



HEPATITIS B VACCINATION STATUS AND ASSOCIATED FACTORS AMONG FEDERAL ROAD SAFETY CORP PERSONNEL, KATSINA STATE, NIGERIA

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ABSTRACT

Introduction: Hepatitis B virus (HBV) is a leading cause of morbidity and mortality in Nigeria. It remains a major occupational health hazard among health care workers and paramedics especially during rescue mission. The Road safety personnel are at even greater risk due to poorer compliance with universal safety precautions during rescue missions. The Federal Road Safety Corp personnel are amongst those persons at risk of acquiring HBV infection that WHO recommended for Catch-up hepatitis B vaccination strategies. However, the current vaccination status of the FRSC personnel is unknown.

Aim and Objectives: To assess the Knowledge, HBV vaccination status and associated risk factors among Federal Road Safety Corp Personnel in Katsina State, North-western, Nigeria.

Methodology: A cross-sectional study was conducted among 180 Federal Road Safety Personnel in Katsina state North Western Nigeria. Data was collected electronically using Kobo Collect tool (KCT) that contained pre-tested interviewer-administered questionnaire. The data was analyzed using Statistical Package for Social Sciences (IBM SPSS) version 24. Univariate (Tables, graphs and charts), bivariate (Chi-square) and multivariate analyses (Binary logistic regression) were used to determine the relationships between categorical variables with a significance level set at $p \leq 0.05$.

Result: Only 15% of the respondents had good knowledge of hepatitis B infections. The mean knowledge score was 10.28 ± 4.16 . The proportion of respondents with good knowledge of HBV was higher among personnel that were aged ≥ 50 years (29.4%) as compared to those aged < 50 years (11.6%). Only one-third (36.0%) of the respondents were vaccinated with required doses of hepatitis B vaccines whereas more than two-fifth (42.8%) of the respondents had zero dose of the Vaccines. Personnel with years of service less than 10 years are 2.3% less likely to be vaccinated as compared to those that spent 10 or more years in service. Those who had never been transferred are 36% less likely to be vaccinated compared to those who had been transferred before.

Conclusion: The knowledge of hepatitis B virus infection and HBV vaccine uptake among Federal Road Safety Personnel was poor. Years of service and being transferred from one-unit command to another were independent factors associated with vaccine uptake. The FRSC in collaboration with the State Ministries of Health should organize public awareness and sensitization campaigns on HBV infection and develop a written policy on pre-employment and periodic vaccination against HBV infection.

Keywords: Hepatitis B, Knowledge, Katsina Northwestern Nigeria, Vaccination status

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INTRODUCTION

Hepatitis B infection is a major public health problem despite availability of potent and effective vaccine that provides 98% to 100% protection [1]. It causes morbidity and mortality with mortality rate of 1.34 million per year [2]. Globally about 257 million people are chronic carriers of hepatitis B Virus (HBV) and 686 000 deaths occur annually due to long-term complications including liver cirrhosis and hepatocellular carcinoma, a number that is projected

to increase [3, 4]. This is a public health challenge as majority of them have poor access to testing and treatment facilities. Nigeria with a prevalence of 12.3%, is in the high endemic zone has around 22,140,000 people HBV carriers [5, 6]. Annually around 26, 424 people die due to consequences of chronic HBV [7, 8]. Among those with infection, chances of becoming HBV carriers are 90% in infants, 30% in early childhood and up to 5% in adults [9, 10]. In persons with chronic HBV infection, the risk of dying prematurely due to liver cirrhosis and

hepatocellular carcinoma (HCC) is 15-25%; one in every 26 infants born run the life-time risk of developing chronic HBV infection [3]. Chronic infection with HBV is responsible for 80% of cirrhosis, and about 60% of HCC in Nigeria [4]. HBV is resilient and can survive outside the body for at least 7 days at room temperature without losing its infectivity. This virus is 100 times more infectious than HIV [10]. Hepatitis B is a major public health threat requiring collective efforts to advance universal vaccination of new-born against Hepatitis B and prevent mother-to-child transmission and people at risk [11]. Data suggested that public safety workers i.e., paramedics, paramilitary and emergency medical service providers are not only at increased risk of contracting HBV but also have exposure risks similar to those of hospital-based health care workers. This was established in studies of Sero-prevalence of HBV infection among rescue workers (paramedics, emergency medical service, police and firefighters) in the United States in (Houston Texas, Boston Massachusetts, and Seattle where they reported Sero-prevalence of 13%, 18% and 22% respectively [12, 13].

The few statutory functions of FRSC are providing prompt attention and care to victims of accidents and clearing obstructions on the Highways. These exposed FRSC Personnel to blood and body fluids in the process of executing their mandate. They are supposed to have basic knowledge of blood and body fluids transmissible infections and use universal precautionary measures to avoid contracting the infections. The U.S. Centers for Disease Control and Prevention (CDC) and WHO have recommended the hepatitis B vaccine for all newborns, children up to age 18, adults 19 through 59 years of age, and adults 60 and older who are at high risk for infection [14]. The vaccination with the monovalent HBV vaccine was introduced in Nigeria in 2004 as part of the National Program on Immunization (NPI), to be given at 6, 10, and 14 weeks of age. However, in 2012, a pentavalent vaccine [14].

