Prevalence of Hepatitis B & Hepatitis C Virus Infections in Potential Blood Donors in Bahawalpur

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Abstract

Hepatitis is commonly transmitted during blood transfusion. The study aimed to find the prevalence of hepatitis B & C among blood donors in Bahawalpur and try to find relation of prevalence with socio-demographic variables. The study was conducted in Bahawal Victoria Hospital Bahawalpur (BVH). The data was collected by trained nurses working in blood bank in supervision of investigator through a structured record review check list developed by investigator in English. The investigator checked data for completeness and cross check from registers. The collected data had been coded before analysis. Descriptive analysis was done to determine the prevalence of hepatitis B & C virus in the study population and its distribution categorized by independent variables i.e. age, gender, marital status, residence and education status of blood donor. The results of study indicated that both Hepatitis B & C are prevalent among 20 – 23 years old persons, males, uneducated people, married and people residing in rural areas of Bahawalpur visiting blood bank of Bahawal Victoria Hospital (BVH) Bahawalpur. So, by providing education to uneducated population and teaching sanitation and careful measures for avoiding hepatitis to married and people residing in rural areas could be a helpful tool in decreasing and controlling hepatitis in this area.

1. Introduction

Safe blood transfusion is always a challenge in developing countries where blood transmitted diseases are very common (1). The rate of transmission of hepatitis B virus depends on the prevalence of actual disease. The areas where Hepatitis B is prevalent, transmission risk is very high (2). On the other hand if the incidence of disease is less, transmission will also be low. In most developing countries Hepatitis B is tested by hepatitis surface antigen (HBsAg) (3). Whereas HBsAg sensitivity assays are dependent on genotype. (4). On the other hand standard blood donor screening tests are also unable to detect patients with HBV S gene mutations. Transmission of infection can also occur at stage where HBsAg is negative, for example at initial or during last stages of disease. This is called occult hepatitis B infection (OBI) (5). OBI can occur from persistent low level viral replication of recovered infections, decreased HBV replication after superadded hepatitis C virus (HCV) infection or escape mutants that are blocking the export of antigen. Previous HBV infection is detected by the presence of hepatitis B core antigen (anti-HBc) (6). In developed countries person with hepatitis B core antigen (anti-HBc) is excluded for donation of blood whereas this procedure is not adopted in developing countries where HBV infection is very common (7). Focus on problems associated with safe blood transfusion and OBI arised very lately as many studies were published on the importance of OBI and anti-HBc. Study evidences report that exclusion of anti-HBc positive blood helps in lowering the transmission rate of HBV infections (8). OBI cases can be identified with great accuracy by the use of nucleic acid amplification (NAT) technology; individuals with negative NAT status are potentially safe blood donors (9). But NAT testing is very expensive for general population. (10). Both Hepatitis B and hepatitis C virus infections are important causes of death in HD patients and can interrupt management of patients in renal dialysis centers (11). Patients cannot fight with these viral infections because of their poor immunity (12). HCV infection is more prevalent than HBV in HD centers. Massive HBV vaccination of community, early detection of HBV positive patients and regular monitoring of HBV high risk individuals can be helpful in controlling the spread of HBV infections (7). Severity of liver disease is increased if patient is suffering from both HBV and HCV infections (13). Prevalence of HBV infection has been drastically reduced because of application of control practices although outbreaks are still very frequent and routine screening is still very important (14). HBV transmitted by permucosal or percutaneous

exposure to infected blood or to body fluids that contain blood and chronically infected persons are major determinants of HBV epidemiology (15).

