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Predictors of Seroprevalence of Hepatitis C Infection among Health Care Workers in Nigeria; A Year after Post Implementation of Nigeria's National Hepatitis Prevention Policy

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Abstract

Background: Hepatitis C virus (HCV) infection is a global public health issue. Health care workers (HCWs) are particularly at risk. Nigeria hepatitis prevention policy aims to achieve country wide elimination of hepatitis through early detection using mass screening with life-style modifications of "at risk population" which are key preventive strategies.

Aim: To determine the seroprevalence of HCV infection among HCWs in a large regional referral hospital in Nigeria.

Methods: A hospital-based descriptive cross-sectional study (hepatitis mass screening) was done at the University of Nigeria Teaching Hospital, Enugu, Nigeria between July and August 2016. Non-randomised sampling was used. Blood samples were assayed for antibodies to HCV. Data on knowledge, risk factors and mode of transmission were collected using a structured, pre-validated, pretested, questionnaire and analysed using SPSS version 20.

Results: A total of 3132 out of 5144 (60.9%) HCWs participated in the study. The seroprevalence of hepatitis C among UNTH staff was 0.90% (28/3132). The mean knowledge score of 68.95% ± 24.23 and 56.70±17.25 translates to fair knowledge level about mode of transmission and risk of transmission of hepatitis C among HCWs, respectively. There was no reported case of hepatitis B and C co-infection. Females HCWs had highest sero-prevalence for HCV 17/5144 (0.33%) (P = 0.164, AOR= 1.76, 95%CI =0.431-2.413).

Conclusion: This study found a low seropositivity of HCV among HCWs. A pointer to the possible success of the hospital-based education awareness programme, an implementation of Nigeria's national hepatitis prevention policy.

Keywords: Hepatitis C Virus, healthcare workers, seroprevalence, health policy

1. Introduction

Hepatitis C virus (HCV) infection is a major health issue of global proportions which requires widespread active interventions for its prevention and control. This is no surprise as the spread of HCV (based on the rate of development of molecular diversity) can be estimated to date back about 500–2000 years (Smith et al., 1995). The HCV was first identified in 1989 though it had been prevalent for many decades (Thorburn et al., 2001). The origin of the infection had been connected to mass anti-schistosomal parenteral treatment campaigns conducted in the 1960s–80s using insufficiently sterilized injection material (Franco, Bagnato, Marino, Meleleo, Serino, Zaratti, et al., 2012). Globally in 2015, over 70 million people had chronic HCV infection (World Health Organization, 2017) with almost 500 000 deaths per year (Franco et al., 2012). Almost one fifth of the world's cases of HCV occur in

Africa (Dore, Ward, & Thursz, 2014). Sub-Saharan Africa has a moderate incidence rate of 2.8% with over 8 million people infected (Mohd Hanafiah, Groeger, Flaxman, & Wiersma, 2013). Nigeria has a prevalence rate of 2.1% with over 3 million people infected with HCV (Lavanchy, 2011). The major burden from HCV infection comes from sequelae from chronic infection (Perz, Armstrong, Farrington, Hutin, & Bell, 2006). Globally, estimates indicate that three to four million persons are newly infected each year, while 170 million people are chronically infected. Approximately 75-85% of HCV-infected persons will progress to chronic HCV infection, and are at risk of developing extrahepatic manifestations, compensated and decompensated cirrhosis, and hepatocellular carcinoma (HCC) (Chen, & Morgan, 2006). Antibodies to HCV (anti-HCV) are a commonly available marker of HCV infection (Franco et al., 2012). The mode of transmission is parenteral, most often through injections, especially when needle sharing is involved, occupational exposure among HCWs, sexually transmitted especially when multiple partners are involved (Wasley, Miller, & Finelli, 2007). Infection by blood transfusion is now somewhat rare especially where quality mandatory blood screening is done. Perinatal transmission is also very uncommon, and the risk of vertical transmission is 6% in mothers who are only HCV positive (Watanabe Saito et al., 2003). There is no vaccine or postexposure prophylaxis for HCV infection (Hughes & Henderson, 2016).

