Knowledge, Risk Perception and Vaccination against Hepatitis B Infection by Primary Healthcare Workers In Jos, North Central Nigeria

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ABSTRACT

Background: Hepatitis B infection remains a major occupational health hazard among healthcare workers in Nigeria where the disease is hyperendemic. Primary healthcare workers are at an even greater risk due to poorer compliance with standard safety precautions by them. The objective of this study is to determine the knowledge, risk perception and vaccination status of primary healthcare workers in Jos regarding Hepatitis B infection.

Methodology

From each of the existing 6 PHC zones in Jos North LGA, 2 PHC clinics were selected by simple random sampling technique using balloting. In each selected PHC clinic all trained healthcare workers who had worked there for at least 1 year and who consented to participate were recruited into the study. A cross sectional study design was then used to collect information from the respondents using a semi structured self-administered questionnaire.

Results

Two hundred and eighty eight primary healthcare workers completed and returned the questionnaires. Two hundred and forty nine (86.5%) had good knowledge of HB infection though only 31 (10.8%) of them had ever attended any training or workshop on standard safety precautions and blood borne infections. As many as 238 (82.6%) mentioned immunization as a strategy to prevent HB infection although only 12 (5.2%) had good knowledge of the vaccine. Furthermore only 52 (19.8%) had received at least a dose of the vaccine. The mean age of those vaccinated was 40.0 ± 4.8 years. Both the knowledge of the vaccine (p=0.000…) and the practice of vaccination (p=0.000…) increased with the age of respondents and the association was statistically significant. Although more males (24.5%) than female (18.6%) were vaccinated, this difference was not statistically significant (p=0.33). Only 7 (12.9%) respondents perceived their work as putting them at high risk of contracting HB infection and 85 (29.5%) believed they were at no risk at all or were unsure.

Conclusion: Primary healthcare workers in Jos have good knowledge of HB infection but poor knowledge of the HB vaccination. HB vaccination among them is very poor as is their perception of their occupational risk for the disease. Continuing education, training and vaccine provision are recommended to address this important healthcare need.

Keywords: Hepatitis B; primary healthcare workers; Nigeria.

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INTRODUCTION

More than 2 billion people alive today have been infected with hepatitis B virus (HBV) at some time in their lives. Of these about 350 million remain infected chronically and become carriers of the virus[1]. Three quarters of the world's population live in areas where there are high levels of infection[1,2]. Hepatitis B (HB)infection is therefore one of the leading infectious diseases in the world and an important public health challenge.

National and regional prevalence rates of HB infection vary widely. It is reported to be 8-10% in South East Asia and sub saharan Africa, 2-7% in eastern and southern Europe, middle East and Japan, and 0.5 to 2% in the United States and northern Europe[2,3]. An estimated 600 000 persons die each year due to the acute or chronic consequences of hepatitis B. About 25% of adults who become chronically infected during childhood later die from liver cancer or cirrhosis caused by the chronic infection. The hepatitis B virus is 50 to 100 times more infectious than HIV[4].

Routes of infection include vertical transmission (such as through childbirth) and horizontal transmission (occupational exposure, sexual contact and intravenous drug use)[5]. The primary method of transmission reflects the prevalence of chronic HBV infection in a given area. In low prevalence areas, injection drug abuse and unprotected sex are the primary methods, although other factors may also be important. In high prevalence areas, transmission during childbirth is the most common, although in other areas of high endemicity such as Africa, transmission during childhood is a significant factor[5]. The prevalence of chronic HBV infection in areas of high endemicity is at least 8%[6].

Hepatitis B virus is an important occupational hazard for workers who are exposed to blood and blood products[4]. Among health care workers, needle prick injuries are common, under-reported and yet pose a significant, risk of exposure to potentially fatal blood-borne viruses. This group of workers therefore, represent one of the largest risk groups for HBV infection worldwide[7-9]. Primary Healthcare workers are at an even higher risk group because of poorer Compliance with standard precautions[10,11]. That is why the WHO has recommended that all healthcare workers should be vaccinated against HBV[12, 13]. Fortunately Hepatitis B is preventable with a safe vaccine that is up to 95% effective especially when given during childhood[4-6].

In countries with a low prevalence [hepatitis B surface

antigen (HBsAg) prevalence <2%] of HBV infection, HBV vaccination programmes for health care workers (HCWs) were initiated in the early 1980s, with immunization being mandatory in some western European countries. In France, this strategy, associated with a reinforcement of universal precautions, quickly resulted in a decrease in occupationally acquired HBV rates in hospitals and in health-related settings[6]. However In Nigeria vaccination coverage rates are still low even among HCWs[2,14].