The FRSC Personnel are both paramedics and paramilitary in Nigeria. They are among the high-risk groups who can contract hepatitis B infections based on the nature of their work (rescue operation). A previous study among FRSC personnel shows that only 30.5% had three or more doses [15]. The current level of knowledge as well as the HBV vaccine uptake of FRSC personnel in Katsina is unknown. Information about their knowledge, vaccine uptake as well as understanding possible risk factors could provide a guide to policy makers (FRSC and State Ministry of Health) in implementing strategies to prevent and control HBV infection among this important paramedical group.

We, therefore, carried out this study to assess the Knowledge, the HBV vaccination status and factors associated with vaccine uptake of among

Federal Road Safety Corpse Personnel Katsina state North western. Nigeria.

METHODS

Study area

Katsina state, north-western Nigeria was formed from the northern half of Kaduna state in 1987. Katsina has borders with the Republic of Niger to the north, Jigawa and Kano to the east, Kaduna to the south, and Zamfara to the west. The Katsina State FRSC sector command has five units' commands which are strategically located at Katsina, Daura, Koza, Funtua and Malumfashi with 325 members and headed by a Corps Commander and supported by two deputy Corps Commanders (operations and administrations). The units monitor highways in three senatorial zones. The Daura zone has a one-unit command. The FRSC personnel in the State transfer victims from sites of accidents to accident and emergency units of the nearest general hospitals for immediate attention. The Malumfashi unit command has an ambulance and a clinic that serve staff and Accident victims along Funtua-Gidan Mutum Daya, and Malumfashi-Zaria roads. The service used to vaccinate personnel during training after recruitment.

Study design

A cross-sectional descriptive study design was carried out among the FRSC personnel in Katsina state.

Study population

All Federal Road safety corps Personnel in the Katsina state sector command

Inclusion criteria and exclusion criteria

All Federal Road Safety corps personnel in the Katsina sector command who consented were included in the study. Those who were sick, temporary staff, and those less than 18 years or less than six months in the service were excluded.

Sample size determination

The sample size was calculated using the formula for descriptive study [16].

$n = z^2pq / d^2$ Where: n = Minimum sample size

z = standard normal deviate at 95% confidence interval = 1.96

p = proportion with characteristic of interest i.e. prevalence of vaccine uptake

A previous study in Kaduna showed vaccine uptake among FRSC personnel was 30.5% These would be proportion P of interest. The proportion not vaccinated by HBV vaccine among the personnel (q) were $1-P$ (100% - 30.5%), $q = 69.5\%$. Using 95% ($Z=1.96$) confidence interval d (degree of precision) of 0.05. The minimum sample size was calculated using the formula for cross-sectional studies; n was the minimum sample size.

$$n = z^2 p/d^2 \quad n = (1.96)^2 \times 0.305 \times 0.695 / (0.05)^2 = 326$$

The total population was less than 10, 000, the sample size was adjusted using the formula

$$n_{adj} = n / (1 + n/N) \quad \text{Where } N = \text{total population} = 326$$
$$/2.0 = 163$$

$$163 + (10\% \text{ of } 163 \text{ for non-response}) = 180$$

Sampling technique

A systematic sampling technique was used in selecting 180 study participants. The list of all personnel (nominal roll) in each unit command were obtained and served as the sampling frame for each unit. The required sample size for each unit was calculated proportionate to the size of the unit and the sampling interval for each unit was calculated. We selected first eligible participants by simple random sampling and subsequent participants were selected based on the sampling interval obtained for each unit. Those on leave or absent during the data collection were replaced.

Study instruments

An interviewer-administered questionnaire, containing closed-ended and open-ended questions was adopted from a previous study [15]. The questionnaire had five sections: socio-demographic characteristics of the respondents, Knowledge of transmission and risk factors of hepatitis B virus, Hepatitis B virus status, uptake of hepatitis B vaccination, doses of vaccine received and reasons for non-uptake of vaccines by the respondents.

Data collection methods

The units' commands of FRSC have compulsory weekly meetings. Data was collected electronically using the Kobo Collect Tool which contained a pre-tested interviewer-administered questionnaire. Questions were built on an excel spreadsheet (XLSX) and converted to XXM format. The XLM form was uploaded to the Kobo toolbox server and the Kobo collect application was installed on Android phones from the Google store. The validated form was downloaded from the Kobo toolbox internet server to the research assistant's Android phones. Four trained research assistants collected data from respondents; two laboratory scientists and two data collectors. Data collected was stored in the server and aggregated after completing the data collection.

