

Hepatitis B and C Infection and Exposure to Risk Factors among the Primary School Teachers in a Northern City of Bangladesh

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To determine the prevalence of hepatitis B and C infection and assess the exposure to risk factors of hepatitis B and C virus infection, hepatitis B vaccination status and also to disseminate basic information on hepatitis, jaundice, hepatitis B and C among the primary school teachers in a northern city of Bangladesh this study was carried out in 500 primary school teachers in Rangpur city from July 2011 to December 2011. A Bengali questionnaire containing questions regarding socio-demography of the participant and exposure to risk factors of HBV and HCV infection was administered and five ml of venous blood was taken from each for testing for HBsAg and Anti-HCV. The data were recorded and analyzed using Microsoft Excel and SPSS v-20 computer program. Majority of the teachers (71%) were female. Only two cases (0.4%) were positive for HBsAg and none for Anti-HCV (0%). Three hundred nineteen (64%) were vaccinated in childhood under EPI programme and 454 (91%) against tetanus. But only 85 (17%) were vaccinated against HBV and almost all were female (82). One hundred ninety five (39%) received injections in previous year and 83 (17%) received multiple injections. Eighty eight (18%) of participants received blood transfusion, females (74) significantly dominated the situation. Two hundred twenty one (44%) underwent surgical procedures and 244 (48%) dental procedures. Females underwent significantly more surgical and dental procedures (61%, 47%) than the males (24%, 32%). Sixty six (13%) had liver disease and jaundice in the past, with a significant male dominance (38) and 125 (25%) had family history of liver disease. One hundred seven (74%) of our male participants had been circumcised by local unregistered doctors and Hazam (who performs circumcision in a local, traditional, unregistered method). One hundred eighty five (37%) had to undergo surgical procedure of various degrees and received injections following injury and accidents and no significant difference was observed between male and female. One hundred twenty three (85%) of male participants used to go barber shop for shaving and 50% of females used to go beauty parlor. Three hundred twenty seven (92%) of females had their ear/nose pierced. Fifty four (11%) of respondents underwent tattooing and acupuncture with a significant female (51) dominance. Thirty (6%) gave family history of HBV infection and none for HCV infection. Though the prevalence of HBV and HCV infection was found to be very low among the primary school teachers but the exposure to risk factors were quite high. On the other hand, HBV vaccination status was found to be low, only 17%. So, health awareness programs and educational workshops are needed for the teachers, who can later educate the children and thereby can play important role in preventing HBV and HCV infection.

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Introduction

Viral hepatitis is a major public health problem in all parts of the world.¹ It is a significant cause of morbidity and mortality, especially in developing countries. An estimated 350 million people worldwide are chronic HBV carriers, representing approximately 7% of the total population^{2,3} and it causes one million deaths annually.⁴ In Bangladesh HBV related liver diseases are important cause of morbidity and mortality. The reported prevalence of hepatitis B virus infection in general population, healthy job seekers, professional blood donors, prostitutes and drug addicts in different locality of Bangladesh were 7.2%, 7.5%, 19-29%, 8.7%, 6.2% respectively.⁵⁻⁹ Hepatitis C virus (HCV) is the major cause of transfusion associated non-A, non-B hepatitis and continues to be a major cause of liver disease throughout the world. HCV infection is found in approximately 3% of the world's population, accounting for 160 million people.^{10,11} The burden of HCV-related chronic liver disease in Bangladesh has increased. But there are a few studies on sero-prevalence of hepatitis C virus infection in Bangladesh. Studies done by Khan M et al.,⁷ in professional and non-professional blood donors, by Shirin T et al.,⁹ among injectable and non-injectable drug abusers, by Laura Gibney et al.,¹² in a population of Bangladesh Tracking industry showed prevalence of HCV infection 1.2% , 0.0%, 24.8%, 5.8% and <1% respectively . Knowledge of the causes and risk factors for HBV & HCV is of utmost importance in preventing the spread of the diseases. Since primary school teachers are in an excellent position to pass these information to the upcoming, this study was designed to determine the prevalence of HBV and HCV infection and assess the exposure of the primary school teachers in Rangpur city, Bangladesh to the risk factors of hepatitis B & C infection and their HBV vaccination status and to disseminate basic information to the teachers on hepatitis, jaundice, hepatitis B and hepatitis C.

