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Research Article

Determinants of Child Feeding Practices in Pakistan; Secondary Data Analysis of Demographic and Health Survey 2006-07

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Abstract

Background: In Pakistan, poor infant and young child feeding practices are contributing to the burden of infectious diseases and malnutrition. To estimate the determinants of selected feeding practices and key indicators of breastfeeding in Pakistan

Methods: The sample included 5718 children aged 0 to 23 months from the Pakistan Demographic and Health Survey of 2006-2007. WHO recommended infant and young child feeding indicators were estimated, and selected feeding indicators were examined against a set of individual, household and community level variables using univariate and multivariate analyses.

Results: Mothers initiated breastfeeding only 26.3% of within the first hour after birth, 97.6% had ever breastfed, 92.5% were currently breastfeeding, and 62.7% were currently bottle-feeding. .The risk factors for bottle-feeding were similar and included having a partner working (OR =1.66) , working mother (OR = 1.17), birth order >5 (OR = 1.25) and in the Richest wealth quintiles (OR for the richest = 2.34). Those who made no visit to the antenatal clinic were at higher risk for not initiating breastfeeding within the first hour (OR = 1.54), no post natal visit were higher risk (OR=1.45), working mother were higher risk (OR=1.76), delivery at facility based centre were higher risk(OR=1.95). The rate of initiating breastfeeding within the first hour was lower in mothers from richer households (OR = 1.77), birth order >5(OR=1.67) and formally married women (OR=2.31).

Conclusions: Breastfeeding indicators suggest that there is need for promotion of breastfeeding practices in the community. They should target women who have the main risk factors.

INTRODUCTION

The beneficial effects of breast feeding are well known to health care professionals around the world. It is generally believed that breast feeding directly promotes the overall health of child and results in decreased childhood morbidity and mortality. Breast feeding is an important determined of the nutritional status of the child, which in turn influence growth and development [1]. Early initiation of breast feeding impacts on the health status of the child because the first milk colostrum contains antibodies that will protect the child from disease. Prolonged breast feeding also beneficial because it contain components which strengthen the child's immune system [2]. Many problems are associated with bottle feeding in the developing world, specifically in areas where sanitation condition is poor. Risk for contaminated water mix with milk is increased and this leads to increase morbidity and mortality of child [3]. Poor nutritional status is one of the most important health problems in Pakistan. In Pakistan, infectious diseases such as diarrhea and acute respiratory infections are the main cause of mortality and morbidity in infants under 1 year of age [4,5]. Under nutrition among children under 5 years of age remains a major problem [5].The importance of breastfeeding in the prevention of infectious diseases and under

nutrition during infancy is well known [4, 6]. The World Health Organization (WHO) infant feeding guidelines recommend that infants should be exclusively breastfed for the first 6 months of life to achieve optimal growth, development, and health [7]. Although breastfeeding is almost universal in Pakistan, the rates of exclusive breastfeeding of infants under 6 months of age are low. Cultural practices include feeding pre-lacteal foods, such as honey, sugar water, or mustard oil, immediately after birth, and this contributes to the low prevalence of exclusive breast-feeding [8].Recent data show that 38%of children aged 2 to 3 months are exclusively breastfed and 23% of children are given complementary foods before the sixth month [6].In addition, rates of bottle-feeding are high, with 30% of infants aged 2 to 3 months being bottle fed. The rate of consumption of baby formula in infants aged 4 to 7 months has almost doubled since2000 and is highest in urban areas [5]. Number of completed interviews with eligible women for the 2006-07Pakistan Demographic and Health Survey was set at 10,000.

OBJECTIVE

To estimate the determinants of selected feeding practices and key indicators of breastfeeding practices in Pakistan.

METHOD

The Pakistan Demographic and Health Survey were conducted throughout country during 2006-07, conducted by National institute of population studies.

The design for this survey is a stratified, multistage, cluster sample of households. Households consist of all urban and rural areas of four provinces of Pakistan. All ever-married women aged 12 to 49 in the selected households were eligible respondents for the women's questionnaire. The sample had yield interviewed with approximately 10,000 ever-married women aged 12 - 49.

