

**Original Article**

# **Factor associated with timely initiation of complementary feeding practices among children aged 6-23 months in rural communities of Dhanusha, Nepal**

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## **ABSTRACT**

**Background and Objectives:** Six months to 2 years of age is known as the transition period and is a component of the critical window of opportunity to support the survival and optimal growth of child. World Health Organization (WHO) recommends that the mothers should start soft, semi-solid, or solid food for their infant at the age of 6 months. Therefore, this study aimed to assess the timely initiation of complementary feeding practices among children aged 6-23 months in rural municipalities of the Dhanusha district of Nepal

**Material and Methods:** A community-based cross-sectional study was conducted in rural municipalities of Dhanusha district, Province 2 of Nepal between February and March 2021. A sample of 366 mothers having children aged 6-23 months were selected using multi-stage cluster sampling. Multivariable logistic regression analysis was applied to explore the timely initiation of complementary feeding practices among children.

**Results:** The study found that more than half 54.9% of the respondent timely initiated complementary feed to their child. Timely initiation of complementary feeding was 1.68 times higher among male children than a female child. Similarly, the mothers who initiated breast milk within one hour and exclusively breastfed were 1.64 times and 4.19 times more likely to initiate complementary feeding than those who had initiated breast milk one hour and more and not exclusively breastfed.

**Conclusions:** More than half of the mother's initiated timely complementary feed to their child. Sex of the child, initiation of breastfeeding within one hour, and exclusive breastfeeding practices were significantly associated with timely initiation of complementary feeding. Therefore, more efforts should be focused to raise awareness regarding age-appropriate feeding among mothers who may increase the timely initiation of complementary feeding and hence reduce the burden of malnutrition and related complications.

**Key Words:** Complementary feeding practices, timely initiation, Nepal

## INTRODUCTION

The introduction of food and liquids other than breastmilk when breastmilk is not enough to meet the energy and micronutrient requirement is known as complementary feeding [1-3]. The energy and micronutrient requirement around the age of 6 months begins to surpass what is provided by breastmilk and further, the infants are developmentally prepared to start the complementary feeds to meet the surge in energy requirement [4]. Six months to 2 years of age is known as the transition period and is a component of the 'critical window of opportunity to support the survival and optimal growth of child [4, 5]. Thus the recommendation of WHO is that the mothers should start soft, semi-solid, or solid food for their infant at the age of six months [3, 4].

Globally 45% of all mortality and 2/3<sup>rd</sup> of deaths are related to inappropriate feeding practices in 1<sup>st</sup> year of life [3, 4]. Children aged 6-23 months of age are at higher risk to suffer from undernutrition. Undernutrition in early life has long-term consequences to the child when they become adult leading to intergenerational effects and loss of productivity [5]. Meanwhile, proper and exclusive breastfeeding in 1<sup>st</sup> 6 months of life has been shown to reduce about 15% of infant deaths and complementary feeding further reduces 6% of all under 5 deaths [3]. Among South Asian countries the rate of timely initiation of complementary feeding is less than WHO recommendation (80-94%). Nepal has

reported only 70% of timely initiation of complementary feeding [4]. Child undernutrition still possesses a serious public health problem for infants and young children less than 5 years of age [6]. Also, suboptimal complementary feeding practices are an important cause of under 5 nutrition in developing countries like Nepal [5].

A study has mentioned that introducing adequate, safe, and timely complementary feeding reduces the risk of malnutrition, morbidity, and mortality [7]. In Nepal, there is a gap in information about the factors leading to inappropriate complementary feeding practices in young children in Nepal [6]. Only a few studies are there to dig out the factors leading to the timely initiation of complementary feeding practices and especially not much information is available in regards to the rural areas. Thus this study aims to explore the factors associated with the timely initiation of complementary feeding practices among children aged 6-23 months in rural communities of the Dhanusa district. This updated knowledge will help local and provincial governments to assist national nutrition programs to better monitor changes and feeding practices and construct interventions to increase feeding practices and thus aid in decreasing undernutrition in Nepal.

## MATERIALS AND METHODS

The study design was community-based cross-sectional and the study was carried

out in rural municipalities of Dhanusha district, Province 2 of Nepal between February and March 2021. The study population includes mothers having children aged 6-23 months living in Laxminiya rural municipality of Dhanusha district province 2 of Nepal. Mothers who gave consent for the study were included in the study. Mothers who were physically or mentally ill and unable to participate in the study were excluded.

