

Prevalence of HCV Antibodies and HBV Surface Antigen among Workers of Zagazig Faculty of Medicine and its Hospitals

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Background and study aim: Viral hepatitis is a serious global public health problem affecting billions of people globally, and both hepatitis B virus (HBV) and hepatitis C virus (HCV) infections are rapidly spreading in the developing countries including Egypt due to the lack of health education, poverty, and illiteracy. So this study was conducted to determine the prevalence of HCV antibodies and HBsAg and possible risk factors of transmission of these infections among workers of Zagazig Faculty of medicine and its hospitals.

Patients and Methods: This study was conducted on two hundred workers (non medicals) All were randomly selected from all clinical and academic Departments of Zagazig Faculty of Medicine and its Hospitals. Their age was above 18 years and up to 60 years. Possible associated factors with infections by the viruses were collected from patient using questionnaire Rapid diagnostic test kits were used to screen for Hepatitis B surface antigen (HBsAg) and anti-Hepatitis C virus (HCV) antibodies.

Results: Out of two hundred 39 (19.5%) of workers had Hepatitis C virus (HCV) antibodies and 7 (3.5%) of workers had Hepatitis B surface antigen and one worker 1 ((0.5%). had dual hepatitis B and C virus coinfection . The prevalence of chronic HCV and HBV is higher among males (20.2% and 4% respectively) than females (17.3% and 1.92%) and both HBsAg and HCV Abs was (0.7%) in males and negative in females. The prevalence of HCV Abs was high among workers with past history of barbering (69.23%) while prevalence of

HBV was high in workers with a history of blood transfusion (28.57%). Multivariate regression was used to estimate independent effects of risk factors on seropositivity of both viruses . A highly significant association was found between workers with history barbering (OR 4.58) and those with seropositivity of HCV abs. While there was no significant association between workers with a history of dental procedure (OR 1.44), operation (OR 1.2) and blood transfusion (OR 1.5) and those with acquired seropositivity of HCV Abs. And a highly significant association was found between workers with history of blood transfusion and those with acquired seropositivity of HBV (OR 8.18), while there was no significant association between workers with a history of dental procedure (OR 0.2), barbering (OR 0.59) and operation (OR 0.63) and those with acquired seropositivity of HBs.

Conclusion: We can conclude that the prevalence of HBV and HCV infections among workers of Zagazig Faculty of Medicine and its hospitals in this study is high. Barbering has 4 times risk of HCV infection and blood transfusion has 8 times HBV infection. and working in operation units was associated with increase the risk of HBV and HCV infections, but working in other units like surgical and non surgical , administration and ICU was associated with increase HCV transmission. For prevention the spread of HBV and HCV, people must be educated about these infections and modes of transmission , better infection control practices in hospitals, healthcare and barbering facilities.

INTRODUCTION

Chronic hepatitis C virus (HCV) infection remains a global health threat with 175 million carriers worldwide. Approximately 3% of the

worldwide population is infected with the hepatitis C virus (HCV) [1]. The prevalence of HCV infection varies throughout the world Egypt has the highest prevalence of hepatitis C virus (HCV) in the world [2].

Estimated nationally at 14.7%. This nation has weathered the largest iatrogenic transmission epidemic of blood-borne pathogens in human history during the era of parenteral antischistosomal therapy and circumcision among males administered by health-care workers using improperly sterilized glass syringes [3]. HCV transmission is ongoing in Egypt, and incidence rates have been estimated at 2.4 per 1,000 person-years (165,000 new infections annually) [4]. Overall, an estimated 6 million Egyptians had chronic HCV infection in 2008. Primary modes of HCV transmission include unsafe injections, other inadequate infection control practices, and unsafe blood transfusions [6,7]. HCV transmission also occurs among injection-drug users in Egypt [8].

Hepatitis B infections are major health problems in Egypt and the entire continent of Africa. Egypt is considered to be a region of intermediate prevalence for HBV infection with a reported 3%–11% [8]. The Hepatitis B Virus (HBV) is transmitted hematogenously and sexually. The outcome of this infection is a complicated viral host interaction that results in either an acute symptomatic disease or an asymptomatic disease.

