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Measles Mumps and Rubella Vaccination Coverage among the Private University Students of Bangladesh: A Nonfunctional Health Belief Model

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Abstract

Among Measles Mumps and Rubella (MMR), the last is the most dangerous virus causing congenital birth defects or pregnancy related anomalies. Western countries are neutralizing them through MMR vaccine following Health Belief Model (HBM). However, the studies conducted in third world countries like Bangladesh very often negate the usefulness of HBM. The present study, hence, aims at testing the model in Bangladeshi context while determining MMR vaccination coverage. A survey questionnaire was designed and, to collect data, 384 students of Northern University Bangladesh (NUB) were selected based on simple random sampling using Fisher's formula. Further qualitative tools such as focus group discussion and in-depth interviews were used to understand the context, reasons for, and perceptions of health behaviours. At the bivariate level of analysis, respondents' perceived threat of Measles Mumps and Rubella as well as perceived benefits and self-efficacy of, and barriers to MMR vaccine were found to be significantly associated with some socio-demographic factors such as gender, marital status, family types, education, household size, household income, household goods, religion and household food security ($P<0.01$ & $P<0.05$). But no construct of HBM was found to be significantly related to receiving MMR vaccine. FGD and in depth interviews on perceived threat of rubella virus and benefits of MMR vaccine reveal that those threats and benefits perceived by the respondents were not culturally constructed and, even, myths and assumptions against MMR vaccine were strongly acculturated. The results suggest that in order to understand health behaviours and risk perceptions in a culturally sensitive setting like Bangladesh, HBM might be extended as a holistic

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approach by adding culture specific knowledge, beliefs, values, myths, assumptions, and survivability factors.

Keywords: MMR Immunisation, Perceived Susceptibility, Rubella Virus, Perceived Benefits, Perceived Barriers.

Background

Among MMR, Measles virus spreads quickly resulting in various complications and even deaths in spite of high quality care (Dannetun et al, 2004: 4228–4232). Mumps is an acute viral illness caused by a paramyxo virus. In the early stage of infection, mumps can have various complications such as orchitis, aseptic meningitis, and pancreatitis. On the other hand, Rubella is the most dangerous among them. Hundreds of years ago, rubella was perceived as a common disease somewhat like chickenpox today. In 1941, Normann Gregg, an ophthalmologist, reported cataracts in 78 infants, many of whom were also affected by congenital heart disease, deafness, blindness, eye defects, heart abnormalities, a small head, mental retardation, a slower than normal growth rate, and the injuries in the brain, liver and lungs (Gregg, 1941:35). Rubella infection in pregnant women may cause foetal death or congenital defects known as CRS. The worldwide epidemic of rubella in 1962-65 drew attention to the significance of CRS. During the epidemics, the rates of CRS per 1000 live births were 1.7 in Israel, 1.7 in Jamaica, 0.7 in Oman, 2.2 in Panama, 1.5 in Singapore, 0.9 in Sri Lanka, and 0.6 in Trinidad and Tobago (Cooper et al, 1995: 268; Cooper, 1985:52; Cutts, 1997: 55-68; Levin, 2007: 1132-33; Rotily, 2001: 331-41). The devastating aftermaths of rubella were reported as foetal abortion, stillbirth, and foetal malformation (Gregg, 1941:35; Milleret al, 1994: 213-19; Reef et al, 2000: 85-95; Strauss et al, 1989: 163-67). Also in Bangladesh, rubella forms a severe problem affecting all ages and sexes. A national study shows that sera from 609 pregnant women were tested where 86% were positive in rubella IgG. The prevalence rate was 80% between 15 and 20 years of age (Nessa et al, 2000: 75-81). Nessa et. al. (2008: 94) in their study on urban and rural Bangladeshi women showed that, in a total of 582 women in the child bearing age, 71.99 percent was positive in Rubella IgG that increased gradually with age. Rahman et. al. (2002: 811-17) conducted a study on 198 hearing-impaired and 200 without hearing impaired children where rubella antibody was detected as positive in 74% of the hearing-impaired children and in 18% of those with normal hearing.

