

LETTERS TO THE EDITORS

Diarrhea in Bangladeshi infants and its association with postnatal depression

Diarrhea is one of the most important causes of death among infants in developing countries. It has been estimated that globally 1.87 million children (0-5 year) die due to diarrhea, of which 73% are from just 15 countries including Bangladesh¹. In addition, recent epidemiological studies have also documented that one quarter of mothers in low income developing countries suffer from postnatal depression^{2,4}. Studies from Pakistan and India have found increased rates of poor physical and mental development among infants of depressed mothers^{5,6}. A systematic review of the research literature over the last 10 years suggests that such an association is more likely to occur among low socio-economic groups, and that infant undernutrition is especially strong where women face greater adversities and are less empowered⁷. Our earlier community based study in rural Bangladesh documented that 22% of mothers suffer from postnatal depression⁴ and the most recent estimates indicates that about 5.1% of deaths of children <5 years of age were attributed to diarrhea in Bangladesh⁸. The aim of the current study was to assess the risk of diarrhea and malnutrition among infants of mothers with postnatal depression.

The study covered 67 villages in Matlab, a subdistrict 55 km southwest of Dhaka, the capital of Bangladesh. An extensive Health and Demographic Surveillance System (HDSS) has been operational in Matlab for more than four decades, maintained by the International Centre for Diarrheal Diseases Research, Bangladesh (ICDDR,B). The longitudinal data collection system of Matlab and the unique identification number assigned to all residents in the HDSS area made it possible to identify participants and their children for this study at the community level and to link these with the HDSS routine database. Detailed information about the recruitment of study subjects has been described elsewhere⁴. Briefly, eight trained interviewers collected information from study participants at their home during pregnancy and at 6-8 weeks postpartum. To assess the psychological status of these women, a locally validated Bangla version of the Edinburgh Postnatal Depression Scale (EPDS-B) was used^{9,10}. Using a cut-off score of 10 on the EPDS-B and

excluding stillbirths, neonatal deaths, and infant deaths before the age of one year, a cohort of 318 mother-child pairs was obtained, of which 64 mothers had postnatal depression.

Information on infants' health had been collected by community health research workers (CHRWs) in the MCH area during their monthly home visits. Diarrhea was defined and diagnosed by asking mothers if their children had symptoms of diarrhea, i.e three or more loose stools per 24 hours with or without mucus or blood in 24 hours preceding the date of monthly visit¹¹. Pneumonia was defined and diagnosed by asking mothers if their children had symptoms of pneumonia, such as rapid breathing, breathing difficulty, chest indrawing and inability to suck breast milk (if child is <2 months old) in the preceding one week. Infants' nutritional status was measured by MUAC (mid-upper arm circumference). A MUAC of less than 110 mm was considered to indicate severe malnutrition while a measurement less than 136 mm indicated a risk for malnutrition.

In all, 318 mothers completed the one year follow up for their children. The mothers' age ranged from 16 to 40 years with a mean of 26.6 years (SD \pm 5.8 years). One fifth (21%) had no formal education and only 5% had education above 10 years of schooling. The majority were housewives (96%) and muslim (88.4%). Over half (59%) of the mothers lived with their children and husband (nuclear family). A majority (77%) of the mothers had only one room to live with their children. The main source of family income was agriculture, fishing and small scale business (48%). Less than 14% of households had modern sanitation facilities although more than 94% had access to clean drinking water through hand-pump tube wells.

A little over half (51%) of the babies were male. Of 318 infants, 94 (30%) had diarrheal illnesses with a maximum of 5 episodes, and 51 (16%) had pneumonia with a maximum of 3 attacks during the one year follow up period. Information on nutritional status was available for 250 (79%) infants. Of these, 5% had MUAC less than 124 mm and 29% had MUAC 125-135 mm indicating they were at risk for malnutrition. A list of variables was compared among depressed and non-depressed mothers in relation to

postnatal depression. None of these were significantly associated with depression status among mothers (Table I).

Table I: Mothers characteristics and her family status in relation to postnatal depression

Variables	Depressed n = 64	Non- depressed n = 254	p value
<i>Socio-demographic</i>			
Age: above 34 years	12 (18.8)	29 (11.4)	0.18
Education: no formal education	18 (28.1)	49 (19.3)	0.17
Occupation: Housewives	63 (98.4)	242 (95.3)	0.43
<i>Perinatal circumstances</i>			
Parity: primi mother	10 (15.6)	69 (27.2)	0.08
Place of delivery: home	30 (46.9)	108 (42.5)	0.63
Female sex of the infant	32 (50.0)	123 (48.4)	0.93
Exclusive breast feeding up to six months	10 (25.6)	43 (25.1)	1.00
<i>Family status</i>			
Income source: agriculture, day labor, small scale business, service [†]	32 (52.5)	119 (48.4)	0.67
Had agricultural land [†]	19 (40.4)	67 (29.8)	0.20
Living space: one room [†]	51 (86.4)	180 (75.0)	0.08
<i>Family hygiene</i>			
Source of water: tube well [†]	60 (98.4)	217 (92.7)	0.14
Sanitation: No modern latrine [†]	56 (91.8.)	207 (84.1)	0.19

Note: [†] Data not available on full sample; Data within the bracket are percentage

The only significant factor which was associated with infant diarrheal illness was the mother's psychological well being in the postnatal period (Table II). Infants of depressed mothers were at higher risk for diarrheal illness than infants of non-depressed mothers. There was no significant association observed between mother's educational attainment, drinking water supply, use of latrine, and early weaning with infants' diarrheal illness. Though non-significant, a positive association was found with infants' nutritional status and diarrhea.