Methods

The study was conducted in 500 primary school teachers from the primary schools in Rangpur City. The study was conducted from July 2011 to December 2011. With the kind permission and co-operation of Upozilla education officer and

Assistant Upozilla education officers (AUEO) we arranged the sessions during their cluster training program when teachers from different schools became available in a particular venue. After getting formal permission to approach the teachers, we explained the purpose and objectives of the study to the teachers and administered the questionnaire to obtain information on socio-demography and potential risk factors for HBV and HCV transmission. The questionnaire was in Bengali language. The questions gathered the following information: relating socio-demography- age, gender, educational level, number of family member, marital status and monthly income and factors pre-disposing to the transmission of hepatitis B and C - number of injections received in the last year, vaccination status, history of surgery , blood or blood products transfusion, dental treatment, treatment following an accident/injury, history of tattooing or acupuncture treatment, ear/ nose piercing, Jaundice or diagnosis of HBV or HCV infection among participants, siblings, parents or other family members, Saloon shaving and regarding circumcision. After taking filled questionnaire sheet, there were question and answer sessions regarding hepatitis, jaundice, hepatitis B and hepatitis C virus infection. Then, informed written consent was obtained from each individual for testing for HBV and HCV infection. We collected five ml of venous blood from each for testing for HBsAg and anti-HCV. The tests were performed with hepatitis B and hepatitis C one step rapid test device (Distinct, made in China). The data were recorded and analyzed using Microsoft Excel and SPSS v-20 computer program. Descriptive statistics of socio-demographic variables and other characteristics of the sample population were computed. Chi-square test was used to find out statistical significance.

Results

We found only 2 cases (0.4%) positive for HBsAg (confirmed by ELISA method) and none (0%) for Anti HCV. A 30 year old young man who was positive for HBsAg had no family history of liver disease and HBV infection but he had been circumcised by Hazam and frequently went to barber shop for shaving. The other 55 year old man who was positive for HBsAg had no personal and family history of liver disease but circumcised

by unregistered doctor and sometimes went to barber shop for shaving and had a history of receiving acupuncture treatment.

The study participants ranged in age from 20 to 57 years, and about 55 % of them were young, between the ages of 20 and 40years. Most of the teachers were female, 71% (355 out of 500). A

significant number of the teachers had master's degree, 39% (194 out of 500). But most of the teachers were in the low income group ranging 5000 to 15000 taka per month, 67% (333 out of 500). Most of them were married, 89% (443 out of 500, Table I).

Table I: Socio-demographic profile of the participants

S#	Demographic Features	n (%)	Male (%)	Female (%)
<i>Gender</i>				
	Gender Distribution	500	145 (29%)	355 (71%)
<i>Age Group (In years)</i>				
	20-30	94 (18.8)	12 (8.27)	82 (23.09)
	31-40	181 (36.2)	61 (42.06)	120 (33.80)
	41-50	153 (30.6)	47 (32.41)	106 (29.85)
	> 50	4 (0.8)	3 (2.06)	1 (0.28)
	No Response	68 (13.6)	22 (15.06)	36 (10.14)
<i>Marital Status</i>				
	Married	443 (88.6)	139 (95.86)	304 (85.63)
	Unmarried	55 (11.0)	6 (4.13)	49 (13.80)
	Widow	2 (0.04)	-	2 (0.56)
<i>Academic Qualification</i>				
	SSC	44 (8.8)	12 (8.27)	32 (9.01)
	HSC	123 (24.6)	61 (42.06)	62 (17.46)
	Bachelor	134 (26.8)	32 (22.06)	102 (28.73)
	Masters	194 (38.8)	40 (27.58)	154 (43.38)
	No Response	5	-	5
<i>Monthly Income</i>				
	5000-10000	141 (28.0)	50 (34.48)	91 (25.63)
	10001-15000	192 (38.4)	58 (40.0)	134 (37.74)
	15001-20000	42 (8.4)	10 (6.89)	32 (9.01)
	20001-25000	2 (0.4)	1 (0.68)	1 (0.28)
	No Response	123 (24.6)	26 (17.93)	97 (27.32)

Table II: EPI & TT Vaccination Status

Risk Factors	Total Subjects=500	Percentage	Male (%) (n=145)	Female (%) (n=355)	P-value
<i>Did you receive vaccines (EPI) in your childhood?</i>					
Yes	319	63.8%	71 (48.96)	248 (69.85)	<0.001
No	181	36.2%	74 (51.03)	107 (30.14)	
<i>Did you receive TT injection for tetanus?</i>					
Yes	454	90.8%	122 (84.13)	332 (93.52)	<0.001
No	46	9.2%	23 (15.86)	23 (6.47)	

