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RESEARCH

Hepatitis C virus seroprevalence among haemodialysis patients, sickle cell patients and blood donors at a tertiary hospital in Yaounde, Cameroon

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Background: Hepatitis C virus (HCV) infection is a serious health care problem in haemodialysis patients, sickle cell patients and blood donation in Africa. However, there is a paucity of information about this in Cameroon. This study presents the prevalence of antibodies to HCV among haemodialysis patients, sickle cell patients and blood donors at the Yaounde University Teaching Hospital, Cameroon.
Methods: A total of 113 participants were included in the study. Sociodemographic data were collected using a questionnaire. The prevalence of HCV antibodies was determined by a rapid diagnostic test (DiaSpot HCV One Step Hepatitis C Virus Test Strip) and data were analysed using Statistical Package for Social Science.
Results: Of the 113 patients, 18 tested positive, giving an overall prevalence of 15.9%. 15.6% (12/77) males had HCV antibodies, while 16.7% (6/36) females tested positive with HCV antibodies. HCV positive rates of 26.3% (10/38), 8.6% (3/35) and 12.5% (5/40) for haemodialysis patients, sickle cell patients and blood donors, respectively, were recorded. However, no statistical significant differences were observed in these three groups ($p = 0.089$).
Conclusion: The present study reveals that the rate of HCV antibodies among the study population is high and Cameroon could be a highly endemic society for HCV infection.

Keywords: Blood donors, HCV antibodies, haemodialysis, hepatitis C virus, seroprevalence, sickle cell

Introduction

Hepatitis C virus (HCV) infection is a major cause and complication of chronic liver disease in the world. The World Health Organisation (WHO) estimates that about 3% (170 million) of the world's population are chronically infected with HCV and more than 350 000 people die annually from hepatitis C-related diseases.[1,2] Available estimates indicate that the overall prevalence of HCV in Sub-Saharan Africa is 3.0%.[3] The central African region has the highest estimated prevalence of 6% (with 13.8% in Cameroon), followed by west Africa with an estimated prevalence of 2.4%, and southern and east Africa have the lowest estimated prevalence of 1.6%.[4,5] HCV is transmissible by blood transfusion and is now known to be the major cause of post-transfusion HCV infections globally accounting for about 90%.[6] The risk of acquiring HCV from blood transfusion varies between 20–40% in countries where blood is not routinely screened for HCV.[5] In resource-limited settings such as Cameroon, available data show prevalences of HCV among blood donors of 1.8, 1.44 and 4.8% at different timepoints.[5,7,8] These data show the need for regular surveillance for HCV infection among blood donors. Patients at risk of HCV infection include transfusion-dependent patients, for example patients with sickle cell anaemia and haemodialysed patients. A prevalence of HCV infection varying between 1.25 to 33.5% among these patients has been reported in other parts of the world.[6,9,10] The aim of our study was to determine the seroprevalence of HCV in individuals at risk, namely haemodialysis patients, sickle cell patients at the Yaounde University Teaching Hospital and blood donors in Cameroon.

Methods

This cross-sectional prospective study was carried out over a period of three months and a total of 113 of participants were recruited. They consisted of haemodialysis patients, sickle cell patients and blood donors registered and/or followed up at the Yaounde University Teaching Hospital (YUTH). Sociodemographic data were collected using a designed and pretested questionnaire. All the samples were tested for the qualitative detection of anti-HCV antibodies using the DiaSpot HCV™ (Sam Tech Diagnostic, China) one step Hepatitis C virus test strip (rapid immune-chromatographic assay). This is a colloidal gold enhanced rapid immune-chromatographic assay for qualitative detection of antibodies to HCV in human serum or plasma. This test has a relative sensitivity of over 99.0% and a relative specificity of 98.6%. This test was validated in the laboratory using samples that were previously tested and stored. The procedure was performed in compliance with the manufacturer's instructions. Ethical clearance was obtained from the Institutional Ethics Committee for Human Health Research of the Catholic University of Central Africa; while authorisation to collect samples was obtained from YUTH. Informed consent was obtained from all the study participants. Data was analysed

Table 1: Seroprevalence of HCV according to the age group of subjects ($N = 113$)

Patients'age group (years)	HCV seroprevalence		Total
	Negative	Positive	
[21–32]	49	7 (12.5%)	56
[33–44]	30	2 (6.67%)	32
[45–56]	10	4 (28.57%)	14
[57–69]	6	5 (45.45%)	11
Total	95	18 (15.92%)	113

$X^2 = 11.56$, $p = 0.009$, Mean = 35.89, SD = ± 1.23.

using the Statistical Package for Social Sciences version 16 (SPSS Inc., Chicago, Illinois, USA). Proportional differences were evaluated by chi-square test, using contingency tables. Statistical significance was considered as $p < 0.05$.

Results

A total of 113 participants were recruited. The mean age of the study participants was 35.89 (±1.23) years; while the age range was 21–69 years. The seroprevalence of HCV obtained in this study was 15.9% (18/113). The age group with the highest prevalence (45.4%) was the 57–69-year age group; while the least prevalence (6.7%) was obtained in the 33–44-year age group. This difference is statistically significant ($p < 0.05$) (Table 1).

A total of 68.1% of the subjects were males, while 31.9% were females. The seroprevalence of HCV was higher in females (16.7%) than males (15,6%), but this difference is not statistically significant ($p > 0.05$) (Table 2).