In order to protect against rubella, MMR vaccine has already been introduced worldwide. At present, MMR II and *Priorix* (a combination

vaccine against measles, mumps and rubella) are also available. Most of the Western countries, by ensuring MMR vaccination coverage, have reduced almost 100 percent of rubella risk (DTB, 2012). All European Union countries have statistics on MMR vaccination coverage varying the rates for the second dose between 47.4% and 100% (WHO, 2005-10). In Belgium, two doses of MMR vaccine are recommended for 12 months old children and 10–12 years old adolescents (BSHC, 2007). In Flanders, northern region of Belgium, recommended MMR vaccine are offered at free of charge where parents seemed to be interested to accept the offer or to have their child vaccinated by a GP or pediatrician. In an EPI survey (1999), 83.4 % of the coverage of first dose was reported in 18- to 24-month-old toddlers in Flanders (Vellinga et al, 2001: 599-603). It is notable that the components of health seeking behavior models were found to be significant in those studies (see detail in the next section). However, in Bangladeshi context, no study has been hitherto conducted on MMR vaccination coverage based on any health seeking behavior model like HBM. The present study, hence, aims at testing the model in Bangladeshi context. The main purpose of the study is to explore if HBM constructs (see detail in figure-1) are significantly related to receiving MMR vaccine. In this case, the study has an endeavour *first of all* to explore the respondents' socio-demographic profile; *secondly*, to examine respondents' perceived susceptibility to and severity of rubella virus as well as perceived benefits of, barriers to and self-efficacy of receiving MMR vaccine by socio-demographic factors; *thirdly*, to examine the respondents' status of receiving MMR vaccine by their socio-demographic features; *fourthly*, to determine the degree of association between vaccination against MMR and respondents' perceived susceptibility to and severity of rubella virus as well as perceived benefits of, barriers to and self-efficacy of receiving MMR vaccine; and *finally*, to determine the degree of association between the vaccination against MMR and cues to action (e.g., media, reminders, personal influence).

HBM in the field of MMR vaccination

Numerous studies investigated whether HBM can predict MMR vaccination. But most of these studies were conducted in European contexts where HBM constructs were found to be significantly associated with health seeking behavior and MMR vaccination coverage.

For example, Smith et. al. (2011: 135-146) found in their study that compared to parents who neither delayed nor refused vaccines, parents who delayed and refused vaccines were significantly less likely to believe

that vaccines were necessary to protect the health of children (70.1% vs. 96.2%), that their child might have got a disease if they were not vaccinated (71.0% vs. 90.0%), and that vaccines were safe (50.4% vs. 84.9%). Children of parents who delayed and refused also had significantly lower vaccination coverage e.g. measles-mumps-rubella (68.4% vs. 92.5%). Smith et. al. also detected that the socio-demographic differences of those respondents were significantly related to their perception and beliefs of MMR vaccination coverage. In other words, parents who delayed and refused vaccine doses were more likely to have vaccine safety concerns and perceive fewer benefits associated with vaccines. Bond and Nolan (2011: 943) found in their study that immunisers, incomplete immunisers and non-immunisers interpreted severity and susceptibility to diseases and vaccine risk differently. According to the study findings, they found a connection between the different perceptions of those respondents and their dread, unfamiliarity, uncontrollability from risk and ambiguity, and optimistic control and omission bias from explanatory theories of decision-making under uncertainty. Immunisers dreaded unfamiliar diseases whilst non-immunisers dreaded unknown, long term side effects of vaccines. Participants believed that the risks of diseases and complications from diseases were not equally spread throughout the community, therefore, when listening to reports of epidemics, it is not the number of people who are affected but the familiarity or unfamiliarity of the disease and the characteristics of those who have had the disease that prompts them to take preventive action. Almost all believed they themselves would not be at serious risk of the ‘new strain of flu’ but were less willing to take risks with their children’s health. In other words, this study found that health messages about the risks of disease might be unproductive as these messages were perceived as unbelievable or irrelevant. This study has several implications beyond the issue of childhood vaccinations as we fight with communicating risks of new epidemics, and may resolve the current dialects, especially in the United Kingdom, of how these theories of risk and decision-making can be tooled to move forward other health behaviours. Vandermeulen et. al. (2008: e428-34) conducted a study aiming at measuring the coverage and influencing determinants of MMR vaccination in 14-year-old adolescents in Flanders, Belgium, in 2005. A total of 1500 adolescents living in Flanders were selected with a 2-stage cluster sampling technique. 80.6% for the first dose and 83.6% for the second dose of MMR were found to be completed. Only 74.6% of the adolescents had proof of 2 MMR vaccines. Univariate logistic regression showed that unemployment of the father was detrimental for vaccination