The incidence of HCV seroconversion from occupational hazard in health care workers is inconclusive, with figures ranging from 0 to 9.7% (Coppola et al., 2016). The focus is now on the risk of contracting HCV infection. Without an effective active immunization, the primary prevention strategies against HCV are mainly on advocating safe injection and blood transfusion practices. With anti-HCV therapy, advanced liver disease is largely preventable but largely constrained by the high cost of diagnostic tests and few personnel with knowledge and skills to provide these treatments. Secondary prevention strategies against advanced liver disease; screening for early detection and promotion of health life choices in terms of alcohol ingestion remain key cost-effective public health tools (Kim et al., 2010; Mitchell et al., 2010; Peters et al., 2010) especially in resource constrained nations like Nigeria.

Few studies have been done on HCV sero-prevalence in Nigeria with reports coming from non-representative studies conducted among high-risk groups including pregnant women receiving ante natal care (Anaedobe, Nwadike, & Fowotade, 2016; Onwere et al., 2011), doctors and dentists (Olubuyide et al., 1997), blood donors (Ayolabi et al., 2006), diabetics (Adegoke et al., 2008), children (Eke et al., 2016) and undergraduates (Jemilohun, Oyelade, & Oiwoh, 2014). At the time of the study, there are few studies on seroprevalence of HCV infection in health care workers in a tertiary health institution in Nigeria. This study aims to assess the knowledge and seroprevalence of HCV infection among HCWs in University of Nigeria Teaching Hospital, a major referral hospital in South Eastern Nigeria.

2. Materials and Methods

2.1 Study Design

This was a hospital-based cross-sectional descriptive study carried out at the University of Nigeria Teaching Hospital (UNTH) Enugu.

2.2 Study Area

UNTH is a 576 bedded hospital with staff of approximately 5144. It is a major referral tertiary hospital located in the South-East of Nigeria which offers family medicine as well specialist medical and surgical consultations, laboratory, blood bank, dental and mortuary services.

2.3 Study Population

The categories of health care workers include; doctors, nurses, pharmacist, laboratory technologists and others ancillary staff like; health assistants, health admin officers, dental therapists and mortuary attendants whose duties range from handling of corpses, equipment cleans ups, sample handling transportation and trash disposal.

2.4 Sampling

Convenience sampling method was used recruit HCW who presented for the free hospital organized hepatitis C virus screening programme and consented to the study. Inclusion criteria include male or female between the ages of 18-70 years. Those members of staff who had jaundice, alcoholics, known liver disease, chronic inflammatory/debilitating illness or have been transfused less than 3months before this study were excluded from the study.

2.5 Sample Size Estimation

All healthcare workers who consented could participate in the study. A total 3132 (3132/5144, 62.6%) HCWs

participated in the study.

2.6 Data Collection

Hepatitis C mass screening is not routinely done in hospital. For this programme, hospital staff were informed and pre-sensitized about the free hepatitis screening programme two weeks prior to the commencement via internal memo, posters, handbills, emails, SMS messages and organized awareness campaigns at strategic locations using public address systems. The programme schedule involved different departments to ensure adequate coverage.

For this study, the primary outcome variables of interest were the prevalence of viral hepatitis C infections amongst HCWs. Potential effect modifiers assessed for included knowledge on transmission and risk factors of hepatitis C infection.

A pre-validated, pre-tested structured questionnaire were administered to study participants in their preferred language (Igbo or English). The questionnaire was designed wholly by the authors for the study and independently assessed by a public health physician not involved in the study. The questionnaire was then pre-tested on a group of 50 HCWs who were not included in the study; doctors (20), nurses (10), scientists(5) pharmacists(5) ,health assistants(5) and administrative staff(5) in a neighbouring hospital, Enugu State University Teaching hospital Enugu to identify most valid questions that will help achieve our objectives. Further reviews were made to develop a final questionnaire. The questionnaire had two sections and 17 questions, 7 on socio-demographic characteristics of respondents and 10 on the knowledge of mode of transmission and risk factors of HCV infection. The questionnaire was translated into the Igbo language and back translated into English by two independent Igbo scholars.