Patients may become immune to the Hepatitis B Virus (HBV), or they may develop a chronic carrier state. Later consequences are cirrhosis and the development of hepatocellular carcinoma [9]. It is approximately 90% for an infection acquired perinatally, and is as low as 5% (or even lower) for adults [10].

The incidence of new infections has decreased in most developed countries, most likely due to the implementation of vaccination strategies [11]. Therefore, transmission from healthcare workers to patients is a rare event, while the risk of transmission from an HBV-positive patient to a healthcare worker seems to be higher. Healthcare workers positive for hepatitis B are not generally prohibited from working. However, the individual situation has to be evaluated in order to decide on the necessary measures. The highest risk factor in most instances is injection drug use [9]. Although direct percutaneous inoculation is the most direct mode of transmission of HCV and HBV, several studies have demonstrated that sexual, household, occupational and vertical transmission may also be of importance [12]. Blood is one of the major sources of transmission of HBV, HCV, and

physicians and patients are becoming more concerned about safe transfusion of blood [13]. The aim of the present study was to measure the prevalence of anti-HCV and HBsAg and possible risk factors of transmission of these infections among workers of Zagazig Faculty of Medicine and its hospitals.

MATERIALS AND METHODS

The people recruited to the study were informed about the objectives of the study and that they were free to refuse participation. A verbal witnessed consent was obtained from each study participant. The study included a total number of two hundred workers. All workers (non medicals) were randomly selected from all clinical and academic Departments of Zagazig Faculty of Medicine and its Hospitals including surgical departments (general, cardiothoracic, gynecological and obstetric and surgical emergencies) and non surgical departments (Internal medicine, Pediatric and academic departments). The age of all workers was above 18 years and up to 60 years. All workers were selected to be non diabetic patients, non smokers, free from hepatic disorders, lung disease, renal disorders, acute inflammatory conditions, or acute infections and not receiving any drugs that are known to affect the liver.

All the subjects included in the study were subjected for full history taking, physical examination and possible associated factors with infections by the viruses were collected from patient using questionnaire. The questionnaire included socio-demographic data, type of health care providers they consulted for health problems, history of jaundice, history of taking injections, previous surgical procedures, frequency of dental visits, receiving blood or blood products, history of current/past use of intravenous drugs, and visiting community barbers for shaving in males. and serological tests for HBs Ag and HCV antibodies had been performed by rapid acting test [14].

Statistical analysis

Data were entered checked and analyzed using Epi-Info version 6 and SPP for Windows version 8 [15]. χ^2 (chi-squared) used for difference between two or more qualitative variables. Correlation between variables was done using correlation coefficient "r". In all tests ($p < 0.05$) is significant and ($p < 0.001$) is highly significant.

RESULTS

Table (1) showed prevalence of HCV Abs and HBs Ag among workers of Zagazig Faculty of Medicine Departments and its Hospitals. Hepatitis C virus (HCV) antibodies was detected in 39 (19.5%) and Hepatitis B surface antigen 7 (3.5%) and both HBsAg and anti-HBc were positive in 1 ((0.5%).

Table (2) showed prevalence of HCV Abs and HBs Ag among workers of Zagazig Faculty of Medicine Departments and its Hospitals in relation to Sex. HCV and HBV prevalence was higher among males 30/148 (20.27) % and 6/148(4%) compared to females 9/52(17.3%) and 1/52(1.92% respectively) and the Prevalence of both HBs Ag and HCV Abs was 1/148 (0.7)% in males and negative in females .

Table (3) showed correlation between Prevalence of HCV Abs among workers of Zagazig Faculty of Medicine Departments and its Hospitals and risk factors of transmission, 46.15% of HCV seropositivity was reported in workers with past history of dental procedure (OR 1.44), 23.08% had history of operation (OR 1.2) 7.69% had history of blood transfusion (OR 1.59) but

69.23 % had past history of barbering (OR 4.58) which gives four times risk of HCV infection .