status, in contrast to partial employment of the mother, which was a favorable factor. Previously unreported determinants of lower coverage rates inferred from this study were single divorced parents, larger families, lower adolescent educational level, enrollment in special education, and repeating a grade. Insufficient documentation was found to be a major barrier in this vaccination coverage study. More attention should go to those with the lowest coverage rates, such as adolescents from large families, with separated parents, and with a lower socioeconomic background. Downs et. al. (2007: 1595–1607) surveyed on 30 US parents of children aged 18–23 months, recruited from three cities with diverse socio-demographic profiles and vaccination attitudes, to identify predominating cognitive pathways in decision making about vaccination. According to the study findings, health oriented category (n = 16) trusted anecdotal communication more than statistical arguments and risk oriented category (n = 14) trusted communication with statistical arguments more than anecdotal information. Benin et. al. (2006: 1532-41) conducted a study on 33 US mothers recruited post-partum in one hospital or in the care of participating midwifery practices in one US state to determine attitudes towards vaccinating; risks and benefits of vaccination; and requirements for, and sources of, information. Respondents categorized into groups, based on behaviours and attitudes. As reported by the respondents, there were two main categories– Vaccinators (n = 25) with sub-categories: 'acceptors' (n = 20) and 'vaccine hesitant' (n = 5). Non-vaccinators (n = 8) with subcategories: 'late (or partial) vaccinators' (n = 3) and 'rejectors' (n = 5) who refused all vaccines. Gust et. al. (2005: 81-92) studied on 584 samples of US parents with at least one child aged 6 years and under. Administering 44 questions about beliefs and attitudes towards vaccination, they found 3.9% of children without recommended immunisations. They also found five attitudinal categories: 'immunisations advocate' (33%); 'go along to get along' (26%); 'health advocate' (25%); 'fence sitter' (13%); and 'worried' (2.6%). Menon et. al. (2003: 891–898) in their research on "Beliefs Associated with Fecal Occult Blood Test and Colonoscopy Use at a Worksite Colon Cancer Screening Program" assessed beliefs associated with fecal occult blood test and colonoscopy use among participants of a worksite colon cancer screening program. Randomly selected employees, aged 40 and older, were mailed a survey on CRC screening-related beliefs. Instruments were tested for reliability and validity. Results indicated that fecal occult blood test use was significantly associated with being female, Caucasian, having low perceived barriers, and provider recommendation. Colonoscopy use was

significantly associated with higher knowledge, lower barriers, higher benefits, higher self-efficacy, and provider recommendation.

The findings of the above studies indicate the usefulness of HBM in the pitch of vaccination coverage. Bangladeshi studies have also focused on HBM in analyzing many public health issues like HIV/AIDS, vaccination status, success of family planning, reproductive health behaviour of adolescent, and so forth. In the recent past, socio-psychological and cultural factors have been considered as central to those dimensions of health seeking behavior (Amanullah and Uddin, 2009: 363-380). Amanullah and Uddin (2009: 363-380) examined the usefulness of HBM in determining health behavior of individuals involved in hospital waste management and tested four components of HBM related to demographic variables, knowledge, and occupational practices of the respondents. The study conducted by them found HBM as dysfunctional. As reported by them, the waste pickers had a lower level of knowledge, attitude, and safe practices than nurses and sweepers. Perceived Susceptibility and Perceived Severity were moderately associated with safe occupational practices among the respondents ($p < 0.05$). In addition, respondents with higher levels of education and income were more likely to have higher levels of Perceived Susceptibility, Severity, and Benefits. The study findings indicate that individuals with greater economic vulnerability might be at greater risk for not using proper protective measures in handling or picking hospital wastes in Bangladesh.

However, In Bangladeshi context none has hitherto, conducted sociological study on if the components of HBM were effective in determining MMR vaccination. Hence, the present study has attempted to examine the relevance of HBM in determining MMR immunisation of the study population.

Theoretical framework: Health Belief Model

The HBM was primarily developed by social psychologists in the 1950s. The U.S. Public Health Service aimed at explaining the failure of disease preventive programs (Hochbaum, 1958; Rosenstock, 1960: 295–302; Rosenstock, 1974: 354–386; Rosenstock et al, 1988: 175–183; Rosenstock et al, 1994). The model added, later, to the inclusion of studying people's responses to symptoms (Kirscht, 1974: 2387–2408) and their behaviors in response to a diagnosed illness, mainly adherence to medical regimens (Becker, 1974: 324–473). The HBM encompasses some "primary concepts that predict why individuals will take action to prevent, to screen for, or to control illness conditions; these include

susceptibility, seriousness, benefits and barriers to a behavior, cues to action, and most recently, self-efficacy" (Champion & Skinner, 2008: 45-65). According to HBM, to avoid risk behaviour, an individual must perceive the threat of a particular disease as severe and susceptible, the benefits of and barriers to a prescribed action and the self-efficacy to perform that action. In addition, socio-demographic factors have indirect effects on likelihood of action or behavior through influencing the perceived susceptibility, severity, benefits, barriers and self-efficacy (Champion & Skinner, 2008: 45-65). Figure1: illustrates the relationships among HBM constructs and vaccination against MMR.