Knowledge of HCV infection was assessed by 10 multiple-choice questions. For each respondent, the percentage of correct answers was calculated as a representative of knowledge score. For participant, score of questions was summed up and converted into percentage to represent the composite knowledge score. The scores were graded as poor knowledge (scores 49.9% and below), fair knowledge (scores between 50 to 69.9%) and good knowledge (scores 70% and above). Cronbach alpha of the questionnaire was 0.85.

2.7 Procedure for Blood Collection

Venepuncture was done by hospital phlebotomists trained for the study. A 4ml venous blood sample was collected aseptically, by venepuncture into an EDTA bottle and allowed to stand. Clear plasma separated from the red cells on standing was then extracted. Presence of antibody to HCV (anti-HCV) was determined using HCV chromatographic immunoassay rapid test strips (Biotest, China). These are in vitro qualitative one-step chromatographic immunoassays for anti-HCV detection and the tests were carried out and the test quality controlled using positive and negative control samples according to the manufacturer's instructions. The anti-HCV detection kit has sensitivity of 99.1% and specificity of 99.5%.

2.8 Personnel and Training

Adhoc research assistants, university graduates with experience in data collection, and phlebotomists were recruited and trained for one week on questionnaire administration, sample collection and testing by the research team consisting of gastroenterologists, public health physicians and haematologists using IEC tools like power point presentation, simulations demonstrations and group discussions. The training was held one week before the commencement of the hospital wide screening programme. The objective were informed consent process, quality data collection and sample collection

2.9 Data Analysis

Data from completed questionnaires were cleaned up to minimize errors, duplication and entered in Statistic Package for the Social Sciences (SPSS version 22.0, IBM SPSS version 22.0 (IBM Corp, Armonk, NY, USA)) for analysis. Characteristics of the participants were presented as simple frequency tables. Other results were presented in form of tables. In testing for associations, Chi-square statistics was used. Variables which reached statistical significance in the bivariate models were included in the multivariate analysis. Strength of association was measured using Odds ratio and statistical significance assessed using P-values and 95% confidence intervals for odds ratio. For all analyses, p-values of < 0.05 were considered statistically significant.

2.10 Key Outcomes

The key outcome measure was seroprevalence of hepatitis C among HCWs while secondary outcome measures included their knowledge base of hepatitis C and its mode of transmission.

2.11 Ethical Considerations

The study was approved by UNTH management and the study protocol was reviewed and approved by UNTH Health Research and Ethics Committee. Informed consent procedure involved signing of informed consent forms by participants after educating them on the purpose of the study, possible outcomes of the screening and available options to be taken depending on the outcome of the screening. Anonymity of data was done with number codes.

3. Results

A total of 3132 out of 5144 health care workers of UNTH were screened for. The ages of participants ranged from 18-75years with a mean age of 39.4 ± 9.6 years. Majority of them were between ages 31 to 60 years 2505 (79.9%), while only 23 (0.7%) were above 60 years old. About three quarters 2237 (71.4%) had tertiary education while 2174 (69.4%) were married. Doctors, nurses, pharmacists were 297 (9.5%), 580 (18.5%) and 46 (1.5%) respectively. Majority 1771 (56.5%) have worked in the hospital for duration of 1 to 10 years (Table 1).

