Hepatitis C antibodies in asymptomatic first-time blood donors in The Gambia: prevalence and risk factors

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Accepted: 12 March 2005

ABSTRACT

This study evaluates the seroprevalence and risk factors for hepatitis C (HCV) antibodies in asymptomatic first-time blood donors in The Gambia. The study population includes 460 blood donors (age range: 18–40 years [mean: 27.5]) who attended the Royal Victoria Teaching Hospital from July to December 2002. Antibodies to hepatitis C are determined using and enzyme-linked immunosorbent assay (ELISA) test system. The prevalence of hepatitis C found in this study was 1.1% (95% CI, 0.16–1.12). Previous history of sexually transmitted disease, married men in polygamous relationships, and hospital or clinic-based workers were determined to be at risk of acquiring hepatitis C. The study shows that seroprevalence of hepatitis C in The Gambia is low compared to other countries in the region.

KEY WORDS. Blood donors. Hepatitis C. Risk factors. The Gambia.

Introduction

Hepatitis C infection is a growing worldwide health concern, with World Health Organization (WHO) estimates of 3% (170 million) of the world's population chronically infected with the virus.[1,2] The virus is an important cause of non-A, non-B hepatitis in certain parts of Africa.[3–6] Most untreated hepatitis C virus (HCV) infections become chronic[4,7] and may progress to cirrhosis and hepatocellular carcinoma.[8–10]

Considerable geographic and temporal variations in the incidence and prevalence of the infection have been reported in studies of blood donors,[11] with figures of 0.5–1.5% in Western Europe, 2.4% in the Eastern Province of Saudi Arabia,[12] 12.3% in Nigeria,[13] 0.9% in Ghana,[14] 6% in the central African region and 1.6% in southern and east Africa,[2] revealing distinct variation in transmission patterns between developed countries and the third world. The high prevalence of HCV infection in the West Africa region,[2,7,15,16] where injected drug use is rare, alongside the concurrent HIV epidemic in the continent,[2] is an emerging threat to the fragile healthcare system in most parts of the region.

In The Gambia, data on the prevalence of the virus and associated risk factors are unavailable and the extent of HCV infection remains unknown. The aim of the present study, which forms part of an ongoing study on HIV and HCV co-infection, is to determine the prevalence of HCV among blood donors and to assess the risk factors for this infection in The Gambia.

Materials and methods

A cross-sectional study was carried out at the Royal Victoria Hospital (now Royal Victoria Teaching hospital), Banjul. During the period July to December 2002, blood donors seen at the hospital were informed of the study. Consenting participants were counselled by trained nurse counsellors and systematically interviewed to obtain their demographic information and behavioural risk factors (eg number of wives, knowledge and use of condoms, etc).

In the study period between July and December 2002, a total of 513 individuals (509 men and four women) donated blood. Of these, 458 men and two women participated in this study after giving informed consent. Male participants represented an ethnic cross-section of the country's population. Mean age was 27.5 years (range: 18–45) and 24 years (range: 20–26) for males and females, respectively. Serum samples were collected and stored at –20°C until used.

Serology

A third-generation enzyme linked immunosorbent assay (ELISA) test system (Ortho-Clinical Diagnostics, USA) was used to screen all the samples for antibodies to HCV.[17] According to the manufacturer, the kit used is encoded with three recombinant hepatitis C antigens (c22-3, c200 and NS5) derived from the NS3, NS4 and NS5 regions of the HCV genome. The test claims 100% sensitivity and 99.96% specificity. Testing was carried out in batches every two to three weeks, as was performed according to the manufacturer's instructions.

Statistical analysis

Prevalence of HCV and 95% confidence intervals (CI) were calculated for each variable and Fisher's exact test was used

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Table 1. Odds ratios (OR) and 95% CI for hepatitis C (HCV) seroprevalence by age and gender.

	Total (%)	HCV+(%)	95%CI	OR	P value
Gender					
Male	458 (99.6)	5 (1.1)			0.98
Female	2 (0.4)	0 (0)			0.98
Age (years)					
18–25	232 (50.4)	2 (0.9)	0.11-3.88	0.65	0.31
26–33	158 (34.3)	2 (1.3)	0.21-7.54	1.28	0.34
34–41	52 (11.1)	1 (1.9)	0.22-17.2	1.98	0.35
42+	20 (4.3)	0 (0)			0.80

to determine the statistical associations between HCV and the demographic/risk factors.

Results

Overall prevalence of HCV in this study was 1.1% (95% CI: 0.16–1.12). Mean age of the anti-HCV positive subjects was 30.6 years. Table 1 shows the gender and age-specific prevalence of HCV infection in the study participants.

Associations between risk factors, HCV antibody status and the determined odds ratios (OR) and 95% CI are given in Table 2. All participants gave a negative response to questions about skin tattooing, wife inheritance, sharing injection needle or used needles. Similarly, none of the participants claimed to have taken a blood oath.

The two female subjects were in polygamous marriages and had a history of previous circumcision; however, neither were anti-HCV positive. None of the subjects reported a history of blood transfusion, and the only person to report a history of jaundice, seven years previously, was anti-HCV negative.

