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Prevalence and Risk Factors of Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV) Infections among Prisoners Admitted to DMCH

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Abstract **Original Research Article**

Background: There are approximately 66 thousand prisoners remained in 68 prisons in Bangladesh. (source: Kara Adhidoptar, Bangladesh). So these number of prisoners suffers from different diseases. Prisoners are associates with various high risk of infectious diseases, as a result of the possibility of transmission of infections in prisons surroundings. A high prevalence of blood borne hepatitis viruses and HIV carried out in correctional facilities around the world by investigations have shown. There are limited data on medical disorders among prison inmates in Bangladesh. The study was aimed at confirming prevalence of HIV, hepatitis B and hepatitis C as well to assess knowledge and attitudes related to HIV, HBV and HCV infections among prisoners admitted to DMCH who referred to medicine department and/ or attended out-patient department in DMCH. ***Objective:*** To determine the prevalence and risk factors of HIV, HBV and HCV infection among prisoners referred to tertiary care hospital. ***Methods:*** This cross sectional study was done with a total number of 100 inmates over a period of one year. Prisoners, imprisonment for more than six months and who gave consent voluntarily were included in the study. After taking consent from the patient's/guardians history was taken and physical examination was done. Sample was selected from the population by purposive sampling technique. Data were analysis was done using SPSS version 22.0. Result was expressed in tables and graphs. ***Results:*** The results showed a significantly higher seroprevalence of HBV (6%) and HCV (4%) though no prisoner was found to be HIV positive compared to the seroprevalence of these virus infections reported in the general Bangladeshi population (5.8% for HBV and 0.3% for HCV). Exposure of risk factors estimated H/O foreign travels 12%, IV drug abuse 14%, extramarital sexual exposure 16%, sharing of needle 10%, H/O blood transfusion 08%, family H/O diseases 05%, immunization of hepatitis B only 8% and homo sexuality 0%. Risk factors for HBV infection was estimated-family h/o disease 20%, IV drug abuse 7.10%, sharing of needles & syringes 10%, sexual exposue12.50%, blood transfusion 12.50%. Risk factors for HCV infection was estimated -IV drug abuse 7.10%, sexual exposue6.25%, sharing of needles & syringes 20%. Risk factors for HIV infection 0% for all risk factors as no one was HIV infected. Among the IDUs 14% was HBV positive and 30% was HCV positive. ***Conclusion:*** The results indicate higher prevalence of HBV and HCV infections among prisoners which has proven that HBV and HCV are the emerging public health problem in a developing country like Bangladesh. Various risk factors contribute to raise prevalence of hepatitis B, hepatitis C and HIV in prisoners. So avoidance from these risk factors is essential to prevent transmission of infection in prison. So health education and dissemination of message about the moods of transmission of these diseases is very important in prison.

Keywords: Prevalence, Risk factors, HIV, HBV, HCV.

