

## Trends in Weaning Practices among Infants and Toddlers in a Hilly Terrain of a Newly Formed State of India

Shaili Vyas<sup>1</sup>, S. D. Kandpal<sup>1</sup>, Jayanti Semwal<sup>1</sup>, Sandhya Chauhan<sup>2</sup>, Vipul Nautiyal<sup>3</sup>

<sup>1</sup>Department of Community Medicine, Himalayan Institute of Medical Sciences, SRHU Dehradun, Uttarakhand, India, <sup>2</sup>Department of Paediatrics, SRMSIMS, Bareilly, Uttar Pradesh, India, <sup>3</sup>Department of Radiotherapy, CRI, Institute of Medical Sciences, SRHU, Dehradun, Uttarakhand, India

### Correspondence to:

Dr. Shaili Vyas,  
C-1/1, HIMS Campus, SRHU, Dehradun,  
Uttarakhand, India,  
E-mail: shailivyas7@gmail.com

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### ABSTRACT

**Background:** Weaning plays a major role in determining the nutritional status of a child. Poor weaning practices during infancy and early childhood, resulting in malnutrition, contribute to impairment of cognitive and social development, poor school performance and reduced productivity in later life. The objective of this study is to know weaning practices of mothers of difficult terrain.

**Methods:** Cross-sectional study was conducted in all villages under Rural Health Training Center, the field practice area of Department of Community Medicine. A total of 500 mothers with children within 3 years of age were included in the study. Pre-tested pre-designed semi-structured questionnaire was used to collect information on weaning practices.

**Results:** Majority of children (51.57%) were weaned at >6 months and were observed to be more under nourished (79.34%) as compared with those between 4 months and 6 months (61.50%). Majority of boys were weaned earlier than girls irrespective of the age of the weaning. Malnutrition was found in majority of those children who were weaned inadequately in terms of both frequency and amount.

**Conclusions:** The present study revealed suboptimal weaning practices among the mothers of hilly region. Thus, appropriate educational strategies should be directed particularly on counteracting various myths related to infant feeding. Moreover, promotion of appropriate feeding should target not only on maternal caregivers, but also on other family members, particularly husbands and grandmothers, taking into account the social and cultural situation of the area.

**Keywords:** Frequency, undernourished, weaning

### INTRODUCTION

Growth of all infants from the age of 6 months onwards depends largely upon the provision of additional building materials supplied through infant foods in order to help them grow into healthy and active adults. They need to be fed on

a diet that provides all the nutrients and energy required for normal growth; vitamins and minerals to alleviate their hidden hunger and keep them strong.<sup>[1]</sup> The term “to wean” means “to accustom” and it describes the process by which the baby is gradually introduced to foods other than milk and is recommended between the 4<sup>th</sup>-6<sup>th</sup> months of life.<sup>[2]</sup> It is transitional to change from liquid to a solid diet, the feeding behavior changes from sucking to chewing and biting and the obligatory introduction with the mother or other caretaker changes to independent feeding.<sup>[3]</sup> This is the time when growth faltering and nutritional deficiencies manifest in children and yet it is often the time when foods are given to provide the volume necessary to keep the child from being hungry without regard to the nutritional quality of the transitional foods.<sup>[4]</sup> Introduction of timely, adequate and balanced weaning food is perhaps one of the most important single and direct remedial measures to combat infant’s malnutrition. Not only the appropriate timings, but appropriate quantity and quality in a hygienic environment, along with increased maternal interaction time also have a desired positive effect on the growth of young children.<sup>[1]</sup> In addition, Clinical studies of the effects of different frequencies of feeding and composition of meals on total daily energy intakes by fully weaned children indicated that both energy density and meal frequency independently affected children total daily energy intake.<sup>[5]</sup> Guidelines for weaning foods suggest that weaning foods given should have characteristics according to nutritional needs, appropriate textures and viscosity and appropriate forms (liquid, semisolid, solid) to support mental and physical development.<sup>[4]</sup> The study was carried out in Uttarakhand, which was carved out of Uttar Pradesh in 2000 as the 27<sup>th</sup> state of the Indian Union. The state has very tough hilly geographical terrain having sparse and scattered population (93% of the area is hilly while only 7% area is plains). With more than three-fourths (78%) of its total population dependent on agriculture for livelihood, the economy of Uttarakhand is predominantly dependent on mountain agriculture. However, the scope for agriculture is severely constrained in the hilly regions of this state due to various physical, geographical and environmental problems. The irrigated land was