Most studies on risks of HB infection and other occupationally acquired blood borne infections have concentrated on hospital employees to the detriment of primary healthcare workers[15,16] The recognition that health care workers in primary health care were an under-provided group with respect to education and training about occupational hazards made the UK's National Institute of Clinical Effectiveness to recommend that everyone involved in providing care in the community should be educated about standard safety principles and trained in hand decontamination, the use of protective clothing, the safe disposal of sharps and the handling of blood and other body fluids[7].

The aim of this study was to determine the level of knowledge of primary health care workers on hepatitis B infection and their hepatitis B vaccination status. This was done with a view to finding out what factors influence their knowledge and practice which will in turn inform programme design to optimize hepatitis B vaccine coverage among the target population. To our knowledge no such study has been undertaken among this group of healthcare workers in Jos before now.

METHODOLOGY

The study was carried out in October and November 2008 in Primary Health care (PHC) Centres of Jos North Local Government Area (LGA) of Plateau state, North Central Nigeria. In Nigeria, local government areas are geographic divisions into which states are demarcated for administrative purposes. Jos North LGA is one of the 17 LGAs of Plateau State. It is located in the northern part of the State. It is a cosmopolitan LGA and houses the seat of government being the capital city of Plateau State. It is made up of 20 wards and has 24 PHC clinics divided into 6 PHC districts. Also located in Jos North LGA are the Jos University Teaching Hospital, Plateau Sate Specialist Hospital, ECWA Evangel Hospital, Our Lady of Apostle's Hospital and many private clinics and hospitals.

The study population consisted of all primary health care workers in the 24 PHC clinics in Jos North LGA who were studied using a cross-sectional descriptive study design. The minimum sample size was calculated to be 264 using the sample size formula for cross sectional studies [17]

$n = Z^2pq/d^2$, where n= desired sample size

z = standard normal deviate at 95% confidence level usually set at 1.96

p= proportion of PHC workers presumed to know about HBV infection

(50%=0.5)

q= 1-p = 0.5

d= degree of precision or acceptable error margin (5% or 0.05 for this study).

This gives $n= (1.96)^2x0.5x0.5/(0.05)^2$

$= 263.69$

This was rounded up to 300.

From the 24 PHC centres in the LGA divided into 6 PHC zones, two were selected from each zone by simple random sampling technique using balloting. In each selected PHC, all the consenting trained health workers who had spent at least one year on the job were recruited into the study. Those who had spent less than one year, administrative staff and other workers who do not handle patients or blood specimens were excluded from the study. Data was collected using semi structured self administered questionnaires administered to the respondents during normal working hours. Revisits were done for workers who were not at their duty posts at the time of first visit.

Knowledge of HB infection and HB vaccination was scored. There were 10 questions on the causative agent of HB infection, routes of transmission, risk factors for HB infection, preventive measures, cure and complications of HB infection. Those who answered 6 or more out of 10 correctly were regarded as having good knowledge. Those who answered 4 or less correctly out of 10 were regarded as having poor knowledge of HB infection. There were 6 questions on HB vaccination. Those who answered 4 or more questions correctly were scored as having good knowledge while those who answered 2 or less correctly were scored as poor knowledge. All data was analyzed using Epi Info version 3.4.1. [18] Categorical variables were presented as proportions and the Mc Nemars Chi Square test was used to test for statistical significance of observed relationships. Means were also determined for quantitative variables such as age.

The estimated period HCWs spent in the healthcare practice unprotected from HB infection was calculated from the ages of those not vaccinated by multiplying the mid points of the various age groups by their frequencies to give the total years spent unprotected. The same procedure done for those vaccinated gave the total number of years spent protected. The difference between these two figures gives the net years spent by all PHC workers at risk of HB infection. Dividing this net by the summation of all years worked by all the PHC workers and multiplying the result by 100 gives the percent years the workers spent in the healthcare practice at risk of HB infection.

The authorities of the Local Government PHC Departments granted permission for the study. Informed written consent was also obtained from each respondent after a detailed explanation of the nature and purpose of the study before the commencement of data collection. They were assured of absolute confidentiality of the information they would give as no personal identifiers were required of them on the questionnaires. They were also given the freedom to withhold their consent and refuse participation or to withdraw at any time in the course of the study without being penalized in any way. Only those who consented for the study and signed the informed consent form were administered the questionnaire.

The Ethical Committee of the Jos University Teaching Hospital gave approval for the study.
Our inability to test for serological markers of hepatitis B infection in the respondents is a major limitation of this study.

RESULTS

A total of 300 questionnaires were distributed to the Primary Health Care (PHC) workers and 288 were completed and returned giving a response rate of 96%. Table I shows that 235 (81.6%) of the respondents were females. The age of the respondents ranged from 20 to 59 years with a mean of 31.7 ±6.8 years and 174 (60.4%) of them were aged between 20 and 29 years. The largest single cadre of the workers was the Community Health Extension workers/Junior Community Health Extension Workers who constituted 119 (41.3%) respondents.