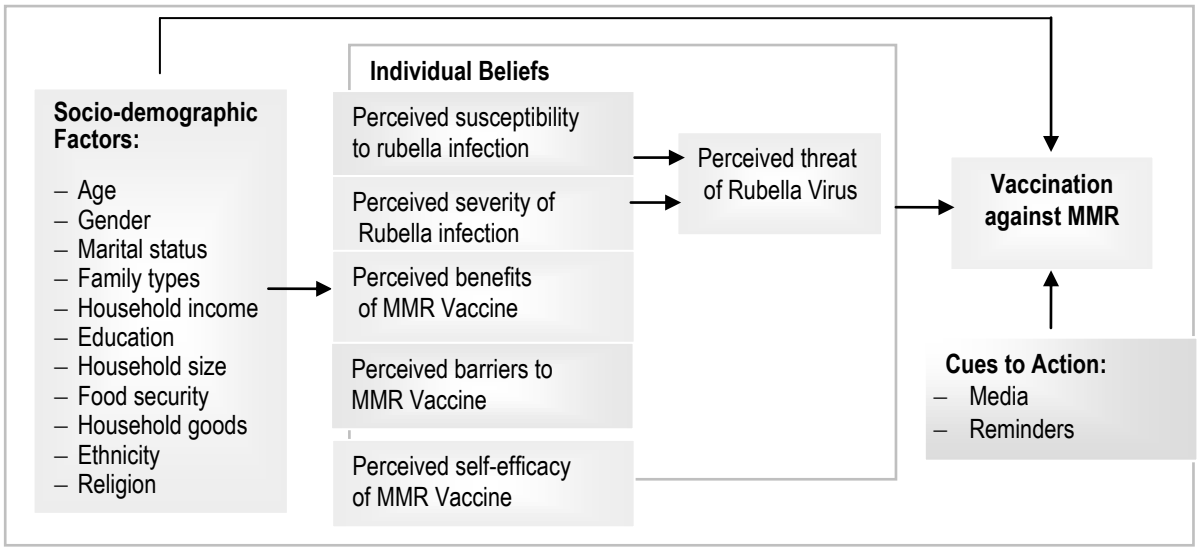

Figure-1: Conceptual Framework of the Study.

However, socio-structural variables that are absolutely absent in this model are also central to affecting personal behavior like immunization behavior and risk practices (Amanullah, 2004; Matsuda, 2002; Uddin, 2007). Because of its too much dependency on psychological factors, there has been trenchant criticism of HBM model. This model primarily depends on an individual's cognition instead of focusing on cultural values, myths, assumptions, and survivability factors in which most risky behavior are embedded (Amanullah, 2002; Douglas, 1994).

Study design and methods

Study population and data collection

The study is based on mixed methods but quantitative in focus. Data have been collected from the study areas from September to October 2013 based on both quantitative and qualitative approaches. A structured questionnaire survey was conducted in order to obtain quantitative data. Also qualitative tools such as FGD and in-depth interviews were used to

authenticate the quantitative results of the study. While collecting data using questionnaire technique, Northern University Bangladesh (NUB) was selected by considering the fact that most of the students were well trained about the threat of rubella virus on the foetus and pregnant women as well as the benefits of MMR vaccine through arranging special classes and seminars. Once NUB was selected, the required number of respondents was selected based on simple random sampling using Fisher's formula (see the formula below) [12].

Fisher's Formula:

$$n = Z^2PQ/ d^2 = (1.96)^2 (0.5) (0.5)/ (0.05)^2 = 384$$

Where,

n = *the desired sample size;*

z = *the standard normal deviate, usually set at 1.96 which corresponds to the 95 percent confidence interval*

p = *the proportion in the largest population estimated to have a particular characteristics*

q = *1.0-p;*

d = *degree of accuracy desired, set at 0.05 in this study*

However, while collecting data some target respondents were found to be unavailable. In this situation, alternative respondents were selected in order that the overall sample size was achieved.

Data analysis and ethical issues

After the completion of the fieldwork, SPSS for Windows (Version 20) was used for coding data and getting the statistical findings. Responses based on the components of Health Belief Model were listed and coded. Prior to main analyses, data were assessed for univariate and bivariate outliers. Confirmatory factor analysis was done to evaluate the validity and reliability of the measures from the survey. Statistical significance of associations was examined using Phi statistics. Notably, binary logistic regression model could not be administered in the present study since vaccination against MMR was not found to be significantly associated with HBM components using Phi statistics at 5 or 1 percent level of significance. Voluntary sharing of the respondents as well as confidentiality of their information was strictly maintained. While interviewing the respondents, force and coercion were avoided and their privacy was safeguarded.

