Relationship between Maternal Perceptions and Preventive Behaviors Regarding Acute Diarrhea of Children in Bangladesh

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ABSTRACT

Diarrhea is the second leading cause of death among children younger than 5 years old worldwide. In Bangladesh it is responsible for sixty-nine thousand diarrheal deaths. It is imperative to understand maternal perceptions of acute diarrhea and their preventive behaviors. This descriptive correlation study aimed at determining the level of maternal perception and maternal preventive behaviors about acute diarrhea and to examine the relationship between them. This study framework was guided by the Health Belief Model (Rosenstock, 1974). One hundred and seven mothers were recruited who had children aged less than 5 years old admitted with diarrhea at the International Centre for Diarrhoeal Diseases Research Bangladesh (ICDDR,B). The questionnaire consists of three parts. These were a demographic characteristic questionnaire, maternal perceptions, and a maternal preventive behaviors questionnaire. This was used for data collection. Three experts ensured the content validity of the questionnaire. The internal consistency and reliability of the maternal perceptions of acute diarrhea questionnaire and the preventive behaviors of acute diarrhea questionnaire scales yielded .94, .84 respectively. Descriptive statistics and Pearson’s correlation were employed for data analysis. The results showed that overall maternal perceptions and maternal preventive behaviors were at high and moderate levels respectively. There was a significantly positive moderate correlation between maternal perceptions and maternal preventive behaviors. The results supported the health belief model. Health care personnel should provide a theory based health education program in order to improve maternal preventive behaviors with respect to children.

Keyword: Maternal Perceptions, Maternal Preventive Behaviors
Background and significance of the problem

Diarrhea is recognized as a major cause of child morbidity and mortality in developing countries (Banda et al., 2007; Gorter et al., 1998; Kosek, Bern, & Guerrant, 2003). It is the second leading cause of death among children under five years of age worldwide (BBS, Bangladesh Bureau of Statistics UNICEF, United Nations Children’s Fund, 2007; Larson, Saha, Islam, & Roy, 2006). Global deaths from diarrhea among children aged less than five years were estimated at 1.87 million in 2004 (Boschi-Pinto, Velebit, & Shibuya, 2008; Candy, 1987; Chiller et al., 2006; Khan et al., 2004; Larson et al., 2006). Seventy percent of these deaths are concentrated in 15 developing countries. Bangladesh is one of these 15 countries and diarrhea is responsible for sixty-nine thousands diarrheal deaths (Boschi-Pinto et al., 2008).

Diarrheal disease is still a major health problem in Bangladesh. The government of Bangladesh states that diarrhea kills an estimated 25,000 people annually, mostly children (IRIN, 2008). On a daily average, 180-200 diarrhea patients were admitted to the International Centre for Diarrhoeal Diseases Research, Bangladesh (ICDDR, B) hospital (IRIN, 2008). According to the ICDDR, B hospital’s statistical surveillance from 2004 to 2008, the total number of children with diarrhea in this hospital was 5596. An average of 1119 diarrhea children (under five) was admitted there annually. Causes of diarrhea were viruses, bacteria and parasites (Mishra, Gupta, & Yadav, 2004). Contaminated foods play a major role in the occurrence of diarrheal diseases. The transmission of infection occurs by direct contact with the agent, through oral–fecal transmission routes due to poor water quality, unhygienic behaviors, improper storage of food and inadequate sanitation practices (Halvorson, 2004). This may be because mothers lack of awareness about safe drinking water, hygiene practice, feeding children with hygienic food and defecation practices (IRIN, 2008).

Diarrhea is a disease that can be prevented by avoiding contacting with causative agents, but children under 5 years of age are unable to protect themselves from these agents. They are under the care of their mothers; therefore the maternal preventive behaviors for children are very important. There are many studies showing the incidence of diarrhea related to maternal behaviors including hygiene practices, child feeding practices, safe water and defecation practices (Banda et al., 2007; Chiller et al., 2006; Gorter et al, 1998; Khan et al., 2004; Nanan et al., 2003; Osumanu, 2008). Mothers are the closest persons to children. Their behaviors toward their children need to be explored, especially their preventive behaviors. A previous study showed that maternal behaviors were found to be related to their perceptions.
The results of Pancharuniti et al.’s study carried out in Vietnam indicated that maternal health beliefs towards diarreal diseases in children played a crucial role in their home management of acute diarrhea. Maternal perceptions on the susceptibility and severity of diarrhea and the benefits and barriers to maternal home care for diarrheal children were significantly correlated to maternal practices.