scarce and most of the agriculture was primarily rain dependent. The small size of settlements and their widespread distribution is a formidable challenge in scattered habitation of this hilly state. Finally women, especially rural women and children are a particularly vulnerable group in Uttarakhand. This is because women, in most cases, in the hills play dual role of bread winner, as well as bread cookers of the family. Women constitute the main workforce in agriculture. They also take care of the cattle, collect fuel wood and fodder from forests, often situated at a considerable distance from the villages involving four to 5 h of walking both ways and do all household chores. Their life is an unending drudgery of hard work. Their condition is made worse by the fact that they also suffer from poor nutrition, which makes them vulnerable to many chronic diseases. Harsh climates, difficult terrain, scarcity of water and gender discriminatory practices make life a struggle for women and children of the hills. She has to not only look after her family and kids, but also has to work in the field. She has to not only fetch water from miles, but also has to manage the fodder for livestock and fire wood for cooking purpose. On top of it, the availability of nutritious, healthy and filling food is negligible. All in all, the women have to exhaust themselves to an extent that it leads to negligence in child’s feeding practices. Furthermore, poverty and low educational levels, taken along with lack of exposure and custom-bound social practices tends to prevent women from seeking advice related to infant feeding etc. Till date, very few studies on Infant feeding practices has been carried out in this decade old state. Therefore, in the present study, an attempt has been made to study the weaning practices in a difficult terrain and to determine the relationship between weaning and nutritional status of infants and toddlers with a view to strengthen these practices for improving the health and nutritional status of Infants and Toddlers.

### Objective

To know weaning practices of mothers of a difficult terrain and to determine the relationship between weaning practices and the nutritional status of their infants and toddlers.

## METHODS

The present community based cross-sectional study was conducted in children below 3 years of age residing in the rural villages of hilly terrain under Rural Health Training Center (RHTC) of Department of Preventive and Social Medicine, Himalayan Institute of Medical Sciences. The survey was carried out from May 2009 to April 2010. Ethical approval for this study was obtained from the institutional ethical committee a list of all the villages under RHTC was obtained. A census was carried out to identify all households with children 0-36 months of age.

To conduct this study, a semi-structured questionnaire was developed and all the questions were framed keeping in mind the objectives to obtain the necessary information. The questionnaire was mainly of the closed type except for few open type questions. This questionnaire was tested with a pilot study of 50 mothers of the same area, who had children less than 3 years of age. The researcher herself interviewed the mothers at the time of pilot testing. The objective of this pilot study was to test the data collection tool's wording, as well as the clarity of stated questions. According to the results of the pilot study, some questions were modified, others were removed and some were added, in order to reach to the final form of the study questionnaire. On the basis of a pilot study  $P$  was taken as 0.48 and  $q$  as 0.52 (1- $p$ ). Allowable error  $d$  was taken as 10% of  $p$ . Sample size thus yielded was 434. Considering 10% non-response, 43 was added to make the total sample size 477. A door-to-door survey was conducted and households with at least one infant below 3 years were selected. In total, 565 under three children were enlisted from these eight villages. Data for infants who reached more than 36 months of age, infants of multiple births defects were excluded from analysis. In families with more than one child, in 0-3 year age group, only the younger child was selected for the present study; thus, 507 mother-infant pairs were identified for the survey. Among the mothers of the eligible infants identified, informed consent to participate in the study was obtained from 98% (500 = 507); thus, the infant population in the selected communities was well-represented. Verbal informed consent was obtained from each of the mother and they were reassured that the information obtained will be confidential and used only for the purpose of this

