



ORIGINAL ARTICLE

What are the Missed Opportunities in Prevention Interventions for HBV, HCV and HIV among Key Populations along the Northern Transport Corridor in Kenya?

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Abstract

Background: Viral infections including HIV, HBV and HCV are important public health concern. Due to shared risk factors, mode of transmission and chronicity, prevention of these infections is likely to reduce morbidity and mortality associated with the viruses. While a number of prevention interventions are available and have been rolled out globally, a number of factors account for continued transmission of these three viral infections. Estimates indicate that close to 600 million people are infected with the three infections. Annually, 2 million people die due to HIV, over 350 thousand due to HCV and 1million due to HBV. There is disproportionate distribution of HIV, HBV and HCV infections where some population groups are increasingly affected.

Objective: This study aimed to determine missed opportunities in HIV, HBV and HCV prevention among key and mobile populations along the northern transport corridor in Kenya.

Methods: This was a cross sectional study in purposively selected counties along the main transport corridor in Kenya. The study targeted a mixed special population that included sex workers, men having sex with men, truck drivers and people who inject drugs aged 18-65 years. Screening for HIV-1, HCV and HBV was conducted from consenting participants. In addition, we carried out personalized Interviews to determine uptake of various prevention interventions.

Results: In the current study, HIV prevalence was at 7.3%, HBV 2.3% and HCV 1.3%. Our findings indicate that only 43.2% of the participants had knowledge on hepatitis, 22.8% considered Hepatitis infection as being more serious than HIV while 52.9% had no idea. A combined majority [46.5%] had between 5 to 50 sexual partners in a year while 4.5% had had more than 50 sexual partners within the period. Among the respondents, 92.1% had tested for HIV prior to this study with 58.1% of them having taken the test in the last 3 months. Those tested over a year ago were 26.0%. For HBV, only 4.6% had ever been tested while for HCV, only 2.1% had previously tested. In the total study population, knowledge of vaccine for HBV was at 20.9%, vaccine uptake at 11.3% and dose completion at 58.8% among those vaccinated.

Conclusion: This study highlights gaps in prevention and implementation of interventions for HIV, HBV and HCV among key population groups. There is need to address both individual and structural barriers in order to control transmissions.

Keywords

Key population, Missed opportunities, HIV, HBV, HCV, Testing, Risk assessment, Vaccination and uptake

Abbreviations

HCV: Hepatitis C Virus; HBC: Hepatitis B Virus; HIV: Human Immuno Deficiency Virus; PrEP: Pre-Exposure prophylaxis; ODK: Open Data Kit; KEMRI: Kenya Medical Research Institute



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Introduction

More than 3600 people die every day due to viral hepatitis-related liver disease, liver failure and liver cancer worldwide. In Africa, chronic viral hepatitis affects over 70 million people (60 million with hepatitis B and 10 million with hepatitis C infections). The high burden of Human Immunodeficiency virus and Hepatitis B [HIV/ HBV] co-infections in African countries may be due to the sharing of common transmission routes such as mother-to-child, unsafe medical and injection practices and unscreened blood transfusions. The prevalence of Hepatitis C virus [HCV] in the general population in Africa ranges between 0.1%-17.5% [1]. The countries with the highest prevalence include Egypt (17.5%), Cameroon (13.8%) and Burundi (11.3%). Universal HBV vaccination has been introduced in most African countries yet the estimated overall seroprevalence of HBV remains high in Africa [2]. East Africa has had only a few studies conducted in epidemiology of viral hepatitis [3].

Kenya is ranked among the high prevalence [$> 5\%$ prevalence] [4] countries for viral hepatitis, and number seven in HIV prevalence globally. These viruses share common modes of transmission making a common approach to their testing and management desirable. The high Hepatitis prevalence in Kenya likely presents missed opportunities in hepatitis programming. The continuum of care for hepatitis is likely to follow a more similar pattern like in HIV. In this case, testing, provision of results, linkage to care, treatment and monitoring of HBV and HCV, viral load and achievement of viral suppression would be the ultimate goal.

Currently, there is no uniformity in testing for hepatitis B and C infections in Kenya with different institutions using different testing methods. Utility of treatment monitoring tests for HBV and HCV require uniformity for better management and linkage to care. When considering HBV, HCV and HIV co-infections, uniformity in testing is also an important prevention strategy and crucial to determine immunization status of susceptible populations.

Currently, HIV PrEP (pre-exposure prophylaxis) is being rollout to at risk HIV negative individuals while some of the same drugs are used for treatment of HBV. Consequently, it is important to determine whether clustering of hepatitis infections could be existing within this population and whether its undetectable due to lack of routine/regular screening. There is therefore urgent need to address the missed opportunities by providing data to support development of implementation strategies. This study aimed to determine missed opportunities in HBV, HCV and HIV prevention interventions among key populations in Kenya through a cross sectional study.

