatures have mentioned that inadequate infant and young child feeding (IYCF) practices might affect the growth and development of the child.^[11,12] Adequate IYCF practices of the infant and young children are thus very important.

Despite this importance, very few studies were done for assessing the IYCF practices and nutritional status of the infant and young children in the postlockdown period among the slum dwellers in this part of India. Having information on this might be helpful for the policymakers to take necessary steps in future, if required. This study was planned to assess the IYCF practices and nutritional status of the children aged <24 months in the slums of Kolkata.

MATERIALS AND METHODS

This cross-sectional study was done in slums of Kolkata Municipal Corporation (KMC). Kolkata is the capital of West Bengal and one of the metropolitans in India. Data collection was conducted between October 2020 and December 2020. All mother-child dyads with children <2 completed years who were residing in the area prior to implementation of lockdown measures were considered as the study population.

The sample size was calculated for both nutritional status and IYCF practices separately. In an earlier study done in slums of Kolkata, the prevalence of Composite Index of Anthropometric Failure was reported as 31.8%. Considering these prevalences with 10% alpha error, 1.5 design effect, and 10% nonresponse rate, the minimum sample size was 142.^[13] In another study done on IYCF practices, the prevalence of adequate dietary diversity was reported as 46%.^[12] Considering this prevalence with 10% alpha error, 1.5 design effect, and 15% nonresponse rate, the minimum sample size was 165. The latter being the largest, this was taken as the required sample size for the study.

Three wards of KMC were selected purposively which are socio-environmentally similar. A list of the young children (<24 months) was prepared in these wards with the help of frontline health and nutrition workers of the area. Then, the required number of children per ward was decided through the probability proportionate through size (PPS) method. Requisite numbers of mother-child dyads were selected

randomly using computer generated random numbers. Those who did not provide consent for the study were not included. Mother was considered the primary respondent.

Five field investigators after being trained on anthropometric measurements of children aged below 2 years and interviewing of mother of young children were involved in data collection, data entry, and analysis. A standardized questionnaire was prepared and pretested for data collection on nutritional status and IYCF practices based on the recommendation of WHO.^[14]

The questionnaire consisted three parts. In the first part, demographic and socioeconomic variables (e.g., date of birth, gender of the child, maternal education and occupation, perceived socioeconomic status of the family, and use of cooking fuel) were collected. Information about maternal education was collected according to the Modified Kuppaswamy classification 2020.^[15] The collected information was then clubbed together into less than middle (or less than class 8 pass) and higher than middle (class 8 completed and above). Date of birth of the children was noted from the Mother and Child Protection Card, which was available with each selected mother. In the second part, information was collected related to IYCF practices in the 24 hour prior to data collection (e.g., exclusiveness and frequency of breastfeeding, frequency of night feeding, amount and frequency of complementary feeding among children aged more than 6 months, and dietary diversity of complementary feeding among children aged more than 6 months). Minimum dietary diversity was defined as children 6–23 months of age who received foods from four or more food groups in addition to breastfeeding during the previous day. Minimum meal frequency was defined as breastfed and nonbreastfed children 6–23 months of age who receive solid, semi-solid, or soft foods (but also including milk feeds for nonbreastfed children) the minimum number of times or more during the previous day. Minimum acceptable diet was defined as children 6–23 months of age who fulfilled all three criteria of minimum meal frequency, minimum amount per meal, and minimum dietary diversity in the previous day. Appropriate feeding was defined as the minimum acceptable diet for children aged 6–23 months and in case of <6 months of age, exclusive breastfeeding for at least 8 times along with night feeding in the previous 24 h of data collection. The third component consisted of weight and height measurement.^[16] Weight was measured using a digital weighing machine (Smart Care Digital Glass Top Weight Scale SCS 210V2.0) and length was measured using infantometer (Portable Baby Infantometer Seca 416) in centimeter using standard procedure as recommended by the WHO.^[17] Weight for age, length for age, and weight for length were calculated from the weight and height. These indicators were used for calculating Composite Index for Anthropometric Failure (CIAF).^[18] CIAF is divided into seven groups – one group with no anthropometric failure and six groups with anthropometric failures. These six groups were divided according to underweight, stunting, wasting and their combination thereof.

The questionnaire was designed in Bengali, the local vernacular. Face and content validity of the instrument was checked in consultation with experts from the field of public health and nutrition. A 2-day training workshop was arranged for the field investigators prior to the field data collection. Around 10% of data were cross-checked as part of quality control measures. Institutional ethical clearance was obtained from the Institutional Ethical Committee of the concerned College (vide memo no. CMSDH/IEC/177/01-2020 dated October 17, 2020). The research followed the guidelines laid down in the Declaration of Helsinki, updated in 2013.