study. After ensuring the confidentiality and building a rapport, in depth interview of mothers of fewer than three children was undertaken each mother was interviewed individually by the researcher at home. The average time taken for filling each questionnaire was around 15-20 min depending on the mother's response. The information was collected using interview technique facilitated by guidelines were (questionnaire) prepared. The questionnaire was directed at ascertaining various aspects of weaning (refers to any solid or semisolid preparation (vegetable, cereal, staple or fruit added to the diet.) i.e., to determine the age at which the child was weaned, frequency, amount and type of weaning foods at the time of introducing the same. To keep a check on the validity of the data, 10% of it was cross-checked. Whole process of data collection was monitored by independent observers and supervised by the investigator. The terms and definitions for infant and young child feeding (IYCF) Practices were according to National Guidelines on IYCF, 2<sup>nd</sup> edition (2006) and Integrated Management of Neonatal and Childhood Illness.<sup>[1,4]</sup> The Indian guidelines on IYCF were used to assess the minimum meal-frequency and amount per meal to compute age-appropriate feeding.<sup>[6]</sup> Nutritional status of the child was assessed with the help of anthropometric measurements. The new World Health Organization standards were utilized for classification of children in various grades of nutritional status.<sup>[7]</sup> Reliability of Anthropometric data was assessed by check-up of height and weight and other measurable variables by the staff of our institution to ensure the quality of data. The data analysis was carried out using a statistical package, Epi info version 6.0. Chi-square test for comparison between groups was undertaken. In all statistical analysis only  $P < 0.05$  were considered significant.

## RESULTS

Out of 500 respondents, 87 mothers didn't introduced any weaning (solid/semisolid) food to their infants. A slightly higher number of children (52%) were weaned at  $>6$  months, whereas 48.5% children were weaned at 4-6 months of age. Further, boys were weaned earlier than girls irrespective of the age of weaning [Table 1]. which

deteriorated the nutritional status of the girls as majority of girls in the age group of 6-12 months were found to be highly undernourished (56.41%) than girls in other age groups [Table 2]. Children in whom weaning had started later than 6 months were observed to be more undernourished (79.34%) as compared with those between 4 and 6 months in whom the prevalence

**Table 1:** Distribution of weanlings according to their age and sex

Variable	Distribution of children		Total n (%)
	Male n (%)	Female n (%)	
Age of weaning <sup>#</sup>			
4-6 months	126 (63.00)	74 (37.00)	200 (48.43)
>6 months	110 (51.64)	103 (48.36)	213 (51.57)
Total	236 (57.14)	177 (42.86)	413**

$\chi^2=5.43, P<0.05$

<sup>#</sup>Weaning here refers to any solid or semisolid preparation (vegetable, cereal, staple or fruit) added to the diet, \*\*Weaning had not been started in 87 children as yet

**Table 2:** Age group and sex wise distribution of children according to their nutritional status

Age group (in months)	No. of children		Total
	Well nourished	Undernourished	
0-6			
Male	8 (22.86)	27 (77.14)	35 (48.61)
Female	14 (37.84)	23 (62.16)	37 (51.39)
Total	22 (30.56)	50 (69.44)	72 (14.40)
6-12			
Male	29 (51.79)	27 (48.21)	56 (58.95)
Female	17 (43.59)	22 (56.41)	39 (41.05)
Total	46 (48.42)	49 (51.58)	95 (19.00)
12-36			
Male	68 (40.72)	99 (59.28)	167 (50.15)
Female	66 (39.76)	100 (60.24)	166 (49.85)
Total	134 (40.24)	199 (59.76)	333 (66.60)
Total	202 (40.40)	298 (59.60)	500

**Table 3:** Nutritional status of children according to their age of weaning\*\*

Age of weaning	No. of children		Distribution of undernourished children		
	Well nourished n (%)	Undernourished n (%)	Wasted n (%)	Underweight n (%)	Stunted n (%)
4-6 months (n=200)	77 (38.50)	123 (61.50)	60 (48.78)	81 (65.85)	70 (56.91)
>6 months (n=213)	44 (20.66)	169 (79.34)*	84 (49.70)	120 (71.01)	124 (73.37)*
Total (N=413)	121 (29.30)	292 (70.70)	144 (49.32)	201 (68.84)	194 (66.44)

$\chi^2=15.85, P<0.05$      $\chi^2=0.024, P>0.05$      $\chi^2=0.88, P>0.05$      $\chi^2=8.65, P<0.05$

