

# Feeding Practices of Infants and Young Children in Pokhara Metropolitan City

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## ABSTRACT

**Background:** For children to grow and develop normally, appropriate feeding practices are essential, especially in the first two years of their lives. These practices can vary depending on the different sociodemographic factors. This study aims to study the feeding practices of infants and young children in different wards of Pokhara Metropolitan City.

**Methods:** A community-based cross-sectional study was conducted and 280 mothers of infants and young children 0-23 months of age were interviewed using a semi-structured questionnaire. Data were entered and cleaned in Ms-Excel and then exported to SPSS version 21.0 for statistical analysis. Binary logistic regression analysis was used to find the association of feeding practices with different independent variables.

**Results:** Only 32.3% of children 0-5 months of age were found to be appropriately breastfed, and 41.8% of children 6-23 months of age were found to have appropriate complementary feeding practices. Children delivered by normal vaginal delivery (AOR 18.118,  $p < 0.01$ , 95% CI 3.831 – 85.689) were more likely to have appropriate breastfeeding practices than those delivered by caesarean section. Children of birth order two or more (AOR 2.226,  $p = 0.016$ , 95% CI 1.171 – 4.620) and living in nuclear families (AOR 2.488,  $p = 0.013$ , 95% CI 1.120 – 5.116) were found to have appropriate complementary feeding practices.

**Conclusions:** This study concludes that the feeding practices of the majority of the infants and young children in Pokhara are not adequate as per the WHO and UNICEF standards.

**Keywords:** Breastfeeding; complementary feeding; IYCF; Pokhara.

## INTRODUCTION

Globally around three million under-five children succumb to undernutrition every year, two-thirds of which are attributed to inappropriate feeding practices.<sup>1,2</sup> Nepal faces a significant malnutrition challenge, with inappropriate feeding identified as a primary cause.<sup>3</sup> According to the latest Nepal Demographic Health Survey Report (NDHS) of 2022, exclusive breastfeeding practices have declined from 70% in 2011 to 56% in 2022, additionally, 25% of under-5 children are stunted, 8% are wasted, and 19% are underweight in Nepal.<sup>4</sup> This research attempts to evaluate the appropriate feeding of infants and young children (IYCF) indicators in Pokhara, a fast-expanding city with a growing economy.<sup>5</sup>

With increased trade and business in Pokhara, there is an increase in the number of working populations, both male and female. The access to commercial meals and milk substitutes has also increased, potentially affecting children's feeding habits. This study aims to determine the factors associated with appropriate breastfeeding and complementary feeding practices in Pokhara Metropolitan City.

## METHODS

A community-based cross-sectional study was conducted in five wards of Pokhara Metropolitan City among mothers of infants and young children (IYC) 0-23 months of age from February 2023 to June 2023. Ethical clearance was

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obtained from the Institutional Review Committee (IRC) at Manipal Teaching Hospital (MCOMS/IRC/544) for this study. Ward numbers 8, 9, 11, 12 and 26, were selected using a lottery method. Formal written approvals were taken from the wards selected for the study. In each ward, children 0-23 months of age were traced with the help of Female Community Health Volunteers (FCHVs). Mothers of children aged 0-23 months who consented were included in the study, whereas mothers with sick children, or with children with any condition affecting their oral feeding, and those with children with special healthcare needs were excluded from the study. According to the Nepal Demographic Health Survey (NDHS) 2016, 86% of children aged 0-23 months of age were breastfed appropriately for their age.<sup>6</sup> Taking this prevalence at a 5% relative margin of error and 5% level of significance, accounting for 10% of non-response, the sample size for our study was calculated to be 280 participants. After obtaining informed consent from the mothers, an equal number of IYC, i.e., 56 from each ward were selected for this study. A questionnaire based on the Demographic and Health Survey Program's DHS-7 questionnaire and adopted from the questionnaire of 'Indicators for assessing infant and young child feeding practices' developed by the World Health Organization (WHO) and United Nations Children's Fund (UNICEF) in the year 2021 was used in this study.<sup>7</sup> The questionnaire included socio-demographic details, questions about feeding immediately after birth, questions about

current breast- and bottle-feeding practices, questions about liquid feeds, and questions on semi-solid, solid or soft feeds of infants and children. Collected data were entered in Microsoft Excel 2010, cleaned, coded and then exported to Statistical Package for Social Sciences (SPSS) version 21.0 for statistical analysis.