Quality assurance

To ensure data quality, research assistants were trained and the questionnaire was pretested in the Zaria unit command under the Kaduna sector command. An adjustment was made to some of the questions based on the observations noted to prevent misinterpretation and ambiguity during the study.

Laboratory tests

In order to know the immunity of the participants a venous blood 5mls samples were obtained for testing of HBV Sero-markers. The plasma was separated after centrifugation within few minutes and safely pipetted into a new plane tube, labelled and was stored at -20°C before transporting to main Laboratory in Ahmadu Bello University Teaching Hospital Zaria. The HBV surface and core antibodies (HBsAb and HBcAb, respectively) were assayed using an enzyme-linked immunosorbent assay (ELISA) kit by Perfermed Chemux Bioscience Inc. San Francisco, USA), which has a sensitivity and specificity of 100% and $\geq 99\%$, respectively; while the HBV surface antigen (HBsAg) was assayed using the ELISA kit by Bio-Rad® (Bio-Rad Laboratories, Berkeley, CA), with sensitivity of 100% and specificity of 99.4%. The laboratory test results for individuals were anonymously linked to individual and questionnaire information through their unique identifiers. Assay runs were strictly performed following standard operating procedures, including quality controls. It was validated as per the manufacturer's instructions. To ensure data quality, research assistants were trained and the questionnaire pretested in Zaria unit command under the Kaduna sector command. Adjustment was made to some of the questions based on the observations noted to prevent misinterpretation and ambiguity during the study.

Data management and measurement of variables

The Main outcome variables were the proportion of FRSC Personnel with good knowledge of HBV and the Proportion of FRSC Personnel immunized or vaccinated with HBV

Statistical analyses

Data was analysed using the Statistical Package for Social Sciences (SPSS) version 24. Data was summarized and presented in tables and charts using proportions. Bivariate and multivariate analyses were carried out to identify associated factors and determinants of HBV vaccination status [17]

To determine the factors associated with the uptake of HBV vaccine, Chi-square and (or Fisher's exact tests where applicable) were performed to assess for the association between independent variables such as sociodemographic variables (age, sex,) and the dependent variables (vaccination status) A binary Logistic Regression analysis was performed and level of significance of ≤ 0.05 considered as significant.

Ethical considerations

Ethical approval was obtained from the Ethical and Scientific Research Committee of the Ministry of Health Katsina state (KMOH). Permission from FRSC management was also sought. Oral and written informed consents were sought from each respondent before a questionnaire was administered. Permission to withdraw from participation in the research was allowed at any point in time. The confidentiality of the participants was assured and no incentives of any form

were offered to respondents who either completed an interview or refused to do so. Data was stored in a password-protected computer to ensure data security.

RESULTS

About half (48.3%) of the respondents were within the 30-39 years age group with a mean age of 38.8 ± 9.34 years. The majority of the respondents were males (94.1%), Muslims (78.3%) and marshals (68.9%) while half (51.1%) of respondents had 10 years and above in service (Table 1).

About one-third (32.8%) of the respondents were perceived to be at high risk of contracting HBV infection. However, 15.6% perceived no risk of hepatitis B virus infection to them (Figure 1).

The mode of transmission of hepatitis B virus infection (Table 2) most commonly known to the respondents (70.0%) was a transmission from sharing a toothbrush with an infected person and it was followed by (70.0%) mother-to-child transmission. Whereas, more than half (57%) knew that there is no transmission by eating food prepared by an infected person. The majority (81.7%) of the respondents knew avoiding exposure to blood and sharing personal instruments were common mode of preventing hepatitis B virus infection (Table 2). Whereas only 28.9% knew that not eating together with infected person was not the best method of prevention of hepatitis B virus infection (Table 2).

More than two third of respondents gave correct responses with regards to the question that assessed their knowledge on symptoms of hepatitis B virus infection (Table 2). Among the respondents only one-eight (15%) had good knowledge of hepatitis B infections (Table 3). The mean knowledge score was 10.28 ± 4.16 (Table 3). The proportion of respondents with good knowledge was higher among personnel that were aged ≥ 50 years (29.4%) as compared to those aged < 50 years (11.6%), the difference observed was statistically significant ($p = < 0.01$). Religion, years of service (≥ 10 years) and age are associated with good knowledge of HBV infections ($p = 0.01, 0.024$ and < 0.01 respectively) (Table 4).

One-fifth (21%) of the respondents (Table 4) were vaccinated with the required dose of hepatitis B vaccines whereas more than two-fifth (43%) had never received (zero dose) the Vaccines.

Reasons for non-vaccination among the respondents (Figure 1) included lack of opportunity as the highest proportion (44%) while fear of being recognised as HBV carrier was the least (10%). Other reasons were lack of time and none availability of the vaccine (33% and 27% respectively). Year of service, religion and history of transfer were factors affecting vaccination status at bivariate level (Table 5).

