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Socio-cultural practices in relation to breastfeeding, weaning and child rearing among Indian mothers and assessment of nutritional status of children under five in rural India

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RESEARCH

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Abstract

Background
Breastfeeding and weaning practices vary among different regions and communities. In India, breastfeeding in rural areas appears to be shaped by the beliefs of a community, which are further influenced by social, cultural, and economic factors. Malnutrition is often associated with inappropriate feeding practices. This study was undertaken with an aim to investigate feeding and weaning practices along with the nutritional status of children under five in rural Maharashtra, India.

Method
A cross-sectional descriptive study was conducted at Pravara Rural Hospital, Loni from February 2009 to September 2009. A structured questionnaire was used to interview 300 mothers of children between age group 0-5 years attending immunization clinic and Paediatric O.P.D. Clinical examination of the children was performed. Information was collected on socio-demographic characteristics, breastfeeding and weaning practices.

Results
There were 61.3% male children and 37.3% female children. A highly significant association with malnutrition was associated with mother's educational status, family's socio economic status and family structure. However, no significant association with malnutrition was noted with religion. Highly significant association was noted between the mothers' educational status and the time of initiation as well as duration of breast feeding and also with the time of initiation of complimentary feeding. It was observed that only 43% children could be labelled as normal while 57% fell in various grades of malnutrition.

Conclusion
The critical window of the first five years of life highlights the importance of appropriate feeding and weaning practices in infants and toddlers. For most problems related to malnutrition may be tackled by engendering awareness in rural mothers and thereby promoting healthy eating.

Key Words
Breast feeding, Weaning, Malnutrition, Rural area

Background

Breastfeeding and weaning of an infant are not only crucial for optimal growth and development but also are important determinants of future physical and mental well being because of the rapid growth spurt and development of organs and tissues during the first year of life[1]. The importance of breastfeeding has been emphasized in various studies [2, 3] and so also the imperative role of exclusive breastfeeding to an infant and the immunological and nutritional values of breast milk[4, 5]. These practices play an important role in reducing child mortality and morbidity; however it may vary among different regions and communities. In India, breastfeeding in rural areas appears to be shaped by the beliefs of a community[2], which are further influenced by social, cultural, and economic factors. A large majority of population of the country has a low income and poor education, thus making the practice of

breastfeeding the only way to give their child a fair chance of survival and good health. The beneficial effects of breastfeeding depend on breastfeeding initiation, its duration, and the age at which the breast-fed child is weaned[6]. The pattern of supplementary feeding during the first 2 years of life is increasingly recognized as important determinants of malnutrition. Malnutrition is often associated with inappropriate feeding practices occurring during the first year of life. These links between malnutrition and child feeding practices have been recognised[7].

Many studies on breastfeeding have been conducted worldwide during the last sixty years and it has been observed that the practice of breastfeeding is on the decline, both in terms of incidence and duration. The World Health Organization (WHO)[8] conducted a collaborative study on breastfeeding in nine developing countries including India between 1975 and 1978, and found socio-cultural factors such as education, employment, income, and urban residence to be the strongest determinants of the length of breastfeeding. Various studies[8-10] including the WHO study, have reported that mothers consider breast milk the best food for infants. However, though such a high percentage of mothers think so, the actual practice is in sharp contrast to this belief. According to the WHO report[8], the incidence of breastfeeding by mothers who ever breastfed their infants, was 96 percent in the urban areas of India whereas it was 100 percent in rural India (the urban rate has been reported to be as low as 45 percent in Middle Atlantic U.S.[11]). However, breastfeeding, the universal practice of the past, is fast changing in this era of modernization. This scenario is rapidly being introduced in India, which is influenced by the western culture and proceeding towards modernization and development wherein more women are joining the workforce. The resolution (World Health Assembly 54.2) urges Member States to support exclusive breastfeeding for first six months as a global public health recommendation[12]. Continuous vigilance over infant feeding practices in community is necessary for timely interventions to ensure optimal growth and development. Information about newborn care and breastfeeding practices in the rural population will be useful for policy makers and for interventional programs. This study was undertaken with an aim to investigate feeding and weaning practices along with the nutritional status of under five children in rural Maharashtra, India.

