



Factors Associated with the Completion of Hepatitis B Vaccine among University Students in Nigeria

By C.O. Agbede, J.O. Kio & O.S Ogundare

Babcock University

Abstract- Hepatitis B virus (HBV) has been identified by WHO as one of the deadliest viral diseases in Africa due to its high prevalence and complications. Thus urgent research and policy attention is needed to stem its spread. The study assessed factors associated with the completion of hepatitis B vaccine among Babcock University students, Nigeria. Multistage sampling procedure was employed to select 360 students to participate in the study after completing all requirements for ethical clearance. Data gathered from the respondents were subjected to descriptive analysis using the Statistical Package for Social Sciences (SPSS Ver. 17). Most of the respondents are adults above 20 years and were aware of the HBV (89%). Despite serious efforts made by the University at educating the students about Hepatitis B, more than 40 % of the students still do not know the causative organism and are totally oblivious of the importance of vaccination. Also, 73% of the students had not completed the recommended 3 dosage vaccines. The findings also showed that despite the high level of awareness up to 44 percent of the students were not sure of their status or have not been previously immunized, indicating that their knowledge did not motivate their actions or practice.

Keywords: *hepatitis B, immunization, student, babcock.*

GJMR-K Classification: *NLMC Code: QW 170*



Strictly as per the compliance and regulations of:



Factors Associated with the Completion of Hepatitis B Vaccine among University Students in Nigeria

C.O. Agbede ^α, J.O. Kio ^σ & O.S Ogundare ^ρ

Abstract- Hepatitis B virus (HBV) has been identified by WHO as one of the deadliest viral diseases in Africa due to its high prevalence and complications. Thus urgent research and policy attention is needed to stem its spread. The study assessed factors associated with the completion of hepatitis B vaccine among Babcock University students, Nigeria. Multistage sampling procedure was employed to select 360 students to participate in the study after completing all requirements for ethical clearance. Data gathered from the respondents were subjected to descriptive analysis using the Statistical Package for Social Sciences (SPSS Ver. 17). Most of the respondents are adults above 20 years and were aware of the HBV (89%). Despite serious efforts made by the University at educating the students about Hepatitis B, more than 40 % of the students still do not know the causative organism and are totally oblivious of the importance of vaccination. Also, 73% of the students had not completed the recommended 3 dosage vaccines. The findings also showed that despite the high level of awareness up to 44 percent of the students were not sure of their status or have not been previously immunized, indicating that their knowledge did not motivate their actions or practice. Factors which positively influenced completion of immunization dosage were the students' perceived need to be protected from HBV, the availability of vaccine, their knowledge of the fact that the monetary cost of vaccine had already been included in the school bills, their opinion that immunization is part of the criteria for complete registration, their knowledge of the effectiveness of the vaccine to protect against HBV, and their perceived susceptibility to HBV infection. Conversely, factors constraining respondents' completion of immunization dosage were their forgetting the date for next appointment, their perception that the vaccine was not necessary, their lack of knowledge about the total number of doses to be taken, their lack of knowledge or inability to remember having been given a vaccine for HBV and perceived fear of possible side effect of the vaccine. There is the need for the institution to re-work the awareness education for Hepatitis B to strongly highlight the need for complete dosage vaccination in order to prevent infection.

Keywords: hepatitis B, immunization, student, babcock.

I. INTRODUCTION

Hepatitis is ranked the world's eight biggest killers and one of the leading public health problems (Aduand Ujah, 2014).

Author α ρ: Department of Public Health, Babcock University, Ilishan Remo, Ogun State, Nigeria. e-mails: akindandan15ster@gmail.com, kemiagbede@yahoo.com

Author σ: Department of Nursing Science, Babcock University, Ilishan Remo, Ogun State, Nigeria.