2. Epidemiology

2.1. Hepatitis C Epidemiology

Clinical evidences regarding HCV are not significant because most cases of hepatitis C infection are either asymptomatic or they are clinically not distinguishable from other types of hepatitis (16). Laboratory confirmation of infection is always needed which could not be available in far off areas of developing countries (17). As a result epidemiological studies based on population parameter are not available. Most of available data is based on either selection of intravenous drug abusers as high risk population or blood donors as low risk population. Both the variable can lead to higher or lower estimates of the actual prevalence of infection. HCV is a worldwide problem and its global prevalence is estimated to be 3%, which means that over 170 million persons are suffering from HCV infection (18). HCV is one the chronic as well as most common blood born infection in United States (19). It is also four to five times more common infection in the world than HIV. Every year 3 to 4 million people are getting infected with HCV (20). Although its distribution varies from country to country but developing countries of Asia and Africa are at high risk (21). Even prevalence also varies among developing countries because highest prevalence 22% is reported in Egypt and lowest documented prevalence is in India 0.9% (22). Prevalence variations can be due to risk factor variation among different countries of the world. Single and most important risk factor in developing countries is the tremendous increase in intravenous drug abuse. Unsafe blood transfusions and reuse of therapeutic syringes can be the contributory factors. Other causes for transmission of HCV include tattooing, sexual exposure, scarification, acupuncture, body piercing or certain occupational factors etc (23). But the contribution to these risk factors in HCV prevalence is poorly defined especially in developing countries around the globe.

2.2. Hepatitis B Epidemiology

Hepatitis is one of the important and serious health problems of the people around the world (24). Data shows that about 2 billion people are infected with HBV and among those 350 million people are chronic carriers (20). HBV is also one of the common causes of death as well because it predisposes a person to liver cirrhosis, hepatitis and even hepato-cellular cancers (25). HBV infection is considered high if surface antigen's positivity is above 8% (26). Amazon basin, some parts of Middle East, sub-Saharan Africa and Far East region's countries are included in high positivity regions. Majority of population of these regions are positive with anti-hepatitis B core antigen and anti-hepatitis B surface antigens (27). Countries where percentage of chronic HBV infected person is between 2 to 7% are considered intermediate and include Central Asia, India, Japan, parts of South America and Middle East (28). In developed countries like Australia, United States, South America and Northern Europe prevalence rate of chronic HBV infection is very low (29). About 45% population of the world lives in highly endemic areas of HBV infection, 43% population is in intermediate whereas 12% population lives in areas where HBV infection endemics are low (30). HBV infection is the main cause of liver diseases in Africa, where 58 million people are carriers and hepatitis B surface antigen positivity range from 5 to 19% (31). About 12.5 million deaths are due to liver diseases caused by HBV infection (32). High prevalence rate is also noted in Ethiopia and other Sub-Saharan Africa. They include 31% death rate in hospital admitted patients in Ethiopia. Unsafe sexual practices are also a major determinants of spread of HBV infections (33). The age at which 50%

had evidence of infection was around 20 years. In other countries positivity ratio was, 44.6% HBsAg in india among chronic liver disease 42.9% HBsAg in Ghana among HCC patients and 36% HBsAg % and 24% among HCC patient in Zimbabwe (34).

2.3. Transmission

HBV and HCV can be transmitted from one person to the other by many ways. Both HBV and HCV are blood born infections and can be transmitted sexually, as well as by cultural, occupational, iatrogenic or recreational activities. Acupuncture, unsafe blood transfusions, contaminated injections are some of the examples of iatrogenic transmission. Tattooing, ear piercing, scarification and intravenous use of drugs can also spread HBV and HCV.

3. Materials And Methods

It was a cross-sectional retrospective record review. The study area was Bahawalpur division Pakistan, located in the south of the Punjab, where the patients mostly visit the Bahawal Vectors hospital, Bahawalpur, Pakistan. All blood donors who donated blood for transfusion at Bahawal Vectors hospital, Bahawalpur between Jan 2016 and Sep, 2016 were included in the study. Simple random sampling technique was used to select study units. The dependent variable of this study was HBsAg/HBsAg status. Socio-demographic characteristics: Sex, Age, Occupation, Residence were independent variables. Structured record review check list developed by investigator was used to collect secondary data from blood donors, register the data; extraction tool was prepared in English. Secondary data were collected by two experienced nurses who were working at the blood bank. The data collectors were trained on the data collection. The investigator supervised the data collection process. Data collectors and the supervisor were trained on the overall study design, objective of the study and data collection instrument and procedure. The investigator had checked the collected data for completeness and corrective measures had been taken accordingly including cross checking from registers. The collected data had been cleaned and coded before analysis. A descriptive analysis was done to determine the prevalence of hepatitis B & C virus in the study population and its distribution categorized by independent variables. Test of proportions was used to assess differences in proportion of hepatitis B & C virus infection among groups. All analyses were done using SPSS Statistics Data, Version 20.