Personnel whose years of service were less than 10 years are 0.26 times less likely to be vaccinated as compared to those who spent 10 years and above in service. Those who have been transferred

from one unit to the other are 2.08 times more likely to be vaccinated compared to those who have never been transferred (Table 6).

DISCUSSION

Seventy per cent of the personnel knew that sharing a toothbrush with an infected person and mother-to-child transmission of hepatitis B virus infection can occur. Whereas, more than half of the respondents correctly knew that hepatitis B virus infection cannot be transmitted by eating food prepared by infected persons. This finding is different from that of a study conducted in Jimma University Medical Centre, Southwest Ethiopia where only nearly one-third (32.2%) of the respondents knew that HBV is not transmitted by contaminated water/food prepared by a person suffering from this infection [20]. Similarly, a study in northern Vietnam and China where over 75% of respondents misunderstood the fact that HBV cannot be transmitted through food, or prevented by a balanced lifestyle and hand shake sharing of utensils, sharing of room and eating food prepared by an infected person as a source of transmission [21]. The other common misconceptions found in our study were transmission by biting insects and transmission by Coughing. These were reported by only one fourth (19.4%) and more than two fifth (46.1%) of the respondents. These findings are comparable with what was reported in China, where about two fifth (41.8%) of respondents that reported HBV can be transmitted through sneezing or coughing, contaminated water (45.8%), and eating with or sharing food with chronic HBV patients (52.4%) [21].

The majority of the respondents (81.7%) in this study knew avoiding exposure to blood and sharing personal instruments were common modes of preventing hepatitis B virus infection. Whereas only about one-third (28.9%) knew that not eating together with an infected person was not the best method of prevention of hepatitis B virus infection. This differed from the findings among safety personnel in Kaduna where only 2.1% (7/337) correctly identified contact with infected blood and blood-contaminated body fluid as routes of transmission of HBV therefore, avoiding exposure to blood and body fluids can prevent contracting HBV infection [15].

Furthermore, only one-eight (15%) of the respondents had good knowledge of hepatitis B virus infections. This finding is lower than the knowledge score reported by Ochu from Kaduna (47%), Hassan in Sokoto (78.2%) and Dayyab in Yobe (82.97%). The difference observed may be due to the number of questions used in calculating the knowledge score [15, 22]. In the Kaduna study just 6 questions were asked but in our study 22 questions were used to calculate the knowledge score. The finding is also different from the mean knowledge score reported by Abiola in Lagos [23]. This difference is expected because it was conducted among healthcare workers who are

supposed to have high knowledge score compared to FRSC personnel who majority of them were not healthcare workers. Our findings are also higher than findings in studies conducted across three states Lagos, Ogun and Abia (4.85 ± 2.69) [21, 23, 24]. When the level of HBV knowledge of road safety personnel is poor, they may unconsciously engage in risky behaviours, unsafe handling of blood at accident scenes leading to increased transmission rates. However, our findings are consistent with study conducted among Saudi Arabia National Guard's (16%) [25].

At least half of the FRSC personnel recruited in this study have had one or more doses of HBV vaccine lower than the 64.5% in multicentre study in Plateau, Bayelsa and Nasarawa states, Nigeria and 63.5% reported in Tanzania, 68.6% among dentist in Benin [27, 28]. However, this is higher than the percentages of HBV vaccination uptake reported in studies in Kaduna (30.5%), Sokoto (40.3%), Bahir Dar Ethiopia, with only 10% ever vaccinated, Niamey, Niger Republic with only 7.2% ever vaccinated and in Enugu and Lagos with only 22.4% and 15.5% said to have ever been vaccinated respectively [16, 18, 23, 27].

This marked difference in vaccine uptake could be due to the time difference in the period during which the studies were conducted. Studies which reported higher values were conducted recently and the current campaign by the Hepatitis Alliance and World Hepatitis Day celebrations may have impacted positively on improving the knowledge of individuals on the need to be vaccinated. Of those respondents who had received one or more HBV vaccines, one-fifth (20.6%), contrary to the 59% found in a study in Edo and 56% in Sokoto States, received three doses while 21.7% and 15.0% received one and two doses respectively [26]. The coverage is comparable with that of the United States where 32% of adults aged 19 to 49 years had complete doses of vaccine. and 17% among adults aged ≥ 50 years [28].

Also, our finding is lower than what study in United Kingdom (UK) shown, adults (46%) were adherent with the schedule for the second dose of hepatitis B vaccine (received by 1 month after the first dose). But for the third dose our finding is similar to findings in UK in which (22%) were adherent with the third dose (from 2 to 6 months after the first dose). Older adults ≥ 70 years had the greatest adherence to this schedule, with 56% and 35% receiving the second and third doses by 1 month and 2–6 months, respectively [29]. By 13 months after the first dose, 38,500 individuals overall had received the second dose, numbers that by 25 months increased only slightly to (54%) [29]. For the third dose, (34%) and (35%) completed the series by 18 and 30 months, respectively [29]. The oldest age stratum ≥ 50 years maintained the greatest adherence to second and third doses in our study with 67% coverage. This study has shown adherence and series completion rates for

hepatitis B vaccines among young personnel are low [29]. Identifying, understanding, and addressing barriers to series completion for multi-dose vaccines for adults in real-world settings are therefore needed. In a similar study in USA, approximately one-third of adults who initiated the Hepatitis B or Hepatitis A-Hepatitis B series completed all 3 doses within 2 years of the minimum spacing (31.17% and 32.27%, respectively) [30].