\*Indicates  $P<0.05$ (significant), \*\*Weaning had not been started in 87 children as yet

was found to be less (61.50%). Statistically, the association was found to be highly significant. Similar observations were noted in wasted, underweight and stunted children [Table 3]. It was observed that children in whom the frequency of weaning was inadequate had maximum prevalence of under nutrition (85.51%) in comparison with those children in whom it was adequate, where the prevalence was found to be 63.27%. Statistical association was also found to be highly significant. Similar pattern was noted in wasted, underweight and stunted children [Table 4]. It was noticed that majority of children who were fed inadequately at the time of weaning were found to be undernourished (76.06%) as compared with those children who were fed adequately, in whom only 65.00% children were undernourished. The association found was also statistically significant [Table 4]. Maximum under nutrition (83%) was found in weanlings who started weaning on fruits and vegetables, followed by those on cereals, pulses and fruits (82.32%) as compared with those on cereals and pulses alone (61.5%). Statistical association was also found to be significant [Table 5].

## DISCUSSION

In the hills, if a lactating mother gets back her first period, the weaning (Annaprashan) ceremony is preponed and the mother in law cooks something sweet, feeds the baby one teaspoon first, then only they allow the mother to feed the baby. After being breastfed the baby is brought out and purified by sprinkling cow's urine. The family feels that the child is the embodiment of God; he is pure (shudh) until his mother gets her period. If this is not done it is believed that the child will remain unhealthy and weak throughout his life. At the time of weaning, sweet rice (commonly known as

**Table 4:** Nutritional status of weanlings according to their amount and frequency of weaning foods

Adequacy of weaning foods	No. of children		Distribution of undernourished children		
	Well nourished <i>n</i> (%)	Undernourished <i>n</i> (%)	Wasted <i>n</i> (%)	Underweight <i>n</i> (%)	Stunted <i>n</i> (%)
Amount of weaning					
Ad adequate ( <i>n</i> =200)	70 (35.00)	130 (65.00)	60 (46.15)	90 (69.23)	73 (56.15)
Ina inadequate ( <i>n</i> =213)	51 (23.94)	162 (76.06)*	84 (51.85)*	111 (68.52)	121 (74.69)*
		$\chi^2=6.09, P<0.05$	$\chi^2=37.90, P<0.05$	$\chi^2=0.017, P>0.05$	$\chi^2=11.12, P<0.05$
Frequency of weaning					
Ad adequate ( <i>n</i> =275)	101 (36.73)	174 (63.27)	68 (39.08)	116 (66.66)	110 (63.21)
Ina inadequate ( <i>n</i> =138)	20 (14.49)	118 (85.51)*	76 (64.41)*	85 (72.03)	84 (71.18)
Total ( <i>N</i> =413)	121 (29.30)	292 (70.70)	144 (49.32)	201 (68.84)	194 (66.44)
		$\chi^2=15.85, P<0.05$	$\chi^2=18.04, P<0.05$	$\chi^2=0.94, P>0.05$	$\chi^2=2.00, P<0.05$

\*Indicates  $P<0.05$  (significant)**Table 5:** Nutritional status of weanlings according to the type of weaning foods

Type of weaning food	No. of children		Distribution of undernourished children		
	Well nourished <i>n</i> (%)	Undernourished <i>n</i> (%)	Wasted <i>n</i> (%)	Underweight <i>n</i> (%)	Stunted <i>n</i> (%)
Cereals+pulses ( <i>n</i> =221)	85 (38.46)	136 (61.54)*	75 (55.15)	90 (66.18)	89 (65.44)
Cereals+pulses+fruits ( <i>n</i> =181)	32 (17.68)	149 (82.32)	65 (43.62)	106 (71.14)	101 (67.79)*
Fruits+vegetables ( <i>n</i> =6)	1 (16.67)	5 (83.33)	4 (80.00)	5 (100)	2 (40.00)
Cereals+vegetables+fruits ( <i>n</i> =5)	3 (60.00)	2 (40.00)	-	-	2 (100.00)
Total ( <i>N</i> =413)	121 (29.30)	292 (70.70)	144 (49.32)	201 (68.84)	194 (66.44)
		$\chi^2=23.49, P<0.05$	$\chi^2=14.77, P<0.05$	$\chi^2=27.30, P<0.05$	$\chi^2=20.61, P<0.05$