It is one of the world's most common and severe infectious diseases. Statistics according to the World Health Organisation (2014) showed that 3-6% of the world's population suffer from Hepatitis B virus, 2 billion people have been infected, and 400 million individuals are chronic carriers of the Hepatitis B virus (HBV) with 350million new cases and above one million people die each year as a result of Hepatitis B virus. Hepatitis B virus is one of the viruses that cause viral hepatitis; it is the most dreaded hepatitisvirus amongst the entire currently identified hepatitis viruses (WHO, 2014). Samuel, Aderibigbe, Salami and Babatunde (2009) stated that Hepatitis B virus has a high prevalence in sub-Saharan Africa and East Asia. Approximately 5-10% of the adult population in these regions are chronically infected with the HBV (Samuel et al., 2009). This has great social and economic implications.

Hepatitis B virus has been identified by WHO (2014) as one of the deadliest viral diseases in Africa due to its high prevalence and complications such as liver cancer, cirrhosis and hepatocellular carcinoma. This has made research into preventing it a major public health issue of global concern. Over three quarters of all the cases of HBV globally occurs in Asia, Middle East and Africa. The prevalence of HBV varies between countries even in the same continent (Samuel et al., 2009).

Nigeria is one of the countries in Africa with high prevalence of hepatitis B virus (Owolabi and Ojo, 2008). According to the Nigeria Institute of Medical Research (NIMR, 2014), above twenty million Nigerians are currently living with Hepatitis B virus. This statistics, which is about 10-40% prevalence level, is said to have reached a hyper endemic level. This means that in every 10 Nigerians, 1-4 of them will test positive to HBV. Yet there is tendency for this figure to rise in the future if preventive measures are not put in place (Adu and Ujah, 2014).

According to Kesieme et al (2011), Hepatitis B virus requires less exposure to cause an infection compared to other blood borne pathogens. They compared the risk of getting an infection when exposed to various blood-borne pathogens from an infected needle prick injury. The result indicated that the risk for being infected with Hepatitis B virus was 30%, 3% for

contracting Hepatitis C virus and 0.3% for HIV infection per 1,000 respective exposures.

Vaccination and avoiding contact with infected blood has been proven to be the most efficient ways of preventing HBV infection / transmission (WHO, 2014). The World Health Organisation has recommended that the Hepatitis B vaccine should be included in the immunization schedule /services rendered (WHO, 2014). Furthermore, it was recommended by the Advisory Committee on Immunization Practices (ACIP) that children should be given their first dose of Hepatitis B vaccine at birth, followed by a second dose at six months and the third dose at eighteen months (Centre for Disease Control & prevention [CDC], 2014). The vaccine has been made available in the global market since 1982(Hepatitis B Foundation, 2013).This has brought about significant drop in the infection cases in many countries. According to WHO (2014), the completion of the vaccine series will induce protective antibody in more that 95% of children, infants and young adults in which the protection can last for a minimum of 20 years and possibly lifelong. It was also stated that, in countries were 8-15% of their children previously used to become chronically infected with HBV, the introduction of the vaccine has drastically reduced the rate of chronic infection to less than 1% among immunized children (WHO, 2014). Paediatric Association of Nigeria in 2012 identified that as at 2004, Nigeria included the Hepatitis B vaccine into the country's immunization schedule, which is twenty-two years after it was made available in the global market (1982). This implies that individuals born before the year 2004 or those that could not afford to pay for the immunization are at risk of HBV infection posing a great threat to themselves and others, (Sadoh and Eregie,2009).

The doses recommended for adolescents and adults comes in a total of three doses as listed

- First dose - At any given time
- Second dose - At least one to two month after the first dose
- Third dose - Six months after the first dose

Various researches carried out on the acceptance and completion of Hepatitis B vaccination showed that there is generally poor acceptance and completion of Hepatitis B vaccination in the developing countries (Peterside et al., 2012; Azodo et al., 2011). In Nigeria, some studies have showed low rate of vaccination against HBV, even below 30%, and generally poor completion culture (Samuel et al., 2009; Kesieme et al., 2011). Even among health worker, who are expected to have higher awareness, the situation is not so different. In Edo state, a research conducted among 320 consenting resident doctors revealed that 50.6% received the hepatitis B vaccine, 49.4% did not receive the vaccine, 71.6% completed the vaccine doses and 28.4% did not complete the dose (Peterside et al., 2012).