Materials and Methods

Study design, setting and population

This was a cross sectional study in purposively selected counties along the main transport corridor in

Kenya. Study sites were in Mombasa, Machakos and Nakuru counties, which are major urban settings along the Northern transport corridor. This corridor is a major transit route that connects the coastal city of Mombasa and neighboring countries in the north including Uganda, Sudan, Ethiopia, Burundi and Rwanda. The study targeted a mixed special population including sex workers, men having sex with men, truck drivers and people who inject drugs aged 18-65 years. The three infections (HIV-1, HCV and HBV) were screened from consenting participants. Interviews were carried out to determine uptake of various prevention interventions.

Methods

Convenience sampling was used to recruit 720 participants from the target population. Individuals from this population were mobilized for screening through field clinics located along the northern transport corridor. North Star Alliance, an organization that runs health programs for special populations along this transport corridor provided access to their clinics for the study. In addition, we conducted outreaches in hotspots areas to reach out to those who could not come to testing sites. Trained interviewers and counselors carried out data collection using Open Data Kit (ODK) from participants who consented for the study. Trained Health workers drew blood samples and tested onsite by rapid tests. For further testing, additional, blood samples were drawn and transported to the HIV division laboratories at KEMRI Nairobi. The questionnaire used consisted of four parts; the first part collected general information and demographics of the population. The second part consisted of questions on perception on HIV, HBV, HCV and HIV. The third section was on vaccination knowledge and finally on risk assessment.

Laboratory personnel in the clinics and those from Kenya Medical Research Institute (KEMRI) supervised the fieldwork. During testing, we first screened participants with rapid test kits that were being used in selected Ministry of health facilities at the time. These rapid kits included On Site HBsAg antigen detection kit and HCV antibody rapid test kit for HCV (CTK Biotech San Diego, California)]. Further testing for HBV and HCV was carried out using Alere Determine™ HBsAg (Alere Inc., MA, USA) and Biotline HCV antibody rapid test kits (Standard Diagnostics, Inc. Korea) consecutively. In-country HIV testing algorithm was used for HIV testing, where Alere HIV Determine antibody test (Alere Inc., MA, USA) was used as first test and First Response HIV rapid antibody test (Premier Medical Corporation, India) as second for confirmation. Data obtained was analyzed by SPSS version (Stata, version 16, Stata Corp., USA).

Ethics statement

The KEMRI Scientific and Ethical Review Unit (SERU) provided ethical clearance before the commencement of the study. Approvals were also sought from respective

counties and heads of facilities where the research was conducted. Patients filled consent forms before participating in the study. For confidentiality, purposes codes were used to identify samples in place of names and the data had restricted access.

Results

Demographics

In this study, 720 participants were recruited. By gender, 62.1% [n=447] were female while 37.9% [n=273] were male.

Knowledge

A lower number of participants (43.2% n = 311/720) had knowledge on Hepatitis B and C infection while 409 (56.8%) had none. Similarly, a small number of the participants 164 (22.8%) thought that getting Hepatitis B virus infection is more serious than being infected

Table 1: Number of sexual partners in the last one year among those who responded to the question on number of sexual partners (583 of 720).

Sexual partners	Frequency	%
1	153	26.2
2-4	133	22.8
5-10	96	16.5
11-20	117	20.1
21-50	58	9.9
> 50	26	4.5
Total	583	100

with HIV compared to those who had no idea (52.9% n = 381).

Risk assessment

Under risk assessment, the study determined the number of sexual partners among the study participants, access to testing of both hepatitis & HIV and hepatitis B, vaccination uptake. Of the total participants, 153 (26.2%) had one sexual partner in the last one year; 133 (22.8%) had 2-4 partners, While combined majority, 271 (46.5%) (That is total between 5-10 to 21-50) had between 5 to 50 partners. Only 26 (4.5%) had had more than 50 sexual partners within the period ([Table 1](#)).

Of the total 720 respondents, 692 (96.1%) responded to having been previously tested for HIV while 28 (3.9%) did not have a prior test. Majority (58.1%) of those previously tested had taken the test in the last 3 months while 180 (26.0%) had tested over a year ago ([Table 2](#)).

For HBV, only 33 (4.6%) had ever been tested while majority 687 (95.4%) had never had hepatitis B testing. On HCV testing only 2.1% (n = 15) had previously been tested and majority 97.9% (n = 705) had not. Among those previously tested for HCV, 33.3% had had the test over a year ago ([Table 2](#)).

