

## Original Research Article

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# Determinants of non-compliance to hepatitis b vaccination among students of Kenya medical training college in Machakos sub county, Kenya

Winfred Nthambi Silla\*, Joseph Juma, Esther Muitta

Department of Public Health, Mount Kenya University, Thika, Kenya

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**\*Correspondence:**

Dr. Winfred Nthambi Silla,  
E-mail: [winfrednthambisilla@gmail.com](mailto:winfrednthambisilla@gmail.com)

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## ABSTRACT

**Background:** Hepatitis B virus (HBV) causes acute and chronic liver disease hepatitis B is an alarming population health concern affecting approximately 10% of the globe. In mortality ranking it is number ten global cause of death for an estimated one cases globally. Hepatitis B is the most important infectious occupational hazard which medical students and healthcare workers encounter. The magnitude of the problem can be gauged from the fact students/HCWs have the high prevalence of HBV carrier state in the population.

**Methods:** The research examines determinants of noncompliance to Hepatitis B vaccination among students of the KMTC Machakos sub county. This research was conducted in KMTC campuses in Machakos Sub County in Kenya. Cross-sectional study design was employed in study where both quantitative and qualitative data amongst KMTC students on determinants of noncompliance to HBV vaccine by these KMTC students stratified random sampling technique was employed. A target of 384 was achieved by use of Fischer's et al formula. Cronbach alpha coefficient was computed to find the validity and reliability. The data gathered was cleaned, organized, coded, and analysed through the use of SPSS, version 21.0 for quantitative data. Descriptive statistics. e.g., graphs, percentages, means and standard deviation while qualitative data was analysed using narratives based on themes and sub-themes. A chi square test was used to test the hypothetical statement by establishing the differences between the observed and expected outcomes on study variables.

**Results:** Most of the students in KMTC indicated that they agree that they are confident in counselling patients about the prevention of HBV where 191 (48.5%) agreed while 74 (18.8%) strongly agreed that they can counselling patients while 70 (17.8%) were not sure that they can counselling patients while 14.0% and 1% they disagreed and strongly disagreed on the counselling patients on prevention of HBV. High number of respondents were confident in prescribing treatment for a patient with chronic hepatitis B where 155 (39.3%) agreed, while 69 (17.5%) were strongly agreed. R square of 99.6% of the data was achieved indicating that there was goodness in fit of the data used in assessment of on the relationship between the studied dependent and independent variables i.e. the attitudes towards Hepatitis B vaccination among students in KMTC.

**Conclusions:** From the findings of the study, it is apparent that the level of awareness on HBV vaccination amongst students in KMTC in Machakos Sub County is high. Majority of the students have sufficient knowledge concerning it. It was found that needle stick injury is the most probable route of the disease transmission. Further, the respondents indicated sexual abstinence and vaccination as the preventive measures against the disease.

**Keywords:** Hepatitis B, KMTC, Students, Vaccination

## INTRODUCTION

HBV causes acute and chronic liver disease. Hepatitis B is an alarming population health concern affecting approximately 10% of the globe. In mortality ranking it is number ten global cause of death for an estimated one cases globally.<sup>1</sup> Hepatitis B is the most important infectious occupational hazard which medical students and healthcare workers encounter.<sup>2</sup> Hepatitis B virus (HBV) is a Hepadnavirus initially studied by Blumberg et al, in 1965.<sup>3</sup> HBV causes acute and chronic liver disease. Hepatitis B is an alarming population health concern affecting approximately 10% of the globe.<sup>4</sup> In mortality ranking it is number ten global cause of death for an estimated one cases globally. Approximately 240-257 million confirmed cases of HBV disease globally.<sup>5</sup> The global incidence of HBV transmission is 1.3% and varies geographically from 0.2% in developed countries to 3% in developing countries.<sup>5</sup> More than 2/3<sup>rd</sup> of the infected cases are the developing world, where the incidence is more than 8%.<sup>5</sup> HBV is prevalent in East African regions, with estimates of HBsAg incidence rate of 8%. Kenya currently is recording a HBV prevalence of 2.1%, with some areas having an incidence of 7.5%.<sup>6</sup>