Frequency and percentages were calculated for categorical data, while mean and standard deviation were calculated for continuous data. Binary logistic regression was used to find the association between dependent and independent variables at a 5% significance level and 95% confidence interval.

## RESULTS

Of the 280 participants, the mean age of the children was 10.02 months with a standard deviation of 6.39 months. The majority (87.1%) of the mothers were between 20 to 34 years of age. The mean age of the mothers was found to be 28.0 years with a standard deviation of 4.94 years. More than 87% of the mothers were Hindu by religion, while a majority (38.6%) were Janajati (mostly comprising of Gurungs, Newars and Magars). Almost 6% of the mothers were illiterate, while about 53% had completed a secondary level of education. The majority (77.1%) of the mothers were homemakers. More than 62% of the children came from nuclear families (Table 1).

**Table 1. Distribution of the infants and young children according to their socio-demographic characteristics (n = 280)**

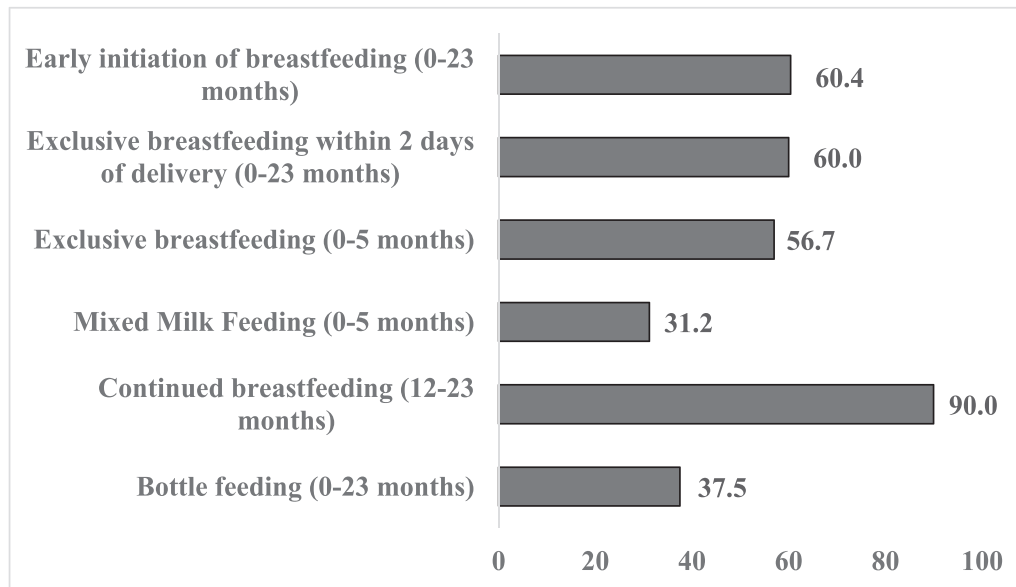
Characteristics	Categories	Frequency	Percentage (%)
Ward number	8	56	20.0
	9	56	20.0
	11	56	20.0
	12	56	20.0
	26	56	20.0
Age of baby (months)	< 6	93	33.2
	6-11	67	23.9
	12-17	87	31.1
	18-23	33	11.8
	Mean $\pm$ SD = 10.02 $\pm$ 6.39		
Gender of baby	Male	146	52.1
	Female	134	47.9

Age of mother (years)	< 20	4	1.4
	20-34	244	87.1
	≥ 35	32	11.4
	Mean ± SD = 28.00 ± 4.94		
Religion of mother	Hindu	244	87.1
	Buddhism	19	6.8
	Christianity	8	2.9
	Islam	6	2.1
	Others	3	1.1
Ethnicity of mother	Janajati	108	38.6
	Brahmin/Chhetri	106	37.9
	Dalit	41	14.6
	Madhesi	16	5.7
	Muslim	6	2.1
	Others	3	1.1
Education of mother	Illiterate	16	5.7
	Basic (Grade 1 - 8)	49	17.5
	Secondary (Grade 9 - 12)	148	52.9
	Bachelor and above	67	23.9
Occupation of mother	Homemakers	220	78.6
	Shops & sales workers	22	7.9
	Professionals	15	5.4
	Technicians and associate professionals	11	3.9
	Clerks/Office assistants	3	1.1
	Students	3	1.1
	Craft and related trade workers	3	1.1
	Elementary occupations	2	0.7
	Agriculture and fishery workers	1	0.4
Type of family	Nuclear	175	62.5
	Joint	105	37.5