INTRODUCTION

There are three purposes are generally cited for imprisonment: deterrence, punishment, and rehabilitation. The first two purposes often conflict with the third yet. By differences in the definitions of crime and in the incidence and duration of incarceration, the perceived balance between these three purposes varies historically and geographically, and is expressed internationally. By lock upon lock; heavy doors slam shut, securing criminals from the surrounding community, prisons are surrounded by large loops of razor wire atop impenetrable walls and secured inside. But prisons are open, not closed societies. Administrators, staff, guards, inmates can come and go. Punishment, correction and rehabilitation in the prisons may conflict with the aims of health care and the goal of the community. The main issues in prison health care are mental health, substance abuse and communicable diseases [1]. People admitted to correctional facilities often have a history of injecting drug use, needle-sharing, and high-risk sexual behaviors [2-4]. These risky behaviors frequently continue during incarceration [5-7] and hence lead to a high transmission of blood-borne viruses, such as human immunodeficiency virus (HIV), hepatitis B virus (HBV), and hepatitis C virus (HCV) in this group of people [8-10]. The spread of these infections continues at an alarming rate worldwide. This pandemic has created a dramatic, often devastating, impact on many countries including Bangladesh. Due to the similar route of transmission of HIV, HBV and HCV, intravenous drug abusers are considered one of the leading high-risk groups [11]. Although HIV and HBV are known to be transmitted sexually but HBV and HCV appear to be less efficient than is the case for HIV. Therefore, it is not surprising to find that some patients with HIV are co-infected with HBV and /or HCV. On the natural history of these infections, the co-infection has a pronounced effect. Although the effect of HBV infection on HIV infection is uncertain, HIV appears to have marked influence on the natural history of HBV infection [12, 13]. Viral hepatitis which is affecting billions of people globally is a serious global public health problem. Due to the lack of health education, poverty, illiteracy and lack of hepatitis B vaccination, hepatitis B virus (HBV), hepatitis C virus (HCV) infections are rapidly spreading in the developing countries including Bangladesh. Also there is lack of information on their prevalence among the general population [14]. Factors contributing to the development of human immunodeficiency virus (HIV), Hepatitis B virus (HBV) and hepatitis C virus (HCV) infections among prisoners: duration of staying in prison, foreign travels, no. of prisoner in a prison, I/V Drug abuse, sharing needle, Extra-marrital Sexual exposure, HBV immunization status, sexual habit: either-Homo or Hetero sexuality, blood transfusion history, any family history of HIV, HBV and HCV infections and H/O contact with HIV, HBV and HCV infected patients. The prevalence of both HBV and HCV infections was associated with sharing of needles and longer duration of injecting drugs used. The seroprevalences of HBV infection in both IDUs and non-IDUs was significantly higher among those who had a history of extramarital and premarital sex [15]. Among IUDs in Bangladesh buprenorphine and pethidine are the primarily injected drugs, although injecting of other substances mixed together is widely used [16]. HBV is responsible for10-35% cases of acute viral hepatitis, 35.7% cases of fulminant hepatic failure, 33.3-40.5% cases of chronic hepatitis and 46.8 % cases of hepatocellular carcinoma (HCC) in Bangladesh. HCV is responsible for chronic liver disease and HCC [17]. HBV spread through contact with infected body fluids and human is the only natural host, blood is the most important vehicle for its transmission but other body fluids including semen and saliva also been implicated [18, 19]. To the best of our knowledge there is no published data regarding the burden of HIV, HBV and HCV infections among prisoners in Bangladesh Assessment of the prevalence of infectious conditions in these populations is needed as the growth of Bangladesh prison population is increasing day by day. The aim of this study, therefore, was to determine the prevalence of HIV, HBV and HCV infections among prisoners in Bangladesh and try to identify the risk factors associated with these infections in this specific population. By estimating the prevalence and risk factors of these conditions in prison systems in Bangladesh, we may begin to better understand and predict the impact of these conditions on correctional and community health care systems. So, a population-based serological survey was conducted in Dhaka to determine the prevalence and risk factors of HBV, HCV and HIV infections.

OBJECTIVE OF THE STUDY

General Objectives

To determine the prevalence and risk factors of HIV, HBV and HCV infection among prisoners referred to tertiary care hospital.

Specific Objectives

- To assess the knowledge about HIV, HBV and HCV among the study groups.
- To describe the attitude about these diseases.
- To measure the association between risk behaviors, in particular injecting drug use, and prevalence.
- To find out the extent of self-reported risk behavior in prisoner. To calculate the percentage of HBV immunization in prisoners

MATERIALS AND METHODS

This was a Cross-sectional observational study. To selection the patient's purposive sampling methods was applied. The study conducted on January 2015 to December 2015. The Prisoners with various medical disorders admitted to medicine unit and/or attending outpatient department of Medicine of Dhaka Medical College Hospital (DMCH), Dhaka, Bangladesh was included in this study and 100 sample sizes were covered.

Inclusion Criteria

All prisoners suffering from medical disorders admitted to Medicine department and / or attending outpatient department of Medicine of DMCH. Prisoners aged 18 years or more were included in the study. Those who had been resided in prison more than 6 month.