Table 1. Socio-demographic characteristics of the respondents

Variables	Categories	Frequency	Percentage
Sex	Male	951	30.4
	Female	2181	69.6
Age (Years)	<20	12	0.4
	20-30	592	18.9
	31-40	1151	36.7
	41-50	922	29.5
	51-60	432	13.8
	>60	23	0.7
Education Level	No formal education	11	0.4
	Primary	229	7.3
	Secondary	626	20.0
	Tertiary	2237	71.4
	Vocational	29	0.9
Marital status	Married	2174	69.4
	Single	869	27.7
	Separated	11	0.4
	Widowed	78	2.5
Job category	Doctor	297	9.5
	Nurses	580	18.5
	Pharmacist	46	1.5
	Laboratory scientists /Technologists	90	2.9
	Health clerks, Dental therapists, Health attendants	2,119	67.6
Duration of service	< 1 year	263	8.3
	1-5 Years	931	29.8
	>5-10 Years	840	26.8
	>10 Years	1,098	35.1

Most Participants showed a good knowledge for mode of transmission 2691/3132(85.9%) and risk factors for transmission of hepatitis 1776/3132(56.7%) respectively, See Table 3.

Most of the participants were aware of hepatitis C 3042/3132 (97.1%) The commonest sources of information

were radio 2251/3132 (71.9%), and health workers 2160/3132 (70.0%). Majority 2180/3132 (69.6%) knew that blood transfusion is a mode of transmission, while 386/3132 (12.3%) believed that it can be transmitted by drinking contaminated water. Less than half of participants 1420/3132 (45.3%) and 1528/3132 (48.8%) believed that multiple sexual partners and sharing of needles respectively are risk factors. Those who believed that breastfeeding, and body contact are risk factors were 593/3132 (18.9%). (Table 2)

The seroprevalence of hepatitis C among UNTH staff was 0.90% (28/3132). Of 3132 HCWs screened, majority of those that tested positive to hepatitis C antibodies 89.2% (25/28) were heath assistants, health admin officers, dental therapists, and mortuary attendants. The minority, 10% (3/28) were doctors and nurses. None of laboratory technologists.

Table 2. Knowledge, mode of transmission and risk factors of hepatitis C infection

Variables	**Correct response**		**Incorrect response**	
	N	%	N	%
Previous source of information about hepatitis	1003	32.0	2129	68.
Heard of hepatitis	3042	97.1	90	2.9
Heard from Radio	2251	71.9	881	28.1
From Health Worker	2160	70.0	972	30.0
From Television	642	20.5	2490	79.5
From Print Media	515	16.4	2617	83.6
From Family Member	305	9.7	2827	90.3
Mode of transmission	Correct response		Incorrect response	
Shaking of hands	84	2.7	3048	97.3
Needle prick	1322	42.2	1810	57.8
Blood transfusion	2180	69.6	952	30.4
Heat	209	6.7	2923	93.3
Sexual intercourse	1532	48.9	1600	51.1
Drinking contaminated water	386	12.3	2746	87.7
Sharing of sharp objects such as needles, razors et	1489	47.5	1643	52.5
Contamination from surfaces	572	18.3	2560	81.7
Risk factors	Correct response		Incorrect response	
	N	%	N	%
Blood transfusion	2134	68.1	998	31.9
Multiple sexual partners	1420	45.3	1712	54.7
Sharing of needles	1528	48.8	1604	51.2
Occupational exposure	1259	40.2	1873	59.8
Others e.g Breast feeding, body contact etc	593	18.9	2539	81.1

Table 3. The grading of overall knowledge

Knowledge level	**Mode of transmission***		**Risk of transmission****		**X^2**	**P- Value**
	N	**%**	**N**	**%**		
Poor Knowledge	441	14.1	1356	43.3	1.078	<0.001
Fair Knowledge	520	16.6	708	22.6		
Good Knowledge	2171	69.3	1068	34.1		
Total	3132	100	3132	100		

3.1 Factors Associated with Hepatitis C Status

Binary logistic regression analysis was performed to assess factors associated with Hepatitis C virus infection. Variables which reached a statistical significance of ≤ 0.2 in the bivariable models (see Table 4) were included in the multivariable analysis. The statistical level of <0.2 was chosen to capture enough population for multivariate analysis.