Table (4) showed correlation between Prevalence of HCV Abs among workers of Zagazig Faculty of Medicine Departments and its Hospitals and occupational exposure. The highest risk was reported with workers in operation units and surgical departments OR >3.36 .

Table (5) showed correlation between prevalence of HBs Ags among workers of Zagazig Faculty of Medicine Departments and its Hospitals and risk factors of transmission. The highest risk was recorded in workers with past history of blood transfusion (OR 8.18) compared with history of dental procedure,(OR0.29),barbering(OR0.59) and operation (OR1.58).Blood transfusion gives eight times risk of HBV infection..

Table (6) showed correlation between Prevalence of HBs Ags among workers of Zagazig Faculty of Medicine Departments and its Hospitals and occupational exposure. The highest risk was reported with workers in operation units OR 4.42 and to less extent in surgical units OR1.17.

Table (1): Prevalence of HCV Abs and HBs Ag among workers of Zagazig Faculty of Medicine Departments and its Hospitals

		Number (200 workers)	Percentage %
HCV Abs	positive	39	19.5%
	negative	161	80.5%
HBs Ag	positive	7	3.5%
	negative	193	96.5%
Both HBs Ags & HCV Abs +ve workers		1	0.5%

Table (2): Prevalence of HCV Abs and HBs Ag in relation to sex

	Male (148)	Female (52)	X ²	P
HBs Ags (+ve) workers	6 (4%)	1 (1.92%)	Fisher	0.67
HCV Abs (+ve) workers	30 (20.27%)	9 (17.3%)	0.22	0.64
Both HBs Ags & HCV Abs +ve workers	1 (0.7%)		Fisher	1.0

Table (3): Correlation between Prevalence of HCV Abs and risk factors of transmission (dental procedure, Barbering, operation , and blood transfusion).

		HCV ab		O.R	X ²	p
		positive	negative			
Dental history	Yes	18 (46.15%)	60 (59.41%)	1.44 (0.67-3.09)	1.04	0.31
	No	21 (53.85%)	161 (40.59%)			
History of barbering	Yes	27 (69.23%)	53 (33.125%)	4.58 (2.03-10.48)	17.25	0.000*
	No	12 (30.77%)	108 (66.875%)			
History of operation	Yes	9 (23.08%)	32 (19.88%)	1.21 (0.48-2.99)	0.20	0.65
	No	30 (86.92%)	129 (80.12)			
History of blood Transfusion	Yes	3 (7.69%)	8 (4.97%)	1.59 (0.32-7.08)	Fisher Exact	0.45
	No	36 (92.31%)	153 (95.03%)			

Table (4): Correlation between Prevalence of HCV Abs and occupational exposure

Department		HCV Abs		Total	OR	X ²	P
		Positive 7	Negative 193				
Administration		8 (10.8%)	66 (89.2%)	74 (100%)	0.37(0.15-0.91)	5.65	0.01*
Operation units		12 (37.5%)	20 (62.5%)	32 (100%)	3.13(1.27-7.71)	7.86	0.005*
ICU		3 (20%)	12 (80%)	15 (100%)	1.03(0.22-4.24)	FISHER	1.0
Departments	Surgical	10 (40%)	15 (60%)	25 (100%)	3.36(1.25-8.93)	FISHER	0.01*
	Non surgical	4 (8.7%)	42 (91.3%)	46 (100%)	0.32(0.09-0.99)	4.44	0.03*
Out Patients		2 (25%)	6 (75%)	8 (100%)	1.4(0.19-8.12)	FISHER	0.65

Table (5): Correlation between Prevalence of HBs Ags and risk factors of transmission (dental procedure, Barbering, operations, blood transfusion).

