Prevalence And Knowledge Of Hepatitis C Virus Infection Among Residents In Otukpo Town, Benue State, North Central Nigeria

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Submitted:6th July, 2022; Accepted:15th August, 2022; Available online: 31st August, 2022

Doi: https://doi.org/10.54117/jcbr.v2i4.2
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ABSTRACT

Hepatitis C virus infection is one of the major causes of morbidity and mortality worldwide. Within the last decade, its sero-prevalence has been reported to be more than 170 million infections worldwide. The study determined the sero-prevalence and knowledge of Hepatitis C Virus infection in Otukpo, Benue State, North Central Nigeria

A descriptive cross-sectional survey of the residents in Otukpo was carried out with the aid of pretested semi structured questionnaire. Consented respondents were also screened for Hepatitis C infection using the Anti-HCV rapid test strip. The associations between relevant variables were also determined. Hepatitis sero-prevalence rate within the study population was 2.8%. Most of the respondents that participated in the study were within the age bracket of 25 – 44 years 195 (51.6%). About fifty eight percent 226 (57.7%) were females and most of the respondents had formal education. Knowledge and awareness of Hepatitis C was poor. Only one third of the respondents had appreciable knowledge of Hepatitis C. Significant statistical association occurred only between gender (male and female) Hepatitis C outcome. The study showed Hepatitis C sero-prevalence rate was relatively high in the studied population. Their knowledge and practices to avoid Hepatitis C virus were also discovered to be very low.

Key Words – Hepatitis C, Sero-prevalence, Blood transfusion

INTRODUCTION

Hepatitis occurs when there is an inflammatory process in the liver which is typified by diffused hepatocellular necrosis. It can be caused by virus, bacteria or fungi. Other etiological agents are; drugs, chemicals and toxins (Falase and Akinkugbe, 2003). Usually viral hepatitis is a result of infection cause by hepatitis virus that are taxonomically represented by virus A to G (Zeng, *et al.,* 2020). The Hepatitis C Virus (HCV) is a positive stranded RNA virus belonging to the family Flavividae and genus Hapacivirus. It is the etiological agent commonly found in post transfusion hepatitis infections (Matsubayashi, *et al.*, 2008; Khan and Ali, 2018). Smith *et al.* (2014) reported that Hepatitis C virus is classified into seven genotypes (1-7) based on the photo genetic

and sequence analysis of their whole viral genome markup. They also possess multiple subtypes. The genotypic distribution depends on the mode of transmission and ethnic variability of the strains (Datta, *et al.,* 2008).

Genotype 1 accounts for up to 83.4 million (46.2%) of cases and has a wide geographical distribution in Northern and Western Europe, Asia, North and South America and Australia (Datta, *et al.,* 2008; Thrift, *et al*., 2016). Genotype 2 is present mostly in West and Central Africa (Petruzziello, *et al*., 2014). For Genotype 3, it accounts for 54.3 million (30.1%) cases globally and is widely distributed in South Asia (Messina, *et al*., 2015). HCV genotype 4 is endemic in Middle East especially Egypt (Antaki, *et al*., 2010). HCV genotype 5 is present only in South Africa (Gededzha, *et al*., 2014; Oladeinde, *et al*., 2014). HCV genotype 6 is endemic in South East Asia especially Hong Kong and Southern China (Bunchorntavakul, *et al.,* 2013; Lavenchy, 2011). Only one case of HCV genotype 7 infection has been reported. It was isolated in Canada from a Central African Immigrant (Messina, *et al*., 2015).

World Health Organization reported an estimated number of 170 million people are infected with HCV globally, while not less than 3 million people are newly infected with HCV every year (Madhava, *et al*., 2002), therefore HCV infection is one of the leading global health problems (Popping, *et al*., 2019). Global prevalence data on HCV are based on sero-prevalence studies and there is great variableness in the distribution in various regions of the world (Shepard, *et al.,* 2005). The highest prevalence rates have been reported from developing countries in Africa and Asia while the developed industrialized nations such as North America and Europe have low prevalence rates (Mohamed, *et al.,* 2015)