Table 4. Factors associated with Hepatitis C Status among participants (N=3132) (Bivariate analysis)

Variable	Hepatitis C Status				COR (95%CI)	P Value
	Positive		Negative			
	N	%	N	%		
Sex						
Male	11	1.2	940	98.8	1.00	
Female	17	1.8	2164	99.2	1.94 (0.789 – 3.512)	0.362
Age group (Years)						
< 30	2	0.3	602	99.7	1.00	
31-40	9	0.8	1142	99.2	1.63(1.353 – 1.794)	0.003
41-50	14	1.6	908	98.4	0.87(0.563 – 1.549)	0.186
51-60	3	0.7	452	99.3	1.31(.278 – 3.947)	0.137
Marital status						
Married	20	0.9	2154	99.1	1.00	
Single	7	0.8	862	99.2	1.40 (1.235 – 1.792)	0.003
Separated	0	0	11	100	1.74 (0.164 – 3.830)	0.196
Widowed	1	1.3	77	98.7	1.93 (0.074 – 2.627)	0.172
Educational level						
Primary	7	2.9	233	97.1	1.00	
Secondary	8	1.3	618	98.7	4.38 (1.517 – 4.107)	0.005
Tertiary	13	0.6	2253	99.4	1.12 (0.730 – 3.676)	0.352
Professional Categories						
Doctors	1	0.3	296	99.7	1.00	
Nurses	2	0.3	578	99.7	1.63 (0.579 – 3.592)	0.261
Pharmacists	0	0	46	100	1.41 (0.179 – 5.321)	0.145
Lab Scientists	0	0	90	100	0.74 (1.478 – 3.736)	0.034
Others	25	1.2	2094	98.8	1.48 (0.857 – 6.627)	0.278
Duration of work in the hospital						
< 1 Year	3	1.1	260	98.9	1.00	
1-5 Years	7	0.8	924	99.s2	0.58 (0.483 – 2.789)	0.175
>5-10 Years	9	1.1	831	98.9	0.34 (0.173 – 4.067)	0.158
>10 Years	9	0.8	1089	99.2	0.29 (0.602 – 4.863)	0.182
Any previous training?						
No	26	1.2	2198	98.8	1.00	
Yes	2	0.2	1001	99.8	0.67 (0.073 – 0.641)	0.031

Table 5. Factors associated with Hepatitis C status among participants (N=3132)

Variable	Hepatitis C Status				AOR (95%CI)	P Value
	Positive		Negative			
	N	%	N	%		
Sex						
Male	11	1.2	940	98.8	1.00	
Female	17	1.8	2164	99.2	1.76 (0.431 - 2.413)	0.164
Age group (Years)						
< 30	2	0.3	602	99.7	1.00	
31-40	9	0.8	1142	99.2	0.16(1.458 – 1.748)	0.004
41-50	14	1.6	908	98.4	0.79(0.862 – 1.896)	0.135
51-60	3	0.7	452	99.3	0.38(0.426 – 3.837)	0.182
Marital status						
Married	20	0.9	2154	99.1	1.00	
Single	7	0.8	862	99.2	1.01 (0.535 – 1.792)	0.385
Separated	0		11	100	0.64 (0.084 – 4.760)	0.782
Widowed	1	1.3	77	98.7	0.53 (0.064 – 3.519)	0.639
Educational level						
Primary	7	2.9	233	97.1	1.00	
Secondary	8	1.3	618	98.7	3.87 (1.717 – 8.467)	0.002
Tertiary	13	0.6	2253	99.4	1.32 (0.830 – 5.400)	0.216
Professional Categories						
Doctors	1	0.3	296	99.7	1.00	
Nurses	2	0.3	578	99.7	0.93 (0.582 – 3.946)	0.278
Pharmacists	0	0	46	100	0.64 (0.079 – 4.821)	0.386
Lab Scientists	0	0	90	100	1.42 (0.468 – 5.735)	0.756
Others	25	1.2	2094	98.8	0.83 (0.931 – 6.641)	0.462
Duration of work in the hospital						
< 1 Year	3	1.1	260	98.9	1.00	
1-5 Years	7	0.8	924	99.2	0.76 (0.613 – 4.769)	0.485
>5-10 Years	9	1.1	831	98.9	0.47 (0.346 – 2.783)	0.698
>10 Years	9	0.8	1089	99.2	0.36 (0.302 – 7.258)	0.792
Any previous training?						
No	26	1.2	2198	98.8	1.00	
Yes	2	0.2	1001	99.8	0.56 (0.068 – 0.745)	0.034