Table III: Risk Factors of HBV & HCV infection

Risk Factors	Total Subjects=500	Percentage	Male (%) (n=145)	Female (%) (n=355)	P-value
<i>How many times did you receive injections in last 1 year?</i>					
Once	112	22.4%	27 (18.62)	85 (23.94)	<0.01
More than one	83	16.6%	14 (9.65)	69 (19.43)	
No	305	61.0%	104 (71.72)	201 (56.61)	
<i>Did you ever receive blood transfusion?</i>					
Yes	88	17.6%	14 (9.65)	74 (20.84)	<0.01
No	412	82.4%	131 (90.34)	281 (79.15)	
<i>Did you ever donate blood?</i>					
Yes	128	25.6%	54 (37.24)	74 (20.84)	<0.001
No	327	74.4%	91 (62.75)	281 (79.15)	
<i>Did you ever under go any surgery on your body?</i>					
Yes	241	48.2%	35 (24.13)	216(60.84)	<0.001
No	249	57.6%	99 (68.27)	139 (39.15)	
<i>Did you under go any dental procedure in a clinic/hospital?</i>					
Yes	212	42.4%	46 (31.72)	166 (46.76)	<0.01
No	228	57.6%	99 (68.27)	189 (53.23)	
<i>Did you ever suffer from liver disease/ jaundice?</i>					
Yes	66	13.2%	38 (26.20)	28 (7.88)	<0.001
No	434	86.8%	107 (73.8)	327 (92.11)	
<i>Did your mother suffer from any liver disease?</i>					
Yes	37	7.4%	18 (15.65)	19 (5.35)	<0.01
No	463	92.6%	127 (84.34)	336 (94.64)	
<i>Did your any family member suffer from liver disease?</i>					
Yes	125	25%	26 (17.93)	99 (27.88)	<0.05
No	375	75 %	119 (82.06)	256 (72.11)	
<i>Who did your circumcision?</i>					
MBBS doctor/Hospital	24	4.8%	24 (16.55)	-	-
Unregistered doctors/Hazam	107	95.2%	107 (83.44)	-	
<i>Did you receive treatment for injury/ accident?</i>					
Yes	185	37%	61 (42.06)	124 (34.92)	>0.10
No	315	63%	84 (57.93)	231 (65.07)	
<i>Did you receive hepatitis B vaccines?</i>					
Yes	85	17%	3 (2.0)	82 (23.09)	<0.001
No	415	83%	142 (98.0)	273 (76.90)	
<i>Do you go Barber saloon for shaving?</i>					
Yes	123	84.82%	123 (84.82)	-	-
No	22	15.17%	22 (15.17)	-	
<i>Do you go beauty parlor?</i>					
Yes	179	50.42%	-	179 (50.42)	-
No	176	49.57%	-	176 (49.57)	
<i>Did you ever pierce your nose/ ears?</i>					
Yes	337	67.4%	10 (6.89)	327 (92.11)	-
No	163	32.6%	135 (93.10)	28 (7.88)	
<i>Did you ever tattooing your body or receive acupuncture treatment?</i>					
Yes	54	10.8%	3 (2.06)	51 (14.36)	<0.001
No	446	89.2%	142 (97.93)	304 (85.63)	
<i>Is any member of your family suffering from hepatitis B virus infection?</i>					
Yes	30	6%	12 (8.27)	18 (5.07)	>0.10
No	470	94%	133 (91.72)	337 (94.92)	
<i>Is any member of your family suffering from hepatitis C virus infection?</i>					
No	493	98.6%	143 (98.62)	350 (98.59)	-
No response	7	1.4%	2 (1.37)	5 (1.40)	

EPI and TT vaccination status of the participants is shown on Table II. A significant proportion (64%) of teachers were vaccinated in their childhood under EPI programme and vaccinated against tetanus (91%). Data on exposure to risk factors of hepatitis B and C among the primary school teachers are presented in Table II. One hundred ninety five (39%) of respondents received injections in previous year and some of them, 17% (83) received multiple injections. Eighty eight (18%) received blood transfusions at least once during their life time. Female participants (21%) received transfusions significantly more than the males. A significant proportion of participants, 241 (48%) underwent surgical procedure and dental procedures, 212 (42%). Females underwent significantly more surgical and dental procedures (61% and 47%) than the males (24%, 32%). Sixty six (13%) had liver disease and jaundice in the past with a significant male dominance (38). One fourth (25%) participants had family history of liver disease. A significant number of male participants, 107 (74%) had been circumcised by local unregistered doctors and Hazam. One hundred eighty five (37%) had to undergo operations of various degrees and received injections following accidents/ injury and no significant difference was found between male and female. Three hundred two (60%) used to go barber shop and or beauty parlor. One hundred twenty three (85%) male used to have barber shaving and 50% of females used to go beauty parlor. Three hundred ninety one (78%) underwent some sorts of body parts piercing procedures. Almost all, 327 (92%) of the female respondents pierced their nose/ear. Fifty four (11%) of participants underwent tattooing and acupuncture treatment with a significant female (51) dominance. Thirty (6%) gave family history of hepatitis B infection but none of the participants gave family history of hepatitis C infection.