Globally, HCV prevalence was estimated at 2.5% (which is equivalent to 177.5 million HCV infected Adults) {Petruzziello, *et al*., 2016}. For Africa and America, the prevalence was reported to be 2.9 and 1.3% respectively (Shimelis, *et al*., 2016; Petruzziello, *et al*., 2016). Sub-Saharan Africa has a prevalence rate of 5.3% which was estimated to be up to 32 million people (Mohd Hanafiah, *et al*., 2013). Egypt has the highest prevalence rate of 17.5%. This was attributed to history of unsterile injection equipment used for mass treatment of the general population with parenteral anti Schistosoma therapy from 1920s to 1980s (Frank, *et al.,* 2000; Sievert, *et al*., 2011; Karoney and Silka, 2013). Other World Health Organization regions with high prevalence of HCV infection are; Eastern Mediterranean and Western Pacific with a prevalence of 4.6 and 3.9% respectively (Karoney and Silka, 2013).

Despite its high prevalence and highly infectious nature, HCV remains under diagnosed and under-reported in Africa (with exception of Egypt) (Karoney and Silka, 2013; Tanjong, *et al.,* 2016). Nigeria is not also exempted as information on the epidemiology of HCV infections is also scanty in Nigeria. Therefore, the aim of this study was to determine the sero-prevalence and knowledge of Hepatitis C Virus infection in Otukpo, Benue State, North Central Nigeria.

METHODS

Study Setting

Otukpo is a town in Benue State, located in the middle belt region of Nigeria, it is a metropolitan town with 5 wards and the major ethic group are the Idomas. Otukpo

town has a General Hospital and 5 Primary Health Centres. The study was carried out at General Out-patient Department (GOPD) of General Hospital Otukpo, and two (2) Primary Healthcare Centers (PHC) located at Ijami Road, Government Residential Area (GRA) and Ahmadu Bello way were selected randomly by balloting.

Research Materials and Instruments

The research instruments were; structured questionnaire, HCV rapid test kits, sterile syringes and needles, alcohol-soaked swaps, disposable latex hand gloves, calculator, computer and statistical package for social sciences SSPS version 20. The research instrument was pretested by administering 20 copies of the questionnaire to patients similar to the intended ones (but excluded from the main study). Their responses were analyzed and appropriate adjustments made thereafter. The questionnaires were self-administered by those patients who could read and write, while others were assisted with appropriate interpretation where necessary in local dialect.

Study design and Population

The study was a descriptive cross-sectional sero-prevalence study. Inclusion criteria are consenting outpatient adolescents and adults age 15 and above attending the sampled health care facilities as earlier stated. Excluded from the study were individuals below the age of 15 years, inpatients and those who declined to participate. The data were collected from May – July, 2017.

Sampling Method

The total study population were obtained from the National Population Commission database using the National Population Census figure of 2006 for Otukpo metropolis. The figure obtained was projected to 2017 using the annual exponential growth rate of 3% (for Benue), a total figure of 109,084 was obtained. The sample size for the study was calculated using the simplified Yamane's formula (1967) which was 399. On each of the sample collection days all the patients that attended hospitals at the collection sites were enlisted for the research throughout the period of the research. The research tools were administered to consented respondents and appropriate documentations were made.

Sample Collection

The following procedure was used to screen the blood samples: the blood samples were aseptically collected through the vein using 5 ml sterile syringes, introduce into a sterile sample bottle (Chessbrough, 2002). The blood sample was dropped on the HCV test strip with addition of drops of buffer provided by the manufacturer. Two strands on the test strip indicates presences of HCV antibodies.

Ethical Consideration

The Health Research and Ethics Committee of the Benue State Ministry of Health and Human Services Makurdi gave the approval for the conduct of the research. The reference number for the approval was MOH/STA/204/VOL/17 dated 11th May, 2017.

Screening for HCV

Screening for HCV using a third generation Enzyme-linked Immune-Assay (EIA), FASTEP, Anti HCV strip, manufactured by Polymed Therapeutic Inc. Houston, USA was also done for all the patients that consented to participate in the study.

Bias

There may be recall bias in some respondents in recalling their knowledge and practices with regards to HCV. Most of the participants

were those who visited the health care facilities. There may be slight variation within the community setting, however, complete enumeration of encountered participants on data collection days minimized probable biased.

Data Analysis

Data were entered into Microsoft Excel programme and imported into SPSS version 20 for analysis. The outcome variable was Hepatitis C sero-status while the independent variables were socio-demographic characteristics, knowledge on HCV and risk factors to Hepatitis C virus. The percentage proportion of respondents with good knowledge were those with correct responses on relevant variables while those with wrong responses as well as those whose responses were 'I don't know' were considered as having poor knowledge. Descriptive statistics were generated for each variable including frequencies and percentages for categorical variables. Association between variables were tested with chi-square; level of statistical significance was set at $P<0.05$. Cases were excluded if there were missing data required for specific analysis. Multiple responses on knowledge and practice were scored to measure knowledge assessment.