As a result of under reporting and poor record keeping in Nigeria, there is a limited/ inadequate access to the appropriate incidence and prevalence of HBV in Nigeria, especially among young adults in the tertiary institutions. It was also reported by Charles and Jay (2012) that with regards to foreign support, there is no defined focus for the hepatitis in Nigeria. She further added that it has not been a major priority for the foreign donor agencies; therefore, Nigeria is faced with the challenge for designing a local model to fight Hepatitis B which will require raising awareness and assessing factors determining receiving and completing the HBV vaccination as highlighted in this paper.

Vaccine against Hepatitis B virus infection has been made available in Nigeria and this should make administration possible to students of various institutions including Babcock University, (which has been selected for this study), during the registration process. According to observations and preliminary survey, majority of the Babcock University students do not return to the Babcock University Teaching Hospital (BUTH) to complete the vaccination (second and third doses) despite the fact that payment has been made for complete doses, and vaccines are also available. This is a challenging situation to health of the general public. These practices make the students susceptible to HBV infection, transmitters of this virus without knowing, and potential patients of liver cancer and so on.

It is against this backdrop that this research was aimed at identifying the various factors associated with the completion of Hepatitis B vaccine among undergraduate students of Babcock University.

II. METHODOLOGY

The study was carried out among undergraduate students of Babcock University Ilishan-Remo, Ogun state. Babcock University began an operation as one of the first private Universities in Nigeria in 1999 and since then students' population has grown steadily. Sampled students were from 300 to 500 levels. A total of 3,485 students were in this group within the period of the survey (with respective population of 1,516[43.5%], 1,640[47.1%] and 329[9.4%] students respectively in each level). The multistage sampling technique was used in the determining sample size. The first stage was the stratification of the University into the 6 existing schools, followed by further stratification into the levels highlighted earlier and finally students that participated were randomly selected from each level (proportionate to population).

Following Yamane (1967), the sample size was calculated from a population of 3, 458 students:

$$n = N/1+ \{N (e^2)\} \dots\dots\dots (1)$$

Where: n=minimum sample size, N=total number of population (which was 3485 for this study) and e=level of precision (e=0.05) which is constant.

Thus, the estimated minimum sample size was 358 respondents which was approximated to 360. The questionnaire used was subjected to both validity and reliability tests. A Cronbach's alpha of above 0.74 was obtained for all constructs.

Data gathered included demographic, knowledge on Hepatitis B vaccination and Students perception towards Hepatitis B vaccination and completion data. Information collected were analyzed and presented using descriptive and inferential statistics. The Statistical package for social sciences (15th editions) was used for all data analysis. Ethical clearance was obtained from the Babcock University Health Research Ethics Committee before commencement of the survey. Furthermore, informed consent forms were also attached to the questionnaires where the respondents indicated their willingness to participate in the study by signing after reading the terms and conditions that applied to the study.

III. RESULTS PRESENTATION

a) Demographic data of respondents

The demographic characteristics of the respondents are presented in Table 1. The results

Table 1 : Demographic characteristics of respondents

Characteristics	Categories	Frequency (n=360)	Percentage
Age (years)	15-19yrs	69	19.2
	20-24yrs	260	72.2
	25-29yrs	26	7.2
	30 and above	5	1.4
Sex	Males	185	51.3
	Females	175	48.7
Marital status	Single	349	98.0
	Married	10	2.8
Religion	Christian	283	78.7
	Islam	70	19.4
	Traditional	7	.9.1
Level	300 level	156	43.3
	400 level	170	47.2
	500 level	34	9.5

Source: Field survey, 2015

revealed that majority (72 %) falls within the age bracket of 20-24 years. Almost half (51%) of the respondents are males while 49% of the respondents are females. The result also revealed that 98% of the students are single. Majority (79%) of the respondents are Christians.

b) Knowledge of respondents

Results in figure 1 shows that majority of students (89%) have heard of Hepatitis B while 11 percent (40 students) indicated that they have not heard of Hepatitis B before.