Method

A cross-sectional descriptive study was conducted at Pravara Rural Hospital, affiliated to a Non Governmental Organisation (NGO), Pravara Medical Trust (PMT) at Loni, a small village situated in the district Ahmednagar. It was conducted from February 2009 to September 2009. A pre designed & pre tested structured questionnaire was used to interview 300 mothers of children between age group 0-5 years attending immunization clinic and Pediatric Out Patient Department (OPD). The questions put forth were in the regional language like Marathi and Hindi. Clinical examination of the children was done following the interview of the mothers'. The objectives of the study were explained to all the mothers prior to the interview and their consent was taken to examine their respective child. No mother objected to answer the questionnaire after the interviewers had explained the purpose of the study. Information was asked on the selected socio-demographic characteristics such as: age of child, birth order, birth weight, immunization status, socio-economic status (SES), educational status of parents (with more emphasis on mothers education); infant feeding practices, time of initiation of breastfeeding as well as complementary feeding and the time period of exclusive breast feeding. Socio-economic status was assessed according to modified BG Prasad classification based on Consumer Price Index of April 2006[13, 14]. Anthropometric parameters of the children like weight, height & mid arm circumference were obtained by medical students by ensuring reliability as far as possible. Multi Weigh machine (Zeal Medical Pvt. Ltd.), with a precision of 0.05 kg was used to measure weight of children aged less than 24 months of age, by laying them horizontally on it, whereas Children aged 24 to 60 months were weighed barefoot using a digital scale with a precision of 0.5 kg. The length/height of the former were measured using a measuring tape that had a precision of 0.01 m whereas the latter were measured using a stadiometer with a precision of 0.01 m while standing straight on a horizontal surface with their heels together and eyes straight forward. Mid arm circumference was measured at the exact midpoint of the left arm using Shakir's tape in the children (> 12 months). Weight for age was taken as the criterion for Protein Energy Malnutrition (PEM) and grading done as suggested by the Indian Academy of Pediatrics (IAP) [15]. Data was then entered into Microsoft Excel and analyzed using software StatistiXL version 1.8. The impact of child feeding practice, as well as socioeconomic and demographic factors on the nutritional status of children were evaluated in the form of percentages, proportions & chi –square test of significance.

Results

The study comprised of 300 mothers who had a child below five years of age. A large proportion (52 %) of the mothers belonged to the age group 20-24 years, followed by 45 % in the age group 25-29 years while 3% belonged to the 30 years and above age group.

Out of the 300 children taken in to consideration, 61.3% were males and 38.7% were females (Table I). 166(55.3%), were the children of birth order one, while 102(34%) were of second order of birth & 32 (10.7%) were having third order of birth or more. Since the study has been carried out by interviewing mothers attending Paediatric O.P.D. and immunization clinic, it was found out that maximum children (92.7%) that were surveyed were completely immunized as per their respective age. Most mothers (84%) were aware that polio can be prevented by immunization, which was followed by awareness about measles (55.67%).

Table I: Demographic Profile of Children			
	Male	**Female**	**Total**
Age of Children (in months)			
0-12	36(12)	34(11.4)	70(23.4)
13-24	30(10)	27(9)	57(19)
25-36	53(17.6)	20(6.7)	73(24.3)
37-48	17(5.6)	11(3.7)	28(9.3)
49-60	48(16)	24(8)	72(24)
Total	184(61.3)	116(38.7)	300(100)
Age (in months), Mean (SD)	26 (2.45)		
Religion			
Hindu	86(46.7)	30(25.9)	116(38.7)
Muslim	45(24.5)	22(19.0)	67(22.3)
Christian	18(9.8)	26(22.4)	44(14.7)
Sikh	25(13.6)	32(27.6)	57(19.0)
Others	10(5.4)	6(5.1)	16(5.3)
Total	184(61.3)	116(38.7)	300(100)
Family Type			
Nuclear	88(47.8)	33(28.4)	121(40.3)
Joint	69(37.5)	54(46.6)	123(41.0)
Extended	27(14.7)	29(25.0)	56(18.7)
Total	184(61.3)	116(38.7)	300(100)
Data in the parenthesis indicate percentage			

4.7% of the fathers and 15% of the mothers were found to be illiterate (Table II). Maximum numbers of fathers (50.7%) were engaged in agriculture, while maximum numbers of mothers (67.7%) were housewives.