RESULTS

Socio-Demographic Characteristics of Respondents

Three hundred and ninety-nine persons were approached and administered the structured questionnaire. However, only three hundred and ninety-two (392) consented, responded and participated in the study. Within this population 11(eleven) respondents tested positive for Hepatitis C antibodies, giving a sero-prevalence rate of 2.8%.

Over a half (57.7%) of the respondents were female; Married population was 49.0% while 144 (36.7%) were unemployed. These are presented in Table 1.

Knowledge, Attitude and Practice of Respondents

About two-third (66.3%) of the respondents had not heard of HCV. Out of the 7 different means of transmission presented to the respondents in the cross sectional survey, only 27.1% specified blood, majority of the people (60.5%) did not know about any means of transmission. Three quarter (75.5%) of the respondents did not know that HCV could be asymptomatic. However more than half of the respondents (52.8%) knows some of the clinical symptoms of HCV but not up to half (39.8%) agreed that it can be treated. Details are as shown in Table 2.

Table 1: Socio-demographic characteristics (n=392)

Variables	Frequency (n)	Percent (%)
Age (years) (n=378)		
15-24	123	32.5
25-44	195	51.6
45-64	55	14.6
65 and above	5	1.3
Gender		
Male	166	42.3
Female	226	57.7
Educational level		
No formal education	8	2.0
Primary	50	12.8
Secondary	167	42.6
Tertiary	167	42.6
Marital status		
Single	180	45.9
Married	192	49.0
Divorced	8	2.0
Widowed	12	3.1
Occupation		
Student	118	30.1
Unemployed	144	36.7
Employed	130	33.2

Table 2: Knowledge, Attitude and Practice of Respondents (n=392)

Variable	Frequency	Percent
Have you ever heard of HCV		
Yes	132	33.7
No	260	66.3
How does HCV Spread**		
Food	16	4.1
Blood	108	27.6
Sexual contact	89	22.7
Hand shake	24	6.1
Sharing of razor blade	81	20.7
Sharing injection needles	80	20.4
Don't know	237	60.5
Is it possible to have HCV but not have symptom		
Yes	96	24.5
No	32	8.2
Don't know	264	67.3
How to prevent HCV infection**		
Wash your hands regularly	64	16.3
Use of condom	93	23.7
Avoid unsterile used medical devices	92	23.5
Don't know	255	65.1
Which symptom of HCV are you aware of**		
Yellow eyes	102	26.0
Tiredness	76	19.4
Vomiting	29	7.4
Can HCV infection be treated		
Yes	156	39.8
No	89	22.7
Don't know	147	37.5

** Multiple response

Summary of Knowledge of Hepatitis C

Overall assessment shows that majority of the respondents (71.0%) have poor knowledge. This is presented in Figure 1

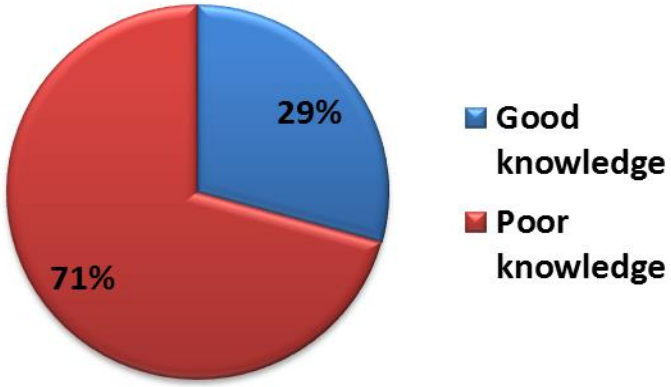

Figure 1: Summary Knowledge of hepatitis C

Risk assessment and hepatitis C statu Few respondents (6.6%) had a history of blood transmission, while most (79.6%) were unsure of their HCV status. About a quarter of the respondents (26.3 and 26.5%) responded that they have had surgical or dental procedures and shared injection needles or razor respectively. Details are shown in Table 3