Statistical analysis

Data collected in paper forms were entered in Microsoft Excel™. Entered data were checked for duplicate and erroneous entries. In case of any error, entered data were compared with paper forms. Entered data were analyzed in GNU PSPP, version 1.2.0 (MA, Boston (USA): Free Software Foundation, Inc., 2020).^[19] Categorical variables were expressed in frequency and percentages. Anthropometric analysis was done using the Anthro Survey Analyser by the WHO.^[20] Finally, two binary logistic regression models were prepared with appropriate feeding and presence of anthropometric failure as dependent variables. In the first model, age group and gender of the children, maternal education, and maternal occupation were included as independent variables. In the model of the anthropometric failure, in addition to the above-mentioned independent variables, appropriate feeding was also included as an independent variable. Model fitness was assessed using a log-likelihood value; $P < 0.05$ was considered statistically significant.

RESULTS

Out of the 165, 161 mothers of selected young children completed the questionnaire with a response rate of (97.58%). Nearly half of the children were from 12 to 23 months age group (72, 44.7%), followed by <6 months old (50, 31.1%). Almost one in three mothers was illiterate and 151 (93.8%) were homemaker. Majority of the participants used community tap for drinking water collection (147, 91.3%) and community sanitary latrine (114, 70.8%). Although 151 (93.8%) children received some form of emergency health checkup in the 3-month period preceding to data collection, monthly growth monitoring was not conducted for majority (142, 88.2%) of children. Health workers conducted home visits for less than half (73, 45.3%) of children.

In the case of children aged <6 months, 7 (14.0%) children received commercial preparation of food other than breast milk, 2 (4.0%) children did not receive night feeding, and 10 (20.0%) children had breastfeeding <8 times in the 24 h prior to data collection. In the case of children aged >6 months, the study revealed that food amount consumed was age appropriate in only 33 (29.7%) children, and dietary diversity (at least four groups of food other than breast milk) was adequate for only 67 (60.4%) children. Majority of the children (129, 80.1%) did not receive supplementary nutrition

from Anganwadi center and all the remaining children (32, 100.0%) received dry food in the preceding 3 months from the day of data collection. The prevalence of appropriate feeding was 64 (39.8%) children [Table 1].

According to CIAF, 88 (54.7%) had no anthropometric failure, 13 (8.1%) had only wasting, 24 (14.9%) had only stunting, 4 (2.5%) only underweight, 7 (4.4%) had both wasting and underweight, 19 (11.8%) had both stunting and underweight, and 6 (3.7%) had stunting, underweight and wasting. One-hundred and twenty-five (77.6%) children had normal weight for age, 112 (69.6%) had normal length for age, and 135 (83.9%) had normal weight for length. Around one-fourth of children (25.5%) had single anthropometric failure, while one-fifth (19.9%) had multiple anthropometric failures.

The study also inquired about COVID-19-appropriate behavior and difficulties faced during the pandemic. Avoidance of gathering (140, 87.0%), social distancing (124, 77.0%), and frequent proper handwashing (152, 94.4%) were reported by the majority of the respondents. During the pandemic, high price of food items (139, 86.3%), cooking fuel (75, 46.6%), and reduction of income (142, 88.2%) were reported by the considerable proportion of study participants.

In the binary logistic regression model with appropriate feeding as a dependent variable, after adjustment for gender of the children, maternal education, and occupation, it was found that the children aged 6–8 months (adjusted odds ratio [AOR] = 17.08, 6.43–45.42) were more vulnerable for not having appropriate feeding. In the model of the anthropometric failure, female gender (AOR = 2.00, 1.01–4.00), maternal education less than middle class (AOR = 2.58, 1.22–5.46), and lack of appropriate feeding (AOR = 2.57, 1.08–6.12) were statistically associated with anthropometric failure [Table 2].

Table 1: Distribution of infant and young child feeding practices among the children (n=161)

Variable	Frequency, n (%)
Exclusive breastfeeding (n=50)	
Yes	40 (80.00)
No	10 (20.00)
Night feeding under 6 months (n=50)	
No	2 (4.00)
Yes	48 (96.00)
Minimum meal amount above 6 months (n=111)	
Adequate	33 (29.73)
Inadequate	78 (70.27)
Minimum meal frequency above 6 months (n=111)	
Yes	33 (29.73)
No	78 (70.27)
Minimum dietary diversity above 6 months (n=111)	
Adequate (four food groups or more)	67 (60.36)
Inadequate (<4 food groups)	44 (39.64)
Appropriate feeding (n=161)	
No	97 (60.25)
Yes	64 (39.75)

Table 2: Distribution of baseline characteristics according to appropriate feeding and anthropometric failure (*n*=161)