Further result in Table 2 revealed that the major source of information about Hepatitis were mostly from University health officials (45.6%) usually during orientations and seminars. More than half of the respondents (57.7 percent) were aware that Hepatitis B is a viral disease while up to 42.3 percent did not know that Hepatitis B is a viral disease.

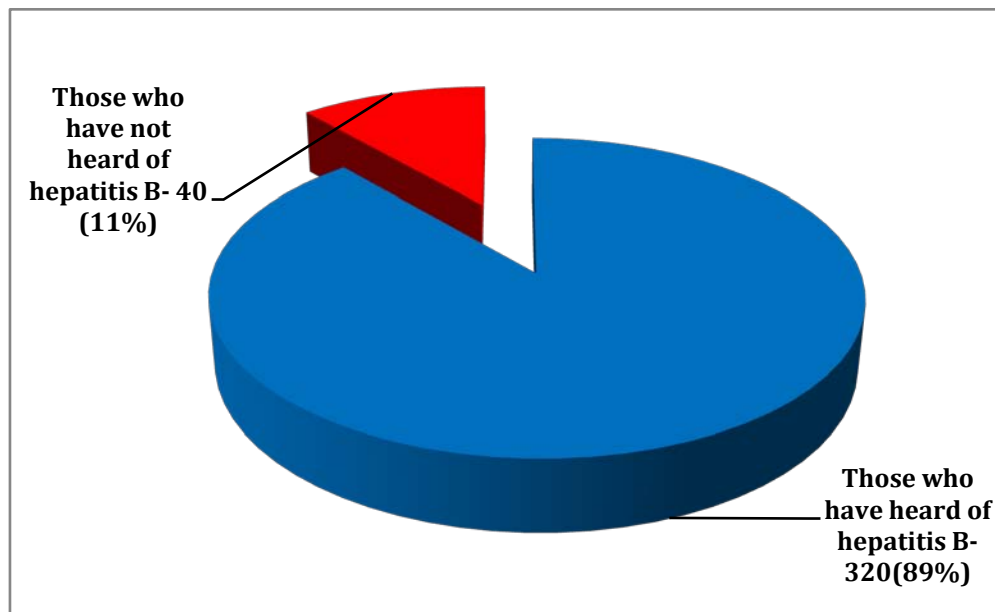


Fig. 1 : Those who have or have not heard about Hepatitis B

Also, 59.7 percent of the respondents knew the signs and symptoms of Hepatitis B while about 40 percent did not know the sign and symptoms. Three quarters (75 percent) of the respondents were aware of the vaccine for preventing HBV. However, up to 25 percent of the respondents were not aware. Some (49 percent) of the respondents had been immunized in the school teaching hospital (BUTH) while some (7 percent) claimed to have been immunized from other teaching hospitals and medical centres outside the University. It was observed that 56 percent of the respondents indicated to have been immunized against HBV while 26 percent have not been immunized and 18 percent were not sure of having been immunized.

Further results showed that about 42 percent and 39 percent of the respondents indicated that Hepatitis B is being transmitted through sex and blood contact respectively. Though 32 percent did not have any knowledge of ways of transmission of Hepatitis B, about 34 percent and 29 percent respondents thought that kissing and sweat are ways of transmission of this infection. Result also showed that most (57 percent) of the respondents did not know the appropriate dosage for complete vaccination; however, about a quarter (27 percent) indicated the correct dosage of 3 doses. Other respondents (7 percent, 5 percent and 4 percent) indicated 6 doses, 2 doses and 1 dose respectively.