Study Procedure

This was a cross sectional hospital based observational study that was carried out among adult prisoners referred to DMCH from Jail hospital. All prisoners were initially screened by the attending duty doctor. They informed me over telephone and we selected the patients to admit to medicine unit. At enrollment patients' demographic and baseline characteristics, including age, sex, address, height, bodyweight, occupation, duration of imprisonment, prison cell population, symptoms, signs, risk factors for of HIV, HBV and HCV infection were recorded. Their knowledge, attitude, risk behavior and immunization status were also recorded. Diagnosis of disease was done by detailed history, clinical examination, investigations directed by the consultant of that particular unit. Although investigations were done according the direction of the physician, for smooth conduction of the study we contacted the clinical pathology department for CBC, RBS, prothombin time, urine R/M/E and other biochemical tests and department fo transfusion medicine unit for HBs ag, anti HCV and HIV. Follow-up and outcome data was collected by direct observation and information from attendants and duty doctors. Sometime they also helped over telephone.

Data Collection

All data were collected by using a preformed data sheet. Data was collected during whole period of study. The maximum time to take an interview was one hour. Patient was monitored after hospital admission and during hospital stay. After discharge during outpatient visit they were asked in a guided way according to questionnaire. Diagnosis was based on clinical ground, investigations. Collected all questionnaire were checked very carefully to identify the error in collecting data. Data processing work contained registration of schedules, editing, coding and computerization, preparation of dummy tables, analysis and matching data. The technical matter of editing, encoding and computerization was very carefully looked after.

Ethical Considerations

Clearance of Ethical Committee was ensured. No data or any information was collected without permission of the participant. Informed written consent was taken from each patient. Confidentiality was assured and anonymity maintained.

Data Processing & Analysis

The collected questionnaires were edited arranged manually. On the basis of key variables, a master-sheet was prepared. Data analyzed by SPSS version 22.0. Interpretations were made subsequently. Data were presented by table and graphic through frequency and percentage figures.

RESULTS

100 prisoners, admitted indoor medicine department of DMCH were very carefully observed. The diagnosis of disease was based on thorough history taking, proper clinical examination, laboratory investigations and follow-up response. The results of observation were given bellow:

Table 1: General characteristics of the whole study population, (N=100)

Variables	Frequency (n)	Percentage (%)
Age group (In years)		
21-30 yrs.	10	10.0
31-40 yrs.	18	18.0
41-50 yrs.	32	32.0
51-60 yrs.	30	30.0
61-70 yrs.	10	10.0
Sex		
Male	91	91.0
Female	9	9.0

Table 1 showed total numbers of 100 prisoners were included in this study. 32% of prisoners were in between 41-60 year's age group and 91% were male.

Table 2: Distribution of population according to resident area, (N=100)

Division	Frequency (n)	Percentage (%)
Dhaka	42	42.0
Rajshahi	24	24.0
Khulna	18	18.0
Barisal	12	12.0
Sylhet	4	4.0

Table 2 showed 42% of prisoners came from Dhaka Division and lowest 4% from Sylhet.

Table 3: Distribution of patient according to prison cell population, (N=100)

Prison cell population	Frequency (n)	Percentage (%)
50-100	16	16.0
100-150	40	40.0
150-200	28	28.0
200-250	16	16.0

Table showed all prisoners came from high density prison cell population. 40% of them came from the Prison cell containing 100-150 prisoners.

Table 4: Frequency of prisoners according to duration of stay in prison, (N=100)

Duration	Frequency (n)	Percentage (%)
< 1 year	10	10.0
1-5 years	28	28.0
5-10 years	46	46.0
>10 years	16	16.0

Table 4 showed that frequency of prisoners who stayed more than 5 years were 62% and less than 1 year was 10%.

Table 5: The person ever heard about AIDS, HBV and HCV, (N=100)

Diseases	Frequency (n)	Percentage (%)
Hepatitis B Virus (HBV)		
Yes	85	85.0
No	15	15.0
Hepatitis C Virus (HCV)		
Yes	74	74.0
No	26	26.0
Human Immunodeficiency Virus(AIDS)		
Yes	70	70.0
No	30	30.0

Table 5 showed that frequency of prisoners heard the hepatitis B virus 85%, hepatitis C virus 74% and AIDS 70%.