There are several psychological, occupational and behavioral factors that should be taken into consideration when predicting hepatitis B vaccination acceptance and compliance for health workers and medical students. Since medical students being mentored for the future medical work force, it is necessary that they should also be vaccinated with HBV vaccine.<sup>7</sup> It has been noted that research on medical students compliance to HBV vaccine has received little investigations globally most regions have taken up recommended infantile EPI schedule while there is decreased efforts in duplicating the same to health professionals and medical students from an infection that can be controlled by adherence to the three dosage schedule for complete compliance level.<sup>8</sup> World Health Organization reports that, vaccination of high-risk groups such as medical students is a reputable act for the control of directional transmission with HBV. The Kenya Medical Training College (KMTA) is the only government midlevel medical training institution in Kenya with 61 satellite campuses all over the country. This study therefore seeks to establish the determinants to non-compliance to HBV immunization amongst students of Kenya Medical Training school in Machakos Sub County.

### Problem statement

Hepatitis B is the most important infectious occupational hazard which medical students and healthcare workers encounter.<sup>2</sup> The magnitude of the problem can be gauged from the fact students/HCWs have the high prevalence of HBV carrier state in the population.<sup>2</sup>

Infection with HBV becomes chronic for the medical student or HCWs who perform exposure prone clinical

procedures. A lengthy course of anti-viral is necessary, which is not only highly expensive but also works in only 40-60% of the infected medical student/HCWs.<sup>9</sup> If this fails, the victim may need to be restricted from doing so. This will act as a significant economic liability, especially in a resource limited third world countries, due to loss of highly skilled and trainee manpower if such infected students/HCWs are to be barred from carrying out their professional duties.

Once a medical student is infected by HBV, he is left to fend for himself. The hapless student could then face daunting prospects, such as difficulties securing health insurance, loss of income due to unemployment, long term disability and premature death.

Unfortunately in most developing countries, unlike the developed, there are no controlled provisions or post vaccination adherence regulations regarding hepatitis B vaccination yet, leading to poor vaccination status of the healthcare community and the population at large.<sup>10</sup>

### **Purpose of the study**

The purpose was to assess the level of awareness on HBV vaccination amongst students in KMTA in Machakos Sub County.

### **Research objectives**

To assess the level of awareness on HBV vaccination amongst students in KMTA in Machakos sub county.

## METHODS

This research used a cross-sectional descriptive study design. A descriptive research is a study concerned with giving a description of the features of a particular individual, or of a cohort in a given situation. The research was seeking to determine the determinants of noncompliance to hepatitis B vaccination by KMTA students of Machakos Sub-County in Kenya. The research employed a mixed approach includes collection of both quantitative and qualitative data amongst KMTA students on determinants of noncompliance to HBV vaccine by these KMTA students. Quantitative data was derived through a researcher guided questionnaire, while qualitative data was gained through analysis of tools used in record keeping related to HBV vaccination. This research was to be done at the Kenya Medical training colleges in Machakos County, namely Machakos and Manza campuses. A stratified random sampling technique was employed in selecting participants in the nine departments of two colleges in Machakos Sub County, then purposive sampling technique was used to select the main informants amongst the student representative council, and had knowledge to the determinants of noncompliance to HBV vaccination of the medical students. Fischer's formula was utilized to calculate the sample size based on the target population.

A stratified random sampling technique was employed in selecting participants in the nine departments of two colleges in Machakos Sub County, then purposive sampling technique was used to select the main informants amongst the student, and had knowledge to the determinants of noncompliance to HBV vaccination of the medical students.

Primary data was collected regarding the determinants of noncompliance to HBV vaccination from the period of 4 months from January 2020 to April 2020. The key informants were KMTC students of Machakos Sub County in Kenya. Structured questionnaires which were researcher assisted, separately for students, and student representative council body, in Machakos and Manza Campuses. For qualitative data, an observation check list was used to determine the vaccination status compliance against individual student HBV vaccine card and clinic record. Validity establishes if the study tool gives a true picture what they are purported to measure or how true the study responses are. The data gathered was cleaned, organized, coded, and analysed through the use of SPSS (statistical package for social sciences), version 21.0. Descriptive statistics. e.g., graphs, percentages, means and standard deviation were used to describe the determinants of KMTC students' noncompliance to HBV

vaccination. Qualitative data was analyzed using narratives based on themes and sub-themes. A chi square test was used to test the hypothetical statement by establishing the differences between the observed and expected outcomes on study variables. Further, the Pearson's correlation coefficient was used to find the relationships existing between variables under study and if they do exist, if they are positive or negative and whether strong or weak. Permissions was sought from the Mount Kenya University Post Graduate Studies Research and Ethics committee and from the NACOSTI, KMTC research and ethics committee in Nairobi headquarters via individual college administration, and the research committees at each of the Machakos and Manza campuses.

