Original Research Article

Prevalence of Hepatitis C virus (HCV) in a Nigerian outpatient setting: A retrospective study

Abstract:

Background The chronicity and rising asymptomatic population with Hepatitis C virus (HCV) infection is a serious health concern which has overtime impeded true diagnosis, the actual prevalence of infection, early onset of clinical management and the actualization of the 2030 World Health Organization (WHO) Hepatitis C eradication goals particularly in middle and low income countries.
Aim: This study sought to determine the prevalence of HCV infection among asymptomatic participants in the general outpatient unit of a secondary health care facility in Nigeria.
Study design: A longitudinal study.
Place and Duration of Study: Laboratory Department, St Mary's Catholic General Hospital, Ibadan, Nigeria, between November 2017 and August 2018.
Materials and methods This study consecutively enrolled 913 patients who visited the hospital between November 2017 and August 2018 after obtaining informed consent. Laboratory diagnosis was by serological detection of anti-HCV antibodies.
Results Only ten participants (1.1%) within the study tested positive to HCV infection, the majority of infection in the male gender (n=7). The association between gender and HCV infection was statistically significant ($x^2=6.468$; $p=0.011$). The highest cases of infection were reported among individuals within the middle age bracket i.e. 31-50 years. The infection was higher among those who had formal education and multiple sexual partners.
Conclusion The study concluded that HCV is a silently growing viral infection that requires immediate attention of the health care and prevention policy makers.

Keywords: Hepatitis C; HCV; Asymptomatic; Outpatients; Nigeria

Introduction

Hepatitis C virus (HCV) is a serious infection of the liver discovered in 1989. It belongs to the family flaviviridae. It is a single stranded, small positive sense ribonucleic acid (RNA) virus [1]. The infection can be acute or chronic with varying degree of severity from brief ailment of a couple of weeks to prolonged and complicated sickness. Its transmission is majorly by unsafe drug injection, transfusion of improperly screened blood and blood products, unsafe health care practices, sexual acts such as anal or with intravenous drug users, among others [2].

World Health Organization (WHO) reports that approximately 150 million people are living with hepatitis C virus worldwide, [3,4] and nearly 700,000 mortalities have been recorded from the viral infection [2,3,4]. In Africa, the rate of infection is generally low [5]. The highest reported prevalence was in Egypt which was associated with a long-term usage history of non-sterile equipment for parenteral antischistomal therapy (PAT) [7,8]. With an estimated prevalence of about 5.3% in the African region; and 2.1% in Nigeria [5,6], the infection remains widely overlooked in national public health policies.

The chronicity and rising asymptomatic population in HCV infection has been established [2]. This however impedes true diagnosis, the actual prevalence of infection and the early onset of clinical management. The outpatient group is a snapshot of the general population and could help us infer relationships and possible outcomes. This study thus sought to determine the prevalence of HCV infection among asymptomatic participants in the general outpatient unit of a secondary health care facility. The study outcome would be a helpful assessment tool for the implementation of HCV interventions in the general population, particularly in at risk persons where necessary.

Materials and methods

Study site and population This cross-sectional study was performed at St Mary's Catholic Hospital, Ibadan, Nigeria. Ibadan is the largest city in West Africa as well as the capital of Oyo State with more than 3 million inhabitants. The hospital is centrally located in the city with about 200 beds.

The 913 patients who visited the hospital between November 2017 and August 2018 and gave informed consent were consecutively enrolled into the study. Parents and legal guardians gave consent for those under 18 years. Participants' information was obtained orally at the point of sample collection**.** Educational status were categorised based on involvement in a structured learning process.

Sample collection and processing

Five milliliters (5mls) of blood was aseptically collected from all the enrolled participants. The serum from the centrifuged blood sample was stored at -20^{o}C till the time for analysis. Centrifugation was done using Eppendorf® Centrifuge 5702 at 3500 rpm for 5 minutes. Analysis was performed using Micropoint diagnostic rapid test kits (Micropoint Rapid Diagnostic, Italy) following the manufacturers' recommendations. It is an immunochromatographic and qualitative laboratory technique for HCV antibodies detection which has an accuracy, sensitivity and specificity of 98.5%, 99.0% and 97.0% respectively.

Data analysis

The obtained data were analyzed using Epidemiological Information 2012 software by Centre for Disease Control and Prevention (CDC). Chi square statistic was used taking statistical significance at $p<0.05$.

Results

Socio-demographic features of the study population

A total of 913 outpatients were recruited into this study. As shown in **Table 1**, 297 (32.5%) males and 616 female (67.5%) participated in this study with male to female ratio of 1:2.1. Age group 21-30 years participated the most (33.0%) followed by 31-40 years (30.4%) while those above 60 years had the lowest participation (2.6%). Those with formal and informal education in this study were 495 (54.2%) and 418 (55.8%) respectively.

Socio-demographic distribution of HCV infection

As illustrated in **Table 2**, only ten participants within the study tested positive to HCV infection, the majority of infection in the male gender (n=7). The association between gender and HCV infection was statistically significant (x^2=6.468; p=0.011). The highest cases (n=6) of infection were reported among individuals within the middle age bracket i.e. 31-50 years. No statistical significance was established between age group and HCV infection (x^2=1.223; p=0.269). HCV infection was higher among those who had formal education (1.2%) (6/495) compared to those with informal education (1.0%) (4/418). There was however no significant relationship between education and HCV infection (x^2=0.136; p=0.712).