Although diarrheal disease is recognized as a major problem in Bangladesh, no studies on maternal preventive behaviors of diarrhea in children and maternal perceptions have been conducted. Therefore, this study is carried out in order to explore maternal perceptions and preventive behaviors of diarrhea in children. The results of the study will be used to enhance maternal preventive behaviors of diarrhea in children, which will reduce the incidence of diarrhea in children under five years of age. It can also fulfill the gap in knowledge of maternal preventive behaviors in diarrhea of children in Bangladesh.

**Objectives of the study**

Objectives of this study were to determine the level of maternal perceptions and maternal preventive behaviors regarding acute diarrhea in children. To examine the relationship between maternal perceptions and maternal preventive behaviors regarding acute diarrhea in children.

**Technical terms**

*Maternal preventive behaviors regarding acute diarrhea in children* refers to maternal actions in taking care of her child in order to prevent her child from contracting diarrhea. It consists of hygiene practices, child feeding practices, safe water practices and defecation practices.

*Maternal perceptions regarding acute diarrhea in children* refers to mother’s subjective perceptions about diarrhea in children. This is in regards to their perceived susceptibility to acute diarrhea, the perceived severity of acute diarrhea, the perceived benefits of practices and the perceived barriers to practices regarding acute diarrhea.

*Perceived susceptibility regarding acute diarrhea* refers to mothers’ beliefs about her child being susceptible to diarrhea.

*Perceived severity regarding acute diarrhea* refers to mothers’ beliefs as to the severity of diarrhea to her child.

*Perceived benefit of practices* refers to the mother’s belief in the benefit of preventive behaviors which expect to reduce the incidence of acute diarrhea.
Perceived barriers of practice refers to the mother’s beliefs on the obstacles to preventive behavior

Framework of this study

The framework of this study based on some parts of the Health Belief Model and literature reviews. The Health Belief Model (HBM) was originally formulated to explain preventive health behaviors and was proposed during the 1950’s as a framework (Rosenstock, 1974). The four main components of the model were applied to use in relation to maternal preventive behaviors (Figure 1). These were perceived susceptibility to disease, perceived severity of disease, and perceived benefits of taking action and perceived barriers to taking action. The study by Pancharuniti et al (2004) indicated that maternal behaviors were found to be related to their perceptions. In this study, perceived susceptibility to disease refers to a mother’s subjective perception of her child contracting a diarrheal disease. Perceived severity of disease refers to a mother’s perception of the seriousness of contracting a diarrheal disease. Perceived benefits and barriers of taking action refer to a mother’s belief regarding the effectiveness and obstacles preventive the practice of behaviors. Maternal preventive behavior is the activities or actions that mother perform/practice to protect their children from illness. Maternal behaviors include hygiene practices, child feeding practices, safe water and defecation practices (Banda et al., 2007; Chiller et al., 2006; Gorter et al., 1998; Khan et al, 2004; Nanan et al., 2003; Osumanu, 2008). According to the Health Belief Model, mothers will carry out preventive behaviors depending on their perceptions.

Maternal perceptions regarding acute diarrhea of children
- Perceived susceptibility of acute diarrhea
- Perceived severity of diarrhea
- Perceived benefits of practice
- Perceived barriers of practice

Maternal preventive behaviors regarding acute diarrhea of children
- Hygiene practice
- Child feeding practice
- Safe Water practice
- Defecation practice

Figure 1: Conceptual framework of maternal preventing behaviors regarding acute diarrhea in children.

Research Methodology

A descriptive correlational study was conducted at the International Centre for Diarrhoeal Diseases Research Bangladesh (ICDDR,B), Dhaka, Bangladesh. The sample consisted of 107 mothers who had children less than 5 years old admitted with diarrhea at the
first time in the ICDDR, B. The sample size was estimated using power analysis with an accepted alpha (α) level of 0.05 with the power (1- β) of 0.80, and the effect size was .27. A purposive sampling technique was used to select the sample in this study.

A structured questionnaire was used as the instrument for data collection. The instrument consisted of three parts including: a demographic characteristics questionnaire; a Maternal Perceptions of Acute Diarrhea Questionnaire (MPQ) (21 items); and a Maternal Preventive Behaviors Questionnaire (MPBQ) (28 items). A 5 point Likert’s scale was used for the MPQ using strongly agree=5, agree = 4, not certain = 3, disagree = 2, disagree = 1. A 5 point Likert’s scale was also used for the MPBQ with always = 4, very often = 3, often = 2, sometime = 1, never = 0. The levels of maternal perceptions were divided into three levels: Low = 1.00 – 2.33; Medium = 2.34 – 3.66; and High = 3.67 – 5.00. The levels of maternal preventive behaviors were also divided into three levels: Low = 0.00 – 1.33; Medium =1.34 – 2.66; and High = 2.66 – 4.00.