Results and discussion

Socio-demographic profile of the respondents

In total respondents participated in our study. The majority of the respondents were from age group from 20 to 25 years (Mean, 23 years &

SD 2.8 years) (Table 1). 54% were male in terms of marital status; most of the respondents were found to be unmarried (94.0 %). More than 97 percent reported that they practiced patriarchy. As reported by nearly 92.94 percent respondents, their monthly incomes exceeded Tk. 20,000 with mean value of Tk. 30052 and standard deviation of Tk. 6890. The majority of the respondents (64.3 %) were taught of the danger of rubella virus and benefits of MMR vaccine and the rest of them were not taught of the same. 55.7 percent of the respondents had more than 2 family members. Nearly 97 percent of the respondents had food security. In terms of rich household goods, the highest proportion of the respondents answered positively (74 %). Above 97 percent respondents were found Bengali and the percentage of Muslim was 82.

The above socio-demographic features of the respondents definitely indicate that they can afford to bear the costs of MMR vaccine. In the next section, it will be explored if they have been vaccinated against MMR or not. Then it will be palpable if HBM is effective in the study area or not. And, if HBM is not effective, an alternative or modification suggested by the respondents will be revealed in determining the coverage of MMR vaccine in Bangladeshi context.

Respondents' status in terms of MMR vaccination

Almost all the respondents did not receive MMR vaccine while only 1% received the vaccine. The study finds that most of the respondents (98.70 %) are not vaccinated against MMR while a negligible portion of the respondents (1.30 %) received MMR vaccine. Though some of the respondents were well trained and educated about the susceptibility and severity of rubella virus and the benefits of MMR vaccine, very negligible portion were vaccinated. However, among those who had been vaccinated, all received two doses of MMR vaccine (See Graph-1 & Table- 2).

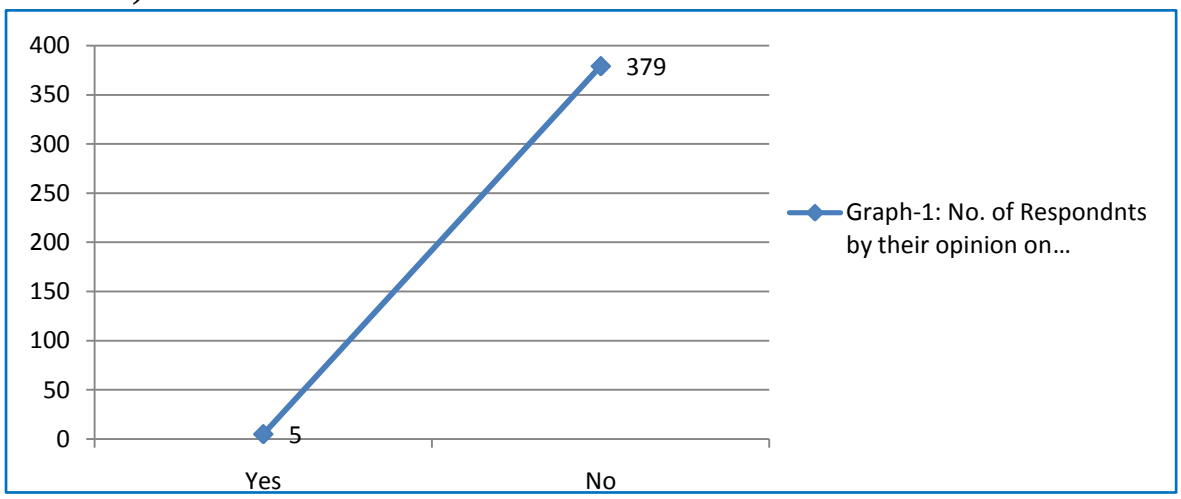

Table 2: Respondents' Status of Vaccination by Dose of MMR

Respondents' Distribution by Dose of MMR	No. of Respondents	Percentage of Respondents
One Dose is Received	0	0
Two Doses are Received	5	100
Total	5	100

Association between selected socio-demographic factors and the respondents' perception

Usually, socio-demographic factors play a significant role in changing perception level of individuals. The present study also shows a similar picture.