Table 2 : Responses on different aspect of knowledge about Hepatitis B

Variables	Categories	Freq	%
Source of information about Hepatitis	Parents	46	14.4
	Friends	38	11.9
	Health officials	146	45.6
	Media	71	22.2
	Others	19	5.9
Respondents' indication of what Hepatitis B is.	Viral disease	208	57.7
	Bacteria disease	25	7.0
	Fungi disease	5	1.3
	Protozoa disease	0	0
	Do not know	122	34.0
Hepatitis B has signs and symptoms	Yes	215	59.7
	No	24	6.7
	Do not know	121	33.6
There is a vaccine to prevent HBV	Yes	270	75.0
	No	1	.3
	Do not know	89	24.7
Location and status of immunization against	BUTH	176	49.0

HBV	Other health facilities	24	7.0
	have not been immunized	95	26.0
	Not sure of having been immunized.	65	18.0
Mode of transmitting HBV	Sexually transmitted	151	42
	Blood contact	141	39
	Through Kissing	123	34
	Through sweat	104	29
	Not sure	115	32
Knowledge about the complete vaccination	3 doses	97	27
	6 doses	25	7
	2 doses	18	5
	1 dose	15	4
	Not sure	205	57

Source: Field survey, 2015

c) *The total number of doses taken by respondents*

Results in Figure 2 showed that the majority (43percent) of the respondents did not know (cannot recall) the total number of doses they have taken. Some (30percent) have not taken the complete dose and only 27percent have taken the complete 3 dosage.

Further descriptive result in Table 3 reveals the knowledge of respondents concerning the appropriate doses of vaccination *vis-a-vis* the number of doses they have taken so far. Majority (51 percent) of the

respondents did not know the actual number of doses received. A unique pattern was observed in which the total number of doses received by the respondents seemed to be anchored on the knowledge about the assumed correct number of doses for the vaccine. Results showed that the majority of respondents who indicated 1 dose (40 percent), 2 doses (73.3percent) and 3 doses (61 percent) as appropriate number are found more in the categories of 1, 2 and 3 doses of total doses taken respectively.