\*Indicates  $P<0.05$  (significant)

mithi bhaat) is introduced with a special ceremony called Annaprashan or the rice feeding ceremony, which is 1-2 months earlier for boys than girls as it formed part of the culture in the hills. The mothers reported that grandparents encouraged this practice as they think the male baby will play the lead role in the family later on and hence should be fed before the female baby and hence this practice should be inculcated from the very beginning itself, which suggests that even the newly formed states of India are not spared from this age long social injustice of gender bias as it deteriorated their (girls) nutritional status as the majority of girls in the age group of 6-12 months were found to be highly undernourished (56.41%) than girls in other age groups. Corroborative findings were noted in a study by Mushaphi *et al.* in Limpopo province and Katara *et al.* in Vadodara in which majority of boys were weaned earlier than girls.<sup>[8,9]</sup> On this day, the priest (pandit) is called for a small worship (puja) and the father's sister (bua) feed the baby sweet rice (kheer/mithi bhaat) with a silver coin. Child is

dressed in new clothes. Some toys such as bat, ball, bus train, pen pencil and copy, a gun, daranti (weapon) are kept in the courtyard and the child is left on the ground to crawl, whichever object the child touches first or moves toward, it is believed that he/she will take interest in that when he/she grows up. Initiation of complementary feeding (CF) at the right time is a vital point in IYCF practices and faulty practices is the main cause of malnutrition. In the current study, although the majority of children 413 (82%) had started weaning yet a slightly higher number were receiving the same after 6 months of age (52%), which shows CF is started mostly during this period, which is quite a disturbing trend as malnutrition was high (79%) among those children who started weaning after 6 months. The reason cited was that mothers usually take it as a ritual, (especially feeding the male child at 6 months) without recognizing its nutritional significance, they gradually assume that once the ritual (as they perceive) of CF has been initiated, it

is not necessary to feed the child on a daily basis and it was absolutely fine to feed the babies occasionally. In addition, lack of knowledge and misconceptions among elderly women, like mothers-in law, who generally influence and guide child feeding practices in the family, are often barriers to initiate CF at the right age. Another important assumption is that a fat baby was regarded as healthy, discouraging mothers to offer complementary foods before 6 months. Our findings are also in line with National Family Health Survey-3 (NFHS-3) (Uttarakhand) and NFHS-3 (India), according to which CF was started in majority, 52% and 55% at 6-8 months of age.<sup>[10,11]</sup> Synonymous findings were observed in a study by Bhandri and Choudhary, in which highest malnutrition (72.7%) was found in children whose weaning was started 7-9 months and lowest (19.6%) at 4-6 months.<sup>[12]</sup> Factors, such as characteristics of diet or child's appetite, are known to influence the frequency of CF. With regard to the frequency of CF, findings shows that 67% of children were given the minimum recommended number of feeds in a day whereas on the contrary, amount of weaning foods was found to be adequate in only 48% of weanlings. Among women who didn't give the recommended number of feeds, most believed that the child cannot eat much as the child would have difficulty in eating more, lack of knowledge regarding the weaning practices was yet another common reason cited. Most of the mothers did not consider nutrition or actual food intake behavior as being important in evaluating the health status of their babies. Babies were fed just to stop them from crying, to pacify or to quench their hunger or to put them to sleep. Yet others believed that it was sufficient as the child was also breastfeeding. Feeding children proactively requires time, which often women are unable to give because of the pressure of household work, especially in a rural area of difficult terrain. Furthermore, no consideration was given to the type of foods, variety and nutritional value of foods given to the child. Only the general appearance of the child was considered as important index of good nutritional status. Further, babies in whom it was adequate both in terms of frequency and amount, preparation of weaning food was found to be questionable. Adequacy of weaning food (in terms of frequency and the amount) does not guarantee