## RESULTS

Descriptive statistics on assessment of the attitudes towards hepatitis B vaccination among students in KMTC in Machakos Sub County.

According to the Table 1, shows the response on various factors used in assessment of attitudes towards hepatitis B vaccination among students in KMTC.

**Table 1: Descriptive statistics on assessment of the attitudes towards hepatitis B vaccination among students in KMTC in Machakos Sub County.**

	SA		A		N		D		SD	
	N	%	N	%	N	%	N	%	N	%
Are you confident in counselling patients about prevention of HBV?	74	18.8	191	48.5	70	17.8	55	14.0	4	1.0
Are you confident in prescribing treatment for a patient with chronic hepatitis B?	69	17.5	155	39.3	80	20.3	63	16.0	27	6.9
Are you confident in ordering laboratory tests to monitor CHB patients?	43	10.9	139	35.3	122	31.0	63	16.0	27	6.9
Would you have any concerns having casual contact or working together with a chronic HBV	43	10.9	64	16.2	94	23.9	104	26.4	89	22.6
Would you have any concerns sharing food or utensils with a CHB?	21	5.3	86	21.8	104	26.4	147	37.3	36	9.1
I don't think I need hepatitis B vaccine because am not at risk	86	21.8	154	39.1	130	33.0	16	4.1	8	2.0
Health work-workers should receive the hepatitis B vaccination	32	8.1	163	41.4	102	25.9	23	5.8	74	18.8

Most of the students in KMTC indicated that they agree that they are confident in counselling patients about the prevention of HBV where 191 (48.5%) agreed while 74 (18.8%) strongly agreed that they can counselling patients while 70 (17.8%) were not sure that they can counselling patients while 14.0% and 1% they disagreed and strongly disagreed on the counselling patients on prevention of HBV. High number of respondents were confident in prescribing treatment for a patient with chronic hepatitis B where 155 (39.3%) agreed, while 69 (17.5%) were strongly agreed while 80 (20.3%) had a neutral case while

those who disagreed and strongly disagreed were presented by 16.0% and 6.9% respectively. The attitude of the students in KMTC to measure on the confident in ordering the tests to monitor CHB patients most of students indicated that 139 (35.3%) agreed while the lowest count was on strongly disagreed with 27 (6.9%).

On testing on the attitude of student based on any concerns in any concerns sharing food or utensils with a CHB where high number of them indicated that they had a disagreed idea with a tally of 147 (37.3%) followed by

those who had a neutral case with a tally of 104 (26.4%) while 21.8%, 9.1% and 5.3% were percentage indicated by those who agreed, strongly disagreed and agreed respectively. A Likert scale was used to measure on any concerns having casual contact or working together with a chronic HBV where the high number of respondents indicated that they 104 (26.4%) disagreed while 89 (22.9%) strongly disagree on any issue on any concerns having casual contact or working together with a chronic HBV. Most of the student liked to have hepatitis B vaccine because they are not at risk but being in a hospital they need to have the vaccine this will minimize the risk of being infected by hepatitis B virus where 154 (39.1%) they agreed to have the vaccine while 130 (33.0%) were not sure whether they need to have the vaccine because they were not at risk. 86 (21.8%) strongly agreed on having hepatitis B vaccine while 4.1% disagreed and 2.0% strongly disagreed on having hepatitis B vaccine. High number of the respondent indicated that there it is necessary for all the health workers to receive hepatitis B vaccine with 163 (41.4%) agreed while 102 (25.6%) had

a neutral idea on hepatitis B vaccination among medics while 23 (5.8%) disagreed while 32 (8.1%) strongly agreed on vaccination among medical practitioners while 74 (18.8%) strongly disagreed.

**Regression results on the on assessment of the attitudes towards hepatitis B vaccination among students in KMTC**

A multiple linear regression was tabulated to test for existing relationship between the attitude and hepatitis B vaccination among students in KMTC. The findings are presented in model summary, ANOVA and regression coefficients in tables below.

R square of 99.6% of the data was achieved indicating that there was goodness in fit of the data used in assessment of on the relationship between the studied dependent and independent variables i.e. the attitudes towards hepatitis B vaccination among students in KMTC.