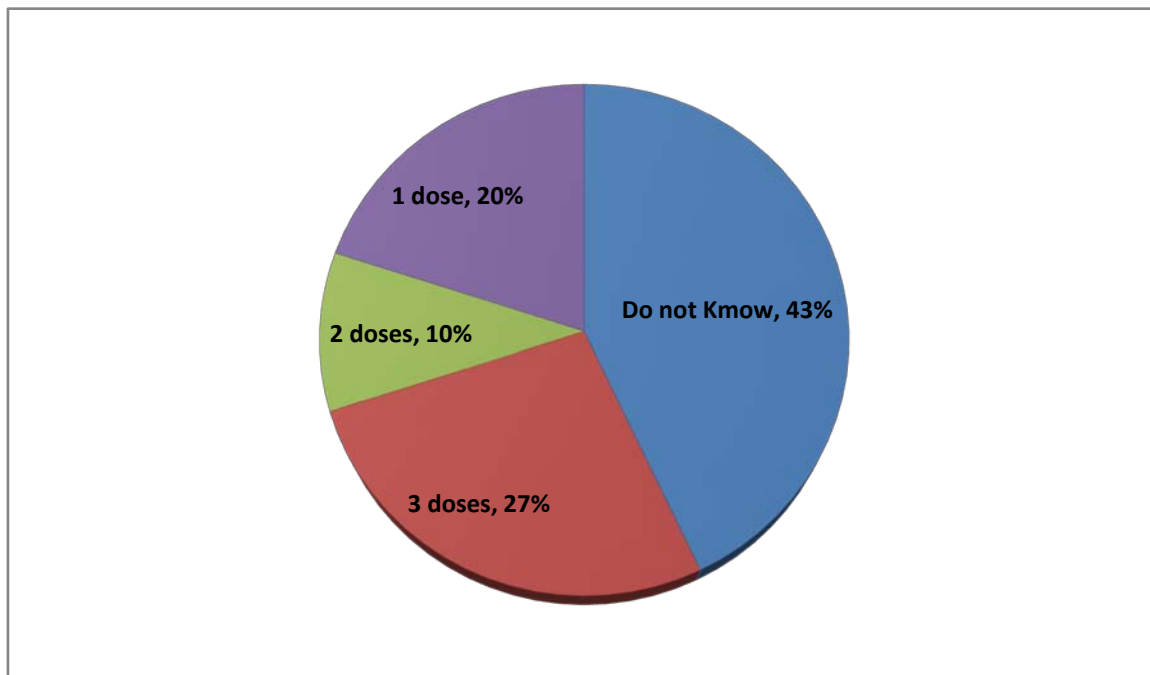


Figure 2 : The total number of doses taken by respondents



Table 3 : A cross tabulation of knowledge about appropriate doses and total doses taken by respondents

		Knowledge about the right complete doses for vaccination					Total
		1 dose	2 doses	3 doses*	6 doses	Do not know	
Total number of doses taken by respondents	1 dose	5 40.0%	2 6.7%	20 24.6%	7 31.6%	42 30.2%	76 27.5%
	2 doses	0 .0%	12 73.3%	10 11.6%	9 36.8%	5 4.3%	36 13.5%
	3 doses	0 .0%	0 .0%	50 60.9%	3 15.8%	1 .9%	54 20.1%
	6 doses	0 .0%	1 6.7%	0 .0%	4 15.8%	2 .9%	7 2.2%
	Do not know	7 60.0%	3 13.3%	2 2.9%	0 .0%	89 63.8%	101 36.7%
	Total	12 100.0%	18 100.0%	82 100.0%	23 100.0%	139 100.0%	274 100.0%

3 doses* = 3 doses are the recommended doses for complete HB vaccination.

d) *Respondents' perception towards Hepatitis B vaccination*

Results in Table 4 showed that 98.3 percent of the respondents agreed that healthy people need to be vaccinated against HBV. Most of the respondents (97 %) agreed that it is appropriate for them to be vaccinated with Hepatitis B vaccine at their age. Most of the respondents (98%) perceived that it is imperative to complete Hepatitis B vaccine dosage and majority (97.7 percent) disagreed that Hepatitis B vaccination is meant for only medical personnel or workers.

e) *Factors influencing vaccination of students*

The result of respondents' factors influencing completion of vaccination dosage for Hepatitis B is as presented in Table 5. Reasons given by the majority of those who have completed the immunization dosage, for completing the doses recommended included their perceived need to be protected from hepatitis B virus

(54 percent); availability of vaccine (52 percent); knowledge of the fact that the monetary cost of vaccine had already been included in the school fees (63 percent); immunization is part of the criteria for complete registration (52percent); knowledge of the effectiveness of the vaccine to protect against HBV (61 percent) and perceived susceptibility to HBV infection (53 percent).

Prominent reasons, by those who have not completed the vaccination dosage, for not completing the doses recommended included forgetting the date for next appointment as indicated by 67 percent of the respondents; perception that the vaccine is not necessary (55%); lack of knowledge about the total number of doses to be taken (59%); lack of knowledge or cannot remember having been given a vaccine for HBV (60%) and fear of possible side effects of the vaccine (57%).