Summary statistics (see Table 5) showed that after adjusting for sex, marital status, educational level, professional categories, duration of work in the hospital, and previous training, the odds for hepatitis C decreased with increasing age of the participants. The odds were 84% lower among participants that were aged 31-40 years compared to those below age of 30 years (AOR:0.16; 95%CI:1.458 - 1.748; P:0.004.)

The odds were 44% lower among participants that had previous training than those were not trained (AOR:0.56; 95%CI:0.068-0.745; P:0.034). The odds for hepatitis C decreased with increasing duration of work in the hospital. Odds for hepatitis C was 24% lower for those who had work for between 1-5 years (AOR:0.76;

95%CI:0.613-4.769; P:0.485). Predictors of hepatitis C seroprevalence were educational levels, professional categories, and previous specific training on hepatitis C virus.

4. Discussion

HCV is a common cause of occupational blood-borne disease. It transmitted from patients to HCWs and frequently leads to a chronic asymptomatic carrier condition for a long time before the development of symptomatic liver disease (Thorburn, Dundas, McCruden, Cameron, Goldberg, Symington et al, 2001; Deuffic-Burban, Delarocque-Astagneauc, Abiteboul, Bouvet & Yazdanpanah, 2011). Therefore, HCWs with HCV infection may be unaware of their disease or carrier condition and infect other persons such as their families or patients (Thorburn, Dundas, McCruden,Cameron, Goldberg, Symington et al, 2001).

Our results suggest a low HCV seroprevalence of 0.90% among an indigenous Nigerian HCWs population. This was comparable to reports from similar studies in Ibadan and Ogbomoso in Nigeria with a reported prevalence as low as 0.4% (Olubuyide et al., 1997) to as high as 11% (Jemilohun, Oyelade & Oiwoh, 2014) respectively. It is, however, low when compared to figures from West sub-Sahara Africa; Benin, Burkina Faso, Cote d'Ivoire, Cameroon, Cape Verde, Ghana, Guinea,The Gambia, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Saint Helena, Sierra Leone, Sao Tome and Principe, Chad, Togo (Mohd Hanafiah, Groeger, Flaxman, & Wiersma, 2013) as reported in a global epidemiological report by Mohd et al The prevalence is comparable to reports from other parts in Africa such as 1.3% in Rwanda (Kateera et al., 2015) but high when compared to reports from other parts of the world such as the Netherlands 0.14% (Okasha et al., 2015), West Scotland 0.28% (Thorburn et al., 2001) and none in Iran (Zaaijer, Appelman, & Frijstein, 2012). The results showed a higher prevalence rate in females than males comparable to a similar study done in Keffi, Nigeria with reported higher HCV prevalence rate in females than males (Pennap, Yakubu, Odula, Joseph, & Forbi, 2010). The predilection for female gender in our hospital based cannot be explained and further studies are needed to better understand this relationship. Some gender related cultural practices like female genital mutilation, piercing, or and poor health seeking behaviours in our environment as reported (Nail, Eltiganni & Islam, 2008) could be contributory. Equally, the highest number with HCV antibodies were between 41-50 years, this was also similar to results from a previous study (Nail, Eltiganni, & Islam, 2008). The reason for this is unknown, though it may not be unaffected by occupational exposures or poor health seeking behaviours in that age group. Furthers studies are needed to clarify this.

A similar Nigerian study reported a higher prevalence of antibodies to HCV in HCWs compared with blood donors, but they were a non-representative self-selected group and persons with high risk behaviour were excluded (Deuffic-Burban, Delarocque-Astagneauc, Abiteboul, Bouvet, & Yazdanpanah, 2011).