Table II: Demographic Profile of Parents			
Education of Parents	**Father**	**Mother**	**Total**
Illiterate	14(4.7)	45(15)	59(9.8)
Primary	21(7)	25(8.3)	46(7.7)
Middle	62(20.7)	79(26.3)	141(23.5)
High school	71(23.7)	70(23.4)	141(23.5)
Intermediate	63(21)	57(19)	120(20)
Graduate	58(19.3)	21(7)	79(13.1)
Post Graduate or above	11(3.6)	03(1)	14(2.4)
Total	300(100)	300(100)	600(100)
Occupation			
Cultivators/ farmers	152(50.7)	73(24.3)	225(37.5)
Landless Labourers	81(27.0)	12(4.0)	93(15.5)
Housewife	0(0.0)	203(67.7)	203(33.8)
Service (Pvt. /Govt.)	35(11.7)	3(1.0)	38(6.4)
Others	32(10.6)	9(3.0)	41(6.8)
Total	300(100)	300(100)	600(100)
Data in the parenthesis indicate percentage			

32% of the children were born with low birth weight (LBW) (Table III). As per the mid arm circumference criteria (only for children> 12 months to 5 years), 49.57% children were in normal category, but as per IAP classification, it was observed that 43% study subjects could be labelled as normal while 57% fell in various grades of malnutrition.

Table III: Nutritional status of children			
	Male	**Female**	**Total**
Birth weight (in Kg)			
≥2.5	119 (64.7)	58(50.0)	177(59.0)
<2.5	54(29.3)	42(36.2)	96(32.0)
Don't Know	11(6)	16(13.8)	27(9.0)
Total	184(61.3)	116(38.7)	300(100)
Mid Arm Circumference (> 12 months, n= 230)			
>13.5	95 (64.2)	19 (23.2)	114 (49.6.)
12.5-13.5	38(25.7)	24(29.3)	62(26.9)
<12.5	15(10.1)	39(47.5)	54(23.5)
Total	148(64.4)	82(35.6)	230 (100)
Indian Academy of Pediatrics Classification of PEM (Weight for age)			
>80%(Normal)	102(55.4)	27(23.3)	129(43.0)
Grade I (71-80%)	32(17.4)	54(46.5)	86 (28.7)
Grade II (61-70%)	44(23.9)	22(19.0)	66(22.0)
Grade III (51-60%)	6(3.3)	11(9.5)	17(5.7)
Grade IV (<50%)	0(0.0)	2(1.7)	02(0.6)
Total	184(61.3)	116(38.7)	300(100)
Data in the parenthesis indicate percentage			

A highly significant association of malnutrition was found with mother's educational status ($\chi 2=83.58$, $p<0.001$), family's socio economic status ($\chi 2=25.04$, $p<0.001$) and family structure/type ($\chi 2=36.19$, $p<0.001$). However, no significant association of malnutrition was seen with religion ($\chi 2=2.65$, $p>0.05$). (Table IV)

Table IV: Association of malnutrition with socio-demographic factors.				
Characteristic	**Malnourished**	**Normal**	**Total**	**p value**
Educational status of Mother				**p<0.001**
Illiterate	10 (5.9)	35 (27.1)	45 (15)	
Primary	17 (9.9)	8 (6.2)	25 (8.3)	
Middle school	64 (37.4)	15 (11.6)	79 (26.3)	
High school	56 (32.8)	14 (10.9)	70 (23.4)	
Intermediate	19 (11.1)	38 (29.5)	57 (19)	
Graduate	5 (2.9)	16 (12.4)	21 (7)	
Post Graduate or above	0 (0.0)	3 (2.3)	03 (1)	
Total	171 (57.0)	129 (43.0)	300 (100)	
Socio-economic status				**p<0.001**
Upper Class	5 (2.9)	15 (11.5)	20 (6.6)	
Upper Middle	28 (16.4)	38 (29.5)	66 (22)	
Middle	46 (26.9)	38 (29.5)	84 (28)	
Lower Middle	68 (39.8)	25 (19.4)	93 (31)	
Lower	24 (14.0)	13 (10.1)	37 (12.4)	
Total	171 (57.0)	129 (43.0)	300 (100)	
Religion				**p>0.05**
Hindu	64 (37.4)	48 (37.3)	112 (37.3)	
Muslim	46 (26.9)	32 (24.8)	78 (26.0)	
Christian	28 (16.4)	20 (15.5)	48 (16.0)	
Sikh	26 (15.2)	18 (13.9)	44 (14.7)	
Others	7 (4.1)	11 (8.5)	18 (6.0)	
Total	171 (57.0)	129 (43.0)	300 (100)	
Family Type				**p<0.001**
Nuclear	95 (55.5)	110 (85.3)	205 (68.3)	
Joint	67 (39.2)	11 (8.5)	078 (26.0)	
Extended	9 (5.3)	8 (6.2)	017 (5.7)	
Total	171(57.0)	129 (43.0)	300 (100)	
Data in the parenthesis indicate percentage				