The completion and adherence were highest in individuals aged 60-64 years at the time of initiation.³⁰ This clearly indicated Hepatitis vaccine adherence and completion in adults is suboptimal in both developed and developing countries. As a result, the majority of adults initiating each vaccine series may not be receiving the full protective benefit of these multidose vaccines. Also, our finding is similar to study conducted by Mohammed Akibu Debre Berhan University, Debre Berhan, Ethiopia, where prevalence rate of complete vaccination against hepatitis B virus was 25.6% [31].

The most frequently mentioned reasons for not being vaccinated in this study were: not knowing where to get the vaccines, lack of opportunity, lack of time and unavailability of vaccines. These findings are comparable with studies in Sokoto, Lagos and Enugu. [21, 23, 24]. The findings are also comparable with that of a study in Ethiopia where the high cost of the vaccine (41%) and unavailability of the vaccine (36%) were the major reasons for not being vaccinated [29]. About one-third of the respondents perceived themselves to be at high risk of contracting HBV infection, 30% moderate, 21.7% low risk and 15.6% perceived no risk of hepatitis B virus infection. However, this is lower than what was previously reported in Kaduna where most respondents (55.3%) rated themselves at high risk of occupational exposure to HBV and 22.4% did not know their risk status.¹⁵ Whereas 5.3% of respondents considered themselves at no risk of exposure to HBV, 5.9% and 11.2% rated themselves at low and moderate risks of exposure, respectively [22]. It is also lower than findings in Ile Ife Osun state [32]. The finding is higher than what was reported in Jos by Jonathan, Issa and Dayyab (12.9%, 14.2% and 6.6%) [33, 35, 36]. Perception of low or no risk by the personnel might have been the reasons for low coverage and non-completion of required doses of vaccine which called for provision of adequate risk communication to FRSC personnel from time to time.

Personnel whose years of service was less than 10 years are 0.023 times less likely to be vaccinated as compared to those that spent 10 years and above in service. This is consistent with what was reported by Issa [36]. Those who had never been transferred are 0.36 times less likely to be vaccinated compared to those who had never been transferred before. Therefore, lack of adherence to vaccination is a major reason of non-completion of full dose of vaccines both in developed and developing countries.

There is therefore an urgent need to provide innovative ways of improving adherence to vaccination schedules.

Findings from this study indicated that majority of the respondents were males, aged 30-39 years with mean age of 38.8 ± 9.34 years. These findings are similar to studies conducted by Chinwe Lucia in Kaduna State among federal safety personnel, in Enugu and that in Bahir Dar Armed Forces general hospital in Ethiopia among military personnel [15, 16, 19]. Most of the participants were Muslims and marshals while half of them had 10 years and above in service. This finding is similar to that of a study in Kaduna but different from findings in Ethiopia [17, 18]. The findings of predominantly Muslim among the personnel may not be unconnected with the majority of people in the area were Muslims. If the study was conducted in the Southern part of the country the reverse may be the case.

Seventy percent of the personnel knew that sharing a toothbrush with an infected person and mother to child transmission of hepatitis B virus infection can occur. Whereas, more than half of the respondents correctly knew that hepatitis B virus infection cannot be transmitted by eating food prepared by infected persons. This findings is different from that of a study conducted in Jimma University Medical Center, Southwest Ethiopia where only near to one-third [74 (32.2%)] of the respondents knew that HBV is not transmitted by contaminated water/food prepared by a person suffering from this infection [31]. Similarly study in northern Vietnam and China where over 75% respondents misunderstood the fact that HBV cannot be transmitted through food, or prevented by a balanced life style and nutrition hand shake, sharing of utensils, sharing of room and eating food prepared by an infected person as a source of transmission [22]. The other common misconceptions found in our study were transmission by biting insects and transmission by Coughing. These were reported by only one fourth (19.4%) and more than two fifth (46.1%) of the respondents. These findings are comparable with what was reported in China, where about two fifth (41.8%) of respondents reported HBV can be transmitted through sneezing or coughing, contaminated water (45.8%), and eating with or sharing food with chronic HBV patients (52.4%) [23, 24].