In this study, some HCWs were categorized as "others"; heath assistants, health clerks, dental therapist, mortuary attendants whose duties ranged from sample receptions, equipment clean ups, sample handling and transportation, trash disposal the highest prevalence for HCV was among this group; Our study also showed that absence of antibodies to HCV in laboratory technologists, This was consistent with a study that was done among HCWs in Iran and Sudan (Morowatishaifabad, ZareSakhvidi, Gholianavval,, MasoudiBoroujeni, & Alavijeh, 2015; Luksamijarulkul, Thammata, & Tiloklurs, 2002). Reasons for this could be due to biosafety practices in laboratories Doctors and nurses both recorded a prevalence of 0.3%, this was low compared to a similar Nigerian study done in Ibadan where an absence of HCV antibodies was reported among doctors and dentists (Olubuyide et al., 1997).

A Dutch study reported prevalence (0.14%; 95% confidence interval [CI]: <0.01% to 0.85%) among HCWs that perform exposure prone procedures (Zaaijer, Appelman, & Frijstein, 2012). This draws attention to the increased risk associated to some procedures and the need for more health education and biosafety trainings for those group of HCWs.

Our study showed that educational levels, professional categories, and previous specific trainings on hepatitis C significantly affected the prevalence of HCV amongst HCW in our institution. A study done in Thailand reported literacy levels and place of residency (urban vs. rural) as independent predictors of HCV transmission (Nawab, 2019). An Italian study equally reported that previous exposure to specific training programme significantly affected nurses' practice in handling haemodialysis patient although this study did not assess the sero status of these nurses (Bianco, Bova, Nobile, Pileggi, & Pavia, 2013). In our study we found that health attendants, morticians, dental therapist were the most group of health workers affected. Education programme organized in our institution targeted doctors, nurses and laboratory personnel may have contributed to low seroprevalence among these groups. Disparity in health education and biosafety training programme among HCWs could be contributory and future studies are needed to check their effect of on seroprevalence of HCV.

The risk posed to patients by an HCV infected HCW is not known and there are no current national guidelines to assist in their management. Negligent medical practices, poor infection control procedures and sharing of needles and sharps have been implicated in reports of transmission to patients (Thompson et al., 2009; Cody et al., 2002). There has been only a single published report of HCV transmission to a patient from an infected cardiac surgeon in Europe despite observing universal safety precautions (Esteban, Sauleda, & Quer, 2008). There is no published report of such transmission to patients from our institution or in Nigeria in general.

In 2015 Nigeria launched her national policy on hepatitis prevention with nation wide mass awareness programme and screening (Zaggi, 2015) which resulted in improved public awareness and avoidance of high-risk behaviours through health education programmes. This agrees with a meta-analysis report which suggested that prevalence of HCV infection may have reduced due to improved prevention (Westermann, Peters, Lisiak, Lamberti, & Nienhaus, 2015). The relatively low prevalence rate of HCV reported in this study may not be unrelated to the successful outcome of this programme increased health education and awareness of hepatitis nation-wide.

4.1 Limitations

This study only assayed antibodies to HCV. Hepatitis C viral DNA detection was not done hence individuals still in the window period (the period between infection and the time the body produces detectable antibodies to hepatitis C virus using an antibody test protocol) of hepatitis C seropositivity could not be detected using this screening methodology. Again some data of interest such as history of occupational exposure, blood transfusion and liver histology were not available due to recall bias

5. Conclusion/Recommendation

The study revealed that Hepatitis C seropositivity was low among health care workers and most had good knowledge of hepatitis C virus, its risk factors and mode of transmission. Educational levels, professional categories and previous training were independently associated with hepatitis C seropositivity.

There is need to bridge any disparity in health education training of hepatitis among HCWs and to avoid complacency among HCWs, continuing medical education and pre-employment hepatitis tailored awareness and prevention program should be sustained in hospitals in Nigeria.

Competing Interests Statement

The authors declare that there are no competing or potential conflicts of interest.

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