Table 6: Knowledge about moods of transmission, (N=100)

Media	Frequency (n)	Percentage (%)
By water		
Yes	34	34.0
No	66	66.0
Through transplacenta		
Yes	90	90.0
No	10	10.0
Blood transfusion		
Yes	98	98.0
No	2	2.0
Through saliva		
Yes	66	66.0
No	34	34.0
Sexual transmission		
Yes	49	49.0
No	51	51.0
Sharing of needle and syringes		
Yes	56	56.0
No	44	44.0

Table 6 showed 34%, 90%, 66%, 49% and 56% prisoners said that these diseases can through transmit water, trans placenta, blood transfusion, saliva, sexual contact, sharing of needles and syringes respectively.

Table 7: Immunization status of HBV, (N=100)

Variables	Frequency (n)	Percentage (%)
Immunization with HBV vaccine		
Yes	8	8.0
No	92	92.0

Table 7 showed that the exposure of risk factors estimated –H/O foreign travels 12%, IV drug abuse 14%, extramarital sexual exposure 16%, sharing of needle 10%, H/O blood transfusion 08%, family H/O diseases 05%, immunization of hepatitis B only 8% and homo sexuality 0%

Table 8: Association of risk factors with HBV, (N=100)

Risk factors			HBV- Positive	HCV- Positive	HIV- Positive
H/O Foreign travels	Yes	12	0	0	0
I /V drug abuse	Yes	14	1	1	0
Sexual exposure	Yes	16	2	1	0
Sharing of needles	Yes	10	1	2	0
Blood transfusion	Yes	8	1	0	0
Family H/Odisease	Yes	5	1	0	0
Sexual habit- homo	Yes	0	0	0	0
H/O contact with infections	Yes	15	0	0	0
Total			6	4	0

Table 9: Association of Intravenous drug abuse (IDUs) with diseases

Association of risk factors	Exposure	HBV	HCV	AIDS	%
IV drug abuse with sharing of needle and syringe	10	1	2	0	30.0
IV drug abuse without sharing of needles	14	1	1	0	14.3
Total	24	2	3	0	20.8

Table 9 showed IDUs with sharing of needles & syringes had 30% and IDUs not sharing of needles & syringes had 14.28 as well as IV drug abuser had 20 associations with these communicable diseases.