3.1: Ethical considerations

The study proposal was approved by the Ethical Committee of University College of Conventional Medicine, The Islamia University of Bahawalpur. An informed written consent was taken from the head of the blood bank center of Bahawal Vectors Hospital Bahawalpur according to the declaration of Helsinki to get the secondary data. As the study was conducted through review of donors' records, there was no harm to individual donors. Informed written consent was also taken from all the selected blood donors and those who were not willing to participate in the study were excluded from it. To preserve confidentiality, extraction of data from records was carried out by data collectors working in the blood bank service. There was no any personal identifier included in the data collection form. The data obtained had not been accessed by a third person, except the principal investigator. After fulfilling the above mentioned requirements and obtaining the permission, the data collection was preceded.

4. Results

The total number of persons visited in blood bank of Victoria Hospital was 2211 and the person having hepatitis B & C was 300 (about 13.5 %). The results of prevalence rate of hepatitis among different socio-demographic factors are given below.

4.1. Age wise Prevalence: The prevalence of Hepatitis B & C was recorded in different age groups, prevalence rate Hepatitis B was 19.2% in the age group of 18–20 years whereas it was 13.6% for Hepatitis C. in the age group of 20–30 years 54.2% prevalence rate was recorded for Hepatitis B and it was 50% for Hepatitis C. Patients > 23 years of age were having 26.7% prevalence for Hepatitis B and it was 36.4% for hepatitis C (Table 1).

Table 1
Prevalence of Hepatitis B & C in different age groups among blood donors

Prevalence of hepatitis B & C in different age groups among blood donors						
			Age of blood donors			Total
			18–20 years	20–23 years	> 23	
Prevalence of hepatitis	Hepatitis B	Count	23	65	32	120
		%within Prevalence of hepatitis	19.2%	54.2%	26.7%	100.0%
	Hepatitis C	Count	24	88	64	176
		%within Prevalence of hepatitis	13.6%	50.0%	36.4%	100.0%
		Total	Count	47	154	96
	%within Prevalence of hepatitis	15.8%	51.9%	32.3%	100.0%	

4.2. Gender wise Prevalence: The prevalence of Hepatitis B in males blood donors was 93.3% and it was 92.6% for Hepatitis C. 7% of female blood donors were having Hepatitis B whereas this ratio was 7.4% for Hepatitis C (Table 2).

Table 2
Prevalence of Hepatitis B & C in different genders among blood donors

Prevalence of Hepatitis B & C in different genders among blood donors						
			Sex of blood donors			Total
			Male	Female	Missed data	
Prevalence of hepatitis	Hepatitis B	Count	112	7	1	120
		%within	93.3%	5.8%	0.8%	100.0%
		Prevalence of hepatitis				
	Hepatitis C	Count	163	13	0	176
		%within Prevalence	92.6%	7.4%	0.0%	100.0%
		of hepatitis				
Total	Count	276	20	1	297	
	%within Prevalence of hepatitis	92.9%	6.7%	0.3%	100.0%	

4.3. Prevalence based on marital status: The prevalence of Hepatitis B was 31.7% in unmarried blood donors and it was 23.9% for Hepatitis C. 68.3% prevalence of Hepatitis B was recorded in married blood donors and this ratio was 76.1% for hepatitis C (Table. 3).

Table 3
Prevalence of Hepatitis B & C in different marital status among blood donors

Prevalence of Hepatitis B & C in different marital status among blood donors					
			Marital Status		Total
			single	Married	
Prevalenceof hepatitis	Hepatitis B	Count	38	82	120
		%within	31.7%	68.3%	100.0%
		Prevalenceof hepatitis			
	Hepatitis C	Count	42	134	176
		%within	23.9%	76.1%	100.0%
		Prevalenceof hepatitis			
Total	Count	81	216	297	
	%within	27.3%	72.7%	100.0%	
	Prevalenceof hepatitis				

4.4. Prevalence based on Education status: The highest prevalence of hepatitis B & C was in uneducated persons as it was 39.2 % and 37.5% for Hepatitis B & C respectively. Prevalence of Hepatitis B was 24.2% in blood donor having a matriculation degree and this ratio was 24.4% for Hepatitis C. blood donors having intermediate degree were having prevalence rate of 11.7% for Hepatitis B and 15.9% for Hepatitis C. Data showed that 24.2% blood donors were having graduation or post-graduation degree were affected by Hepatitis B and this ratio was 22.2% for Hepatitis C (Table. 4)