The items of the questionnaire were developed from the basic concept of the health belief model, and also on relevant literature reviews and from the previous studies. This was in order to assess the level of maternal perception and preventive behaviors on diarrheal children in Bangladesh. Content validity of the instrument was evaluated by the three experts, two from the Department of Pediatric Nursing, Faculty of Nursing, Prince of Songkala University, and one medical doctor from ICDDR, B, Bangladesh. The reliability of the instrument was determined with Cronbach’s Alpha Coefficient by using 20 samples who had the same inclusion criteria as the study subjects. The internal consistency and reliability of the maternal perceptions and preventive behaviors scales yielded .94, and .84 respectively. The questionnaire was first prepared in English and then translated into Bengali and back translated to English to maintain the structure of the content of the instrument. The human rights of the subjects were respected in this study. The subjects who agreed to participate in this study were assured that the data were kept confidential and reported as group data. The rights to refuse to participate in this study were all explained.

Data were analyzed by using a statistical computer program. Pearson’s Correlation statistics were used for testing the relationships. These were between the perceived susceptibility, the perceived severity regarding acute diarrhea, the benefits of preventive behavior, the barriers to preventive behavior, and the maternal preventive behaviors regarding acute diarrhea in children. All the assumptions for parametric testing were thus met.
Results

The results from the data analysis were presented and based on the purposes of the study. These data included the demographic characteristics, the levels of maternal perceptions, the maternal preventive behaviors and the relationship between maternal perceptions and maternal preventive behaviors.

Demographics characteristics of samples: Most mothers were Muslim (94 %) and nearly ninety percent (87.9%) of the mothers were housewives. More than 50 percent had secondary level education. In addition, approximately 67.3 percents of their diarrheal children were in the 2-12 months age group. The mean age of the children was 12.76 months (SD = 9.37, MIN= 2, MAX = 60). Most (78.4 %) of the children affected by diarrhea were males. The majority of the children (65.4 %) took breastfeeding/formula and solid food.

The level of maternal perceptions: Overall, maternal perceptions were at a high level ($\bar{x} = 3.83$, SD = .36). Three of the four subscales were at high level; these were perceived susceptibility to diarrhea, perceived severity of diarrhea, and perceived benefits of practice ($\bar{x} = 3.83$, SD =.53, $\bar{x} = 4.22$, SD =.55, $\bar{x} = 4.41$, SD =.64 respectively). The perceived barrier to practice was at a moderate level ($\bar{x} = 3.08$, SD =.71) (Table 1).

Table 1
Level of maternal perceptions regarding acute diarrhea of children under 5 years of age

<table>
<thead>
<tr>
<th>Maternal Perceptions</th>
<th>$\bar{x}$</th>
<th>SD</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived susceptibility regarding acute diarrhea</td>
<td>3.83</td>
<td>.53</td>
<td>High</td>
</tr>
<tr>
<td>Perceived severity regarding acute diarrhea</td>
<td>4.22</td>
<td>.55</td>
<td>High</td>
</tr>
<tr>
<td>Perceived benefits of practice</td>
<td>4.17</td>
<td>.51</td>
<td>High</td>
</tr>
<tr>
<td>Perceived barriers of practice</td>
<td>3.08</td>
<td>.71</td>
<td>Moderate</td>
</tr>
<tr>
<td>Overall maternal perceptions</td>
<td>3.83</td>
<td>.36</td>
<td>High</td>
</tr>
</tbody>
</table>

Levels of maternal preventing behaviors: The overall maternal preventive behaviors were at a moderate level ($\bar{x} = 2.60$, SD =.53). The maternal preventive behavior had four subscales, two of which, hygiene practices and child feeding practices, were both at a high level ($\bar{x} = 2.82$, SD =.48, $\bar{x} = 2.71$, SD =.65). The other two subscales, safe water practices and defecation practices were at a moderate level ($\bar{x} =2.65$, SD =.74, $\bar{x}=2.19$, SD =.94) (Table 2).
Table 2 Levels of maternal preventive behaviors regarding acute diarrhea of children under 5 years of age

<table>
<thead>
<tr>
<th>Maternal Preventive Behaviors</th>
<th>$\bar{x}$</th>
<th>SD</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hygiene practices</td>
<td>2.82</td>
<td>.48</td>
<td>High</td>
</tr>
<tr>
<td>Child feeding practices</td>
<td>2.71</td>
<td>.65</td>
<td>High</td>
</tr>
<tr>
<td>Safe water practices</td>
<td>2.65</td>
<td>.74</td>
<td>Moderate</td>
</tr>
<tr>
<td>Defecation practices</td>
<td>2.19</td>
<td>.94</td>
<td>Moderate</td>
</tr>
<tr>
<td>Overall maternal preventive behaviors</td>
<td>2.60</td>
<td>.53</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

The relationship between maternal perceptions and maternal preventing behaviors: Pearson’s Correlation was used to see the relationship between maternal perceptions and maternal preventing behaviors. It was found that there was a significantly moderate correlation between maternal perceptions and maternal behaviors ($r = .60, p < .01$). The perceived severity of diarrhea was also moderately correlated to maternal behaviors ($r = .55, p < .01$). Perceived susceptibility to diarrhea and perceived benefits of practices were weakly correlated with maternal behaviors ($r = .30, p < .01$, $r = .48 p < .01$ respectively). There was no significant correlation between perceived barriers to practices and maternal behaviors (Table 3).