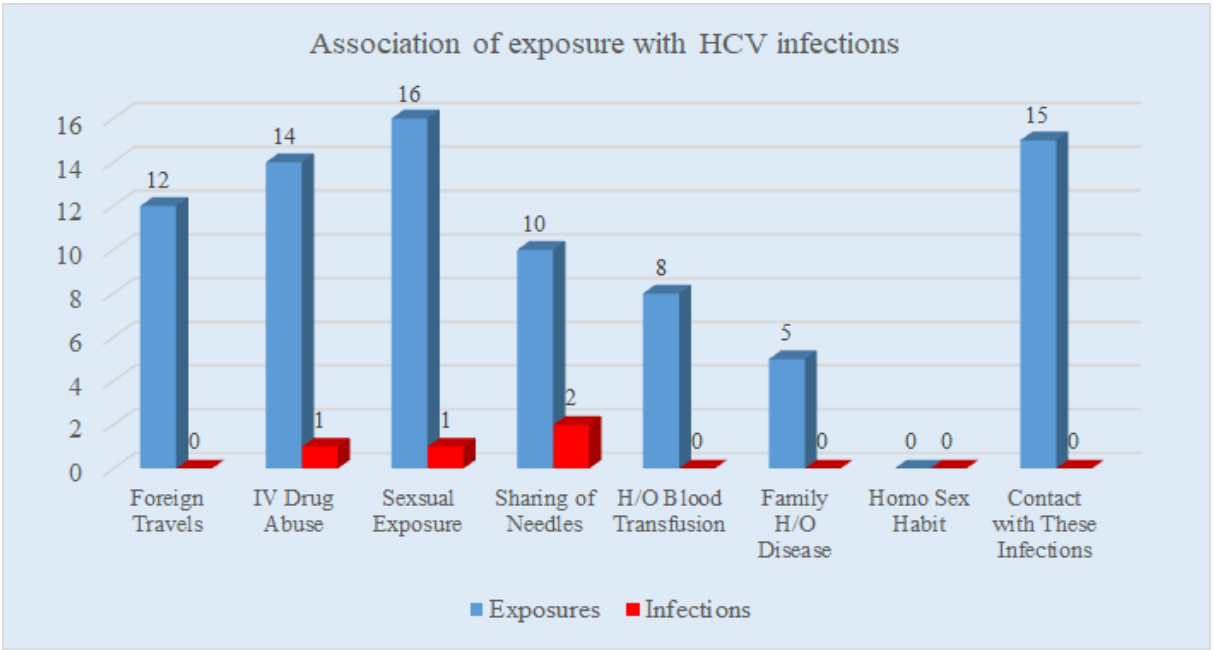

Figure I: Association of exposure with HCV infections

Figure I showed association of risk factors with HCV H/O foreign travels 0%, IV drug abuse 7.10%, sexual exposure 6.25%, sharing of needles and syrings 20% blood transfusion, family history, sexual habit and contact with HCV positive patients has o% respectively

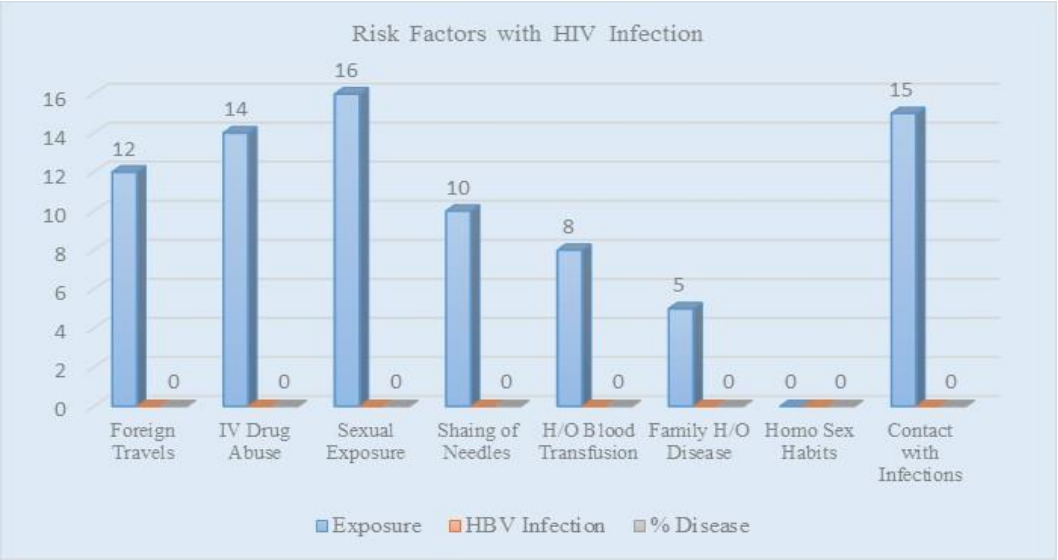

Figure II: Associations of risk factors with HIV infections (N=100)

Figure II Bar diagram showing association of risk factors with HCV. H/O foreign travels 0%, IV drug abuse 0%, sexual exposure 0%, sharing of needles and syrings 0% as well as h/o blood transfusion, family history, sexual habit and contact with HCV positive patient s has o% respectively.

Table10: Association of drug abuse with HBV and HCV, (N=100)

Among IDUs	HBV	HCV
Total infections	2	3
Percentage	8.3%	12%

Table 10 showed drug abuse was associated with 8.33 %HBV, and 12% of HCV infections

Table 11: Percent of HBV, HCV and HIV infection among prisoners, (N=100)