Two hundred and forty nine respondents (86.5%) had good knowledge of HB infection. Table II shows that respondents aged 50-59 years had the highest proportion (97.4%) of "good" on the knowledge score while those aged 30-39 had the lowest proportion (75.0%) of the "good" score. Although knowledge increased with age, it was not statistical significant (p= 0.06). Only 31 (10.8%) of the PHC workers had ever attended any training workshop on standard precautions and blood borne infections. The others got their information from school (73.6%), the mass media (54.2%) and from discussion with colleagues (26.0%).

A total of 255 (88.5%) and 243 (84.4%) respondents mentioned the use of disposable syringes/needles and hand gloves respectively as preventive measures against HBV infection. Two hundred and thirty eight (82.6%) and 144 (50.0%) mentioned immunization and sterilization of instruments respectively as the preventive methods they knew. However only 52(19.8%) out of the 263 who responded to the question on vaccination status had been vaccinated. As many as 150 (71.1%) of those who were not vaccinated attributed it to "lack of vaccine for adults".
Analysis of vaccination status (Table III) shows that those aged 50-59 years had the highest proportion of those vaccinated; 12(63.2%). The mean age of those vaccinated was 40 ± 4.8 years. The practice of vaccination increased with the age of respondents and this was statistically significant (p = 0.000..). Proportionately more males; 13(24.5%) were vaccinated compared with 39 (18.6%) of the females. The relationship between sex and vaccination status was however not statistically significant (p=0.33).

From Table IV, only 12 (5.2%) of the respondents had good knowledge of hepatitis B vaccination and this knowledge was found to increase with increasing years of their practice (p=0.000…). Among the 288 respondents, only 37 (12.9%) considered their work as putting them at high risk of contracting hepatitis B infection. Table V shows that most respondents; 166(57.6%) considered the risk as low while 74

Table I: Socio-demographic distribution of respondents N= 288

Variable	Frequency	Percentage
Sex		
Male	53	18.4
Female	235	81.6
Age (years)		
20-29	174	60.4
30-39	40	13.9
40-49	55	19.1
50-59	19	6.6
Cadre		
CHO	26	9.0
CHEW/JCHEW	119	41.3
Nurse/Midwife	49	17.0
Lab technician/Assistant	55	19.2
Pharmacy technician/assistant	26	9.0
Others	13	4.5

CHO: community Health officer
CHEW: Community Health Extension Worker
JCHEW: Junior Community Health Extension Worker

Table II: Knowledge of hepatitis B infection among the respondents by age

	Knowledge				
Age (years)	Good	%	Poor	%	Total
20-29	150	86.2	24	13.8	174
30-39	30	75.0	10	25.0	40
40-49	51	92.7	4	7.3	55
50-59	18	94.7	1	5.3	19
Total	249	86.5	39	13.5	288

X^2 = 7.45, df =3, p= 0.06

Table III : Age of PHC workers in relation to their practice of vaccination

	Vaccination status				
Age	vaccinated	%	not vaccinated	%	Total
20-29	11	8.0	126	92.0	137
30-39	10	23.8	32	76.2	42
40-49	19	29.2	46	70.8	65
50-59	12	63.2	7	36.8	19
Total	52	19.8	211	263	80.2

X^2 = 38.5, df= 3, p = 0.000.

Table IV: Years of experience of respondents and their knowledge of hepatitis B vaccination

	Knowledge				
Years of experience	good	%	poor	%	Total
d 5	3	1.8	167	98.2	170
6-10	2	6.7	28	93.3	30
>10	7	24.1	22	75.9	29
Total	12	5.2	217	94.8	229

X^2 = 25.1, df =2, p = 0.000.

Table V: Respondents personal risk perception of hepatitis B infection

	Frequency	Percentage
High risk	37	12.9
Low risk	166	57.6
No risk	74	25.7
Not sure	11	3.8
Total	288	100.0

(25.7%) said they stood no risk at all of contracting HBV from their work. Eleven (3.8%) were unsure.

DISCUSSION

Hepatitis B infection has occupied an important position as an occupational health hazard of healthcare workers (HCWs) in the last couple of years. This has been borne out of the fact that HB virus is a blood borne infection and HCWs are exposed to blood and other potentially infectious body fluids in the course of their work[9,19]. Evidence also abounds that 40-46% of HB infection in HCWs in developing countries are attributable to work related percutaneous injuries with sharps[12] .

Most of the respondents in this study were young meaning that most of them had put in only a few years of service. Previous researchers had earlier found that trained primary healthcare workers were generally young in age compared to traditional birth attendants and traditional healers who also work in the community[20]. Young age comes with inexperience, inadequate knowledge and misconceptions regarding HB infection and vaccine.