Table 3: Risk assessment

Variable	Yes		No		Unsure	
	Freq	**%**	**Freq**	**%**	**Freq**	**%**
Have you ever been transfused blood	26	6.6	330	84.2	36	9.2
Have you had surgery or dental procedure	103	26.3	281	71.7	8	2
Have you had a dialysis	14	3.6	365	93.1	13	3.3
Have you ever taken injection not prescribed by doctor	54	13.8	331	84.4	7	1.8
Have you ever shared infection needles or razor with others	104	26.5	275	70.2	13	3.3
Do you have any tribal scarification or tattoo marks	93	23.7	299	76.3	0	0
Ever lived with someone with HCV	8	2	161	41.1	223	56.9
Are you a medical healthcare worker	82	20.9	310	79.1	0	0
Do you know your HIV status	2	0.5	253	64.5	137	34.9
Do you know your Hepatitis status						
Hepatitis B positive	3	0.8	74	18.9	312	79.6

Hepatitis C positive	3	0.8				
If positive to Hepatitis have you ever received treatment (n=6)	3	50	3	50	0	0
Hepatitis C status	11	2.8	381	97.2	0	0

Association between socio-demographic characteristics and Hepatitis C outcome

Gender was significantly associated with Hepatitis C (sero-positivity) (Yates continuity correction = 5.66, p = 0.017). Details in Table 4

Association between knowledge of Hepatitis C and its outcome

There is no statistically significant association between Hepatitis sero-positivity and any of the knowledge variables. (See Table 5)

Table 4: Association between socio-demographic characteristics and hepatitis C outcome

Variables	Hepatitis C (n %)		Test statistics	p-value
	Positive	Negative		
Gender				
Male	9(5.4)	157(94.6)	Continuity correction =5.66	0.017*
Female	2(0.9)	224(99.1)		
Age (years)				
≤ 44	10(3.2)	307(96.8)	Continuity correction =0.05	0.819
>44	1(1.6)	60(98.4)		
Educational level				
No formal education	0(0.0)	8(100.0)	Fisher's Exact=3.69	0.305
Primary	0(0.0)	50(100.0)		
Secondary	8(4.8)	159(95.2)		
Tertiary	3(1.8)	164(98.2)		
Marital status				
Currently not Married	6(3.0)	194(97.0)	χ^2=0.06	0.812
Currently Married	5(2.6)	187(97.4)		
Occupation				
Student/Unemployed	7(2.7)	255(97.3)	Continuity correction =0.00	1.000
Employed	4(3.1)	126(96.9)		

*=Significant

Table 5: Association between knowledge on hepatitis C and its outcome

Variables	Hepatitis C (n %)		Test statistics	p-value
	Positive	Negative		
Have you ever heard of HCV				
Yes	3(2.3)	129(97.7)	Continuity correction =0.02	0.895
No	8(3.1)	252(96.9)		
Is it possible to have HCV but not have symptoms				
Yes	0(0.0)	96(100.0)	Continuity correction =2.43	0.119
No	11(0.0)	285(96.3)		
Can HCV infection be treated				
Yes	2(1.3)	154(98.7)	Continuity correction =1.38	0.241
No	9(3.8)	227(96.2)		
Knowledge/aware on HCV				
Good knowledge	2(1.7)	113(98.3)	Continuity correction =0.238	0.625
Poor knowledge	9(3.2)	268(96.8)		

DISCUSSION

Hepatitis C sero-prevalence of 2.8% was obtained in this study among a total of 392 respondents that were screened. The same value was obtained by Ahinge *et al*, (2013) also at Makurdi, North Central Nigeria, though their studies were among pregnant women. There is documented evidence of Hepatitis C sero-prevalence from other geo-political regions in Nigeria by the following researchers: Sheyin *et al*, (2012); Mboto *et al*, (2010) and Ogunro *et al*, (2007). They reported 4.5%, 0.4% and 9.2% respectively in Kaduna State, Northwest; Calabar, South East and Oshogbo in the South West. According to Bigwan *et al.* (2016), some of the possible reasons that could be responsible for these differences in the sero-prevalence values includes; socio-cultural and religious beliefs; health care delivery system adopted in the locality and the sample size used.

The sero-prevalence obtained in this study also correlated with the total prevalence rate of 2.9% for Africa (Shimelis, *et al*., 2016; Petruzziello, *et al*., 2016), but it was higher than values ranging between 0 – 1.4% reported from USA and Europe (Alter, *et al*., 2007) where HCV prevalence is declining because of increased knowledge and awareness, diagnosis, access to treatment and management, and continuous research on Hepatitis C virus infection.