In first stage, they selected 1000 sample points (clusters), 390 in urban areas and 610 rural areas. In second stage they selected 100000 households.

The analysis was based on data collected form PDHS 2006-07. Analysis was restricted to children under 24 month of age who were living with the respondents, which was equivalent to weighted total of 5718 children.

Feeding indicators and independent variables

Infant and young child feeding indicators as described by WHO [9] were estimated. These indicators include the timely first suckling rate (proportion of infants less than 12 months of age who first suckled within 1 hour after birth), the ever-breast rate (proportion of infants less than 12 months of age who were ever breastfed),the current breastfeeding rate (proportion of children less than 24 months of age who are currently breastfed), bottle feeding rate (proportion of infants less than 12months of age who received any food or drink from bottle in previous 24 hours).

The explanatory variables were classified into two levels: individual and household. The individual-level attributes included the child's sex, age; the mother's age, whether she worked in the past 12 months, and her marital status; and the educated or not by the mother and the father had employed or not. Data on the number of antenatal clinic visits, place of delivery, mode of delivery, birth order of child, and postnatal contacts with health care providers were also obtained the household wealth index, were included as household-level variables. The wealth index was constructed using principal components analysis to determine the weights for the index based on information collected about several household assets and facilities. This index was divided into five categories (quintiles) and each household was assigned to one of these categories.

Statistical analysis

Analyses were performed using SAS version 9.1. Chi-squared tests were used to test the significance of association. In the Univariate analyses, odds ratios with 95% confidence intervals were calculated in order to assess the unadjusted risk of independent variables on selected adverse feeding outcomes. Multiple logistic regression was used in a stepwise backwards model to estimate the odds ratios adjusted for independent variables, and those with $p < .05$ were retained in the final model.

RESULT

Socio-Demographic Characteristics of the sample

Table 1 lists the individual and household characteristics of the surveyed children. Approximately one-third (27.36%) of the mothers of these children had a Literate and 40.46%had worked. Male and female children of all age groups were almost equally represented in the sample. A total of 80.25% of the mothers had made at least one antenatal clinic visit during the pregnancy. Of the total births, 58.66% were home deliveries, and 41.34%had received assistance at birth from a trained health professional. Post natal visits around 68.34% mothers had visit to health facility.

Infant and young child feeding indicators, 2006-07

Table 2 **o**f the total of 5718 children aged 0 to 23 months, a high proportion (92.5%) had been breastfed during the past 24 hours. A very high proportion (97.6%) of infants had ever been breastfed, but only 26.3% had initiated breastfeeding within the first hour after birth, indicating that a considerable proportion had been given either nothing or pre- lacteal foods immediately after birth.

Differentials feeding indicators

Tables 3 summarize the breastfeeding indicators according to individual, household and community level characteristics. The proportion of infants who were ever breastfed were greater in mother's age of 15-34y, illiterate, normal delivery of baby, housewives, birth order 1-5, and delivery at home. The rate of timely initiation of breastfeeding was higher among children of more educated parents. The rate of timely initiation was lower for infants whose birth order was five or greater than for infants of lower birth order, and it was higher for infants born in health facilities than for children born at home. Antenatal care was associated with a higher rate of timely first suckling. There was a high rate of current breastfeeding among mother's age of 15-34y, illiterate, normal delivery of baby, housewives, birth order, delivery at home and there was little variation across the subcategories of wealth quintiles and ethnicity .

Table 1: Individual and household level characteristics of children 0-24 months of age, PDHS 2006-07 (n= 5718).