Discussion

In our study, we have found a very low rate of prevalence of HBV infection among the primary school teachers in comparison to other studies done in Bangladesh. This is probably due to increase in awareness regarding hepatitis B & C infection and healthy socio-economic background of the participants. We found no person infected with hepatitis C virus. In our study, hepatitis B vaccination among primary school teachers was 17% (85) which is much lower than the rate (37%) among primary school teachers in Karachi.¹³

The current study has some limitations. First, the sample size was not large. Second, we did not include hepatitis B core antibody, anti HBS and liver function tests as doing so would have increased the costs. However, our findings provided essential information that highlights the need to strengthen the awareness program on hepatitis B and C in educating the population on the risk of the diseases.

Use of syringes was found in 39% (195) of the respondents and 17% (83) of them received multiple injections in last 1 year. The meta-analysis of previous studies supported that subjects who received more injections were more likely to be infected. Unsafe injections currently account for a significant proportion of all new hepatitis B and C infections. Several epidemiological studies have shown that at least 20% of all new HBV infections are due to unsafe injections in developing countries. At least 50% of injections are unsafe. Average 95% of all injections are therapeutic, the majority of which were judged to be unnecessary.¹⁴⁻¹⁷

A significant proportion of teachers underwent surgical procedures (48%) and dental procedures (42%) posing them in a high risk of HBV and HCV infection. In a

study Qureshi H et al., showed a significantly increased risk of HBV and HCV infections following dental treatment.¹⁸ In a review article Mahboobi N., and her colleagues concluded that dental treatment can be included among the risk factors of HBV and HCV infection.¹⁹

Quite a good number of male participants (74%) had been circumcised by unregistered doctors or Hazam. This could be a potential risk for HBV and HCV infection. In a study Nwokediuko S C and co-authors found significant difference between the HBsAg sero-prevalence in the circumcised group and in the uncircumcised group.²⁰

Body piercing culture was found to be very high in our participants. Almost all of our female participants had their ears and nose pierced which could be a risk for HBV and HCV transmission. Jafari S et al., showed in a systematic review and meta analysis that tattooing is associated with hepatitis B transmission in all sub groups.²¹

We found 85% of our male participants used go barber shop for shaving which could be a risk for HBV and HCV transmission. Jimenez et al., showed barber shaving as a significant factor in the community transmission of hepatitis B virus in Egypt.²²

A significant proportion (25%) of participants had a family history of liver disease and a personal history of liver disease and jaundice (13%), revealing that liver disease is very common. Qureshi H et al., showed a significantly increased risk of HBV and HCV infections among family members.¹⁸ We found about 18% of participants had a history of blood transfusion which could be a potential risk for HBV and HCV transmission.

There was a significant difference observed in male and female teachers with respect to their exposure to certain risk factors. Male teachers were more exposed to risks associated with the visits to the barber shop, circumcision, injury and accidents related injections and surgery and low HBV vaccination rate. Female teachers, on the hand, were more vulnerable to HBV and HCV infection from excessive surgical procedures, dental procedures, blood transfusion, ear/nose piercing, tattooing and acupuncture. In a study among primary school teachers in Karachi, Mustufa et al., found nearly similar findings.¹³ The risk of HBV and HCV transmission among primary school teachers of the Northern City of Bangladesh does not appear to be different from that of general population.

Though we have found a very low rate of HBV and HCV infection in primary school teachers but they were exposed to various risk factors. By arranging health awareness programs and educational workshops, knowledge of the risk factors to be disseminated to the all primary school teachers in Bangladesh, so that they can teach the upcoming generation and thereby can play an important role in preventing HBV and HCV infection.