The prevalence rate in this study implied that an appreciable number of persons are

infected with Hepatitis C Virus in the study area, perhaps in the chronic state with the possibility of subsequent development of chronic irreversible liver damage. It also portends potentials for HCV transmissions within the larger population considering the poor knowledge and awareness of Hepatitis C virus as shown in the study.

The statistically significant association in the female gender and HCV outcome in this study is somewhat similar to the findings by Shams *et al.* (2010) that past obstetrical/surgical procedure and the risk of perinatal transmission of infection existed in both HCV and HBV transmission since the infections can occur both vertically as well as horizontally.

Knowledge and awareness of Hepatitis C mode of transmission are critical to prevention, treatment and care. Majority of the respondents in this study demonstrated poor knowledge of Hepatitis C virus. Only less than half (39.5%) of the respondents had adequate knowledge about the mode of transmission, symptoms, prevention and treatment. Ahinge *et al*, (2013) also reported poor knowledge of HCV in Makurdi in their findings. Meanwhile, Vermunt *et al*, (2015); Proeschold-Bell *et al*, (2010) and Surjadi *et al*, (2011) in New Zealand, North Carolina and San Francisco, California in United States respectively reported an association between tertiary education and knowledge of HCV. Similarly, Shah and Abu–Amara, (2013) in their review article reported that education was a sine qua non to prevention and effective management of HCV.

This observation is particularly worrisome considering the fact that some communities in the studied area (and some other areas in Nigeria) still practice tribal marks incision, and vulvectomy with the use of unsterilized sharp objects (Amuche, *et al*., 2017; mon O´Dey, 2019). Sundari. (2020) in his book "*The untold story"* described how complicated the issues could be presented in developing countries particularly in emergency situations. There are documented cases of secondary health facilities in some rural areas that lacks basic equipment and kits for screening for HCV anti-bodies before blood transfusion. This further underscores the need to create awareness on Hepatitis C Virus not only among the health workers but nationwide possibly via print, audio and visual media, road shows, medical outreaches in a manner that it was done for Human Immunodeficiency Virus / Acquired Immune Deficiency Syndrome (HIV/AIDS) sometime ago.

Hepatitis C Virus is primarily transmitted through blood to blood contact. The significant association of Hepatitis C sero-positivity with blood transfusion in this study correlated with Uneke *et al*, (2005) and Lee *et al*, (2005) whose study found blood transfusion a significant risk factor in Hepatitis C virus infection.

There was also significant association in Hepatitis C sero-positivity among HIV positive children in this study. This was similar to the study that was reported by Salu *et al*, (2018) in Lagos Nigeria. The study reported co-infection of HCV among HIV positive children and according to the report this may further increase the undesirable chances of chronic liver diseases which will consequently reduce their life expectancy.

CONCLUSION

The study showed that Hepatitis C was prevalent in the study area which can be extrapolated to what may be happening in other locations in Nigeria and with particular reference to the North Central geopolitical zones where the study was conducted.

Therefore, the study can be used as a veritable tool for the need to adopt international best practices especially at our secondary healthcare facilities as it relates to blood transfusion procedures. Globally and particularly in developing countries, the policy makers should be adequately informed about the inherent dangers associated with unstandardized invasive practices that may arise due to lack of basic reagents and other necessary infrastructure at our healthcare facilities. It suggested the need for continuous education of the healthcare workers, the patients and their care givers on the knowledge of Hepatitis C. This will have a direct impact on the quality of life of those meant to receive blood transfusion. The need for individuals to be screened and know their Hepatitis C status is very glaring from the study. This will help to prevent complications associated with delay or lack of treatment. The significant association between the gender and HCV outcome need further investigation in the study area authenticate the factors that are responsible.

DECLARATIONS

Ethical Approval and Consent to participate

The Health Research and Ethics Committee of the Benue State Ministry of Health and Human Services Makurdi gave the approval for the conduct of the research. The three hundred and ninety-two (392) respondents that participated in the study consented.

Consent for publication

All the authors consented to the publication

Availability of data and materials

Yes

Competing interests

None

Acknowledgements

Our sincere appreciation goes to all the people that provided technical assistance such as the laboratory scientist and compilation of the data

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