the nutritional well-being of the child. Food was also found to be overcooked and over-diluted (rice water). Snacking was also identified to quench the hunger probably contributing to a lower total energy intake. The qualitative study shows that women and family members didn't proactively feed a measured quantity of food to their children; instead, children were fed a few spoonfuls while family members were eating or were given a piece of roti or biscuit to hold and left to eat by themselves. While the entire family is involved in the process of child feeding, none of the family members were aware of the recommended quantity of food and the frequency of feeds required for the optimum growth of the child. Our findings are completely in line with a study in UP, where 63% of children were given the minimum recommended number of feeds in a day. In Abidjan, it was recorded that inadequate CF at age 6 months was associated with impaired growth during the next 12 months, with a 37% increased probability of stunting as compared to our study where stunting was found to have a statistically significant association to amount of weaning and wasting to both frequency and amount of weaning foods.<sup>[13]</sup> A child should get all the nutrients from the food items from the very beginning of CF. With regards to the weaning food, the main weaning food in this region was rice water (mand), coarse grains as mandua, Jhingora (Maandavi), Barley, maize, pulses such as Bhatt, Gahat (traditional back legume) etc., and seasonal fruit (citrus fruits such as malta, kinu, Leachy, Pulam, kafal) etc., nuts, especially dates (*chokda*) and nutmegs (*jaiphal*) are mashed and given to infants which a peculiar practice in this community. According to local belief, it will sooth the baby and helps for normal sleep. Usually, it is given in small amounts so it will not contribute with much energy. A nutritious preparation eaten during the winter months are Chapatis of a mixed dough of maans (urd dal), soybean and madeira (coarse millet) and gahat. In the index study, as cereal was the staple diet, it was the weaning food for the majority of the children (53.51%) followed by cereals, pulses and fruits (43.83%) and fruits and vegetables (1.45%). All the above food items were consumed by only 3 (0.73%) children. Our findings match well with a study by Katara *et al.* in Vadodara and Hussein in Dodoma and South Western Tanzania, in which

majority of children were getting food prepared from cereals followed by pulses, fruits and vegetable and cereals were usually the first foods to be introduced.<sup>[9,14]</sup> Most of the infants in our study were not given vegetables, which could be due to issues of consistency and ignorance and were considered as cold food. Another widely shared misconception was that infants under 1 year of age cannot digest animal foods while rest considered it as impure food. Further maximum under-nourishment was found in those who started weaning on fruits and vegetables (83%) followed by those on cereals, pulses and fruits (82.32%). The reason, which could be cited is as the stomach capacity of an infant is quite low, feeding him simultaneously with fruits quenches his hunger and decreases his intake of cereals and pulses, which are energy rich source than those infants who are totally on cereals and pulses. Moreover, fruits which was the major cultivation of the region were guava and citrus fruits (malta, kinu), which does not provide with sufficient calories.

## CONCLUSIONS

Thus, it can be concluded that weaning practices among the hills was not that alarming as in some other parts of the country and was found to be satisfactory in most of the terms as was evident from the nutritional status of children in this age group (6-12 months) was far better than in other age groups, whereas it was found to be the reverse for girls as their nutritional status was more affected in this particular age group due to the delay in the introduction of weaning foods. The only fallback of weaning culture in hills was inadequate knowledge regarding the type of weaning food. The use of over diluted and overcooked weaning foods among these low socio-economic families coupled with sociocultural factors (various myths and taboos) compounded the feeding problem.

### Recommendations

Hence, it is necessary to impregnate in the minds of the people that it is not only the amount and frequency, but quality of weaning foods equally plays a major role in growth of the child. Emphasis on the need for improving the dietary quality of weaning foods and the inclusion of animal source foods. Mothers should be encouraged for traditional CF practices through popular media to promote

nutritional status of the children. Knowledge and skill should be provided to practice nutritionally balanced traditional complementary foods in household levels scientific study on complimentary feeding practices needs to be conducted in national level by concern sectors. Issues on child nutrition, especially in feeding practices should be given high priority in national plan.

### Limitations

Our study was cross-sectional and hence certain biases arise. Information regarding the weaning practices was obtained from the mother as there was no other means of obtaining that information and as such could have been subject to recall bias. Reliability of Anthropometric data was assessed by checkup of height and weight and other measurable variables by the scientific staff of our institution to ensure quality of data. Birth date was ascertained from Anganwadi Centre records, antenatal cards or hospital discharge cards. The findings of this study cannot be generalized to the rest of the country due to differences in the genetic makeup and the socio-economic and dietary habits in different rural communities in India, which has several ethnic groups. The information received during the interview depended mostly on recall. Recall bias is known to affect the accuracy of data and contribute to systemic error. To ensure the smooth flow of information and minimize this bias, the interview was not conducted in a question and answer format, but in a discussion format, in which responses to questions in the questionnaire were noted without interrupting the flow of the conversation.

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