HCV infection according to risk factors among study participants

As demonstrated in **Table 3**, six (1.7%) participants who had multiple sexual partners were positive to HCV. However, the association between having multiple sex partners and HCV infection was not statistically significant. (x^2=2.122; p=0.145).

In our study the association of HCV infection with drug injection and tattoos were low. Only one participant of the 95 individuals involved in drug injection tested positive to HCV. For tattoo inscription, only two of the one hundred and one participants involved tested positive for HCV infection. No significant relationship was established between these risk factors (drug injection and tattoos inscription) and HCV infection.

Table 1: Socio-demographic features of the study population

Features	Category	Frequency	Percentage
Gender	Male	297	32.5
	Female	616	67.5
Age group	0-10	107	11.7
	11-20	76	8.3
	21-30	301	33.0
	31-40	278	30.4
	41-50	99	10.8
	51-60	28	3.1
	>60	24	2.6

Education	Formal	495	54.2
	Informal	418	55.8

Table 2: Socio-demographic distribution of HCV infection among study participants

Features	**Category**	**Frequency**	**Results**			
			Positive (%)	Negative (%)	x^2	p-value
Gender	Male	297	7 (2.4)	290 (97.6)	6.468	**0.011**
	Female	616	3 (0.5)	613 (99.5)		
Age group	0-10	107	1 (0.9)	106 (99.1)	1.223	0.269
	11-20	76	1 (1.3)	75 (98.7)		
	21-30	301	2 (0.7)	299 (99.3)		
	31-40	278	4 (1.4)	274 (98.6)		
	41-50	99	2 (2.0)	97 (98.0)		
	51-60	28	0 (0)	28 (100)		
	>60	24	0 (0)	24 (100)		
Education	Formal	495	6 (1.2)	489 (98.8)	0.136	0.712
	Informal	418	4 (1.0)	414 (99.0)		

Table 3: HCV infection according to risk factors among study participants

Risk factors	**Response**	**Results**

		Frequency	Positive (%)	Negative (%)	x^2	p-value
Multiple sex partners	Yes	345	6 (1.7)	339 (98.3)	2.122	0.145
	No	568	4 (0.7)	564 (99.3)		
Drug injection	Yes	95	1 (1.1)	94 (98.9)	0.002	0.966
	No	818	9 (1.1)	809 (98.9)		
Tattoo	Yes	101	2 (2.0)	99 (98.0)	0.821	0.365
	No	812	8 (1.0)	804 (99.0)		

Discussion

Previous studies have shown the varied rates of prevalence of HCV in Nigeria among various study populations [9-18]. This study revealed that the prevalence of hepatitis C virus infection among asymptomatic general outpatients in our setting is 1.1% (n=10). Our findings showed that the prevalence of HCV infection in the general population is low supporting previous works in other regions in Nigeria, North America and Western Europe [19,20].

Our study accessed the association of HCV infection across gender, various age groups, educational status and three presumed risk factors i.e. multiple sexual partners, injection drug use and tattoos inscription.

Despite a lower participation rate, the male gender had a higher HCV infection ratio. This agrees with reports of previous studies in similar population settings [21], where a higher prevalence of HCV infection was reported among the male gender. The significant variation arising among the

gender could be attributed to the increased risk associated activities in the male gender. This is however at variance with reports from Niger Delta, Jos, Ilorin [22] and undergraduates in Ogbomoso [11] where HCV prevalence rates are higher among the female compared to their male counterparts.

The infection was highest among the 31-50 age bracket. This is similar to the report of Damola *et al* in Ibadan [23] where the authors observed higher HCV prevalence among the older participants (≥40 years) compared to the younger ones (<40 years). Furthermore, this result supports the chronic nature of the infection, taking a long time before disease progression [24]. However, this is different from 21-30 years recorded by Jeremiah *et al* in Port Harcourt [25].

HCV infection was higher among those who had formal education compared to those with informal education. There was however no significant relationship between education and HCV infection which implies that an educational awareness of infection does not automatically infer a reduced risk.

In correlation with the risk factors considered in this study, there was a non-significant increase in the number of cases that had multiple sex partners, injection drug use and tattoo. However, there was no strong independent association between these risk factors and HCV infection in the general population. This agrees with the findings of Olive Obienu *et al* who reported that the predisposing factors associated with HCV in Nigerian patients remain largely unclear [26]. Layden *et al* further clarified that although the major transmission routes are known, the exposure risks in Africa, including Nigeria are less clearly defined [27].

Comparing our result with previous studies which screened for HCV infection in selected population group (within the general population) in similar population setting, we observed a significant relationship between selected population group (blood donors [28], HIV and HBV positive patients [29]) and HCV infection.

A diagnostic algorithm that employs a community specific, known risk factors and transmission routes to identify selected patient population group within the general population could help reveal pockets of infection among asymptomatic patients enabling targeted intervention policies. However, to establish this fact, further large scale studies that directly compare the efficacy of a diagnostic algorithm approach to the conventional approach will be needed.

Study limitation: We were unable to employ confirmatory diagnostic assays to distinguish between acute, chronic and past infections primarily due to lack of funds.

Conclusion

In conclusion, despite the low prevalence of infection, novel strategies are required to actualize the elimination of a silently growing viral infection.

Ethical approval: Ethical approval was gotten from the Oyo State Ethic Research Committee before the study commenced.

Consent: Individuals who gave informed consent and permitted sample collection were included in this study while those who declined consent and/or refused sample collection were not included in the study.

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