Table 4
Prevalence of Hepatitis B & C in different educational status among blood donors

Prevalence of Hepatitis B & C in different educational status among blood donors								
			Education					Total
			Illiterate	Matric	Intermediate	Graduation/ Post graduation	Missed data	
Prevalence of hepatitis	Hepatitis B	Count	47	29	14	29	1	120
		% within Prevalen ceof	39.2%	24.2 %	11.7%	24.2%	0.8 %	100.0 %
		hepatitis						
	Hepatitis C	Count	66	43	28	39	0	176
		% within Prevalen ceof	37.5%	24.4 %	15.9%	22.2%	0.0 %	100.0 %
		hepatitis						
Total		Count	113	72	42	69	1	297
		% within Prevalen ceof	38.0%	24.2 %	14.1%	23.2%	0.3 %	100.0 %
		hepatitis						

4.5. Prevalence based on residence: The prevalence was recorded to be high in people of rural areas as 58.3% for Hepatitis B and 64.8% for Hepatitis C. Prevalence of Hepatitis B in urban areas as 40.8% and Hepatitis C was 35.2% (Table 5).

Table 5
Prevalence of Hepatitis B & C in different residence among blood donors

Prevalence of Hepatitis B & C in different residence among blood donors						
			Location of blood donor			Total
			Rural	Urban	Missed data	
Prevalence of hepatitis	Hepatitis B	Count	70	49	1	120
			58.3%	40.8%		100.0%
		%within Prevalence of hepatitis			0.8%	
	Hepatitis C	Count	114	62	0	176
		%within Prevalence of hepatitis	64.8%	35.2%	0.0%	100.0%
Total	Count	185	111	1	297	
	%within Prevalence of hepatitis	62.3%	37.4%	0.3%	100.0%	

5. Discussion

Hepatitis is commonly transmitted during blood transfusion process and various socio-demographic variables are frequently associated with it (35). Transmission of hepatitis depends upon its prevalence, greater the prevalence greater will be the transmission rate (36). The study aimed to find the prevalence of hepatitis B & C among blood donors in Bahawalpur. A safe blood transfusion is a necessary measure to prevent hepatitis (37). The current study showed the high prevalence of hepatitis in males, results of study matched with a previous study showing occurrence of hepatitis in males and especially more prevalent in homosexual males. Transmission of Hepatitis is commonly associated with sexual intercourse (38). The current study indicated that both types of Hepatitis were more prevalent among married persons. Moreover, a study showed that intra familial spread of HCV also occur as seropositivity for anti-HCV is 5–10-fold in individuals living with an HCV-positive patient compared with general population. So, common occurrence of hepatitis in married persons might be from both reasons i.e., sexual relationship and increased ratio of intra familial spread of hepatitis. Sanitary measures and educational status are also important in spread of hepatitis so awareness is important for prevention of hepatitis (39). The current study evaluated that prevalence is common in illiterate persons and who residing in rural areas where some times sanitary measures are poor. Age factor is also studied in this study and the prevalence rate was found to be high in young patients of 23 years old. The reason might be alcohol consumption and cigarette smoking of this age group population as young persons of this age are frequently involved in these habits and both factors are strong risk factors for occurrence of Hepatitis B & C (40). However, data on history of cigarette smoking and alcohol consumption was not taken in this study. It is strongly recommended that the missing variables should also be studied among this study population.

6. Conclusion

It is concluded from present study that both Hepatitis B & C are prevalent among 20–23 years old persons, males, uneducated people, married and people residing in rural areas in blood bank of Bahwal Victoria hospital Bahawalpur. The prevalence rate was high in people with no medication history as compared to people with proper medication. So, by providing education to uneducated population and teaching sanitation and careful measures for avoiding hepatitis to married and people residing in rural areas could be a helpful tool in decreasing and controlling hepatitis in this population

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Figures

Figure 1

Prevalence of Hepatitis B & C in different age groups among blood donors

Figure 2

Prevalence of Hepatitis B & C in different genders among blood donors

Figure 3

Prevalence of Hepatitis B & C in different marital status among blood donors

Figure 4

Prevalence of Hepatitis B & C in different educational status among blood donors

Figure 5

Prevalence of Hepatitis B & C in different residence among blood donors