

Is there a link between maternal illiteracy and childhood diarrhea?

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Objective

To assess the association between maternal illiteracy and frequency of childhood diarrhea.

Methods

This cross sectional study was carried out at Department of Pediatric of Combined Military Hospital Multan from September 1, 2008 to May 1, 2009. A total of 200 mothers were interviewed regarding frequency of diarrhea in their child between 1-2 years of age over past one year. One hundred children belonged to breastfed group and 100 to bottle fed group. All mothers lived in houses with piped water supply, filtered drinking water in immediate neighborhood and latrines inside the house. Husbands educational status varied between matriculate to intermediate and earning between Pak Rs 7000-9000/month. Dependent variable diarrhea was analyzed for both groups of children after stratifying mothers education into 4 categories nil to class 3, class 4 to 9, matric and intermediate to graduate. Frequency of diarrhea was recoded for last one year and diarrhea

morbidity was calculated on a scale of three.

Results

For breast fed group the frequency of diarrhea annually varied from 0.41 for highly educated mothers (intermediate to graduate) to 2.182 for uneducated mothers ($p=0.001$). For morbidity, the difference was even more striking and varied from 0.42 to 4.04 ($p=0.001$). The difference between diarrhea frequency and morbidity was also striking for the bottle-fed group, being 0.78 to 2.54 for annual frequency and 1 to 3.69 for morbidity for high to no education respectively.

Conclusion

Frequency and morbidity of diarrhea was more in less educated mothers. This suggests that one of the interventions aiming to reduce diarrhea should be to improve maternal education status. (Rawal Med J 2009;34:199-202).

Key words

Infantile diarrhea, maternal education, breastfeeding.

INTRODUCTION

Diarrhea contributes to an annual 3.5 million deaths in children under the age of three, and diarrhea-related illness and complications are associated with malnutrition, growth faltering, and compromised immunity.¹ Interventions to improve hygiene behaviors, sanitation, and water quantity and quality can reduce all-cause morbidity by >20%, and hygiene interventions specifically were reported to reduce diarrhea morbidity by nearly 45%.² The World Bank has declared the promotion of improved hygiene to be the third most productive method for preventing diarrhea-related morbidities.³ Children under 3 years of age are unable to wash their hands or demonstrate other kind of hygienic behavior and are completely dependant on their mothers. World leaders at the United Nations Millennium Summit in September 2000 agreed on a critical goal to reduce deaths of children <5 years by two thirds by the year

2015.⁴ World Health Organization (WHO) recommends that all newborn babies be exclusively breastfed for 6 months. Many studies from Brazil and Bangladesh have shown that education changed attitudes and practices that led to increased frequency of exclusive breastfeeding.⁵ The aim of this study was to assess the association between maternal illiteracy and frequency of childhood diarrhea.

SUBJECTS AND METHODS

This was a cross sectional study conducted by a structured interview of 200 mothers regarding frequency of diarrhea in their child between 1-2 years of age over a period of one year. One hundred children belonged to breastfed group and 100 to bottle fed group. All mothers lived in houses with piped water supply, filtered drinking water in

immediate neighborhood and latrines inside the house. All were entitled for free hospital care in Combined Military Hospital (CMH) Multan and all lived in the cantonment. Postgraduate and working mothers were excluded. Husbands' educational status varied between matriculate to intermediate and earning was between Pak Rs. 7000-9000/month. Diarrhea was defined as passage of 3 or more loose stools/day. The frequency was recorded over past one year. Also morbidity from diarrhea was scored on a scale of three, from diarrhea managed at home-1, requiring at least overnight admission plus IV fluids-2 and persistent diarrhea lasting >14 days-3. This was done for each episode of diarrhea and the scores were added.

Statistical analysis

Dependent variable diarrhea was analyzed for both groups of children after stratifying mothers education into 4 categories nil to class 3, class 4 to 9, matric and intermediate to graduate. Mean and standard deviation was calculated for quantitative variables and frequencies with percentages were presented for qualitative variables. One way Analysis of Variance test (ANOVA) was applied to see the significant difference of frequency and morbidity of diarrhea in all groups of education of mothers. P-value <0.05 was considered significant. The questionnaire was entered and analyzed on SPSS v.15.

RESULTS

There was similar age distribution in both arms and majority of children in the breast fed group were aged between 17-24 months (Table 1). Majority of the mothers belonged to the no education group in both arms (Table 2 and 3).

Table 1. Age distribution of study children.

	Breast fed group	Bottle fed group
Age Group (months)	Number (%)	Number (%)
12-16	37 (37)	33 (33)
17-20	36 (36)	43 (43)
21-24	27 (27)	24 (24)

The frequency of diarrhea was 2.8182 in the breast fed group for the uneducated and dropped steadily to 0.417 for the highly educated. For morbidity, a similar linear trend was noted varying between 4.04 to 0.42 for the uneducated to educated respectively (p=0.001) (Table 2).