Table 4 : Respondent's perception towards the completion of Hepatitis B vaccination

Perception	Agree		Disagree	
	N	%	N	%
Healthy people need to be vaccinated against HBV	354	98.3	6	1.7
I need to be vaccinated with Hepatitis B vaccine at your age	350	97.3	10	2.7
Hepatitis B vaccination is meant for only medical doctors and nurses	26	7.3	334	92.7
Individual should receive the Hepatitis B vaccine	350	97.3	10	2.7
Individuals should complete the doses of the vaccine	352	97.7	8	2.3

Source: Field survey, 2015

Table : Factors influencing respondents' completion of Hepatitis B vaccination dosage

†Factors	Frequency	%
<i>Factors positively influencing completion (n = 97):</i>		
perceived need to be protected from hepatitis B virus	52	54
availability of vaccine	51	52
knowledge of the fact that the monetary cost of vaccine had already been	61	63

included in the school fees		
immunization is part of the criteria for complete registration	51	52
knowledge of the effectiveness of the vaccine to protect against HBV	59	61
perceived susceptibility to HBV infection	52	53
<i>Factors negatively influencing completion (n= 263):</i>		
forgetting the date for next appointment	176	67
perception that the vaccine is not necessary	145	55
lack of knowledge about the total number of doses to be taken	155	59
lack of knowledge or cannot remember having been given a vaccine for HBV	158	60
fear of possible side effect of the vaccine	150	57

†multiple response available

Source: Field survey, 2015

IV. DISCUSSION OF RESULTS

Most of the respondents are adults and mature enough to take informed decisions regarding health issues. Most of the students are aware of the HBV, especially those who commenced the school from first year, because it is part of the awareness program given to the students during their first year orientation. This result is similar to the conclusion of Dahlström *et al* (2013). Despite the vigorous effort of the University at educating the students about Hepatitis B, some of the students still do not know the causative organism and are totally oblivious of the importance of vaccination. Usually, people do not take health education seriously until they are down with one form of sickness or the other. Irrespective of the students' individual knowledge or attitude towards Hepatitis B, as part of registration requirement, the entire students who have not hitherto been immunized, were encouraged to take the first dose of the vaccination in their first year. Those who have not been immunized are those who either refused the immunization or enrolled in the school at upper levels. Since the hepatitis B vaccine was given along with other medical examination tests and vaccinations, some of the students whose responses showed poor knowledge of HBV and HB vaccination, probably did not pay attention to the details of their medical procedures and probably did not follow up with the subsequent doses of vaccination for Hepatitis B. The findings also showed that despite the high level of awareness, up to 44 percent of the students were not sure of their status or have not been previously immunized, indicating that their knowledge did not motivate action or practice. Further findings showed that most of the students did not know the appropriate dosage for complete Hepatitis B vaccination and in fact had not taken the complete 3 dosage according to WHO recommendation (WHO, 2012), irrespective of the fact that most of them perceived that immunization is good and complete dosage must be taken. This result clearly showed the need for intervention programme to align the knowledge, perception and practice of the students in the study area with standards regarding Hepatitis B immunization.

Factors which positively influenced completion of immunization dosage were the students' perceived need to be protected from hepatitis B virus, the availability of vaccine, their knowledge of the fact that the monetary cost of vaccine had already been included in the school bills, their opinion that immunization is part of the criteria for complete registration, their knowledge of the effectiveness of the vaccine to protect against HBV, and their perceived susceptibility to HBV infection. By implication, increasing or improving on these factors will contribute to enhancing uptake of complete immunization dosage. This result is consistent with the submissions of Pathak *et al.* (2013). Conversely, factors constraining or negatively influencing respondents' completion of immunization dosage were their forgetting the date for next appointment, their perception that the vaccine was not necessary, their lack of knowledge about the total number of doses to be taken, their lack of knowledge or inability to remember having been given a vaccine for HBV and perceived fear of possible side effects of the vaccine. Amelioration of these factors is expected to increase uptake and completion of immunization for Hepatitis B. The study conducted by Obi *et al.* (2013) also posited similar results.