All but one of the hospital/clinic workers were anti-HCV negative. The exception was a 27-year-old married man with two wives, a cleaner in a local clinic who reported a history of sexually transmitted disease (STD) four years previously.

Although comparatively higher HCV prevalence and OR were found with increasing age among all the subjects, variables such as healthcare work, history of STD and shorter-term residence in their present abode were not statistically significantly associated with HCV prevalence ($P>0.05$).

Discussion

The HCV prevalence of 1.1% observed in the study population is below the estimated prevalence of 2.4% in West Africa, below the WHO global estimate of 3%[2] and below the rate of 12.3 % reported among blood donors in Nigeria.[13] It is, however, similar to the finding of 1.3% among blood donors in Ghana.[7] These variations in prevalence may be due to the geographic and temporal variation associated with the incidence and prevalence of the infection[11] and also to variation in iatrogenic causes of HCV,[2] which has not been fully evaluated in sub-Saharan Africa, and, more probably, to the type of HCV kit used.[18]

Table 2. Odds ratios (OR) and 95% CI for hepatitis C (HCV) seroprevalence by selected risk factors ($n=460$).

	Total (%)	HCV+(%)	95%CI	OR	P value
Marital status					
Married	187 (40.7)	3 (1.6)	0.37-12.9	2.21	0.24
Unmarried	273 (59.3)	2 (0.7)	0.08-2.71	0.45	0.24
Type of marriage					
Monogamous	105 (56.0)	1 (1.0)	0.04-4.23	0.38	0.33
Polygamous	82 (44.0)	2 (2.4)	0.24-27.8	2.6	0.33
History of STD					
Yes	7 (1.5)	1 (14.3)	2.06-127	18.7	0.07
No	453 (98.5)	4 (0.9)	0.08-0.49	0.05	0.07
History of transfusion					
Yes	2 (0.4)	0 (0)			0.98
No	458 (99.6)	5 (1.1)			0.98
History of jaundice					
Yes	5 (1.1)	0 (0)			0.95
No	455 (98.9)	5 (1.1)			0.95
Duration at address					
> 10 years	394 (85.7)	4 (1.0)	0.08-5.90	0.67	0.39
< 10 years	66 (14.3)	1 (1.6)	0.17-13.6	1.55	0.39
Type of employment					
HCW	14 (3.0)	1 (7.1)	0.95-669	8.6	0.14
Non-HCW	446 (97)	4 (8.9)	0.02-1.13	0.13	0.14

HCW=healthcare worker

The fact that four out of the five subjects with HCV in the present study had no apparent risk factors for the virus other than sexual contact is in line with reports which indicate that a high proportion of subjects with HCV infection have with no apparent routes of transmission. This suggests the existence of other non-apparent routes of transmission.[19,20]

The increasing prevalence of HCV with age and the higher prevalence among married men, particularly those in a polygamous relationship, is demonstrated in this study. This contrasts with the rate in unmarried men and in married men in monogamous relationship, which supports the evidence in favour of sexual contact as a mode of transmission. However, the associations reported here are not statistically significant ($P>0.05$).

Conflicting findings concerning the sexual transmission of HCV have been reported. Some studies have found a higher prevalence of anti-HCV among sexual partners of anti-HCV-positive patients than among blood donors,[21–23] although others could not confirm these findings.[24,25] However, available evidence indicates that the transmission of HCV via sexual contact is less efficient than is seen with other sexually transmitted viruses.[26]

The very small number of women recruited to this study may be explained by the nature of The Gambian blood donation system, which predominantly involves male family members (up to third cousins and sometimes beyond). Women are involved in the process only when no suitable or compatible male donors are available.

The finding that participants with a history of STD had a higher HCV prevalence needs to be explored in more depth. Some studies have found a higher prevalence of HCV among patients attending STD clinics than among blood donors,[27,28] while another observed that sexual transmission does not contribute significantly to HCV infection in Malawi.[29]

The present study provides baseline information on HCV and associated risk factors for its transmission in The Gambia, and should be of value to health policy strategists and as a basis for further study. It may also facilitate an informed decision on the need for routine HCV screening of blood for transfusion in The Gambia. The study also provided further evidence for the sexual transmission of the virus and supports previous assertion of the lower risk of HCV acquisition by individuals in long-term monogamous partnerships.[26]

In order to limit screening costs and reduce the risk of HCV transmission, the selection of blood donors should be restricted to those with no previous history of STD and those involved in monogamous marriages. Furthermore, this study reveals that women cannot be targeted easily for research that focuses on blood donors in The Gambia, and recommends a cross-sectional study of pregnant women in order to assess the prevalence of HCV in women. □

The authors thank Dr Sam Omar, director of medical services, Department of State for Health and Social Services, for approval of the work; the Chief Medical Director, Dr Esangbedo and the head of the pathology department, Mr Jaye, for use of laboratory facilities; Mr Baldeh and Mr Tijani for counselling work; all colleagues in the laboratory who gave generously of their time; Dr Alabi, MRC Fajara, for his advice on the project; and Dr Mark Egbe for reagents and material support.

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