Field testing outcomes for HIV, HBV and HCV

Current testing results (during the study) indicated 7.3% (n = 50/688) were HIV positive; 2.3% (n = 15/656) HBV positive while positivity for HCV was 1.3% (n = 8/640) ([Table 3](#)).

Table 2: Previous access to testing for HIV, HBV and HCV (All participants [n = 720] responded to this question).

	Tested previously			When Tested last			
	Yes	No	Total	< 1 Month	2-3 Months	> 1 year ago	Total
Ever been tested for HIV	692 (96.1%)	28 (3.9%)	720 100%	110 (15.9%)	402 (58.1%)	180 (26.0%)	692 100%
Ever been tested for HBV	33 (4.6%)	687 (95.4%)	720 100%	6 (8.2%)	11 (33.3%)	16 (48.5%)	33 100%
Ever been tested for HCV	15 (2.1%)	705 (97.9%)	720 100%	4 (26.7%)	6 (40.0%)	5 (33.3%)	15 100%

Table 3: Current testing status for HIV, HBV and HCV based on participants who took the particular test.

Current Test	Current status	Number	%
HIV	HIV Positive	50	7.30%
	HIV Negative	638	92.70%
Total HIV tested		688	100.00%
HBV	HBV Positive	15	2.30%
	HBV Negative	641	97.70%
Total HBV tested		656	100%
HCV	HCV Positive	8	1.30%
	HCV Negative	632	98.70%
Total HCV tested		640	100%

Table 4: Knowledge and access to Vaccine.

1.	Ever heard of HBV vaccination (n = 719)	Frequency	%
	Yes	150	20.9
	No	569	79.1
	Total	719*	100
2.	Have been vaccinated (n = 150)	Frequency	%
	Yes	17	11.3
	No	133	88.7
	Total	150**	100
3.	Vaccination dosage completion (n = 17)		
	3 doses (complete)	10	58.8
	2 doses	2	11.8
	1 dose	5	29.4
	Total	17***	100
4.	Reasons not vaccinated (n = 703)	Frequency	%
	Not aware of vaccination	546	77.7
	I don't know where to go for it	69	9.8
	I don't see the need	11	1.6
	It's expensive	12	1.7
	Others	65	9.2
	Total	703	100

*719-Responses; **150-those who had been vaccinated; ***17-Dose completion status

Knowledge and uptake of Hepatitis B vaccine

A total of 719 participants responded to a question on 'ever heard of hepatitis vaccination'. Only 20.9% [150] of them had heard about the vaccination while majority 79.1% (569) had not. Of those who were aware of vaccination, only 11.3% (17/150) had been vaccinated for HBV whereas 58.8% of them (10 of 17) had had full dosage (3 doses). The rest 7 (41%) had not completed the dosage. Those who received vaccination, 4 got it in private health facilities and 13 from public. The main reason why respondents had not been vaccinated was lack of vaccine awareness 77.7% (546), while 69 (9.8%) did not know where to go for vaccination (Table 4).

Result on correlation between HBV Vaccination, level of education and marital status indicated that majority [10/17] of those vaccinated, had attained tertiary education. Being male was significantly associated with vaccination uptake ($p = 0.001$) while married individuals were more likely to be vaccinated than singles or those in cohabiting relationships though this was not statistically significant ($p > 0.05$).

Discussion, conclusion and recommendation

The current study aimed to determine missed opportunities in HIV, HBV and HCV infection prevention among a high-risk population group. Considering testing is an important prevention and management strategy in viral infections; awareness, access to testing, vaccination and uptake of interventions are important indicators for a tailored program among vulnerable populations.

Sero-surveillance and monitoring of associated risks to HIV, HBV and HCV infections among key population is therefore necessary.

Demographic characteristics in the current study indicate more women than men accepted to participate in the study. Most likely, and like in many other health interventions, women have better health seeking behavior than men. Equally, gender dimension has been shown to influence health-seeking behavior [5-7]. This could possibly explain why more women than men participated in the study.

While rollout testing for HIV has been highly rated and majority of individual accessed testing in many settings, for HBV and HCV the goal is still far-fetched. In this study, 92% of participants had tested for HIV previously. Comparably only 4.5% and 2% had previously tested for HBV and HCV respectively. Globally, by 2020 it was estimated that two thirds of key population either had tested for HIV in the past year or at least had an HIV test before [8]. The global health sector strategy on viral hepatitis, 2016-2021 target to increase viral hepatitis B and C diagnosis from < 0.5 to 30% and 90% by 2020 and 2030 respectively [9]. Based on our findings these targets are a long way to go and it will take great commitments from nations to fast track the targets.

