



## Factors predisposing to hepatitis B viral infection among psychoactive substance users in Nateete, Kampala district, Uganda. A cross-sectional study.

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### Abstract

#### Background:

Hepatitis B virus (HBV) infection remains a major global public health concern, particularly among high-risk populations such as psychoactive substance users. This study assessed factors predisposing to HBV infection among psychoactive substance users in Nateete, Kampala District.

#### Methodology:

A cross-sectional study was conducted among 150 psychoactive substance users in Nateete Parish, Lubaga Division, Kampala District. Participants were selected using simple random sampling. Data were collected using structured questionnaires. Data were entered into Microsoft Excel and analyzed using SPSS version 20. Descriptive statistics, including frequencies and percentages, were used to summarize findings.

#### Results:

The majority of participants were female (73.3%), aged 26–45 years (86.7%), and unemployed (60%). Predisposing factors to HBV infection included low income (40% earning  $\leq$ 5,000 UGX monthly), unemployment, multiple sexual partnerships (40% reporting more than two partners), and prolonged residence in the area. Alcohol was the most commonly used substance (37.3%), followed by khat (26.7%) and marijuana (21.3%).

#### Conclusion:

Psychoactive substance users in Nateete are exposed to multiple socioeconomic and behavioral factors that increase their vulnerability to HBV infection, particularly unemployment, low income, risky sexual practices, and alcohol use.

#### Recommendations:

There is a need to strengthen targeted HBV screening and vaccination programs among substance users, integrate harm-reduction services with sexual health education, improve access to affordable vaccination, and implement community-based awareness campaigns focusing on high-risk populations in urban informal settlements.

**Keywords:** Hepatitis B virus, Psychoactive substance use, Risky sexual behavior, public health, Nateete, Kampala district.

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### Background.

The use of psychoactive substances such as alcohol, marijuana (*Cannabis sativa*), amphetamines, oral tobacco, heroin, and khat (*Catha edulis*) remains a significant global public health challenge. Psychoactive substance use is associated with having multiple sexual partnerships, unprotected sexual intercourse, at times with individuals whose health status may not be known, drug–sex exchanges,

and sharing of drug preparation equipment such as used needles and syringes. Engaging in these behaviours increases the risk of transmission of the Hepatitis B virus (HBV) infection. Hepatitis B is a life-threatening infection caused by HBV (Ssekamate *et al.*, 2022). Hepatitis B is an infection of the liver caused by the Hepatitis B virus. Hepatitis B infection caused by the Hepatitis B virus is among the most serious viral infections. It is a global health



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problem and one of the leading causes of death around the world. Worldwide, 2 billion people are infected with the Hepatitis B virus, and about 360 million individuals live with chronic Hepatitis B infection. In addition, Hepatitis B virus infection is responsible for about 80% of primary liver cancers. Therefore, every year approximately 780,000 individuals die from chronic or acute Hepatitis B virus infection (Khan *et al.*, 2017). The prevalence of HBV in PWID and FSWs was 6% and 3%, respectively, with the highest prevalence in PWID being in South-East Asia (9%) and Africa and the Eastern Mediterranean (5% each), and the lowest prevalence being in the Americas and Western Pacific (1% each). In high- and middle-income countries, HBV transmission is more perinatal and horizontal. In low-income countries, however, transmission occurs through drug injection and high-risk sexual behaviors. Asia and Africa have the highest HBV endemicity, but highly effective vaccination programs in some countries have pushed the pattern towards moderate or low endemicity. Most countries in Africa have high endemicity, with the exception of Tunisia and Morocco, which have moderate endemicity. HBV vaccination is effective in reducing and eliminating HBV by 2030 (Rashti *et al.*, 2020). There are approximately 3000 PWID in Zanzibar. Injection drug use is facilitated by its location on the Indian Ocean coast of Africa along drug trafficking routes (Khatib *et al.*, 2017). In Uganda, Kampala study findings are also similar to a study among young injection drug users in the US, where only 10% of younger participants reported having completed the Hepatitis B vaccine series (Ssekamatte *et al.*, 2022). The major reasons given by 80% of the participants for non-uptake of the Hepatitis B vaccine included a lack of awareness about the vaccination campaign, myths about the vaccine, inaccessibility of the vaccine, and fear. Regarding the non-completion of the full three doses of the Hepatitis B vaccine, 80% of participants attributed it to challenges such as difficulties in accessing vaccination sites, stockouts, and myths about the vaccine (Kimera *et al.*, 2024). Among the predisposing factors; individual factors (e.g., substance use expectancies, sensation seeking, mental health problems), peer influences (e.g., peer substance use behaviors and norms), family and parental factors (e.g., substance use among parents, parent-child relationships, parental monitoring and support, parental attitudes, rules and monitoring of teen substance use, family conflict), and various community factors (e.g., community-level availability of and exposure to alcohol and other substances, social/communal norms about substance use) are associated

with increased risk of substance use (Bo *et al.*, 2023). Besides, evidence on screening and vaccination against Hepatitis B among substance users in informal settlements in low-and middle-income countries like Uganda is limited (Ssekamatte *et al.*, 2022). This study assessed factors predisposing to HBV infection among psychoactive substance users in Nateete, Kampala District.

### **Methodology.**

#### **Study design.**

A cross-sectional study design was used. This type of study design was used because it allows the collection of data from the study population at a single point in time. It's efficient and cost-effective. They are quick and inexpensive to conduct, making them suitable for various research goals, especially when investigating prevalence or identifying associations.