Variables	Total	Lack of appropriate feeding, <i>n</i> (%)	OR (CI)	AOR (CI)	At least one anthropometric failure, <i>n</i> (%)	OR (CI)	AOR (CI)
Age group (months)							
<6	50	9 (18.0)	Reference	Reference	20 (40.0)	Reference	Reference
6–8	16	12 (75.0)	13.67 (5.57–33.52)	17.08 (6.43–45.42)	7 (43.7)	1.43 (0.68–2.94)	1.87 (0.74–4.76)
9–11	23	22 (95.6)	1.00 (0.29–3.49)	0.89 (0.25–3.20)	11 (47.8)	1.22 (0.41–3.57)	0.93 (0.29–2.94)
12–23	72	54 (75.0)	0.14 (0.02–1.08)	0.13 (0.02–1.04)	35 (48.6)	1.03 (0.40–2.63)	2.04 (0.73–5.56)
Gender							
Male	81	44 (54.3)	Reference	Reference	32 (39.5)	Reference	Reference
Female	80	53 (66.2)	1.64 (0.87–3.13)	2.07 (0.91–4.72)	41 (51.3)	1.61 (0.86–3.01)	2.00 (1.01–4.00)
Maternal education							
Less than middle	106	64 (60.4)	Reference	Reference	54 (50.9)	2.32 (1.17–4.61)	2.58 (1.22–5.46)
Middle or above	55	33 (60.0)	0.98 (0.51–1.92)	0.99 (0.42–2.32)	19 (34.5)	Reference	Reference
Maternal occupation							
Home maker	151	90 (59.6)	Reference	Reference	68 (45.0)	Reference	Reference
Domestic helper	10	7 (70.0)	1.59 (0.39–6.25)	5.24 (0.89–30.87)	5 (50.0)	1.22 (0.34–4.39)	1.47 (0.34–6.28)
Appropriate feeding							
Yes	64				20 (31.3)	Reference	Reference
No	97				53 (54.6)	3.08 (1.57–6.05)	2.57 (1.08–6.12)
Nagelkerke <i>R</i> ²				0.47			0.20

OR: Odds ratio, AOR: Adjusted OR, CI: Confidence interval

DISCUSSION

Earlier researchers showed that the scenario of IYCF practices among slum-dwelling children was dismal.^[12,13,21–23] COVID-19 pandemic and subsequent restrictions might aggravate the situation.^[9]

It was interesting to note that on 24 h recall, 80% of women having children aged <6 months reported appropriate feeding, i.e., exclusive breastfeeding, at least eight times feeding in last 24 h with night feeding. Compared to earlier studies and the figure quoted in NFHS, this is staggeringly high.^[24] Minimum meal frequency and minimum meal amount were practised by less than one-third of women with children of age group 6–23 months, whereas minimum meal diversity was reported by approximately 60% of women. This is relatively lower compared to earlier studies in the same areas.^[12,13] A systemic review by Manikam *et al.* on South East Asia also concurred with the findings.^[25] Hardship on the issues such as availability and affordability of food items and cooking fuel along with reduction in family income might play some role in it.

Nearly half of the young children had anthropometric failure, and more importantly, one-fifth had multiple anthropometric failures. This is higher compared to approximately one-third of children having CIAF in pre-pandemic period in slums of Kolkata.^[13] It was reported that children with multiple anthropometric failures were more susceptible to infections, diseases, and mortality, and even so, considering the lack of amenities, hygiene in the impoverished setting of urban slums.^[26,27]

Appropriate dietary practices were followed by two in every five children, majority of them were aged below 6 months.

The risk of inappropriate diet was significantly higher among children aged 6–8 months. Transition of diet from breast milk to semi-solid/solid food might not be well handled by slum-dwelling mothers. This finding is in consistent with previous local and global studies.^[11,16,28–30]

Female gender of the child was associated with a higher risk of anthropometric failure(s). Although the difference was not significant, the proportion of female children who received an appropriate diet was nearly 12% points less than their male counterpart. Along with diet, other factors such as care, including health-care services, might have been differential between male and female children. Gender disparities in care, feeding, and nutrition are an age-old phenomenon in India.^[31,32] However, when anthropometric indicators are concerned, data from a nationwide survey in India failed to show any difference in anthropometric failures due to gender of the child.^[33–35] The difference in finding might be due to COVID-19 pandemic induced disruption in the food supply. Further studies are warranted to explain this difference in finding.

Maternal education was found to be often associated with awareness and practice of optimum IYCF among mothers of young children as well as care and health-seeking behavior. It was also noted in the present study, children of mothers with lower education were more likely to have anthropometric failure(s). This is consistent with previous literatures.^[36,37]

As per the framework of maternal and childhood malnutrition, diet is one of the proximate variables determining the nutritional status of the children.^[38] In the same line, inappropriate diet was found to be significantly associated with anthropometric

failure(s). Earlier research studies also corroborated this finding.^[39,40]

Being a cross-sectional study, any causal relation of the anthropometric failures and IYCF practices with COVID-19 pandemic and related restrictions could not be drawn. It is possible that children who had experienced a decrease in growth velocity and recovered before our data collection were missed. Assessment IYCF practices based on 24 h recall by the mothers and thus might be influenced by measurement errors and/or social desirability bias. In spite of our best effort, this could not be completely ruled out. However, interview and anthropometric measurements were conducted by the trained investigators using a standardized procedure. This is one of the strengths of the study.

CONCLUSIONS

In the context of COVID-19 pandemic, as noted in the present study, the picture of IYCF practices among children below 24 months in the slums of KMC was dismal. Almost half of the children had anthropometric failures, while one-fifth had multiple failures. The families faced hardship on availability and affordability of food items and cooking fuel as well as due to a reduction of family income. Children aged 6–8 months were more likely to have inappropriate diet. Low maternal education, female gender of the child, and inappropriate diet were significantly associated with anthropometric failure(s).

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Conflicts of interest

There are no conflicts of interest.

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