The distribution of HCV seroprevalence according to the subjects' category showed that the highest prevalence (26.3%) was obtained in patients on haemodialysis. The prevalence was 12.5% and 8.6% for blood donors and sickle cell subjects, respectively. However, this difference is not statistically significant ($p > 0.05$) (Table 3).

Table 2: Seroprevalence of HCV according to gender of subjects ($N = 113$)

Gender	HCV seroprevalence		Total
	Negative	Positive	
Male	65 (84.41%)	12 (15.58%)	77 (100%)
Female	30 (83.33%)	6 (16.67%)	36 (100%)
Total	95 (84.07%)	18 (15.92%)	113 (100%)

$X^2 = 0.021$, df = 1, $p = 0.884$.

Table 3: Seroprevalence of HCV according to category of subjects ($N = 113$)

		HCV sero status		Total
		Negative	Positive	
Patient's state	Haemodialysis	28 (73.68)	10 (26. 31%)	38 (100%)
	Sickle cell	32 (91.42)	3 (8.57%)	35 (100%)
	Blood donors	35 (87.50)	5 (12.5%)	40 (100%)
Total		95 (84.07)	18 (15.92%)	113 (100%)

$X^2 = 4.82$, df = 2, $p = 0.089$.

Discussion

Out of 113 subjects, 15.9% (18/113) were positive to HCV antibodies. This rate is quite high. The prevalence of HCV in the general population in Africa ranges between 0.1% and 17.5%, depending on the country.[11] The countries with the highest prevalence include Egypt (17.5%), Cameroon (13.8%) and Burundi (11.3%).[11] The countries with the lowest prevalence include Zambia (0.2%), Kenya (0.9%), Malawi (0.7%) and South Africa (0.1%).[11] Since HCV is a blood-borne pathogen, the high prevalence recorded in some countries, such as Cameroon, might be due to practices of non-sterile medical procedures or unsafe traditional practices (scarification, tattoo, circumcision).[12] We found that patients between 57 and 69 years of age were at a higher risk of HCV infection compared to other studied age groups. Our study findings are comparable to those of Layden *et al.*,[16] who reported that age-specific prevalence rates peak at 55 to 64 years of age. The association of HCV with increasing age is probably due to the fact that with aging, viral infection is confronted with a reduction in both innate and induced specific immunologic responses.[13,14]

Our results in this study demonstrated that the majority of patients on haemodialysis (26.3%) had antibodies against HCV. Different rates have been reported in other parts of the world. In a population of 262 patients on haemodialysis from a tertiary care hospital in northern India, Malhotra *et al.*[8] recorded an HCV prevalence of 33.5%. However, Zabadi *et al.* found that there was an HCV prevalence of 7.4% among 868 haemodialysis patients attending nine haemodialysis hospitals in the West Bank of Palestine.[15] According to Karoney and Siika,[5] the prevalence of HCV infection in haemodialysis patients varies from country to country, and ranges between 1 and 84.6%. Prolonged vascular exposure and multiple blood transfusions increase the risk of acquiring this blood borne infection in haemodialysis patients. Contaminated devices, equipment and supplies and attending personnel may also play a crucial role in nosocomial transmission of this infection. Furthermore, production of uremia due to renal failure is associated with the state of immune dysfunction characterised by immunosuppression that contributes to the high prevalence of infection among these patients.[11,16]

Out of 32 sickle cell patients registered in our study, 8.57% (3/35) were found positive for HCV antibodies. This result is different from that of Moussa *et al.*[9] who detected a prevalence of 23% among 70 Egyptian children with sickle cell disease (SCD) in Egypt and from that of Namasopo *et al.*[10] who reported a prevalence of 2.5% obtained in 244 children in Uganda. The high rate of the HCV antibodies obtained among these high-risk patients can be explained by multiple blood transfusions received, as all the patients were sickle cell anemia-HbSS. Nowadays red blood cell transfusion therapy is a key component in the comprehensive management of patients with SCD and has increased as a means of prevention over time. There is strong evidence that HCV antibody positivity is directly related to the number of blood transfusions in these patients.[15]

Out of 40 blood donors enrolled in the current study, 12.5% were positive for HCV antibodies, which is higher than those obtained by Tagny *et al.*,[14] Noubiap *et al.*[12] and Ymele *et al.*[16] who respectively recorded rates of 1.8%, 1.44% and 4.8% among blood donors in Cameroon. The discrepancy of the current study findings may be due to the comparatively small sample size of the study population. In Cameroon, routine testing is conducted by hospital and clinic laboratories on blood donors for blood borne-pathogens such as HIV, HBV and HCV for each single donation and the findings of the individual tests are addressed by these health institutions.

Conclusions

The prevalence of HCV antibodies is quite high in the studied population. More studies and surveillance are needed to generate data on this infection and other possible sources of infection. Preventive measures are important in curbing HCV, and include safe sex practices, strict donor selection, health education, safe injection usage, proper sterilisation of instruments, and use of sensitive laboratory test kits should constitute an important package of a prevention program. Accurate identification and clinical management of both the blood donors and family members would reduce the probability of infection through blood transfusion and prevent further dissemination of the infection. This study was limited due to a small sample size and lack of polymerase chain reaction confirmation.

Conflict of interest – The authors declare that they have no competing interests.

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