Majority of the respondents in this study knew avoiding exposure to blood and sharing personal instruments were common mode of prevention of hepatitis B virus infection. Whereas only about one third (28.9%) knew that not eating together with infected person was not the best method of prevention of hepatitis B virus infection. This differed from the findings among safety personnel in Kaduna where Only 2.1% (7/337) correctly identified contact with infected blood and blood contaminated body fluid as routes of transmission of HBV therefore, avoiding

exposure to blood and body fluids can prevent contracting HBV infection [15].

Furthermore, only one-eight (15%) of the respondents had good knowledge of hepatitis B virus infections and the mean knowledge score was 10.28 ± 4.16 . This finding is lower than the knowledge score reported by Ochu from Kaduna (47%) and Hassan in Sokoto (78.2%). The difference observed may be due to the number of questions used in calculating the knowledge score [15].

In Kaduna study just 6 questions were asked but in our study 22 questions were used to calculate the knowledge score [14, 15]. The finding is also different from the mean knowledge score (72.54 ± 7.60) reported by Abiola in Lagos. This difference is expected because it was conducted among healthcare workers who are supposed to have high knowledge score compared to FRSC personnel who majority of them were not healthcare workers. Our findings are also higher than findings in studies conducted across three states Lagos, Ogun and Abia (4.85 ± 2.69) [14, 15, 16].

However, our findings are consistent with study conducted among Saudi Arabia National Guard's (16%) [25]. The FRSC personnel aged ≥ 50 years (29.4%) had significant increase in good knowledge as compared to those aged < 50 years (11.6%). Age, Religion, and years of service (≥ 10 years) were significant factors associated with good knowledge of HBV infections. This is comparable with study in Malaysia which revealed that age, ethnicity, education and family income were significant predictors of good knowledge) [26]. Though in our study the level of education was not statistically significant and family income was not assessed.

At least half (57.2%) of the FRSC personnel recruited in this study have had one or more doses of HBV vaccine lower than the 64.5% in multicentre study in Plateau, Bayelsa and Nasarawa states, Nigeria and 63.5% reported in Tanzania, 68.6% among dentist in Benin [27, 28]. However, this is higher than the percentages of HBV vaccination uptake reported in studies in Kaduna (30.5%), Sokoto (40.3%), Bahir Dar Ethiopia, with only 10% ever vaccinated, Niamey, Niger Republic with only 7.2% ever vaccinated and in Enugu and Lagos with only 22.4% and 15.5% said to have ever been vaccinated [16, 18, 24].

This marked difference in vaccine uptake could be due to the time difference in the period during which the studies were conducted. Studies which reported higher values were conducted recently and the current campaign by Hepatitis Alliance and World Hepatitis Day celebrations may have impacted positively on improving the knowledge of individuals on the need to be vaccinated. Of those respondents who had received one or more HBV vaccines, one-fifth (20.6%), contrary to the 59% found in a study in Edo and 56% in Sokoto States, received three doses

while 21.7% and 15.0% received one and two doses respectively [26]. The coverage is comparable with that of United States where, 32 percent among adults aged 19 to 49 years had complete doses of vaccines. and 17 percent among adults aged ≥ 50 years [27].

Also, our finding is lower than what study in United Kingdom (UK) shown, adults (46%) were adherent with the schedule for the second dose of hepatitis B vaccine (received by 1 month after the first dose). But for the third dose our finding is similar to findings in UK in which (22%) were adherent with the third dose (from 2 to 6 months after the first dose). Older adults ≥ 70 years had the greatest adherence to this schedule, with 56% and 35% receiving the second and third doses by 1 month and 2–6 months, respectively [29]. By 13 months after the first dose, 38,500 individuals (54%) overall had received the second dose, numbers that by 25 months increased only slightly to (54%) [29]. For the third dose, (34%) and (35%) completed the series by 18 and 30 months, respectively [29]. The oldest age stratum ≥ 50 years maintained the greatest adherence to second and third doses in our study with 67% coverage. This study has shown adherence and series completion rates for hepatitis B vaccines among young personnel are low.²⁹ Identifying, understanding, and addressing barriers to series completion for multi-dose vaccines for adults in real-world settings are therefore needed. Similar study in USA, approximately one-third of adults who initiated the Hepatitis B or Hepatitis A-Hepatitis B series completed all 3 doses within 2 years of the minimum spacing (31.17% and 32.27%, respectively) [30].

The completion and adherence were highest in individuals aged 60-64 years at the time of initiation.³⁰ This clearly indicated Hepatitis vaccine adherence and completion in adults is suboptimal in both developed and developing countries. As a result, the majority of adults initiating each vaccine series may not be receiving the full protective benefit of these multidose vaccines. Also, our finding is similar to study conducted by Mohammed Akibu Debre Berhan University, Debre Berhan, Ethiopia, where the prevalence rate of complete vaccination against hepatitis B virus was 25.6% [29].

The most frequently mentioned reasons for not being vaccinated in this study were: don't know where to get the vaccines (44%), lack of opportunity (41%), lack of time (33%) and unavailability of vaccines (27%). These findings are comparable with study in Sokoto, Lagos and Enugu. The findings are also comparable with that of a study in Ethiopia where high cost of the vaccine (41%) and unavailability of the vaccine (36%) were the major reasons for not being vaccinated [29].