Table 2. Frequency and morbidity of diarrhea in breast fed group.

Educational Status* n=100	Frequency of Diarrhea (mean ± SD)	Diarrhea Morbidity (mean ± SD)	P value
No education (55)	2.8182±1.4	4.04±1.6	0.001
Low (21)	1.0476±0.6	1.43±0.1	
Medium (12)	0.9167±0.7	1±0.7	
High (12)	0.4167±0.5	0.42±0.5	

*No education (0-3), Low (4-9), Medium (matric), High (Inter to graduate).

For the bottle fed group frequency and morbidity for diarrhea varied between 2.54 to 0.78 and 3.69 to 1 respectively (p=0.001). Morbidity for highly educated for diarrhea was 1 for bottle fed but only 0.42 for the breastfed group.

Table 3: Frequency and morbidity of diarrhea in bottle fed

Educational Status* n=100	Frequency of Diarrhea (mean ± SD)	Diarrhea Morbidity (mean ± SD)	P value
No education (54)	2.54±1	3.69±1.8	0.001
Low (25)	1.04±0.6	1.28±0.7	
Medium (12)	1.17±0.5	1.67±0.9	
High (9)	0.78±0.6	1±1	

group

*No education (0-3), Low (4-9), Medium (matric), High (Inter to graduate).

DISCUSSION

Despite nuclear capability of Indo-Pak subcontinent the standard of child and maternal health rank amongst one of the worst in the world.⁴ Approximately 99% of neonatal deaths take place in developing countries.⁵ The question to be answered is: Is education the magic bullet for improvement in children lives and health. For mortality studies, indirect mortality estimates are based on demographic censuses and surveys, and registered deaths and there may be significant recall and

reporting bias.⁶ For our survey, we designed a special calendar in which dates of key social and religious events during last year were identified. We chose class 4 as a cut off as many Pakistani female children attend primary school for 4 years. Even with this level of education, females are able to read the newspaper and gain knowledge from other media.

Caretakers in families with education were found to feed the children more frequently, with fresher food, and in cleaner, more protected places in a study from Bangladesh.⁷ Thus, a need for promoting more formal and non formal education has been suggested.⁸ In our study, we used a group with identical living and sanitary conditions to remove the effect of confounders. The frequency of diarrhea morbidity was especially high in bottle fed group in our study.

Here, presumably education led to better hygiene practice of sterilizing bottle and teats. Improving domestic hygiene practices is potentially one of the most effective means of reducing the global burden of diarrheal diseases in children.⁹ We chose morbidity in this small survey as it was not adequately powered to detect statistical significance of mortality. For the purpose of calculating disability in addition to calculating diarrhea episodes/year we calculated the disability on a scale of three with persistent diarrhea scoring highest.

This had very good correlation with literacy status as educated mothers are more likely to use oral rehydration salt and consult a doctor leading to decrease admission and persistent diarrhea rates. If we had only estimated diarrhea over the past 6 months, mother's memory was deemed to be more reliable but diarrhea has seasonal recurrence and only annual data can give correct estimate. The strength of our study is that we had strict control group to decrease the effect of confounding factors. In most international studies logistic regression analysis has been used to remove the effect of confounding factors. While most studies focus on diarrhea in the under 5 year group, due to our strict inclusion criteria we only enrolled children between 1-2 years. The analysis of Iranian District Health Survey (DHS) showed that reported morbidity was higher in children of literate mothers.¹⁰ This was at

variance with most other international studies and also our survey that suggests that even a little knowledge is beneficial. The only other survey that noted no positive effect of education was an Indian study where maternal education was linked to higher gender discrimination in children less than 5 years of age.¹¹

We deliberately excluded working women from the study as despite having education, on account of employment outside the house; their child would be looked after by a care taker and the child's health would crucially depend on the habits of the caregiver. Knowledge of oral hydration salt (ORS) was however low among uneducated mothers in our study. Relationship between maternal education and childhood diarrhea is also influenced by household wealth.¹² How does even a little bit of formal education change the behavior of women? A plausible explanation is the respect and obedience to authority, ability to follow a time table of routine. Hence educated women are able to seek and follow the dictates of health care providers.⁶ Maternal education leads to increase in the speed with which mother responds to child's illness. As shown in our survey, in addition to increase in frequency of diarrhea, illiteracy leads to higher morbidity due to poor maternal response. As one Nigerian said "If you think education is expensive try illiteracy."¹³

CONCLUSION

Maternal educational level is associated with improved neonatal and infantile survival. A case can be made for preference of female over male education as it contributes to more welfare than the

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male counterpart!

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