In the case of HIV, while majority of individual had tested in the last 3 months preceding this study, there were still missed opportunities for re-testing. Despite the high risk of infection associated with key populations, five percent of the participant had last tested over a year

ago. Their counterparts (75%), probably recognizing their risk to HIV exposure had at least had a HIV test in the last 3 months. Re-testing for HIV is one of the strategies for identifying early infections among high-risk population groups. Other indications for retesting include; Incident of known HIV exposure, ongoing risk behaviors and Repeat indeterminate HIV status [10]. This is consistent with our study participants, majority of whom had multiple partners in the last one year. Re-testing should however be differentiated from repeat testing. The latter refers to a situation where a person decides to be tested again or goes to different testing sites for the same following an initial test and without a specified time or incidence. This happens due to lack of trust or confidence in the test or because of client's disbelief of the test outcomes based on their perceived risk or previous exposure.

In this study, awareness on hepatitis vaccine and vaccination was very low. This is despite the high risk factors for Hepatitis B and C and HIV infections associated with key populations. Lack of awareness is likely attributed to the fact that unlike HIV, hepatitis B and C infections are not program priority diseases. The attention given to these infections and the level of funding is therefore low in Kenya and many other developing countries. Globally, an estimated 1.4 million deaths per year are attributable to viral hepatitis where, 47% of these are due to HBV and 48% to HCV infections [9]. This mortality compares well to that of HIV and TB. Important to note that viral co-infection between HIV, HBV and HCV is a major public health concern that can no longer take a back sit.

Considerably, a low number of individuals had received HBV vaccination. Among those who were aware of the vaccination (only 11% of the 150). Low level of vaccination has been reported in other studies [11,12]. Where's ten percent of the study population did not know where to go for vaccination, 2% did not see the need for it. This indicates the need to sensitize such populations on benefits of vaccines for the good of the communities within their reach. Key populations also play an important role in transmission dynamics of a number of infections. They therefore constitute an essential partnership in prevention and control of HIV, HBV and HCV infections.

HBV Vaccination level of education and marital status

In this study, level of education and gender were important factors for vaccine uptake. Despite females having better health seeking behavior, female gender was not likely to be associated with vaccine uptake. This may be attributed to male occupation (mobile population) which is mostly associated with cross border movements and therefore more informed of potential risks of infection. Level of education [13]; Knowledge of hepatitis [14] and gender [15,16] have been cited as

determinants of hepatitis vaccine uptake.

Number of doses received

Of the 17 respondents who received vaccine, 10 (59%) had received all the three doses while two had received two doses and five had received one. Compliance with HBV vaccine dosage is a major concern for example in a study in USA only 40% of adults who had received 1st dose took the 2nd and only 22.3% took the 3rd dose [17]. Findings of a similar study found that 48.8% of health workers had received one dose, 29.1% two doses, and only 22.1% had received all three doses in Sudan [11]. While in Nigeria 48.9% of health workers had received 3 doses [18].

Each of the 17 respondents in the current study indicated to have received the vaccines in different health facilities four of which were private and 13 public. This is an indication that it is likely more feasible to access vaccination in a public health facility for this population. Majority of those vaccinated (10/17) had their doses more than six months from the time of interview. Administration of Hepatitis B monovalent vaccine is carried out in 3 dosage series at 0, 4 and 6 months according to ministry of health guidelines in Kenya [19]. For those who never received the vaccine, majority among the responded (78%, 546/703) indicated that they were not aware of availability of a vaccine for hepatitis. Other reasons were as varied including lack of awareness on where vaccine is offered, fear of other infections, cost and seeing no need for a vaccine. The problem of vaccination is not only among adults in Africa which is the least vaccinated region in the world, but even among infants for whom vaccination is routine through Expanded Program on Immunization [EPI]. Only one in ten infants in Africa is vaccinated at birth and coverage of first dose at birth is 10% compared with global coverage of 39% [20].

Probably the biggest drawback towards the health sector strategic goals for viral hepatitis is that this pandemic is not well understood in many developing countries. Many countries in Africa are yet to establish the nature of the epidemic especially the 'who' and 'where' in order to direct resources and interventions like is the situation in HIV and AIDS. As shown in our study, it is likely that key and mobile populations should be a priority. Surveillance of the triple viral infections could better inform the strategic directions on framework for action towards the viral hepatitis goals- 2020 and 2030.

Conclusion

Knowledge on hepatitis B and C is low among the key population. Uptake of testing and vaccination is even lower in this population hence the need create awareness. In this era of rapid testing and increased quality of test kits, lack of routine testing in a high-risk population is a missed opportunity in prevention and management of prevalent infections.

Recommendations

Surveillance of hepatitis B and C is necessary among Key population. There is need to initiate awareness and testing programs among Key population groups.

Declaration of Conflict of Interest

We declare no conflict of interest.

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Author's Contributions

Authors contributed equally to this publication.

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