There was also highly significant association between the mothers' educational status and the time of initiation ($\chi2=22.34$, $p<0.001$) as well as duration of breast feeding ($\chi2=41.68$, $p<0.001$) and also with the time of initiation of complimentary feeding ($\chi2=64.22$, $p<0.001$). (Table V)

Table V: Feeding and weaning status of infants	
Particulars	**Total**
Time (approximate) of initiation of breastfeeding	
Within 2 hrs	189 (63.0)
2-8hrs	72(24.0)
8hrs-2 days	14(4.7)
>2days	25(8.3)
Total	300(100)
Feeding status of Children	
Exclusively breast fed	181(60.3)
Partially breast fed	119(39.7)
Not breast fed	0(0.0)
Total	300(100)
Age at which weaning (complementary feeding) was started	
< 4months	7(2.3)
4-6 months	112(37.4)
6-8 months	128(42.6)
8-12 months	19(6.4)
>1 year	6(2)
Not Applicable*	28(9.3)
*As these infants are below the age of 4 months, complimentary feeding has not yet been started	
Data in the parenthesis indicate percentage	

Almost all the mothers' breastfed their child (Table V), and 63% mothers initiated breastfeeding within two hours of birth. 88% women had hospital deliveries, while only 12% had home delivery. 91.7% mothers gave their babies colostrum. 8.3 % of the mothers didn't breast feed their child for 2 days due to advice from mother in laws (as the concept of witch's milk prevails in rural India) and few due to separation from their baby and gave them pre lacteal feeds like sugar water (3.2%), ghee (2.2%), honey (1.8%), jaggery water, gripe water and discarded the colostrum.

Most women (86%) breastfed their child 6 to 8 times a day, with duration of 10 to 15 minutes & interval between feeding was 1 to 3 hours. 84.7% mothers gave demand based feeds to their babies. 28 (9.3%) infants were less than 4 months of age and were exclusively being breastfed & weaning was not started yet. A majority of mother's (42.6%) weaned their child between 6 to 8 months of age while in 37.4% weaning was started within 4 to 6 months of age. Fresh cow's milk was commonly selected instead of dried milk powder. 54.3% mothers gave their babies animal milk (cow /buffalo), home made preparations like dal water, rice water, mashed vegetables, khichri at the time of weaning. 25.7 % gave commercially available food while 32 (10.7%) gave both homemade & commercially available food.
Of the common social practices, oil massage was given to 245(81.7%) babies, followed by application of kajal in 210(70%) babies & in 5(1.6%) opium was given by mothers.

Almost half the children (47.6%) have not had any episodes of diarrhoea in the past three months. 13.7% children suffered from diarrhoea three or more times in the past three months. Feeding (including breast feeding, feeding semisolids or solids) was continued during diarrhoea as before illness (not reduced or diluted) by 183 (61%) mothers while 117(39%) of mothers stopped breastfeeding or feeding semisolids or solids. A highly significant association between the feeding status of children and the incidence of diarrhoea was noticed ($\chi 2=35.86$, $p<0.001$). 16% mothers were using feeding bottles while 84% (252) mothers did not bottle feed at all & top milk was given by katori- spoon. 88.7% mothers were aware that Oral Rehydration Solution (ORS) can be given in the treatment of diarrhoea, however only 25.3% mothers were aware of the proper method of preparing ORS. 74.7% mothers preferred to prepare one glass or one cup of solution at a time rather than one litre and mentioned about powder to be used as 1-2 tea spoon full per glass or per cup *etc.* Many mothers still cannot mix ORS properly or realize the importance of giving fluids during acute diarrhoea in their children.

Discussion

Breastfeeding is an unequalled way of providing ideal food for the healthy growth and development of infants; it is also an integral part of the reproductive process with important implications for the health of mothers. Inadequate knowledge about feeding practices & appropriate foods is often a greater determinant of malnutrition than the lack of food. Appropriate complementary feeding depends on accurate information and skilled support from the family, community and health care system[16].