The sample size was calculated by using the formula  $n = z^2pq/d^2$  [8]. Where,  $z$  is the standard normal distribution equals 1.96 at 95% confidence level and  $p$  is the percentage of mothers who timely introduced solid, semi-solid, or soft foods to their child in Nepal (86.0%) taken from Multiple Indicator Cluster Survey 2019 [9]. Considering 5% of permitted error and design effect of 1.5, the sample size came to 278. Assuming 20% of nonresponse, the final sample size was determined as 334. We collected data from 366 respondents.

Multistage random sampling was adopted to select rural communities, then households, and finally, study subjects with the help of female community health volunteers (FCHV). Data were collected from respondents by face-to-face interviews using a semi-structured questionnaire prepared based on previous studies. The questionnaire was pretested with 10% samples and modification was done.

Timely initiation of complementary feeding was defined as a percentage of children who received solid, semi-solid,

or soft foods at the age of 6 months and termed as a dependent variable. Age, religion, education, types of family, family income, age of children, sex of children, and awareness and practice on child feeding were taken as explanatory variables. The association between timely initiation of complementary feeding and several independent variables was assessed using the chi-square test in univariate analysis. A significant variable in univariate analysis was entered in multivariable logistic regression analysis. A p-value less than 0.05 was considered statistically significant. Data were analyzed using Statistical Package for Social Sciences Version 23.0 for Windows. Ethical approval was obtained from the Institutional Review Board of Janaki Medical College (Approval number: 19-2077/78). Informed consent was taken from the participant and confidentiality was maintained.

## RESULTS

Out of 366 respondents, more than half 54.9% of the respondent timely initiated complementary feed to their child. Most of the respondents (71.9%) were from the age group 21 to 30 years and 96.2% were Hindu. More than half (51.4%) of the respondents had secondary and higher education and more than two-thirds (69.7%) of respondents belong to joint families. Thirty-seven percent of the respondents had monthly income lies in 3<sup>rd</sup> tercile followed by 33.3% in 2<sup>nd</sup> tercile. Moreover, it was found that 56.0% of children were female, and more than two-third (67.8%) were aged between

13-23 months. Association between maternal socio-demographic characteristics and timely initiation of complementary feeding practices among children is presented in Table1.

complementary feeding respectively while only (40.4%) were aware regarding exclusive breastfeeding. Likewise, few (37.4%) of the respondents initiated breastmilk within one hour and more

**Table 1 Association between maternal socio-demographic characteristics and timely initiation of complementary feeding practices among children aged 6-23 months (n = 366).**

Characteristics	Total, N=366(%)	Timely initiation of Complementary Feeding		OR (95%CI)	P-value
		Yes	No		
		(n=201,%)	(n=165,%)		
<b>Age</b>					
20 years & less	46(12.6)	19(41.3)	27(58.7)	1.857 (0.98-3.50)	0.056
21-30 years	263(71.9)	149(56.7)	114(43.3)	1.954 (0.88-4.29)	0.096
More than 30 years	57(15.6)	33(57.9)	24(42.1)	Reference	-
<b>Religion</b>					
Muslim	14(3.8)	6(42.9)	8(57.1)	1.65(0.56-4.87)	0.360
Hindu	352(96.2)	195(55.4)	157(44.6)	Reference	-
<b>Educational Status</b>					
Primary and Lower	178(48.6)	85(47.8)	93(52.2)	1.76(1.16-2.67)	0.008
Secondary and above	188(51.4)	116(61.7)	72(38.3)	Reference	-
<b>Types of Family</b>					
Nuclear	111(30.3)	56(50.5)	55(49.5)	1.29(0.82-2.02)	0.258
Joint/Extended	255(69.7)	145(56.9)	110(43.1)	Reference	-
<b>Family Income per month</b>					
1 <sup>st</sup> tercile	122(33.3)	65(53.3)	57(46.7)	1.20(0.71-2.03)	0.479
2 <sup>nd</sup> tercile	107(29.2)	62(57.9)	45(42.1)	1.03(0.63-1.68)	0.906
3 <sup>rd</sup> tercile	137(37.4)	74(54.0)	63(46.0)	Reference	-
<b>Age of Children (Months)</b>					
6-12 months	118(32.2)	63(53.4)	55(46.6)	1.09(0.70-1.70)	0.685
13-23 months	248(67.8)	138(55.6)	110(44.4)	Reference	-
<b>Sex of Children</b>					
Male	161(44.0)	100(62.1)	61(37.9)	1.68(1.10-2.56)	0.015
Female	205(56.0)	101(49.3)	104(50.7)	Reference	