Table 3: Summery Table of Cramer's Phi Values* on the Respondents' Perception on Rubella Virus and MMR Vaccine by Socio-demographic Factors

Socio-demographic Factors	Perceived Susceptibility	Perceived Severity	Perceived Benefits of MMR Vaccine	Perceived Barriers to Receiving MMR Vaccine	Perceived Self-efficacy
Age	Phi= -.049	Phi= -.044	Phi= -.039	Phi= .068	Phi= -.066
Gender	Phi= .766†	Phi= .748†	Phi= .741†	Phi= .222†	Phi= -.214†
Marital Status	Phi= -.314†	Phi= -.309†	Phi= -.303†	Phi= -.835†	Phi= -.856†
Family Types	Phi= .197†	Phi= .193†	Phi= .189†	Phi= .562†	Phi= -.577†
Household Income	Phi= .194†	Phi= .177†	Phi= .181†	Phi= .070	Phi= -.025
Education	Phi= .994†	Phi= .978†	Phi= .961†	Phi= .284†	Phi= -.275†
Household Size	Phi= 1.000†	Phi= .983†	Phi= .967†	Phi= .282†	Phi= -.273†
Household Food Security	Phi= .096	Phi= .114‡	Phi= .110‡	Phi= .470†	Phi= -.483†
Household Goods	Phi =-.135†	Phi= -.132†	Phi= -.141†	Phi= -.095	Phi= .064
Ethnicity	Phi= -.054	Phi= -.057	Phi= -.059	Phi= -.040	Phi= .039
Religion	Phi= -.153†	Phi= -.160†	Phi= -.138†	Phi= -.057	Phi= .053

* For the above nominal level variables, Phi (for 2×2 cross table) tests are used (See Ref. 7 for details about the criteria on applying measures of association).
† Significant at the 0.01 level
‡ Significant at the 0.05 level

Table-3 shows that respondents' perceived susceptibility to and severity of rubella infection as well as perceived benefits of and barriers to MMR vaccine were found to be positively associated at 1 percent level of significance ($P<0.01$) with some socio-demographic factors such as gender, marital status, family types, education and household size. At the same level of significance, household income, household goods and religion were affiliated to respondents' perceived susceptibility to and severity of rubella infection as well as their perceived benefits of MMR vaccine. However, household food security was found to be related to

perceived severity of rubella virus and benefits of MMR vaccine with P< 0.05, and to perceived barriers to receiving MMR vaccine with P< 0.01. This statistics are not unusual but consistent with many studies in both developed and developing countries. But, interestingly, almost all socio-demographic factors were negatively associated with perceived self-efficacy of receiving MMR vaccine.

Association between selected socio-demographic factors and the respondents' vaccination against MMR

Though the socio-demographic factors have a significant impact on the respondents' perception on rubella virus and MMR vaccine, and most of the respondents in Northern University Bangladesh knew well about rubella virus and its complexities during pregnancy due to attending seminars and open discussion forum among students and teachers, receiving MMR vaccine was found to be associated neither with socio-demographic factors nor with the perception status of respondents (for detail in table- 4 and table -5). That is, Phi statistics of age (0.06 with P> 0.05), gender (0.06 with P> 0.05), marital status (0.07 with P> 0.05), family types (0.02 with P> 0.05), household income (0.03 with P> 0.05), education (0.04 with P> 0.05), household size (0.04 with P> 0.05), household food security (0.03 with P> 0.05), household goods (0.07 with P> 0.05), ethnicity (0.02 with P> 0.05) and religion (-0.07 with P> 0.05) clearly show that HBM is not effective in the field of MMR immunization in Bangladesh. Interestingly, most of the students (64.32 %) who were well trained and educated 1 year ago are yet to be vaccinated (See Table-1). Phi statistics clearly indicate that the present study contradicts with several studies conducted in European contexts.

Table 4: Summery Table of Cramer's Phi Values* on the Respondents' Vaccination against MMR by Socio-demographic Factors

Socio-demographic Factors	Receiving MMR Vaccine	Approx. Sig.
Age	Phi= .06	.25
Gender	Phi= .06	.24
Marital Status	Phi= .07	.18
Family Types	Phi= .02	.70
Household Income	Phi= -.03	.52
Education	Phi= .04	.46
Household Size	Phi= .04	.46
Household Food Security	Phi= .03	.58
Household Goods	Phi =.07	.18
Ethnicity	Phi= .02	.71
Religion	Phi= -.07	.20