The mean birth weight of the children was 3.011 kg with a standard deviation of 0.511 kg. About 46% of the children were firstborn, while almost 9% were of birth order three or more. The majority (96.1%) of the children were delivered in a health facility, while three of them (1.1%) were home deliveries without the presence of any Skilled Birth Attendant. About 42% of the children were delivered via Caesarean section.

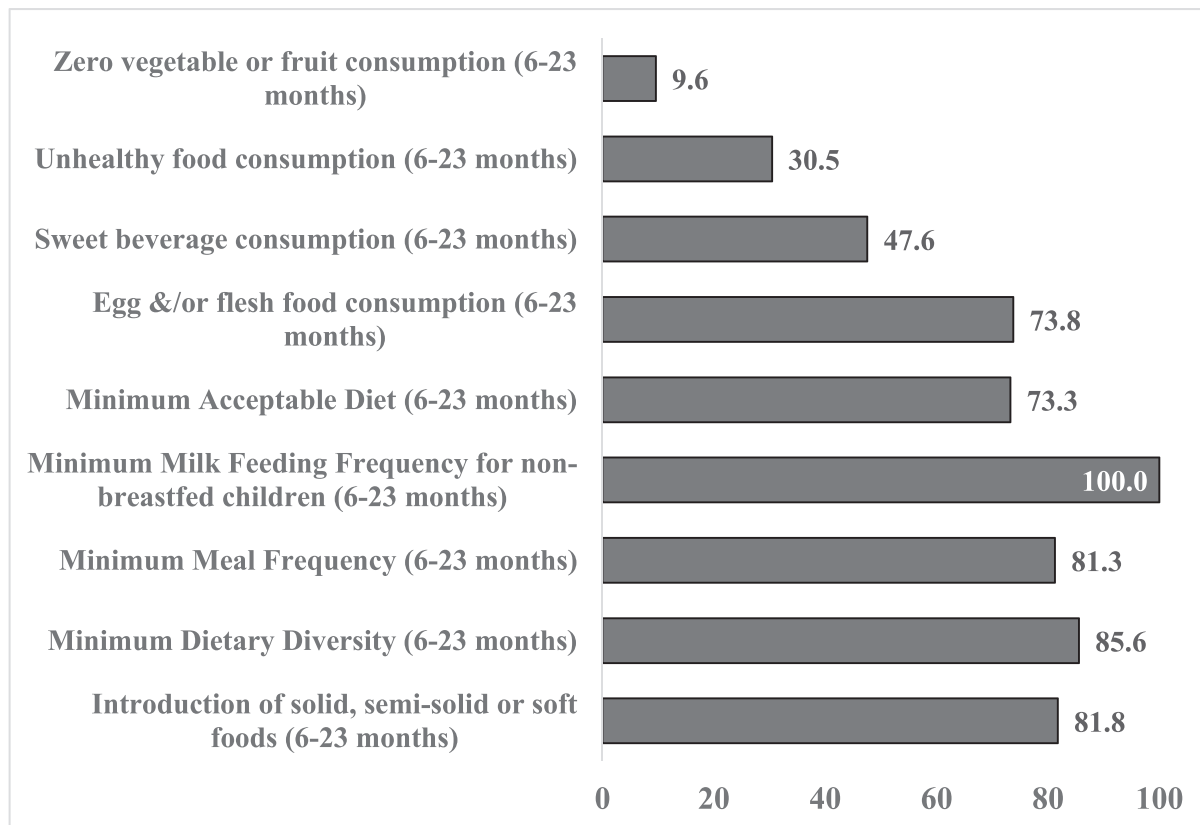
Among the 280 infants and young children, 276 (98.6%) were found to be breastfed at some point in their lives. Out of the four children who were never breastfed, three were girls.