**Table 2: Model summary on the on assessment of the attitudes towards hepatitis B vaccination among students in KMTC.**

Model Summary					
Model	R	R square	Adjusted R square	Std. error of the estimate	
1	0.998 <sup>a</sup>	0.996	0.996	0.06453	

Source data (field data 2020)

**Table 3: ANOVA summary on the assessment of the attitudes towards hepatitis B vaccination among students in KMTC.**

ANOVA <sup>a</sup>					
Model	Sum of squares	df	Mean square	F	Sig.
1	Regression	421.293	7	60.185	14451.092
	Residual	1.608	386	0.004	0.000 <sup>b</sup>
	Total	422.901	393		

Source data (field data 2020)

An f-value of 14451.092 was obtained which is greater than the f-table value at (386.7) at 95% confidence interval which is 2.0333 hence this indicate we reject the null hypothesis that there existed a relationship between the attitudes towards hepatitis B vaccination among students in KMTC. A significance of 0.000 which is less than p<0.05 statistically significant relationship indicated that attitudes towards hepatitis B vaccination among students in KMTC.

From the Table 4 it indicates the regression coefficient on the parameters used in assessment of attitude towards

hepatitis B vaccination among the student in KMTC where a constant of -0.037 was obtained. The coefficient of each different where confident in ordering laboratory tests to monitor CHB patients with 0.281 had high coefficient among the parameter used to assess the attitudes towards hepatitis B vaccination among students in KMTC followed by concerns sharing food or utensils with a CHB with 0.181 while confident in prescribing treatment for a patient with chronic hepatitis B 0.085 had the lowest coefficient. A significance of 0.000 which is less than p<0.05 statistically significant relationship indicated that attitudes towards hepatitis B vaccination among students in KMTC.

**Table 4: Regression coefficients on the assessment of the attitudes towards hepatitis B vaccination among students in KMTC.**

Model		Unstandardized coefficients		Standardized coefficients	T	Sig.
		B	Std. error	Beta		
	(Constant)	-0.037	0.013		-2.818	0.005
	Are you confident in counselling patients about prevention of HBV?	0.189	0.010	0.176	19.127	0.000
	Are you confident in prescribing treatment for a patient with chronic hepatitis B?	0.085	0.012	0.094	6.966	0.000
	Are you confident in ordering laboratory tests to monitor CHB patients?	0.281	0.011	0.291	24.802	0.000
1	Would you have any concerns having casual contact or working together with a chronic HBV	0.114	0.011	0.142	10.845	0.000
	Would you have any concerns sharing food or utensils with a CHB?	0.181	0.010	0.184	17.264	0.000
	I don't think I need hepatitis B vaccine because am not at risk	0.095	0.011	0.083	8.991	0.000
	Health workers should receive the hepatitis B vaccination	0.070	0.008	0.075	8.609	0.000

Source data (field data 2020)

The following multiple linear regression was formulated and can be used to estimate the attitude of the student towards hepatitis B vaccination.

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \beta_7 x_7 + \epsilon$$

$$y = -0.037 + 0.189x_1 + 0.085x_2 + 0.281x_3 + 0.114x_4 + 0.181x_5 + 0.095x_6 + 0.070x_7 + \epsilon$$

$x_1$  = Confident in counseling patients about prevention of HBV

$x_2$  = confident in prescribing treatment for a patient with chronic hepatitis B

$x_3$  = Are you confident in ordering laboratory tests to monitor CHB patients.

$x_4$  = Would you have any concerns having casual contact or working together with a chronic HBV.

$x_5$  = Would you have any concerns sharing food or utensils with a CHB.

$x_6$  = I don't think I need hepatitis B vaccine because am not at risk.

$x_7$  = Health workers should receive the hepatitis B vaccination.

Where each coefficient corresponds towards the parameter as indicated above.

#### ***Thematic analysis on the on assessment of the attitudes towards hepatitis B vaccination among students in KMTC***

Some of the students indicated that there was an issues with communication from the institution where

*"The college is not doing enough because there is no communication. They wait for the students to push for it"*

This made felt that implementation of the vaccination program was not efficient. They felt that poor monitoring and assessment of the vaccine supply chain as well as lengthy procurement processes were to blame for delays.