As trained healthcare workers they are expected to be knowledgeable about HBinfection but it has been found that misconceptions abound even among them[2]. Correct knowledge is vital in the control of HB infection and a number of studies have shown that, along with access to the vaccine, knowledge is one of the primary determinants of compliance in hepatitis preventive programmes[2,21]. In this study we found that as many as 86.5% of the respondents had good knowledge of HB. Among the age groups, the proportion with good knowledge of HB was highest among the oldest category and it increased consistently with increasing age. The difference in knowledge between age categories was not statistically significant, probably because of the disproportionately large concentration of subjects in the youngest age category.

This trend was also observed for the vaccination status of the healthcare workers where the older age groups were more likely to be vaccinated and, in this case, the difference was statistically significant. Age of the workers is a proxy measure of years of experience on the job and this gives them opportunities to update their knowledge about the disease on the job and through the media and contacts with colleagues. With more years on the job they are able to also overcome their misconceptions about the disease as well as have opportunities to vaccinate themselves. However it has also been shown that knowledge and experience alone do not necessarily translate into good practice of HB vaccination. Although some authors have found a direct relationship between the high level of knowledge expected among the professional staff and vaccination[21]. Fatusi et al working among healthcare workers in a teaching hospital in Ile Ife found vaccine compliance to be much higher among medical record, engineering and physiotherapy staff than that among medical, laboratory and nursing staff. The authors reasoned that the heavy work load of doctors and nurses, logistics of vaccine administration and fear of side effects might have reduced the compliance for doctors, nurses and laboratory staff. On the other hand the fear of disease and the high hope placed on HB vaccine promoted its acceptance by the other staff[2].

In the present study at least 75% of all the age groups had good knowledge of hepatitis B infection. This knowledge was mainly derived from what they learnt in school and the mass media as only 10.8% had ever attended refresher courses or workshop where they were updated on hepatitis B infection. This is grossly inadequate as healthcare workers need on going continuing education to keep them abreast of best practices in the prevention and control of the disease[2].

Of all the respondents only 19.8% had received at least one dose of hepatitis B vaccine. This is much lower than figures reported for all categories of health care workers in a Moroccan study[8], agrees with the range of 18-19% estimated by the WHO as coverage rate for developing countries [12]and is higher than the 15.8% reported by Talaat, et al in a similar population in Egypt in 2003[22]. In the study reported from Ile Ife, vaccine compliance rate (having received 3 doses of HBV) was 38.7% and participation rate (having received at least one dose of HBV) was 91.8%[2]. The high figures may be reflective of the fact that the study was carried out in a tertiary hospital where a lot of research and training take place and therefore the level of awareness about HB and the vaccination is high.

We found the mean age of those vaccinated in our study to be 40.7 ± 6.2years. Although this does not give the exact age at primary vaccination it suggests the age at which vaccination is commenced for the PHC workers. Our respondents are therefore, on average, vaccinated at an older age than the 24 years and 30 years documented among the nursing and medical staff respectively of the Armed Forces in India[21]. Age at vaccination is an important factor in the immunogenicity of the HB vaccine and higher age at vaccination in adults has been identified as a factor in HBV non response[13,21]. Furthermore late primary vaccination means that healthcare workers in this study spent 71.3% years in the health profession with occupational risk of HB infection. Thus, late vaccination has reduced the cost effective benefit of HBV vaccine in our subjects. Studies have reported maximum occupational risk of HB infection to be during training and early years of the health profession when exposure is maximum and awareness of risk of blood borne pathogen is minimal[5,12,23]. Our study found no statistically significant sex difference in the vaccination coverage of the workers. This is at variance with what Chaudhari et al found in India in 2009[12].

Available literature confirms that primary health care workers are exposed to blood borne infections including hepatitis B[23,24]. That is why the seroprevalence of the disease is also very high among them[6,25]. Inspite of the obvious risk of occupational exposure to blood born infections, only 12.9% of our respondents believed that their work put them at high risk of contracting hepatitis B infection. The rest thought they were at low risk, no risk at all or were unsure. The perception of risk drives the practice of prevention. Their low risk perception explains why the vaccination coverage among was also low. The most commonly mentioned methods of prevention of hepatitis were the use of disposable needles/syringes and immunization but their compliance to these protective measures is poor. Unless deliberate efforts are

made to ensure compliance, awareness alone may not suffice to protect the healthcare workers.

This study found the knowledge of HB infection to be quite high among the PHC workers though both the knowledge of HB vaccine and its uptake among them was very low. Their perception of the occupational risk for HB infection was also low. We recommend that a deliberate programme of education/training and vaccine provision should be implemented for the target population in order to protect this group of vulnerable healthcare workers from HB infection and to prevent them from transmitting it to their clients.

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