Table 3 Pearson’s correlation matrix between maternal perceptions and maternal preventive behavior regarding diarrhea in children

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Perceived susceptibility of acute diarrhea</td>
<td>1</td>
<td>.24*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Perceived severity of acute diarrhea</td>
<td>.24*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Perceived benefits of practices</td>
<td>.17</td>
<td>.64**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Perceived barrier of practices</td>
<td>0.02</td>
<td>-.07</td>
<td>-.03</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Total maternal perceptions</td>
<td>.46**</td>
<td>.68**</td>
<td>.69**</td>
<td>.56**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6 Total maternal preventive behaviors</td>
<td>.30**</td>
<td>.55**</td>
<td>.48**</td>
<td>0.19</td>
<td>0.60**</td>
<td>1</td>
</tr>
</tbody>
</table>
Discussion

From this study it was found that overall maternal perceptions were at high levels ($\bar{x} = 3.83$, $SD = .36$). This was because three subscales out of the four subscales of perceptions (susceptibility, severity, benefit) were all at a high level. Only the perceived barriers were at a moderate level. This result was similar to the study of Sripituk (2006) which also found maternal perceptions were at high level except the low perceived barriers. This is possibly because mothers perceived their children to be susceptible to diarrhea, perceived the severity of diarrhea and perceived the benefits of taking preventive steps. But the perceived barrier of taking preventive behavior was at a moderate level. This was because there were some mothers (38%) who perceived exclusive breastfeeding as inconvenient. It was found that 6.5 percent of mothers were breastfeeding exclusively. This might be because of the Islamic belief that parts of women’s bodies must not be exposed to those who are not close family members (Shaikh & Ahmed. 2006). Therefore, some mothers felt exclusive breastfeeding to be inconvenient.

Overall, the level of maternal preventive behaviors was at a moderate level because among the four subscales, two subscales (hygiene practice and child feeding practice) were at a high level. However, other two subscales (safe water practices and defecation practices) were at a moderate level. Maternal preventive behaviors about hygiene practices and child feeding practices were at a high level. This might be because of the health education provided by health workers in hospitals. These two topics were emphasized by the mass media during an outbreak of diarrhea. Safe water practices and defecation practices are still health problems in Bangladesh because the infrastructure is lacking. Children are more likely to be exposed to water contaminated with pathogens (PATH, 2008). In this study half of the mothers never used boiled water for drinking and cleaned their utensils with ground water. Regarding defecation practices, defecation in open ground has been a common socio-cultural practice both in rural and urban areas (Local Government Division., 2008). Almost all of the children (98%) in this study still defecated in open fields. Most of the mothers never disposed of feces in toilets before cleaning the diapers. This might be because of a general common belief among people that children’s feces were not very harmful. As a result, they were not careful about the safe disposal of children’s feces. After children had defecated, mothers usually threw out the feces into drains, garbage pits and open places (Local Government Division., 2008).
There was statistically positive moderate correlation between maternal perceptions and maternal preventing behaviors ($r = .60, p = .01$). This was in accord with the Health Belief Model which mentioned that people will take action to avoid threats depending on their perceptions. This meant that maternal preventive behavior depended on their perceptions. The results of this study were similar to the study of Pancharuniti et al. (2004). This found that the maternal perceptions of susceptibility, severity of acute diarrhea, benefits of and barriers to practices on maternal home care for childhood diarrhea were significantly correlated to mothers’ practices.

**Conclusions and recommendations**

The findings of this study partially supported the health belief model. The maternal perceptions of acute diarrhea were at a high level whereas the maternal preventive behaviors were at a moderate level. There was a significantly moderate correlation between maternal perceptions (perceived susceptibility, perceived severity and perceived benefits) and maternal preventive behaviors regarding diarrhea in children. It is imperative for health workers to develop a theory-based health education program to improve maternal perceptions and maternal preventing behavior relating to diarrhea. Moderate relationships were found between perception and behavior. Therefore, future research needs to identify other relating factors that may contribute to maternal preventive behaviors regarding diarrhea in children, such as self-efficacy and cues to action.

**Acknowledgement**

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