Among all the children 0-23 months of age, 60.4% were found to be initiated with breastfeeding within one hour of birth. Sixty percent of the children were found to be exclusively breastfed for the first two days of birth, while 37.5% of the children 0-23 months of age were found to be bottle-fed (Figure 1).



**Figure 1. Breastfeeding indicators (in percentage) of infants and young children.**

About 82% of the children 6-23 months of age were found to be introduced to solid, semi-solid or soft food. More than 85% of children 6-23 months of age were found to have consumed food and beverages from at least five out of eight defined food groups during the previous day (Minimum Dietary Diversity (MDD)). About 81% of children 6-23 months of age were found to have been fed with solid, semi-solid or soft foods (including milk feeds for non-breastfed children) the minimum number of times or more as per their age, the previous day (Minimum Meal Frequency (MMF)). (Figure 2)



**Figure 2. Complementary feeding indicators (in percentage) of infants and young children.**

While comparing the breastfed and non-breastfed children, all three indicators MDD, MMF and Minimum Acceptable Diet (MAD) were found to be lower in non-breastfed children than in breastfed children. According to the WHO and UNICEF recommendations, the percentage of children 0-5 month of age who were appropriately breastfed were found to be 32.3%. Likewise, appropriate complementary feeding for children 6-23 months of age was calculated to be 41.8%.

Binary logistic regression was applied to find the factors associated with appropriate breastfeeding practices in 93 children who were between 0-5 months of age. Children 0-5 months of age who got delivered by normal vaginal delivery were found to be 18.12 times more likely to have appropriate breastfeeding practices as compared to the children who got delivered via caesarean section (95% CI 3.831 - 85.689,  $p < 0.001$ ) (Table 2).

**Table 2. Factors associated with appropriate breastfeeding practices. (n = 93)**

Characteristics	Categories	B-coefficient	AOR	p-value	95% Confidence Interval	
					Lower	Upper
Gender of baby	Male	Ref.				
	Female	0.501	1.650	0.411	0.501	5.436
Age of mother (in years)	< 35	Ref.				
	≥ 35	- 0.277	0.758	0.783	0.106	5.432
Religion of mother	Hindu	Ref.				
	Non-Hindu	0.863	2.371	0.291	0.477	11.776
Ethnicity of mother	Brahmin/Chhetri	Ref.				
	Janajati	1.078	2.939	0.157	0.660	13.076
	Others	1.138	3.120	0.195	0.559	17.424
Education of mother	Illiterate	Ref.				
	Basic (1-8)	1.490	4.439	0.285	0.289	68.257
	Secondary (9-12)	0.802	2.230	0.539	0.173	28.815
	Bachelor & above	1.303	3.679	0.406	0.171	79.280
Occupation of mother	Homemakers	Ref.				
	Working mothers	0.454	1.575	0.500	0.421	5.896
Working status of parents	Both unemployed	Ref.				
	Single working parent	0.994	2.702	0.535	0.117	62.481
	Both working parents	1.922	6.833	0.289	0.196	238.113
Family type	Joint	Ref.				
	Nuclear	0.474	1.607	0.459	0.458	5.632
Place of delivery	Home	Ref.				
	Health facility	- 1.569	0.208	0.496	0.002	18.957
Mode of delivery	Caesarean section	Ref.				
	Normal	2.897	18.118	< 0.001	3.831	85.689
Birth weight of the baby (in kg)	< 2.5	Ref.				
	≥ 2.5	1.022	2.779	0.474	0.169	45.733
Order of birth	1	Ref.				
	2 or more	- 0.357	0.700	0.579	0.198	2.473
Constant		- 0.5675	0.003	0.075		

AOR: Adjusted Odds Ratio

Children 6-23 months of age who belonged to nuclear families were found 2.5 times more likely to have appropriate complementary feeding practices than those children who belonged to joint families (95% CI 1.210 - 5.116,  $p = 0.013$ ), which was statistically significant. Similarly, children of second or more birth order were found to be 2.3 times more likely to have appropriate complementary feeding practices than first-born children (95% CI 1.171 - 4.620,  $p = 0.016$ ). (Table 3)