Finally, logistic regression analysis was carried out on selected risk factors for diarrhea among infants of 318 mothers. Interestingly, the association between mothers' postnatal depression status and diarrhea

among their infants became more evident after controlling for confounding factors. Infants of postnatally depressed mothers were around twice (95% CI: 1.1- 3.5) at likely of having diarrhea than mothers who were non-depressed, all other factors being equal.

To our knowledge, this is the first study showing the association between postnatal depression and diarrhea among infants in Bangladesh. In this study, infants of depressed mothers were approximately twice at higher risk of diarrheal morbidity than infants of non-depressed mothers. Consistent with findings from another study, our findings suggest that postnatal depression was independently associated with increased episodes of diarrhea among infants¹². Although non-significant, our study also documented that infants' of depressed mothers were at increased risk for malnutrition.

Table II: Unadjusted relative risk of diarrheal episode within mother and other risk factors during infancy

	Diarrhea		p value
	Yes (n=94)	No (n=224)	
Postnatal depression	27 (28.7)	37 (16.5)	0.02
Mothers age >34 years	15 (16.0)	26 (11.6)	0.38
Mother had <6 years of schooling	46 (48.9)	103 (46.0)	0.70
Living in nuclear family	57 (60.6)	130 (58.0)	0.80
Had child(ren)	68 (72.3)	155 (69.2)	0.70
Female sex of infant	45 (47.9)	110 (49.1)	0.90
Used tube well water [†]	81 (94.2)	196 (93.8)	1.00
Used modern toilet [†]	9 (10.1)	35 (16.1)	0.20
MUAC <136 mm [†]	30 (41.1)	55 (31.1)	0.17
Weaning before 6 months of age [†]	40 (72.7)	113 (74.8)	0.90

Note: [†]Data not available on full sample; MUAC: mid-upper arm circumference; Data within the bracket are percentage

The mechanism of diarrheal illness is a complex process mediated by micro-organisms, individual immunity, environmental and socio-cultural factors including maintenance of hygiene practices. Although our study did not explore the ways in which postnatal depression operated to produce diarrheal illness among infants, the plausible explanation could be that depression among mother might have adversely impacted on their care practices for their infants. Postnatally depressed mothers are likely to be less attentive to food handling, food preparation and maintenance of personal hygiene for their children, all of which could contribute to increased

transmission risks of diarrhea. It is noteworthy to mention that although non-significant we found that infants who were at risk of malnutrition (MUAC<136 mm) were prone to diarrheal illness too. To block the physiological cycle of malnutrition-infection synergism, carrier roles have been found to be important.

The findings of this study suggest that routine screening and management of postnatal depression at the primary health care level in Bangladesh should be given serious consideration, given the increased risks of diarrhea and possible malnutrition among infants. Further research is needed to elucidate the possible links with nutrition and care giving for young children of mothers with postnatal depression.

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Ascitic fluid lipid profile and albumin level

Many diseases are complicated by the accumulation of free fluid within the peritoneal cavity (ascites). The most common cause of ascites is liver cirrhosis, but in about 20 percent of cases there is an extrahepatic cause¹. Serum ascites albumin gradient (SAAG) has been suggested to categorize ascites better than either the total protein concentration or other parameters²⁻⁴. If the SAAG is 1.1 g/dL or greater the patient is considered to have portal hypertension. Conversely if the SAAG is <1.1 the patient is unlikely to have portal hypertension. Several studies have proved a higher cholesterol gradient in ascites of patients with peritoneal carcinomatosis⁵⁻⁷. Like SAAG, serum ascites lipid gradient (SALG) is also a subtraction of serum and ascitic fluid values of lipid fractions, But till now only one study has been published on the significance of SALG in the differential diagnosis of ascites of different causes⁸. Regarding the necessity of more evaluations about the association between SALG and portal hypertension this study was designed to find a simple and cost effective test in order to differentiate between portal hypertensive (cirrhotic and non-cirrhotic) and nonportal hypertensive ascites.

The prospective study was carried out from July 2008 to July 2009 on 180 patients with ascites of four different etiologies: 75 patients with cirrhosis, 9 with portal vein thrombosis, 3 with idiopathic portal hypertension, 3 patients with leukemia and hepatic vein thrombosis, 45 patients with abdominal tuberculosis, 45 patients with intraabdominal malignancy and ascites. The diagnosis was made according to clinical manifestation and relevant investigations. Serum and ascitic fluid samples were collected simultaneously under aseptic technique from all patients on the day of admission. The serum and ascitic fluid lipid profile were estimated using automated analyzer (RANDOX laboratories Ltd.