Table 2 shows maternal awareness and practices on child feeding and its association with timely initiation of complementary feeding to their children. More than half of the respondents (59.2%) and (52.5%) were aware of the initiation of breast milk and

than half (56.6%) were exclusively breastfed. Maternal awareness and practices regarding child feeding were found significantly associated with timely initiation of complementary feeding among children.

**Table 2. Association between Awareness and Practice on child feeding and timely initiation of complementary feeding practices among children aged 6–23 months (n = 366).**

Maternal awareness and practices on child feeding	Total,N=366 (%)	Timely initiation of		OR (95%CI)	P-value
		Yes	No		
		(n=201,%)	(n=165,%)		
<b>Aware about the initiation of</b>					
Yes	217(59.2)	141(63.3)	76(36.7)	2.75(1.89-5.43)	<0.0001
No	149(40.8)	60(44.0)	89(56.0)	Reference	-
<b>Aware about exclusive</b>					
Yes	148(40.4)	101(68.2)	47(31.8)	2.53(1.63-3.92)	<0.0001
No	218(59.6)	100(45.9)	118(54.1)	Reference	-
<b>Aware of complementary feeding</b>					
Yes	192(52.5)	124(64.6)	68(35.4)	2.29(1.50-3.49)	<0.0001
No	174(47.5)	77(44.3)	97(55.7)	Reference	-
<b>Initiated breast milk</b>					
Within one hour	137(37.4)	94(68.6)	43(31.4)	2.49 (1.59-3.88)	<0.0001
One hour and more	229(62.6)	107(46.7)	122(53.3)	Reference	-
<b>Exclusively breastfed</b>					
Yes	207(56.6)	148(71.5)	59(28.5)	5.01(3.20-7.84)	<0.0001
No	159(43.4)	53(33.3)	106(66.7)	Reference	-

The result of the multivariable analysis is shown in Table 3. Sex of the child, initiation of breastfeeding within one hour, and exclusive breastfeeding practices were significantly associated with timely initiation of complementary feeding among children aged 6–23

months ( $p<0.0001$ ).

Timely initiation of complementary feeding was 1.68 times higher (AOR=1.68; 95% CI: 1.05-2.69) among male children than a female child. Similarly, the mothers who initiated breast milk within one hour and exclusively breastfed were 1.64 times (AOR = 1.63; 95% CI: 1.11–2.79) and 4.19 times (AOR = 4.19; 95% CI: 2.34–7.49) more likely to initiate complementary feeding than those who had initiated breast milk after one hour and not exclusively breastfed.

## DISCUSSION

The prevalence of timely initiation of complementary feeding for children was found to be 54.9 percent in this study which is way below the WHO cut-off of >80% for quality complementary feeding practices [4, 10]. This is low as compared

**Table 3: Multivariable Logistic Regression Model for Timely initiation of Complementary Feeding among children aged 6–23 months**

Characteristics	Adjusted OR	95% CI	p-value
<b>Sex of the Child</b>			
Male	1.68	1.05-2.69	0.029
Female	Reference	Reference	-
<b>Initiated Breast milk</b>			
Within One hour	1.63	1.11-2.79	0.039
One hour and more	Reference	Reference	-
<b>Exclusively breastfed</b>			
Yes	4.19	2.34-7.49	<0.0001
No	Reference	Reference	-

to other studies performed in India (55%), Bangladesh (71%), Srilanka (84%), Ethiopia (51%), and Kenya (80.6%). A much lower percentage of infants were timely initiated complementary feeding as compared to our national data Nepal (70%) [3]. This study attempted to analyze various independent variables among which sex of the children, maternal awareness, and practices on child feeding were found to have a significant association to timely initiation of complementary feeding.