**Table 3. Factors associated with appropriate complementary feeding practices. (n = 187)**

Characteristics	Categories	B-coefficient	AOR	p-value	95% Confidence Interval	
					Lower	Upper
Age of baby (in months)	6-11	Ref.				
	12-17	0.209	1.233	0.573	0.596	2.548
	18-23	0.258	1.294	0.608	0.483	3.466
Gender of baby	Male	Ref.				
	Female	0.093	1.098	0.785	0.562	2.144
Age of mother (in years)	< 35	Ref.				
	≥ 35	- 0.869	0.420	0.116	0.142	1.238
Religion of mother	Hindu	Ref.				
	Non-Hindu	- 0.050	0.951	0.928	0.321	2.817
Ethnicity of mother	Brahmin/Chhetri	Ref.				
	Janajati	0.249	1.283	0.558	0.557	2.956
	Others	0.102	1.107	0.837	0.421	2.914
Education of mother	Illiterate	Ref.				
	Basic (1-8)	- 0.074	0.929	0.928	0.189	4.575
	Secondary (9-12)	0.465	1.591	0.546	0.352	7.194
	Bachelor & above	1.202	3.327	0.159	0.624	17.725
Occupation of mother	Homemakers	Ref.				
	Working mothers	- 0.486	0.615	0.295	0.247	1.529
Working status of parents	Both unemployed	Ref.				
	Single working parent	0.260	1.297	0.841	0.102	16.428
	Both working parents	0.582	1.790	0.671	0.122	26.238
Family type	Joint	Ref.				
	Nuclear	0.912	2.488	<b>0.013</b>	1.210	5.116
Place of delivery	Home	Ref.				
	Health facility	0.780	2.182	0.320	0.468	10.171
Birth weight (in kg)	< 2.5	Ref.				
	≥ 2.5	0.661	1.937	0.221	0.672	5.586
Order of birth	1	Ref.				
	2 or more	0.844	2.326	<b>0.016</b>	1.171	4.620
Constant		- 0.727	0.065	0.137		

AOR: Adjusted Odds Ratio

## DISCUSSION

This study was designed to investigate child feeding practices at Pokhara. The findings provide valuable insights into the feeding practices in this population and shed light on potential factors associated with appropriate breastfeeding and complementary feeding.

Breastfeeding is a fundamental aspect of infant and young child feeding, providing optimal nutrition and contributing to the overall health and development of children. In our study, there were 60.4% of children in whom breastfeeding was initiated within the first hour of birth, which indicates positive progress in promoting early initiation practices. This finding is comparable to another study done in the Kaski district of central Nepal.<sup>8</sup> However our finding was higher than that of the national average of 55%, as reported in the NDHS 2022.<sup>4</sup> The rate is also higher than in other South Asian countries like India (36.4%), Bangladesh (24%), and Pakistan (8.5%).<sup>9-11</sup> This might be due to the increase in access to maternal health services, effective intervention, and commitments to promote breastfeeding through nutrition programs in Nepal, especially in urban areas like Pokhara.

In our study, about 82% of the children, 6-23 months of age were introduced to semi-solid, solid or soft foods, which is slightly less than the national average of 84.6% as reported in NDHS 2022. While the MMF was found to be similar in our study and NDHS 2022, MDD and MAD were found to be very high as compared to the national survey data. It was also higher than that seen in the urban areas of Gandaki province in Nepal.<sup>4</sup> Another study done by Khatri and Shrestha in 2016, in the Kaski district had found a higher MMF than our study, but the MAD and MDD were much lower in their study as compared to ours.<sup>12</sup>

A significant association was found between the mode of delivery and breastfeeding practices in our study. Infants delivered by normal vaginal delivery were found to be 18.12 times more likely to have appropriate breastfeeding practices compared to those delivered via caesarean section (95% CI 3.831 - 85.689,  $p < 0.001$ ). A study conducted in a maternity hospital in Kathmandu Valley found that infants delivered by caesarean section were less likely to be exclusively breastfed compared to those born vaginally.<sup>13</sup> Similar results were published in the recent NDHS report, which showed that children who were delivered by caesarean section had lower EBF practices.<sup>4</sup> This consistency in findings suggests that the association between the mode of delivery and breastfeeding practices might be a common trend

across different regions of Nepal.