Characteristic	Weighted %	95% CI	SE
Mother's Age			
15-34yrs	76.79	75.70-77.88	0.85
>35yrs	23.21	22.12-24.3	0.85
Mother's Education			
Illiterate	72.64	71.48-73.8	0.87
Literate	27.36	26.2-28.52	0.87
Delivery by C-section			
yes	3.14	2.69-3.59	0.31
No	96.86	96.41-97.31	0.31
Mother Working outside home			
Never worked	59.54	58.27-60.81	1.07
Ever worked	40.46	39.19-41.73	1.07
Birth order of child			
1-5	78.83	77.77-79.89	0.83
>5	21.17	20.11-22.23	0.83
Sex of child			
Male	53	51.71-54.29	0.91
Female	47	45.71-48.29	0.91
Age of child (year) (n= 4986)			
0	35.85	34.61-37.09	0.97
1	30.61	29.42-31.8	0.97
2	33.54	32.32-34.76	
Place of delivery			
Health facility	41.34	40.06-42.62	1.18
Home	58.66	57.38-59.94	1.18
Ethnicity			
Urdu	6.28	5.65-6.91	0.61
Punjabi	37.56	36.3-38.82	1.23
Sindhi	11.97	11.13-12.81	0.76
Pashto	15.09	14.16-16.02	0.86
Balochi	2.93	2.49-3.37	0.41
Others	26.17	25.03-27.31	1.22
Household level factors			
Household wealth index			
Poorest	23.62	22.52-24.72	1.18
Poor	21.14	20.08-22.20	1.03
Middle	19.79	18.76-20.82	0.91
Rich	18.03	17.03-19.03	0.90
Richest	17.42	16.44-18.40	0.94
Husband occupation			
Working/Employed	96.93	96.48-97.38	0.36
Not working/Un-Employed	3.07	2.62-3.52	0.36
Bottle Feeding			
Yes	46.45	45.26-47.84	0.97
No	53.55	52.26-54.84	0.97
Breastfeeding			
Ever breastfed	90.89	90.14-91.64	0.58
Never breastfed	9.10	8.35-9.85	0.58

Table 2: Breastfeeding indicators among children 0 to 24 months of age, PDHS 2006-07.

Indicator	Size of subsample (weighted)	*n* (weighted)	Rate (%)	95% CI
Timely First suckling rate [a]	4361	1159	26.34	25.03-27.65
Ever-breastfed rate[a]	3287	3213	97.67	97.15-98.19
Current breastfeeding rate[b]	5718	5176	92.53	91.85-93.21
Bottle-feeding rate[a]	3310	2257	65.75	64.13-67.37

a. Infants < 12 mo. *b*. Children < 24 mo.

The bottle feeding rate also did not differ according to the investigated health care characteristics, such as, place of delivery, among wealth quintile, sex of child, working status, but it more in whose husband worked, and Punjabi's mothers in subcategory of ethnicity.

Determinants feeding indicators: Univariate and multivariate analyses

Unadjusted and adjusted odds ratios were calculated to estimate the effect of the independent variables on of two adverse infant feeding outcomes: bottle-ff and no timely initiation of breastfeeding.

Risk actors or bottle feeding

Table 4 shows interestingly, women who had partners have employed (OR =1.66; 95%CI, 0.99 to 2.79; p = <.005), women who had birth order greater than five (OR =1.25;95%CI,1.06 to 1.46; p = <.05), As expected, maternal working status influenced feeding status: working mothers were more likely than non-working mothers to bottle-fed adjusted OR = 1.17; 95% CI, 1.01 to 1.36; p <0.03).

Risk factors of timely initiation of breastfeeding

Table 5 shows those who made antenatal clinic visits were at lower risk for no timely initiation of breastfeeding (adjusted OR = 0.98; 95% CI, 0.73 to 1.31;p=0.90). Mothers who worked had higher rate of timely initiation of breastfeeding (adjusted OR = 0.76; 95% CI, 0.59 to 0.96;p=0.02). The rate of timely initiation was also higher in mothers of formally married (divorce, widow (adjusted OR = 2.31; 95% CI, 1.29 to 4.39; p =0.01).

DISCUSSION

The results show that many important feeding indicators in Pakistan were at suboptimal level and require further improvement in order to fulfill the goal of optimal feeding for all infants and young children in Pakistan. This secondary data analysis shows that breastfeeding is almost universal in Pakistan but the rates of timely initiation are very low. This pattern has been documented in other Middle Eastern countries including UAE [11].

Optimal infant and young child feeding is especially significant for Pakistan because of the high rates of infectious diseases. Breast-feeding has a highly protective effect against these illnesses [4]. Although almost all of the infants had ever

Table 3: Rates of Timely first suckling, current breastfeeding, ever breastfeeding and bottle feeding by individual and household characteristics, PDHS 2006- 07.