For example, vaccination against MMR has been associated with socio-demographic factors such as educational status (Borra`s et al, 2009: 69-72; Fielding et al, 1994: 525-30; Haidinger et al, 1996: 194-200; Lowery et al, 1998: 221-25; Miller, 1994: 213-19; Suarez et al, 1997: 845-48; Vandermeulen et al, 2008: e428–34; Vellinga et al, 2001: 599-603), family income (Bates et al, 1994: 1105-10; Fielding et al, 1994:525-30; Lowery et al, 1998: 221-25; Markuzzi et al, 1997: 133-43; Suarez et al, 1997: 845-48; Waldhoer et al, 1997: 145-49), occupational position (Reading et al, 1994: 1142-44), age (Miller, 1994: 213-19; Suarez et al, 1997: 845-48), ethnicity (Fielding et al, 1994: 525-30; Haidinger et al, 1996: 194-200; Lowery et al, 1998: 221-25; Markuzzi et al, 1997: 133-43; Strobino et al, 1996: 1076-83; Suarez et al, 1997: 845-48; Vandermeulen et al, 2008: e428–34; Vellinga et al, 2001: 599-603), family size (Miller, 1994: 213-19; Strauss et al, 1989: 163-67; Strobino et al, 1996: 1076-83; Vandermeulen et al, 2008: e428–34), marital status (Bates et al, 1994: 1105-10;Lowery et al, 1998: 221-25;Waldhoer et al, 1997: 145-49), employment status (Haidinger et al, 1996: 194-200; Lowery et al, 1998: 221-25; Markuzzi et al, 1997: 133-43; Vandermeulen et al, 2008: e428–34; Vellinga et al, 2001: 599-603), household goods (Strobino et al, 1996: 1076-83) and parent-related factors (Rotily et al, 2001: 331-41; Skinner et al, 1998: 546-49; Wright and Polack, 2006: 137-42).

When the students were asked to opine why they were not vaccinated though they could afford the cost of MMR vaccine as evident from their socio-economic condition, especially household income, educational status, food security and household goods (for detail in Table-1), one of the FGD participants puts it:

> Though the household income of our family is satisfactory, I did not receive the vaccine. If the vaccine is offered free, I would like to receive it. She, for instance, reasoned that 9 months old babies have access to taking MR vaccine for it has been recently incorporated in our national immunization list. So, we expect from Gob to offer the vaccine free for all the people of our country, she added (23-year-old Zannatul Ferdous, BBA student, NUB). There was no objection from other FGD participants against this view.

In order to get in-depth information, a dialogue which was advanced between the researcher and respondents selected for in-depth interview is as follows:

Table 5 Dialogues between investigator and a respondent who was not vaccinated against MMR

Investigator: Do you mind if I take few minutes to talk about your own status of MMR vaccination?

Respondent: Ah, no. In fact I didn't receive MMR.

Investigator: OK, can I continue my talk so as to comprehend the root cause of your decision?

Respondent: Yeah, OK.

Investigator: Can I get the permission to ask you about how MMR is important to prevent from rubella infection and its complexities?

Respondent: Well, in fact, rubella doesn't result in a moribund situation. But, it has severe impacts on pregnant women and foetus.

Investigator: You're right but I'm concerned about knowing your status of vaccination against MMR.

Respondent: I knew everything about the benefits of MMR vaccine. But it's costly. That's why, it wasn't received.

Investigator: Well, if GoB offers this vaccine free for all, then?

Respondent: Definitely, I'll be vaccinated against MMR.

Investigator: Do you mind if I ask whether MMR vaccine is affordable for you?

Respondent: Ah, no. I think I can afford it. But all are like me.

Investigator: Well, if others would receive MMR, then?

Respondent: There would've had a possibility to receive it.

Investigator: Many many thanks for your patience.

Respondent: OK, thanks.

This dialogue clearly shows that that free offer of MMR vaccine and cultural construction is necessary for making MMR vaccination program successful.

Association between perception of the respondents and receiving MMR vaccine

From the Table-5, it is evident that receiving MMR vaccine is not significantly related to the individual health perception related factors such as perceived susceptibility to and severity of rubella virus (Phi value

of 0.04 with P<0.05), perceived benefits of and barriers to MMR vaccine (Phi values of 0.04 & -0.07 with P< 0.05), as well as perceived self-efficacy to receive MMR vaccine (Phi value of 0.07 with P< 0.05).

Table 5: Summery Table of Cramer's Phi Statistics on Receiving MMR Vaccine by their perceptions on rubella virus and MMR vaccine

Respondents' Perception	Receiving MMR Vaccine	Approx. Sig.
Perceived Susceptibility to Rubella Virus	Phi= .04	.45
Perceived Severity of Rubella Virus	Phi= .04	.44
Perceived Benefits of MMR Vaccine	Phi= .04	.42
Perceived Barriers to Receiving MMR Vaccine	Phi= -.07	.17
Perceived Self-efficacy of Receiving MMR Vaccine	Phi= .07	.15

This result is inconsistent with Champion's study on the behaviours of breast self-examination [13-14] and mammography [15]. In 1984, Champion developed and validated scales for perceived susceptibility, severity, benefits, and barriers to breast self-examination. A perceived severity scale was developed but dropped due to the lack of variance and predictive power [13]. Several studies have showed parental beliefs as the cause of their refusal of MMR vaccination but mainly in young children and seldom in older children and adolescents [20, 29, 51].