V. CONCLUSION AND RECOMMENDATION

The study assessed the response in terms of knowledge and perception of students in Babcock University towards the Hepatitis B immunization. The factors which influenced completion of immunization dosage were also assessed. Majority of the respondents had heard about Hepatitis B and knew that there is a vaccine which can prevent HBV, yet more than half of them have not completed the dosage. Based on the findings, the following recommendations are made:

1. The result showed discrepancy between knowledge and practice among the students. There is the need for the institution to re-work the awareness education with respect to Hepatitis B and the need for complete dosage vaccination in order to prevent infection.
2. Vaccine given to students and other clients at Babcock University Teaching Hospital (BUTH) should be explained, documented and a card given

to each client stating the date of the next appointment/dose. Follow-up action can be done in form of text messages that can be sent out to remind all clients/students of the dates of subsequent doses.

- Evidence of complete vaccination can be part of higher level registration requirement to motivate completion.

REFERENCES RÉFÉRENCES REFERENCIAS

- Audu, R., & Ujah, I. (2014). Twenty million Nigerians living with hepatitis. *Vanguard news*. Retrieved from <http://www.vanguard.com> August 30, 2015
- Azodo, C.C., Ehizele, A.O., Uche, I., & Erhabor, P. (2011). Hepatitis B vaccination status among dental surgeons in Benin City. *Annals of Medical and Health Sciences Research*. 2(1): 10- 20
- Centre for Disease Control and Prevention [CDC] (2014). Vaccines of Infants, Children and Adolescents. *Morbidity and mortality weekly report*. Feb 7, 2014 pp. 95-102.
- Dahlström, E., Funegård, V.E. & Lundberg, P. (2013). Knowledge about hepatitis B virus infection and attitudes towards hepatitis B virus vaccination among Vietnamese university students in Ho Chi Minh City.
- Kesieme, B. E., Uwakwe, K., Irekpita, E., Dongo, A., Bwala, K.J., & Alegbeleye, J.B. (2011). Knowledge of Hepatitis B vaccine among operating room personnel in Nigeria and their vaccination status. *Hepatitis Research and Treatment*. 20: 15-24 available at <http://dx.doi.org/10.1155/2011/157089>
- Obi, A.I., & Ofili, A.N. (2013). Hepatitis B vaccination among Doctors in Benin City, Edo State Nigeria. *Journal of community medicine & health education* 20(3): 3-7
- Owolabi, H.A., & Ojo, A.S. (2008). Hepatitis B virus and Chronic Liver Disease in Nigeria. *African Journals of Chronic Diseases* 14(1): 20-28
- Pathak, R., Chaudhary, C., Pathania, D., Ahluwalia, S.K., Mishra, P.K., & Kahlon, A.S. (2013). Hepatitis B vaccine; coverage & factors relating to its acceptance among health workers of a tertiary care centre in North India. *Pub Med* 58(1):13-22
- Peterside, O., Duru, C.O., Adeyemi, O.O., Kunle-Olowu, E.O., Kunle-Olowu, O.A., & Akinbami, F.O. (2012). Hepatitis B vaccination rate among medical students at the Niger Delta University Teaching Hospital, Bayelsa State Nigeria. *Global advanced research journal of medicine & medical sciences*. vol. 1(10): 280-285.
- Sadoh, A.E., & Eregie, C.O. (2009). Timeliness and Completion Rate of immunization among Nigerian Children Attending a Clinic-based Immunization Service. *Journal of health, population and nutrition*, 27(3): 391-395.
- Samuel, S. O., Aderibigbe, S. A., Salami, T. A. T., & Babatunde, O. A. (2009). Health workers knowledge, attitude and behaviour towards hepatitis b infection in southern Nigeria. *International Journal of Medicine and Medical services* 1(10): 418-424
- World Health Organization [WHO] (2014). Report on Hepatitis. Retrieved from <http://www.who.com> August 2015
- Yamane, Taro (1967). Elementary sampling theory. Englewood Cliffs, N.J. Prentice-Hall, 1967