		HBs Ag		O.R	X ²	p
		positive	negative			
Dental History	Yes	2 (28.57%)	106 (54.92)	0.29 (0.04-1.75)	Fisher exact	0.24
	No	5 (71.43%)	87 (45.08%)			
History of Barbering	Yes	2 (28.57%)	78 (40.41%)	0.59 (0.08-3.54)	Fisher exact	0.70
	No	5 (71.43%)	115 (59.59%)			
History of operation	Yes	2 (28.57%)	39 (20.20%)	1.58 (0.2-9.70)	Fisher exact	0.63
	No	5 (71.43%)	154 (79.80%)			
History of blood Transfusion	Yes	2 (28.57%)	9 (4.66 %)	8.18 (1.0-59.5)	Fisher exact	0.04*
	NO	5 (71.43%)	184 (95.34%)			

Table (6): Correlation between Prevalence of HBs Ags and occupational exposure

Department		HBs Ag		Total	OR	X ²	P
		Positive	Negative				
		7	193				
Administration		2 (2.7%)	72 (97.3%)	74 (100%)	0.67(0.09-4.05)	FISHER	1.0
Operation units		3 (9.4%)	29 (90.6%)	32 (100%)	4.24(0.71-24.1)	FISHER	0.08
ICU		0 (0.0%)	15 (100%)	15 (100%)	0.0(0.0-10.4)	FISHER	1.0
Departments	Surgical	1 (4%)	24 (96%)	25 (100%)	1.17(0.5-9.3)	FISHER	1.0
	Non surgical	0 (0.0%)	46 (100%)	46 (100%)	0.0(0.0-2.6)	FISHER	0.35

DISCUSSION

In comparison to rate of HBsAg and HCV infection, in general population of Egypt, The current study presented the prevalence of HBV surface antigens and HCV antibodies among workers of Zagazig Faculty of Medicine and its Hospitals. In our study, HCV Abs was detected in 19.5 percent of the workers of Zagazig Faculty of medicine and its hospitals. Our findings were consistent with El-Zanaty [5] who mentioned that the prevalence is as high as 20% in Egypt. In our study, the prevalence of HCV Abs in males is 20.27 percent and in females is 17.3 percent. Males had considerably higher rates of HCV antibodies than females. Similar results were reported in a cross-sectional survey in Upper

Egypt, in which the prevalence of HCV Abs was higher among males than females (12% and 8%, respectively and it was also highest among those > 30 years of age [16]. The most likely explanation for the higher prevalence among males than females is that males make more frequent visits to barber shops than females and may share shaving equipment, and circumcision for boys by informal health care providers was marginally associated with HCV infection [17]. In our study, the prevalence of HCV Abs is 27 (69.32) of 39 HCV seropositive patients with past history of barbering, Razor sharing and shaving in barber shops has been identified as a key risk factor of transmission of HCV. Many workers consider infection with HCV to be an

occupational hazard for barbers [26] Other researchers consider barbers a source of infection to their clients, especially when there is reuse of razor blades that may transmit infection through micro-trauma [26] ,howeve, others found no relation between shaving by community barbers and infection with viral hepatitis [17]. The current study reported that 18 (46.15 %) of 39 HCV-seropositive patients with a past history of dental procedure with an O.R. 1.44 (0.67-3.09). An analysis of data on acute viral hepatitis collected by an Italian surveillance system found that 9 percent of all cases of acute HCV infection had only a history of dental work as a risk factor [18].

In our study, the prevalence of HCV Abs is 9 (23.08 %) of 39 HCV-seropositive patients with a past history of operation with an O.R. 1.21 (0.48-2.99). There is no significant association between seropositivity of HCV and past history of operation. The risk of acquiring hepatitis C by needle-stick injury is extremely low, ranging from 0 to 10.3 % [19].

In our study, the prevalence of HCV Abs 3 (7.69%) of 39 of workers with a past history of blood transfusion O.R.1.59 (0.32-7.08). There is no significant association between seropositivity of HCV and past history of blood transfusion the result is an agreement with Khattab [20] who found that 13.6% of Egyptian blood donors were serologically confirmed to be infected with HCV. Infection with HCV is reduced due to effective blood screening before blood transfusion [12]. Incidence of transfusion related hepatitis C is still higher in some areas of the world. In a study of 147 Chilean patients with chronic hepatitis C, the most common risk factor was blood transfusion in 54% [21]. In our study, the prevalence of HCV Abs is 3 (10.2%) of 15 workers of ICU with an O.R.1.03(0.22-4.24) and the prevalence of HCV Abs is 2 (25%) of 8 workers of out patients with an O.R 1.4(0.19-8.12) and the seropositivity of HCV due to frequent contact with infected people. There is no significant association between seropositivity of HCV and working in these Departments. This is due to good infection control program. Neal [22] reported that healthcare workers are at greater risk of exposure to the hepatitis C virus than the rest of the general population.