Characteristic	Timely first suckling rate			Current breastfed rate			Ever breastfeeding rate			Bottle-feeding rate		
	Weighted %	95% CI	p	Weighted %	95% CI	p	Weighted %	95% CI	p	Weighted %	95% CI	p
				Individual level factors								
Mother Age												
15-34y	12.22	11.25-13.19	0.17	71.16	69.99-72.33	0.19	70.30	69.12-71.48		35.23	33.99-36.47	0.12
>35y	3.17	2.65-3.69		21.36	20.3-22.42		20.58	19.53-21.63		11.22	10.4-12.04	
Mother's Education												
Illiterate	11.75	10.79-12.71	0.47	67.76	66.55-68.97	0.01	69.25	68.05-70.45		33.95	32.72-35.18	0.03
Literate	3.63	3.07-4.19		24.76	23.64-25.88		21.63	20.56-22.7		12.50	11.64-13.36	
Delivery by C-section												
yes	15.06	14-16.12	0.65	2.83	2.4-3.26	0.11	2.14	1.76-2.52	0.01	1.26	0.97-1.55	0.6
No	0.34	0.17-0.51		89.67	88.88-90.46		88.73	87.91-89.55		45.23	43.94-46.52	
Mother Worked												
Never worked	9.21	8.35-10.07		55.42	54.13-56.71	0.04	54.15	52.86-55.44		26.26	25.12-27.4	0.01
Ever worked	6.18	5.47-6.89	0.66	37.09	35.84-3834		36.73	35.48-37.98		20.19	19.15-21.23	
Birth order of child												
1-5	12.40	11.42-13.38		78.83	77.77-79.89		71.61	70.44-72.78	0.08	36.30	35.05-37.55	0.21
>5	2.99			21.17	20.11-22.23		19.27	18.25-20.29		10.14	9.36-10.92	
Sex of child												
Male	8.02	2.48-3.5	0.67	48.69	47.39-49.99	0.12	47.66	46.37-48.95	0.12	25.01	23.89-26.13	0.36
Female	7.37	6.59-8.15		43.82	42.53-45.11		43.22	41.92-44.48		21.44	20.04-22.84	
Age of child (year) (n= 4986)												
0	7.45	6.67-8.23	0.03	35.42	34.09-36.75	0.05	53.01	51.3-54.72	0.21	17.15	15.87-18.43	0.04
1	8.57	7.74-9.40		29.83	28.56-31.1		44.66	42.96-46.36		17.07	15.79-18.35	
2				32.01	30.71-33.31							
Place of delivery												
Health facility	7.06	6.30-7.82	0.15	36.93	35.68-38.18		37.65	35.99-39.31		22.73	21.3-24.16	0.01
Home	8.32	7.5-9.14		55.59	54.3-56.88		53.23	51.52-54.94		23.72	22.27-25.17	
Ethnicity												
Urdu	1.15	0.83-1.47	0.001	6.06	5.44-6.68	0.01	5.62	4.836.41	0.01	3.15	2.55-3.75	0.01
Punjabi	4.61	3.99-5.23		33.74	32.51-34.97		33.25	31.64-34.86		20.40	19.03-21.77	
sindhi	1.91	1.5-2.32		11.03	10.22-11.84		10.98	9.91-12.05		5.10	4.35-5.85	
Pashto	3.07	2.56-3.58		14.44	13.53-15.35		14.26	13.06-15.46		4.81	4.08-5.54	
Balochi	0.66	0.42-0.90		2.76	2.34-3.18		2.82	2.25-3.39		0.87	0.55-1.19	