Sex of the children was found to be significant on timely initiation of complementary feeding practices but a study conducted in Northeast Ethiopia disagrees with the finding [11]. The desire of a son in the family so that he could continue the inheritance of the family and the thought process that the son is the one who looks after him in the parent's old age as daughters would go to her husband's home after marrying. This may have led to bias in care and ultimately on complementary feeding practices of the female child. This concept is more prevalent in the rural Nepal.

The gap of knowledge about appropriate complementary feeding among mothers has been shown to harm the timely initiation of complementary feeding practices [3]. This study has shown that maternal awareness and child feeding practices are significantly associated with the timely initiation of complementary feeding practices. Nutritional education and counseling aspects of maternal health

care services with outreach clinic services in the rural part of Nepal may have played a role in this which is also congruent with another study [4]. Regular antenatal checkups, as well as postnatal visits, may have elevated the level of awareness about the initiation of breastfeeding and its importance, awareness of exclusive breastfeeding, knowledge regarding complementary foods, and child feeding practices. Institutional delivery may have also played an important role in decreasing the knowledge gap and imparting information regarding complementary feeding practices. The importance of Antenatal visits, postnatal visits, and institutional delivery on timely initiation of complementary feeding has been proven in different studies [1, 3, 4, 10-12].

Increased access to digital platforms such as television, radio and increasing internet usage leading to globalization may have played a positive role in increasing awareness and child feeding practices. A study has also shown that mothers having exposure to media are more likely to practice complementary feeding [11].

Studies have shown exclusive breastfeeding as a positive indicator for timely complementary feeding [13]. Our findings are congruent with this study. The reason behind it could be that mothers practicing exclusive breastfeeding are more knowledgeable and know the importance of timely initiation of complementary feeding. In

this study mothers who had initiated breastmilk within one hour had a significant association with timely initiation of complementary feeding, similar findings were seen in another study where mothers who initiated breastfeeding within an hour were three fold more likely to start complementary feeding within 6 months [ 14]. The rationale behind it could be that mothers were more aware of the importance of feeding practices.

This study shows no relation between maternal age and timely initiation of complementary feeding practices but younger mothers were feeding timely as compared to older mothers. The lesser percentage of old mothers may be the cause of it but other studies have supported that older mothers have timely initiation of complementary feeding[15, 16].

Also, in this study, no association was present between mother's higher education and timely initiation of complementary feeding practices which disagrees with the findings of many other studies conducted in India, Ethiopia, Ghana, Nigeria, as well as with our own country [2, 4, 5, 10, 13, 15-19]. But a study conducted in Pokhara, Nepal, and Rural Soro District of Southwest Ethiopia has findings congruent with this study [3, 12]. The reason behind this could be the rural status of the study site in both the studies where external influences on the culture and society are minimal and the cultural norms were followed strictly.

Also, fewer preferences given to female education may be the cause.

Income of the family has been shown to impact timely initiation of complementary feeding practices where high earning families would initiate appropriate complementary feeding practices as compared to low earning in different countries as well as in Nepal [3, 6, 20, 21]. But this study shows no association of family income with appropriate feeding practices. The reason could be the study site in rural areas where the majority of the population may have similar income sources leading to minimal changes in complementary feeding practices.

Variable results were seen on the impact of age of children on timely initiation of complementary feeding where some studies showed association [2, 3, 15, 18, 20] whereas other showed no association [1]. This study showed no association of age of children on appropriate initiation of complementary feeding practices. This might be due to food insecurity and understanding of the mothers that the child will be able to tolerate feeds and can be able to digest. The family type was not a predictor for timely initiation of complementary feeding practices and was supported by another study [11]. The reason may be the fact that this study is self-reported and therefore may be biased. Also, religion was not a predictor for the timely initiation of complementary feeding practices. Thus to enhance the timely initiation of complementary

feeding practices a more focused approach should be made to strengthen the maternal and child health program by incorporating innovative ideas on awareness of mothers on the benefits of early and exclusive breastfeeding with knowledge on complementary feeds and its importance on child growth.

## CONCLUSION

The study showed slightly more than half of the mothers initiated timely complementary feeding to their child. Sex of the child, initiation of breastmilk within one hour, and exclusive breastfeeding practices were the factors independently associated with timely initiation of complementary feeding among children aged 6–23 months. Therefore, more efforts should be focused to raise awareness regarding age-appropriate feeding among mothers who may increase the timely initiation of complementary feeding and hence reduce the burden of malnutrition and related complications among children.

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