HBV infection is one of the most important infectious diseases worldwide. Around one million persons die of HBV-related causes

annually. Egypt is considered as intermediate prevalence area (3-11%) (20). In our study, HBs Ag was detected in 3.5 percent of the workers of Zagazig Faculty of medicine and its hospitals. Our findings were consistent with the prevalence (3-5%) in the Mediterranean countries, Japan, Central Asia, the Middle East, and Latin and South America [11].

In our study, the prevalence of HBs Ag Abs in males is 4 percent and in females is 1.92 percent. Males had considerably higher rates of HBs Ags than females. Similar figures were reported from a study in Pakistan in which the prevalence was 2.5% for HBs Ag, and among them the majority of cases were males [23].

In our study, the prevalence of HBs Ag is 2 (28.57 %) of 7 workers with a past history of dental procedure with an O.R. 0.29 (0.04-1.75). There is no significant association between seropositivity of HBV infection and history of dental procedure. Vectors of infection with HBV in dental practice are blood, saliva and nasopharyngeal secretions [24]. In our study, the prevalence of HBs Ag is 2 (28.57 %) of 7 of workers with history of barbering with an O.R. 0.59 (0.08-3.54).There is no significant association between sero positivity of HBV infection and history of barbering. Facial shaving from barbers has been repeatedly documented as a risk factor for transmission of HBV in various countries and is well known to cause abrasions and small cuts [25]

In our study, the prevalence of HBs Ag is 2(28.57 %) of 7 of workers with history of operation with an O.R. 1.58 (0.2-9.70). There is no significant association between seropositivity of HBV infection and history of operation, Due to the implementation of routine vaccination of health care workers the incidence of HBV infection among them is lower than in the general population. Therefore, transmission from healthcare workers to patients is a rare event, while the risk of transmission from an HBV-positive patient to a healthcare worker seems to be higher [26]. In our study, the prevalence of HBs Ag is 2 (28.57 of 72 of workers of Administration with an O.R. 0.67 (0.09-4.05) .The prevalence of HBs Ag is 1 (28.57 %) of 7 of workers of Out Patients with an O.R. 4.0(0.5-29.1). The prevalence of HBs Ag is 1 (28.57 %) of 24 of workers of surgical departments with an O.R. 1.17 (0.5-9.3). There is no significant association between seropositivity of HBs Ag

infection and occupational exposure, although the risk of transmission increased 4 fold in operation units and out patient due to exposure to blood, blood products and surgical instruments. Exposure to blood and body fluids remains an important concern for healthcare workers, especially those who sustain a percutaneous injury. The risk of acquiring hepatitis B infection following a needle stick injury is estimated at approximately 30% [27].

We conclude that the prevalence of HCV Abs among workers was 19.5% with males affection more than females .In HCV Abs positive workers 46.15% had history of dental procedure, 69.27% had history of barbering, 23.08% had history of operation, 7.6% had history of blood transfusion, Barbering increase the risk of HCV transmission 4 times .Workers of surgical departments showed 40% for positivity of HCV Abs and in operation units 37.5%, both increase the risk of transmission more than 3 times , Also workers in non surgical department and administration showed significant association with HCV Abs positivity. The prevalence of HBV Ag among workers was 3.5% with males affection more than females, HBV Ag positivity was significantly associated with history of blood transfusion ($p < 0.05$), with 8 fold increase the risk of transmission, the prevalence of HBS Ag was 9.4 % among workers in operation units, with increase risk of transmission 4.24 times. All of the above reflect the importance of infectious control measures not only in ICU, but also in all departments, including operation surgical and non surgical and even administration. Increase public awareness of these infections , modes of transmission, ways of prevention may help to reduce the prevalence of both HCV and HBV.

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