Others	3.98	3.40-4.56		24.46	23.35-25.57		23.94	22.48-25.4		12.10	10.99-13.21	
				Household level factors								
Household wealth index												
Poorest	3.70	3.14-4.26	0.31	21.8	20.73-22.87	0.17	21.06	19.67-22.45	0.26	9.05	8.07-10.03	0.01
Poor	3.20	2.68-3.72		19.69	15.72-17.66		19.76	18.40-21.12		9.41	8.42-10.4	
Middle	2.86	2.37-3.35		17.98	16.98-18.98		17.96	16.65-19.27		9.13	8.15-10.11	
Rich	2.53	2.06-3.0		17.04	16.07-18.01		16.51	15.24-17.78		8.74	7.78-9.7	
Richest	3.07	2.56-3.58		16.00	15.05-16.95		15.58	14.34-16.82		10.10	9.07-11.13	
Husband occupation												
Worked	14.89	13.83-15.95	0.70	89.50	88.71-90.29		3.05	2.46-3.64		45.47	43.77-47.17	0.08
Not worked	0.51	0.3-0.72		3.05	2.6-3.5		87.83	86.71-88.95		0.96	0.63-1.29	

Table 4: Univariate and multivariate analysis showing association of bottle feeding with individual, household and community level characteristics, PDHS 2006-07.

Characteristic	Bottle-fed					
	Unadjusted			Adjusted		
Characteristic	OR	95% CI	p-value	OR	95% CI	p-value
Individual level factors						
Mother's Education						
Illiterate	1.00			1.00		
Literate	0.571	0.44-0.74	<0.01	1.09	0.93-1.27	0.26
Maternal working status						
Never worked	1.00			1.00		
Ever worked	1.30	1.00-1.69	0.04	1.17	1.01-1.36	0.03
Birth order of child						
1-5	1.00			1.00		
>5	1.06	0.91 - 1.25	0.40	1.25	1.06-1.46	0.05
Place of delivery						
facility	1.86	1.61-2.15	<0.01	0.67	0.57-0.78	<0.01
Home	1.00			1.00		
Ethicinity						
Urdu	2.49	1.80-3.46		0.43	0.29-0.64	<0.01
Punjabi	2.45	1.98-3.02	0.01	0.38	0.29-0.49	<0.01
Sindhi	1.52	1.17-1.98	0.01	0.65	0.46-0.90	0.01
Pushto	1.00			1.00		
Balochi	0.89	0.59-1.33	0.01	0.80	0.48-1.34	0.41
Others	1.81	1.47-2.23	0.01	0.45	0.34-0.58	<0.01
Household level factors						
Household wealth index						
Poorest	1.00			1.00		
Poor	1.21	0.95-1.54	0.03	0.54	0.39-0.76	0.04
Middle	1.31	1.02-1.69	0.11	0.51	0.36-0.73	0.02
Rich	1.53	1.18-1.98	<0.01	0.37	0.26-0.53	<0.01
Richest	2.34	1.82-3.01	<0.01	0.25	0.17-0.36	<0.01
Husband employed						
Working/Employed	1.86	1.16-2.97	0.09	1.66	0.99-2.79	0.05
Not working/Un-Employed	1.00			1.00		

breastfed, less than one-third were breastfed within 1 hour after birth. This low rate is a cause for distress and needs to be improved. Recent data have shown that the rate of timely initiation of breastfeeding is somewhat higher in Pakistan (26.34%) than in India (24%) [7] but is lower than that in Nepal (33.44%) [8]. In Pakistan, the data presented here suggest that women who had more antenatal clinic visits were more likely to initiate breastfeeding in a timely manner. This reemphasizes that increasing the utilization of ante-natal care would have a positive effect on breastfeeding promotion. Further interventions to encourage women delivering at home to initiate early breastfeeding, possibly through education of key family members and traditional birth attendants and peer support, will be needed to improve rates of early initiation of breastfeeding, because the majority of deliveries in Pakistan take place at home.

An established approach to promoting appropriate breastfeeding practices in Pakistan is through the use of local peer counselors to provide information and support to mothers [14]. A recent meta-analysis of individual peer counseling for the promotion of exclusive breast-feeding found that the odds of exclusive breastfeeding in mothers receiving the counseling

Table 5: Univariate and multivariate analysis showing association breastfeeding with individual, household and community level characteristics, PDHS 2006-07.