Association between cues to action and receiving MMR vaccine

Usually, cues to action play a significant role in utilizing three basic communication processes: awareness, instruction, and persuasion. However, the present study shows a different picture in taking MMR vaccine. Table-6 shows that there is no significant affiliation of receiving MMR vaccine with media exposure (Phi statistic of 0.08 with P< 0.05), reminder (Phi of 0.07 with P< 0.05) and personal influence (Phi of 0.07 with P< 0.05).

Table 6: Summery Table of Cramer's V Statistics on Selected Cues to Action

Cues to Action	Receiving MMR Vaccine	Approx. Sig.
Media	Phi= .08	.12
Reminder	Phi= .07	.17
Personal Influence	Phi= .07	.15
† Significant at the 0.01 level		

The respondents from the study areas reported that in spite of availability of and accessibility to media and reminder, they could not take MMR

vaccine due to the lack of social construction of MMR vaccine. As an FGD participant puts it:

> We have learned a lot about the risks of rubella virus and the benefits of MMR vaccine. Recently, different private TV channels are telecasting the severity of rubella virus and the benefits of MMR vaccine. But, we are not enthusiastic to receive the vaccine. I think, this issue should be socio-culturally constructed and MMR vaccine should be offered free and supported by GOs and/or NGOs in our country (22-year-old Rabeya, LLB student, NUB).

Another FGD participant opines

> Though we have learned about rubella virus in this University, we do not find any poster or campaign regarding Rubella virus and its severity. That is why, social awareness regarding this perilous virus has not been created till now. GoB and NGOs should be more concerned with this dangerous virus to save the women and to protect birth defects, we think. We want to be emancipated from the attack of the virus. We are surprised at the reluctance of GoB in offering MR vaccine for all the people of our country and in limiting MR vaccine within new born babies (23-year-old Sanzida, CSE student, NUB).

Conclusion

The main objective of the study was to explore if HBM constructs were significantly related to receiving MMR vaccine. The study findings reveal that though respondents' perception (i.e., perceived susceptibility to and severity of rubella infection as well as perceived benefits of, barriers to and self-efficacy of MMR vaccine) was found to be significantly associated with most of the socio-demographic factors (see Table-3), no construct of HBM was found to be significantly related to receiving MMR vaccine (see Table-4, Table-5 and Table-6). Thus, the present study contradicts with several studies conducted in European contexts (For example see Borra`s et al, 2009: 69-72; Fielding et al, 1994: 525-30; Haidinger et al, 1996: 194-200; Lowery et al, 1998: 221-25; Miller, 1994: 213-19; Suarez et al, 1997: 845-48; Vandermeulen et al, 2008: e428–34; Vellinga et al, 2001: 599-603; Bates et al, 1994: 1105-10; Waldhoer et al, 1997: 145-49; Reading et al, 1994: 1142-44; Strobino et al, 1996: 1076-83; Strauss et al, 1989: 163-67; Rotily et al, 2001: 331-41; Skinner et al, 1998: 546-49; Wright and Polack, 2006: 137-42; Helwig et al, 1998: 676–80; Klein, 1989 : 1687). However, the result of the present study is partially consistent with those of Uddin (2007), Matsuda (2002) and Amanullah (2002 & 2004) where too much dependency of HBM on

psychological factors instead of focusing cultural values, myths, assumptions, and survivability factors in which most risky behavior are embedded was seriously criticized.

The study, hence, suggests that initially MMR vaccine should be offered free for all people irrespective of ages, gender and races and thus MMR vaccination program will be socio-culturally constructed. Finally, the study recommends developing HBM as a holistic approach by adding culture specific knowledge, beliefs, values, experiences, myths, assumptions, and survivability factors in order to achieve a more culturally sensitive context for understanding health behaviors and risk perceptions of the concerned individuals. The study also recommends for the future researchers to conduct rigorous studies in this field including a large number of private universities of Bangladesh as the current study includes only NUB considering the fact that sufficient campaign oriented to dangerous impacts of rubella virus on the foetus and pregnant women was administered in this university through arranging seminar and class room as well as open discussion.

Abbreviations

MMR: Measles, mumps and rubella; HBM: Health belief model; NUB: Northern University Bangladesh; FGD: Focus group discussion; CRS: Congenital rubella syndrome; IgG: Immunoglobulin-G; GP: General practitioner; EPI: Expanded program on immunization; SPSS: Statistical package for the social sciences; SD: Standard deviation;

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