There were 61.3% male children and 37.3% female children in our study. Maximum numbers of families were from middle (28%) & lower middle (31.0%) socioeconomic status, maximum numbers of mothers (67.7%) were housewives & 15% of the mothers were found to be illiterate. However in spite of the discrepancy in the educational status, all the mothers' breastfed their child. In previous study, it was noted that mothers who were educated above graduate level and higher socioeconomic status terminated breastfeeding early[17]. Fawzia A.et al (1997) observed that breast-feeding was more popular among illiterate mothers (38.4%) compared with university graduates (20.4%) [18]. In present study 88% women had hospital deliveries, while only 12% were having home delivery. 63% of mothers initiated breastfeeding within two hours of birth. Various reasons were given for the delay for the breastfeeding, among which most predominant were the advice of the other in laws due to belief in the age old social custom of rural India that the early breast milk is the witch's milk, followed by the separation of the mother and the child after delivery. Rahi et al (2006) reported that breastfeeding was initiated within four hours significantly more in institutional delivery as compared to home delivery[19]. Colostrum was given to babies by majority of mothers in comparison to other studies[20, 21]. 84.7% mothers gave demand based feeds to their babies. Kalra et al (1982) in their study concluded that most mothers do not follow any strict schedule and mostly breast feed by demand whenever the baby cried[17].
27 % of infants were given pre-lacteal in the form of water mixed mostly, with honey or sugar, jaggery water, gripe water. Similar practice of pre-lacteal feeds was also prevalent in rural area of Rajasthan[20]. Prelacteal feed are given under the impression that they act as laxatives or as means of clearing meconium[21]. Unfortunately, they are not aware that prelacteal could be source of contamination too. Fresh cow's milk was commonly selected instead of dried milk powder. 54.3% mothers gave their babies animal milk (cow /buffalo) but in Kushwaha et al (1987) have reported the use of commercial milk formula to the extent of 26% in peri-urban area[22]. Our findings regarding timely introduction of weaning foods are not very encouraging. In present study mixed picture of too early and too late weaning was seen as weaning was started too early in 2.3% of children & introduction of complementary feeding started quite late (>6months) among some children. In rural areas of Rajasthan the mean age at food supplementation initiation was 8.7 months, far beyond the recommended time[20]. Late introduction of weaning food by Indian mothers is a well-documented fact and is considered to be a major cause malnutrition[22, 23]. Interestingly, Padmadas et al (2002)[24] observed that the prevalence of stunting was high among children aged 42–47 months who are weaned at ≥6 months. As per the mid arm circumference criteria (> 12 months), 49.57% children were in normal category in contrast to the IAP classification in which only 43% study subjects could be labelled as malnourished. Results of study by Joseph et al in rural area of Karnataka showed that the indicators, such as mid upper arm circumference, need to be used with caution, since these are not sensitive enough to detect all cases of malnutrition[25]. However, severe malnutrition is well detected by mid arm circumference. In a study carried by Mridula et al (2004) 60.5% under five children were found to be suffering from various grades of malnutrition (PEM) in urban slums of Varanasi[26].

13.7% children suffered from diarrhoea three or more times in the past three months but only 39% of mothers stopped breastfeeding or feeding semisolids or solid during diarrhoea. Sudarshan et al (1995) reported that in 31 %

infants, breastfeeding was stopped and in 16% of toddler's solid foods were withheld during diarrhoea[27]. A hospital based study from Lahore reveals that feeding was stopped or reduced by 25% of the mothers during diarrhoea[28]. A considerable quantity of nutrients is lost in diarrhoeal stools. Appetite is impaired and food is often withheld from the child by the mother because of an erroneous belief that rest to the bowel promotes early recovery. These again emphasize the need for education of mother regarding child feeding practices. 16% mothers were using feeding bottles, which is consistent with the findings of previous studies which have quoted the prevalence of bottle feeding between the range of 14.8% to 41.9%[18, 22]. In present study, only 25.3% mothers were aware of the proper method of preparing oral rehydration solution. In a study carried out by Seyal et al (2009) 42.8% mother could prepare it properly[28].The limitation in the present study was that the study includes all under five children; thus could not rule out the recall bias of mothers in relation to breastfeeding practices with older children.

Conclusion

The critical window of the first five years of life highlights the importance of appropriate feeding and weaning practices in infants and toddlers. For the most problems related to malnutrition in children there is need to create awareness in rural mothers to promote healthy feeding practices and impart nutrition education to prepare low cost locally available food. This study warrants the public health authorities as well as the community health workers to orient the breastfeeding promotional activities amongst pregnant women as well as mothers of infants.

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Authors' Contribution

JDD and PK conceptualized the project and study design. JDD, PAG, PK and SMMA participated in data analysis, drafting the manuscript, sequence alignment and made useful contribution in the revision of the literature. JDD, DBP and VDP participated in writing discussion. Data Collection and statistical analysis was done by PK and SMMA. All authors read and approved the final manuscript.

PEER REVIEW

Not commissioned. Externally peer reviewed.

CONFLICTS OF INTEREST

The authors declare that they have no competing interests.