Infections	Negative	Positive
HBV	93	7
HCV	95	5
HIV	100	0

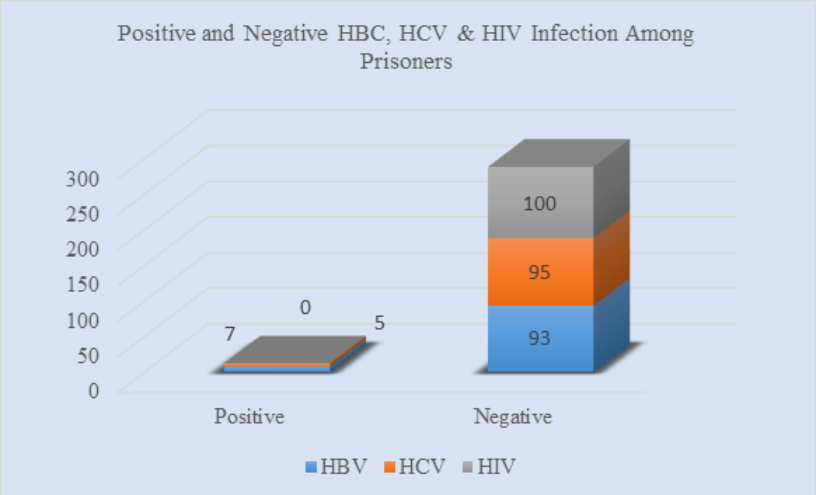

Figure III: Association of HBV, HCV & HIV among prisoners, (N=100)

Figure III showed Percentage of HBV, HCV and HIV infection among prisoners were 7%, 5% and 0% respectively.

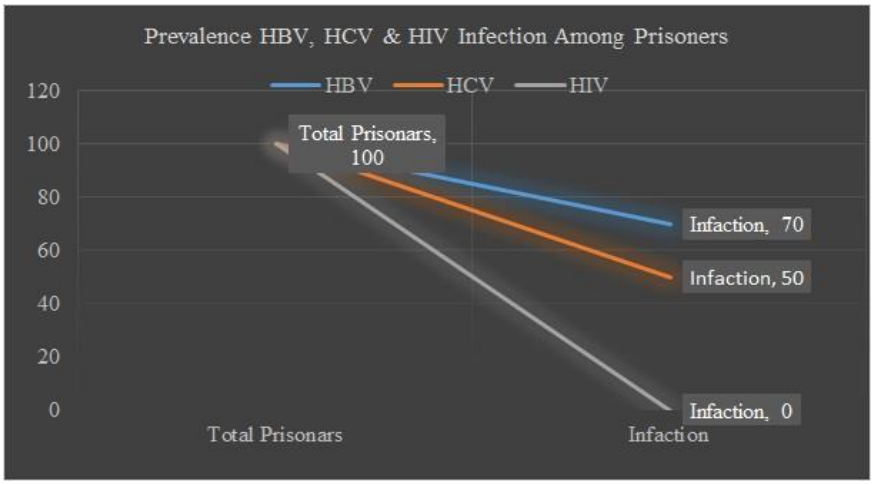

Figure IV: Prevalence of HBV, HCV and HIV Infections among Prisoners

Figure IV showed the prevalence of HBV, HCV and HIV Infection among prisoners were 60, 40 and 0 respectively.