*"Yes (we should be vaccinated before practical attachment) because we are going to be exposed in the various department of the hospital."*

This might contribute to students felling that the delay in getting the vaccine was due to an unconcerned administration. In addition, they felt that the administration had not put in place proper awareness creation channels about the availability of the vaccine to its students.

#### **DISCUSSION**

The research indicated that there were more female respondents compared to male respondent with 64.0% against 36.0%. Most of the students sampled in the study come from the department of nursing with a total tally of 104 (26.4%) while public health officer student had a tally of 65 (16.5%). The clinical medicine had a total of

38 (9.6%), in the department of midwifery, medical laboratory environmental health, medical imaging pharmacy, occupational therapy and Orthopaedic Trauma medicine were indicated by 4.8%, 3.0%, 11.7%, 4.8%, 11.7%, 3.8% and 7.6% respectively.

On the assessment of Hepatitis B virus infection with 301(76.1%) indicating yes while 93(23.6%) have never heard about the Hepatitis B virus infection. From those who indicated yes they indicated different sources from where they heard Hepatitis virus B infection from with majority indicating from a class by lecturer with a total of 168(55.8%) followed by those who heard from the media with a total of 112(37.1%), those who heard the information from colleagues, physician and infected person were 12(4.1%), 4(1.3%) and 5(1.8%) respectively. High number of students indicated that Hepatitis B virus can be transmitted is by contact with blood of an infected person with 98(24.9%) respondents, contact with contact with body fluid contaminated by blood of an infected person and also Sexual transmission had also had high frequency of 74(18.8%) and 71(18.0%) respectively.

On possession of Hepatitis B vaccination card, 78% indicated they have it while 22% stated no. All the respondents (100%) indicated that they had started on Hep vaccine. On the duration since last dose of Hepatitis B vaccine, 23% stated to have received it 1-3 months, 51% 4-6 months while 29% more than 6 months.

Attitude towards Hepatitis B vaccination among the student in KMTC where a constant of -0.037 was obtained. The coefficient of each different where confident in ordering laboratory tests to monitor CHB patients with 0.281 had high coefficient among the parameter used to assess the attitudes towards Hepatitis B vaccination among students in KMTC followed by concerns sharing food or utensils with a CHB with 0.181 while confident in prescribing treatment for a patient with chronic hepatitis B 0.085 had the lowest coefficient.

There are some limitations of the study. Some of study subjects were closed to on the information required by the investigator; motivation such as a common goody during the answering questions during the discussion period, transport facilitation and assurance to the participants.

Most respondents had doubt on the work of the researcher, which instilled fear to the respondents. Presence of administrative officials such as administrators, faculty heads and student body council helped in confirming confirm that this information was meant for academic use and for other personalized or financial gains whatsoever.

## CONCLUSION

From the findings of the study, it is apparent that the level of awareness on HBV vaccination amongst students in KMTC in Machakos Sub County is high. Majority of the

students had sufficient knowledge concerning it. It was found that needle stick injury is the most probable route of the disease transmission. Further, the respondents indicated sexual abstinence and vaccination as the preventive measures against the disease. However, concerning the effectiveness of hepatitis B vaccine against transmission of the disease, majority indicated lack of knowledge at all. About the students' knowledge on the risk of professional exposure to the hepatitis B disease majority of the respondents indicated they are exposed to a high risk. On the status of compliance to hepatitis B vaccination schedule 51% of the respondents had completed the vaccine schedule while 49% had not completed it. On the attitudes towards hepatitis B vaccination, the students' vaccination status and the determinant to the current status was the high cost of the vaccine and its unavailability. On the existence of institutional policies for vaccination against HBV all the respondents strongly agreed that hepatitis B vaccine policy should be imposed to keep them protected from infection; it should be compulsory. The respondents agreed that although the vaccination provides immunity, it was very expensive.

## Recommendations

Because of the nature of their profession, medical students are at risk of transmitting the infection from the people they attend in hospitals. In this regard, they should comply with hepatitis vaccination schedule. Medical students should also encourage each other to get the vaccination as preventive measure against acquiring the disease. The vaccination should continue to be made mandatory for medical students and accessible at no cost. It should be a protocol for entry to the health training profession. Awareness concerning the virus should also be reinforced through workshops and social forums. For the period of HBV vaccine prevention, student medics need to be more serious in their prevention against HBV by updating their knowledge of improving their HBV vaccine uptake in line with the EPI policy because they still belong to a high-risk group.

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