The possible explanation for the observed association between caesarean section and suboptimal breastfeeding practices could be attributed to the physiological and psychological differences between vaginal and caesarean deliveries. Vaginal delivery facilitates early skin-to-skin contact and immediate initiation of breastfeeding, which can enhance the establishment of breastfeeding and maternal-infant bonding. In contrast, a caesarean section may involve anaesthesia, longer recovery time, and separation of the mother and infant immediately after birth, which can impede the initiation and continuation of breastfeeding.

The present study utilized binary logistic regression analysis to identify factors associated with appropriate complementary feeding practices among children aged 6-23 months. Regarding complementary feeding, family structure emerged as a significant factor associated with appropriate practices. The analysis revealed a significant association between family structure and complementary feeding practices. Specifically, children belonging to nuclear families were found to be 2.5 times more likely to have appropriate complementary feeding practices compared to children from joint families (95% CI 1.210 - 5.116,  $p = 0.013$ ), signifying a statistically significant relationship. This finding was corroborated by a study by Khatri et al. in the Kaski district of Nepal, which reported that children from nuclear families had higher odds of receiving appropriate complementary feeding compared to those from joint families.<sup>12</sup>

In nuclear families, decision-making regarding child-feeding practices may involve fewer individuals, which could lead to consistent and optimal feeding practices. Additionally, nuclear families often have a smaller number of caregivers, allowing for better communication and coordination regarding feeding routines and the introduction of appropriate complementary foods, which could explain the findings.

Our study highlighted a significant association between birth order and appropriate complementary feeding practices, indicating that children of second or higher birth order were more likely to receive appropriate complementary feeding compared to first-born children. Puspitorini et. al. in a study done in Indonesia, also reported that children of higher birth order had higher odds of receiving appropriate complementary feeding compared to first-born children, which aligns with our findings.<sup>14</sup> A systematic review by Horta et al. in 2012 also had findings similar to our study.<sup>15</sup>



Parents may become more experienced and knowledgeable about appropriate feeding as they raise more children, and there may be better adherence to complementary feeding guidelines for subsequent children as a result. Additionally, older siblings may serve as role models and influence feeding behaviour, positively impacting the complementary feeding practices of younger siblings. These factors may contribute to higher-order children having better feeding practices.

Our study did not find any differences in feeding practices between male and female children, which is similar to the study done in rural districts of Pakistan and other South Asian countries.<sup>16,17</sup> Contrary to that, better feeding practices were observed in male children in studies done in India.<sup>18,19</sup>

Many studies done in South Asian countries, Indonesia and Ethiopia found a statistically significant association between feeding practices and maternal education.<sup>16,17,20-22</sup> But our study did not find such an association. Being educated does not necessarily mean that mothers necessarily have comprehensive knowledge about feeding practices. On the other hand, this could also highlight the need for the inclusion of nutrition and good feeding practices in the school curriculum, especially in developing countries like ours.

Studies done in Pakistan and Indonesia found the feeding practices to be significantly associated with the working status of the mothers, but no such association was found in our study.<sup>16,21</sup> Different factors, including cultural beliefs, historical practices, flexible working conditions and family involvement in child rearing could have contributed to this.

Our study did have certain limitations. Since a 24-hour recall method with self-reporting of the feeding practices of infants by mothers was used for data collection, this study may be liable to recall and response biases. Also, since the calculations of some IYCF indicators required specific sub-samples of age groups of children, the sample size decreased, which may have led to the decreased statistical power of the study leading to the inability of our study to detect an association between variables. The mother's knowledge of feeding practices and family income was also not included in our study.

## CONCLUSIONS

This study found that children's feeding practices are unsatisfactory based on the IYCF indicators in Pokhara.

Counselling pregnant women regarding appropriate breastfeeding and complementary feeding practices during their ante-natal care visits and also post-delivery, emphasizing the importance of 1000 golden days, may be a beneficial behaviour change strategy for improving feeding practices. Also, investing in the Baby Friendly Hospital Initiative (BFHI), provision of mandatory maternity leave for at least three months in all government and private sectors, flexible working hours for lactating mothers and the provision of crèche at workplaces may be some of the measures that can be undertaken by the stakeholders to promote better feeding practices in infants and children.

## ACKNOWLEDGEMENTS

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## CONFLICT OF INTEREST

The authors declare no conflict of interest.

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