DISCUSSION

The purpose of this study was to observe the prevalence and risk factors of HIV, HBV and HCV infections among prisoner who were referred from jail. The present study, which is to our knowledge the first in Bangladesh on prisoners. The results showed a significantly higher seroprevalence of HBV (6%) and HCV (4%) though no prisoner was found to be HIV positive compared to the seroprevalence of these virus infections reported in the impoverished urban community in Dhaka, Bangladeshi population (5.8% for HBV and 0.3% for HCV) [14] Total 100 patients were included in this study. Maximum numbers of patients (62%) were in between 41-60 year's age group and 91% were male. Majorities (90%) were Muslim and (50%) prisoners were self-employed. In the population 42% of the prisoners came from Dhaka division, lowest value (4%) from Sylhet, 70% lived in rural area. All came from high density prison cell population; majorities (40%) of them from the prison cells containing 100-150 prisoners. In the study it was showed that the prisoners who stayed >5 years in prison were 62%. Frequency of prisoners heard the hepatitis B virus 85%, hepatitis C virus 74% and AIDS 70%. 34% prisoners said that these diseases can through transmit water, 90% through transplacenta, 66% through blood transfusion, 49% through saliva, 50% through sexual contact and 56% through sharing of needles and syringes as well. There is no available study estimating prevalence of HBV, HCV and HIV infections among prisoners in our country. In my study it was found that HBV was the most common occurring disease among prisoners in DMCH which was 6%. The result is inconsistent with the study in other parts of the world which had identified a substantial number of cases. The prisoners in southern khorasan province, Iran, 61 cases (6.9%) were positive for HBsAg and 68 cases (7.7%) were positive for anti-HCV. 4 cases (6.6%) were HDV positive as well among subjects who were HBsAg positive. Co-infection of HBV and HCV was found in 6(0.7%) subjects. One case was positive for HIV infection (0.1%) which also had co-infection with HCV [25]. Association of risk factors with diseases was estimated; H/O foreign travels 12%, IV drug abuse 14%, extramarital sexual exposure 16%, sharing of needle 10%, H/O blood transfusion 8%, family H/O diseases 5% and homo sexuality 0%. Risk factors for HBV infection was estimated-family h/o disease 20%, IV drug abuse 7.10%, sharing of needles & syringes 10%, sexual exposue12.50%, blood transfusion 12.50%. Risk factors for HCV infection was estimated -IV drug abuse 7.10%, sexual exposure 6.25%, sharing of needles & syringes 20%. Risk factors for HIV infection 0% for all risk factors as no one was HIV infected. Among the IDUs 14% was HBV positive and 30% was HCV positive. Among the drug abuser who had been shared needles and syringes disease prevalence was 30% and among them who did not share disease prevalence was 14.28% and total prevalence of diseases among drug user was 20%. Among the intravenous drug abusers (IDUs) hepatitis B and hepatitis C positive was 8.33% and 12% respectively. In contrast, the low prevalence of HIV in our prison populations (0%) possibly a true reflection of the very low prevalence of HIV infection in the Bangladeshi general population. As a study in Khulna from 2007 to 2009 were screened for HBs-Ag, anti-HCV, anti-HIV 1 & 2 reactivity in a cross-sectional survey by rapid test method. In all blood donors the seroprevalence of HBsAg, Anti-HCV, HIV antibody 1 & 2 was 1.4%, 0.09% & 0.03% respectively. Prevalence of confirmed positivity was 0.62% for HBsAg, 0.04 % for Anti-HCV, 0.02% for HIV Western Blot. Our present study supports similar studies done on prisoners in different parts of the world showing that

prisoners represent a high-risk group for blood-borne diseases. Due to the higher proportion of individuals with a prior history of injecting drugs, the vast majority (12%) of our anti-HCV positive prisoners were IDUs which indicates that the significantly higher seroprevalence of HCV among prisoners was most likely in Bangladesh.

LIMITATIONS OF THE STUDY

The study was conducted in Department of Medicine, Dhaka Medical College Hospital in the capital city on a small number of prisoners within a short period of time, so the findings may not reflect the actual epidemiology of disease in prison as well as in the country. The study showed only hospital frequency of medical disorders among prisoners. Incidence and prevalence study need to explore Jail Hospital data, which was not included in the study. In additions, some inmates may not have responded correctly to parts of the questionnaire relating to drug use, sexual behavior, and history of sexually transmitted diseases although confidentiality was stressed during the explanation of the purpose of the study. Finally, the questionnaire did not address socioeconomic factors such as income and education among others, which generally are good indicators of the low level of awareness of the possible modes of transmission of these viral infections in this group of individuals

RECOMMENDATIONS

So we suggest to increase the number of prison cells with HBs-Ag, Anti- HCV and Anti –HIV screening facilities in case of suspected case entry into jail. And screening should be done periodically in the jail hospital as significant numbers of prisoners have these diseases. As present status of immunization in prisoners is very low, so it clearly indicating need for universal hepatitis B vaccination. Majority of the prisoners did not know the negative impact of the risk factors in occurring communicable diseases. So health education, and vaccination of HBV is very important in prison. Future study should emphasize on people's perception, knowledge and practice behavior extensively on HBV, HCV and HIV infection. In additions, collaborations should develop between the prison's administration, academic institutions, and community-based organizations to provide HBV, HCV and HIV prevention services within the prisons

CONCLUSION

Hepatitis B and hepatitis C is the most frequent disease among prisoners in DMCH. Based on the results, I found that the prevalence of HBV and HCV among prisoners of Bangladesh had the similarity with other Asian countries. In my study I also found that significant number of prisoners had more than one risk factors. The use of disposable needles & syringes, safe sex practice and afraid from drug abuse as well as health awareness and health education program may help to prevent the fatality.

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