About one-third of the respondents were perceived to be at high risk of contracting HBV infection, (30%) Moderate, 21.7% low risk and 15.6% perceived no risk of hepatitis B virus infection. However, this is lower than what was previously

reported in Kaduna where most respondents (55.3%) rated themselves at high risk of occupational exposure to HBV, 22.4% did not know their risk status. Whereas 5.3% of respondents considered themselves at no risk of exposure to HBV, 5.9% and 11.2% rated themselves at low and moderate risks of exposure, respectively [22]. It is also lower than findings in Ile Ife Osun state [32]. The finding is higher than what was reported in Jos by Jonathan (12.9%) [33]. Perception of low or no risk by the personnel might have being the reasons for low coverage and non-completion of required doses of vaccine which called for provision of adequate risk communication to FRSC personnel from time to time.

Personnel whose years of service was less than 10 years are 0.023 times less likely to be vaccinated as compared to those that spent 10 years and above in service. Those who had never been transferred are 0.36 times less likely to be vaccinated compared to those who had never been transferred before. Therefore, lack of adherence to vaccination is a major reason of non-completion of full dose of vaccines both in developed and developing countries. There is therefore an urgent need to provide innovative ways of improving adherence to vaccination schedules.

Limitations

Re-call and volunteer bias may occur in this study. The participants who had history of exposure or tested positive in the past may recall facts about HBV and HBV vaccination better than those who had never been exposed or tested. People who participated may have different health seeking behaviour than those who didn't participate. Risk of deliberate misinformation by the respondents was anticipated due to the nature of the phenomenon under the study. These limitations were minimized by educating the study participants on the importance of the study and also by given informed consent form to read and ask questions. They were reassured on confidentiality of information given.

CONCLUSION

The study concludes that both the level of knowledge of hepatitis B virus infection and the HBV vaccine uptake among Federal Roads Safety Personnel in Katsina state was poor. Years of service and being transferred from one unit command to another were independent factors associated with vaccine uptake..

RECOMMENDATION

- The FRSC in collaboration with the Katsina State Ministry of Health should organize public awareness and sensitization campaigns on HBV infection among its personnel.

- The FRSC should periodically screen all their personnel for HBV infection to identify those that need immediate care and those that need vaccination
- The Sector Commander in collaboration with the Katsina State Ministry of Health should organize risk communication sessions with FRSC personnel in all the unit commands in the state

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Table 1: Sociodemographic Characteristics of the FRSC personnel, Katsina sector command (n= 180)

Characteristics	Frequency	Percentage
Age(years)		
20 - 29	23	12.8
30 - 39	87	48.3
40 - 49	36	20.0
≥ 50	34	18.9
Sex		
Male	170	94.1
Female	10	5.9
Marital Status		
Single	30	16.7
Married Monogamous	64	35.6
Married Polygamous	85	47.2
Widow	1	0.6
Religion		
Islam	141	78.3
Christianity	39	21.7
Residence		
Urban	121	67.2
Rural	59	32.8
Educational Level		
Secondary	55	30.6
NCE/OND	48	26.7
University	77	42.8
Unit Command		
Daura	37	20.6
Funtua	40	22.2
Katsina	52	28.9
Koza	20	11.1
Malumfashi	31	17.2
Rank		
Officer	56	31.1
Marshal	124	68.9
Years of service		
< 5	39	21.7

5 - 9	49	27.2
10 - 14	44	24.4
≥15	48	26.7

Table 2: Knowledge on transmission of hepatitis B virus infection among FRSC personnel Katsina sector command (n= 180)

Transmission of hepatitis B infections	Frequency	percentage
Knew transmission by Contaminated instruments	115	69.0
Knew no transmission by Hugging	65	36.1
Knew transmission by Mother to child	126	70.0
Knew transmission by Sexual intercourse	119	66.1
Knew no transmission of HBV by talking	128	71.1
Knew no transmission by biting insects	35	19.4
Knew no transmission by Coughing	83	46.1
Knew no transmission by eating food prepared by an infected person	103	57.2
Knew transmission by eating food prechewed by an infected person	103	57.2
Knew transmission HBV by sharing a toothbrush with an infected person	132	73.3
Knew no transmission HBV by holding hands with an infected person	97	53.9
Symptoms		
Yellowish discoloration of eyes	113	73.9
Fever	110	71.9
Nausea	72	47.7
Vomiting	78	51.0
Fatigue	73	47.1
Abdominal swelling	91	59.5
Prevention		
Avoiding exposure to blood	255	81.7
Avoiding sharing personal instruments	143	79.4
Not eating together with infected person	52	28.9
Vaccination against HBV	121	67.2

Table 3: The Knowledge grade of hepatitis B virus infections among the FRSC personnel, Katsina sector command (n =180)