Characteristic	Not timely initiation of breastfeeding					
	Unadjusted			Adjusted		
Characteristic	OR	95% CI	p-value	OR	95% CI	p-value
Individual level factors						
Mother's Education						
Illiterate	1.00			1.00		
Literate	0.94	0.76-1.17	0.61	1.01	0.78-1.30	0.90
Mother's Antenatal visit						
No	1.18	0.71-1.22	0.45	1.54	0.99-1.61	0.90
Yes	1.00			1.00		
Mother's Post-natal visit						
No	1.25	0.82-1.35	0.87	1.45	0.73-1.50	0.69
Yes	1.00			1.00		
Maternal working status						
Never worked	1.00			1.00		
Ever worked	1.04	0.86-1.26	0.04	1.76	0.59-0.96	0.02
Age of child						
0	1.00			1.00		
1	1.43	1.15-1.79	0.01	0.70	0.60-0.88	0.02
Place of delivery						
facility	1.06	0.82-1.22	0.95	1.95	0.75-1.19	0.65
Home	1.00			1.00		
Household level factors						
Household wealth index						
Poorest	1.00			1.00		
Poor	0.94	0.71-1.22	0.65	0.90	0.64-1.26	0.54
Middle	1.01	0.75-1.36	0.91	0.98	0.69-1.39	0.93
Rich	0.97	0.71-1.34	0.89	1.29	0.69-1.41	0.95
Richest	1.25	0.91-1.73	0.16	1.77	0.52-1.13	0.19
Gender of Child						
Male	1.00			1.00		
female	0.99	0.81-1.22	0.96	1.19	0.97-1.47	0.08
Mother's marital status						
Currently married	1.00			1.00		
Formerly married (divorced, widowed)	0.46	0.25-0.85	0.01	2.31	1.21-4.39	0.01
Birth order						
1-5	1.00			1.00		
>5	1.03	0.83-1.29	0.75	1.67	0.75-1.27	0.87

was "substantially increased in the neonatal period (15 studies; odds ratio [OR] 3 ·45;95%CI 2 ·20 –5 ·42,p <0 ·0001;random effects)and at 6 months of age (nine studies;1 ·93, 1·18 –3·15, p < 0·0001)"" [15]. This approach needs to be scaled up in Pakistan to support breast-feeding, especially for women who have limited contact with health services.

The large geographic variation in breast-feeding rates may need to be studied further. Rapid urbanization and migration of the rural population to Karachi for work may have had an impact on breastfeeding rates, as most women in urban settings have to start work soon after delivery. Similarly, there seems to be a trend toward more educated and wealthy mothers being less likely to exclusively breast-feed their babies than less educated and less wealthy mothers, which suggests that interventions should be targeted at these women. In comparison with other countries in the region, Pakistan lags behind both India (446%) [7] and Nepal (553%) [8]. Bottle feeding common in Pakistan, more than 65% of children less than 12 month of age are fed with bottle with a nipple. Bottle feeding practices may potentially result in increased morbidity because of unsafe water and preparation facilities. The prevalence of bottle-feeding in Pakistan is high, especially among families of higher socioeconomic status. Working mothers also have a significantly higher prevalence of bottle-fed and this indicates that legislation requiring employers to provide facilities for breastfeeding or expressing breast milk may have a positive effect in Pakistan. Marketing of breast milk substitutes in private facilities in cities such as Karachi and Lahore is common. Although there is legislation to limit the marketing of breast milk substitutes in Pakistan, there have been many breaches in recent

years and continued monitoring is necessary. Peer counseling to support breast feeding is one such approach that needs urgent evaluation in rural and urban populations in Pakistan.

CONCLUSION

Pakistan is a society in transition and traditional practices are being abandoned in favor of a more westernized lifestyle. The prevalence of most infant feeding indicators in Pakistan were low and need improvement in order to gain the full benefits of breastfeeding for child health and nutrition. A targeted breastfeeding promotion should start and messages focus on young mothers because they are most vulnerable group. It is also important to understand the factors responsible for the low rates of important breastfeeding indicators in women with better education and higher socioeconomic status, as this information should guide the design of interventions for this target group of women. The use of peer counseling to support appropriate breastfeeding should be scaled up.

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Competing interests

"The authors declare that they have no competing interests."

Authors' contributions

"MZ conceived of the study, and participated in its design to draft the manuscript. Participated in the sequence alignment, drafted the manuscript, design of the study, performed the statistical analysis, discussion and conclude the study. **ZF** Authors read and approved the final manuscript."

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