Courtesy: Roche Bangladesh Limited

References

1. Kao JH, Chen PJ, Lai MY, Chen DS. Occult hepatitis B virus infection and clinical outcomes of patients with chronic hepatitis C. *J Clin Microbiol* 2002; 40:4068-4071.
2. Colin WS, Edgar PS, Lyn F. Hepatitis B virus infection: Epidemiology and vaccination. *Epidemiologic reviews* 2006; 28:112-125.
3. Zaki H, Darmstadt GL, Baten A, Ahsan CR, Shaha SK. Seroepidemiology of

- hepatitis B virus infection in Bangladesh. *J Trop Pediatr* 2003; 49 :371-374.
4. Mahoney FJ. Update on diagnosis, management and prevention of hepatitis virus infection . *Clin Microbiol Rev* 1999; 12:351-366.
 5. Islam MN, Islam KMN, Islam N. Hepatitis B virus infection in Dhaka, Bangladesh. *Bang Med Res Council Bull* 1984; x(1).
 6. Khan M,Ahmed N. Seroepidemiology of HBV and HCV in Bangladesh.*Int Hepatol Journal.*1996; 5:27-29.
 7. Khan M, Hussain M, Yano M, Hashizume K, Yusuf M, Tanaka E, Matsumoto A, et al. Comparison of seroepidemiology of hepatitis C in blood donors between Bangladesh and Japan. *Gastroenterol Jpn* 1993; 28(Suppl.5):28-31.
 8. Sattar H, Islam MN. Hepatitis B virus among the prostitutes of Dhaka, Bangladesh.*Med Res Council Bull* 1996 Apr; 22(1):8-11.
 9. Tahmina Shirin,Tahmeed Ahmed, Anwarul Iqbal, Munirul Islam, Nazrul Islam. Prevalence and risk factors of hepatitis B, Hepatitis C and Human Immunodeficiency Virus infections among the Drug addicts in Bangladesh.
 10. Zou S, Tepper M, Giulvi A. Current status of hepatitis C in Canada. *Can J Public Health* 2000; 91:510-516.
 11. Arora DR, Sehgal R,Gupta N,Yadav A,Mishra N, Siwach SB. Prevalence of parenterally transmitted hepatitis viruses in clinically diagnosed cases of hepatitis. *Indian Journal of Medical Microbiology* 2005; 23:44-47.
 12. Laura Gibney, Saquib N, Metzger J, Chowdhury P, Siddiqui MA, Hassan MS. Human immunodeficiency virus, hepatitis B and C in Bangladeshs trucking industry-prevalence and risk factors. *International Journal of Epidemiology* 2001; 30:878-884.
 13. Mustafa MA, Memon AA, Nasim S, Shahid A and Omar SM. Exposure to risk factors for hepatitis B and C viruses among primary school teachers in Karachi. *J Infect Dev C tries*2010; 4(10):616-620.
 14. Simonsen L, Kane A, Lloyd J, Zaffran M, and Kane M. Unsafe injections in the developing world and transmission of blood borne pathogens: a review. *Bulletin of the World Health Organization*, 1999, 77 (10).
 15. Kane A, Lloyd J, Zaffran M, Simonsen L, and Kane M. Transmission of hepatitis B, hepatitis C and human immunodeficiency viruses through unsafe injections in the developing world: model-based regional estimates. *Bulletin of the World Health Organization*, 1999, 77 (10).
 16. Simonsen L et al. Unsafe injections in the developing world and transmission of blood borne pathogens: a review, *Bulletin of the World Health Organization*, 1999, 77: 789-800.
 17. EPI information system, global summary. Geneva, World Health Organization, 1998: 26 (unpublished document WHO/EPI/GEN/98.10., available upon request from Essential Drugs and Other Biologicals, World Health Organization, 1211 Geneva 27, Switzerland).
 18. Qureshi H, Arif A, Riaz K, Alam S E, Ahmed W and Mujeeb S A. Determination of risk factors for hepatitis B and C in male patients suffering from chronic hepatitis. *BMC Res Notes.* 2009; 2: 212. Published online Oct 23, 2009.
 19. Mahboobi N, Porter S R, Karayiannis P, Alavian S M. Dental treatment as a risk factor for hepatitis B and C viral infection. A review of the recent literature. *J Gastrointestin Liver Dis*, March 2013 Vol. 22 No. 1: 79-86.
 20. Nwokediuko S C and Ijoma U. Relatively high seroprevalence of hepatitis B surface antigen in female civil servants in Enugu

State of Nigeria. *Euroasian Journal of Hepato-Gastroenterology*, January-June 2011; 1 (1): 19-22.

21. Jafari S, Buxton J A, Afshar K, Copes R, and Baharlou S. Tattooing and risk of hepatitis B: A systematic review and meta-analysis. *Can JPublic Health* 2012; 103 (3): 207-12.
22. Jimenez A P, El-Din N S, Hoseiny M E, Daly M E, Hamid M A, Aidi S E, Sultan Y, Sayed N E, Mohamed M K, and Fontanet A. Community transmission of hepatitis B virus in Egypt: results from a case control in greater Cairo. Published by Oxford University Press on behalf of the International.