Knowledge	Frequency	percentage
Overall Knowledge Grading		
Good Knowledge	27	15.0
Poor Knowledge	153	85.0

Good knowledge= knowledge score ≥ 60

Table 4: Hepatitis B virus infection vaccination status of FRSC personnel Katsina sector command (n =180)

Variable	Frequency	Percentage
Vaccination status		
Vaccinated	103	57.2

Not Vaccinated	77	42.8
Doses of Vaccines		
0	77	42.8
1	39	21.7
2	27	15
≥ 3	37	20.6

Table 5: Factors associated with vaccination status among FRSC personnel, Katsina sector command, (n = 180)

Variable	Vaccinated Frequency (%)	Unvaccinated Frequency (%)	OR (95%CI)	X ² and (P-value)
Age (Years)				
20 - 49	80 (54.8)	66 (45.2)	0.58 (0.26 – 1.28)	1.86, (0.17)
≥ 50	23 (67.6)	11 (32.4)		
Years of Service				
< 10 years	36(40.9)	52(59.1)	0.26(0.14 – 0.48)	18.72(< 0.001) *
≥ 10 years	67(72.8)	25 (27.2)		
Sex				
Male	96 (56.8)	73(43.2)	0.75 (0.21 – 0.66)	0.20, (0.66)
Female	7 (63.6)	4(36.4)		
Marital Status				
Never Married	34 (53.1)	30 (46.9)	0.77 (0.42 – 1.43)	0.68 (0.41)
Ever Married	69 (59.5)	47 (40.5)		
Religion				
Islam	16 (11.3)	125 (88.7)	0.33 (0.14 – .78)	6.8, (0.01) *
Christianity	11(28.2)	28 (71.7)		
Residence				
Urban	18(14.9)	103(85.1)	0.97 (0.41 – .31)	0.004 (.095)
Rural	9(15.3)	50 (84.7)		
Educational Level				
Ordinary Level	62 (60.2)	41 (39.8)	1.33 (0.73 – 2.41)	0.87 (0.35)
Advance Level	41 (53.2)	36 (46.8)		
Transfer				
Ever	69 (64.5)	38 (35.5)	2.08 (1.14)	5.69 (0.02) *
Never	34 (46.6)	39 (53.4)		
Multiple Sexual partners				
Yes	18 (64.3)	10 (35.7)	1.42 (0.62 – 3.28)	0.68 (0.41)
No	85 (55.9)	67 (44.1)		
Knowledge				
Good Knowledge	14 (51.9)	13 (48.1)	1.29 (0.57–0 .93)	0.37, (0.54)
Poor Knowledge	89 (58.2)	64 (41.8)		

- Statistically significant, **OR** = Odds Ratio **CI** = Confidence Interval

Table 6: Predictors of vaccination status among FRSC personnel, Katsina sector command, (n = 180)

Variable	aOR (95% CI)	P-value
Years of Service (< 10 years vs ≥ 10 years*)	0.023 (0.003 – 0.17)	< 0.01
Transfer (Never vs Ever*)	0.36 (0.15- 0.86)	0.02

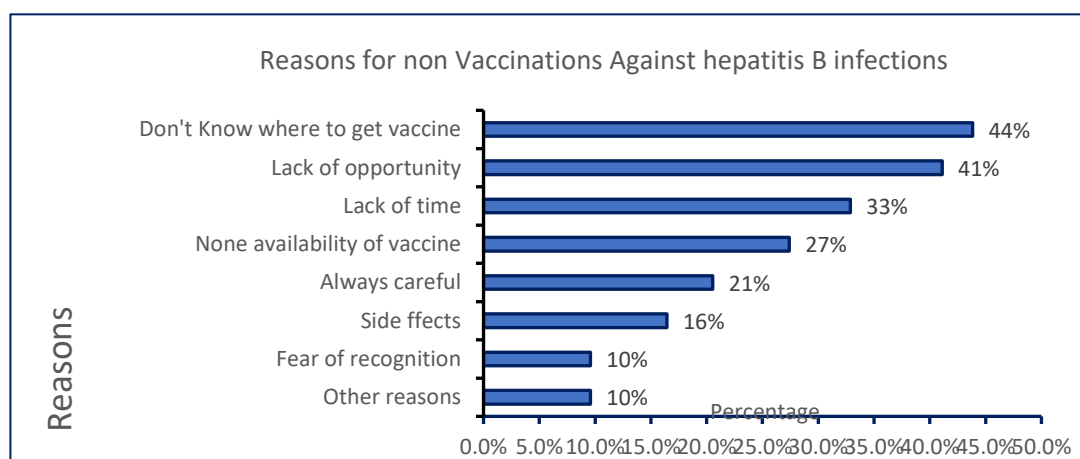


Figure 1: The reasons for none Vaccinations against HBV infections among FRSC personnel Katsina sector command June, 2023

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