#### **Study Area.**

The study was carried out in Nateete Parish, Lubaga Division Sub-County, Kampala District, in Central Uganda. Nateete is located on the southwestern edge of the city of Kampala. It is bordered by Busega to the north, Lungujja to the northeast, Lubaga to the northeast, Ndeeba to the southeast, Mutundwe to the south, and Buloba to the west. The coordinates of Nateete are: 00 17 50N, 32 31 37E (Latitude: 0.2972; Longitude: 32.5268).

The road distance between Kampala's central business district and Nateete is approximately 8 kilometers (5.0 mi).

#### **Study population.**

Those who currently use or have a history of using psychoactive substance for example, those who injected or smoked drugs, as well as those who were residing within the selected study area or accessed services through treatment centers, harm reduction programs, or outreach facilities.

#### **Inclusion criteria.**

All psychoactive substance users in Nateete Parish who were accessing Hepatitis B screening and vaccination services during the time of the study.

#### **Exclusion criteria.**

All psychoactive substance users in Nateete Parish who were already screened and vaccinated for Hepatitis B at the time of the study.



### Sample size determination.

The sample size was determined using a standard formula (Kiss and Leisly 1965).

$$N = \frac{z^2 * p (1-p)}{d^2}$$

Where;

N = Sample size.

Z = confidence interval at 95% (1.96)

P = prevalence (50%

According to Ssekamatte

*et al.* (2020)) Q = (1 - p)

d<sup>2</sup> = standard error allowed. Therefore,

$$N = \frac{(1.96)^2 (0.5) (1 - 0.5)}{(0.08)^2}$$

$$= \frac{3.8416 * 0.5 * 0.5}{0.0064}$$

$$= \frac{0.9604}{0.0064}$$

$$= 150.0625$$

$$= 150.0625$$

$$= 150.0625$$

Therefore, a sample size of 150 psychoactive substance users was considered in the study.

### Sampling technique.

A simple random sampling technique was used to select all those who fit the inclusion criteria and were available at the time of study. Using this type of probability sampling, a smaller group from a larger group of total participants was selected. This sampling technique was selected because it gave all individuals equal chances for participation in the study. It's also unbiased, which prevents skewed results.

### Sampling procedure.

A simple random sampling technique was used. The even and odd numbers (from 1 to 300) were written on small pieces of paper, folded, and then placed in the box. The participants drew papers from the box randomly to choose the samples. Those who chose even numbers were included in the study, and those who chose odd numbers were excluded from the study.

### Data collection tools.

Structured questionnaires were used to collect data on participants' demographic characteristics, predisposing factors, and factors that negatively influence Hepatitis B screening and vaccination services access.

### Data collection procedures.

The selected participants were informed by the researcher/assistant about the study and asked to sign the consent form before they agreed to participate in the study. Afterwards, they were then interviewed to collect information on their demographic characteristics, factors that negatively influence Hepatitis B screening and vaccination services access, as well as predisposing factors for HBV infection using a structured questionnaire. A blood sample was collected from the participants and tested for HBsAg. The results were recorded in the laboratory results form.

### Study variables.

#### Dependent variables.

Screening status, vaccination status, number of screenings/vaccinations, knowledge level, and willingness to access services.

#### Independent variables.

Knowledge level about Hepatitis B, type of substance used, frequency of substance use, mental health status, experience of stigma/discrimination, social support, distance to health facility, availability of integrated services, healthcare provider attitude, criminalization/fear of legal consequences, cost of screening/vaccination services.

### Quality Control

A pre-tested and standardized questionnaires developed based on literatures and expert input, translated and back translated tools if using local languages to ensure clarity and cultural relevance, trained research assistants in data collection procedures, performed spot-checks and random re-interviews to confirm reliability responses, checked for inconsistencies, missing data and outliers, used descriptive statistics to spot anomalies in distribution, ensured informed consent is properly documented, kept records of training attendance, involved peer educators or representatives of substance users in study planning.

### Data analysis and presentation.

Collected data was entered in Microsoft Excel, cleaned, and exported to SPSS Version 20.0 for analysis. The analyzed data were presented in the form of percentages and frequencies in tables, pie charts, graphs, and narratives.



### Ethical considerations.

A letter of introduction from the registrar of the Mildmay Institute of Health Science, through the coordinator, alongside the approval letter from the Mildmay review research committee board, was attached to the application letter to Kampala City Council Authority. Another introductory letter was given to the different community hospitals in Nateete Parish to seek permission so as to carry out the study at the individual facilities. Informed consent

was sought from the respondents, where the Researcher introduced herself to the respondents and educated them about the purpose of the study and safety of the whole process, and the benefits of the study.

### Results.

**Table 1. Demographic characteristics of respondents**

Characteristics	Category	Frequency (n = 150)		Frequency (n = 150)	Percentage (%)		Percentage (%)
		Male	Female		Total	Male	
AGE	18-25	6	9	15	15	8.2	10.0
	26-35	22	48	70	55	43.6	46.7
	36-45	10	50	60	25	45.5	40.0
	> 46	2	3	5	5	2.7	3.3
	<b>Total</b>		<b>40</b>	<b>110</b>	<b>150</b>	<b>100</b>	<b>100.0</b>
MARITAL STATUS	Single	18	67	85	45	60.9	56.7
	Married	6	4	10	15	3.6	6.7
	Divorced	12	8	20	30	7.3	13.3
	Widow	3	2	5	7.5	1.8	3.3
	No response	1	29	30	2.5	26.4	20.0
<b>Total</b>		<b>40</b>	<b>110</b>	<b>150</b>	<b>100</b>	<b>100.0</b>	<b>100</b>
Level Of Education	Primary	10	18	28	25	16.4	18.7
	Secondary	20	55	75	50	50.0	50.0
	Tertiary	3	12	15	7.5	10.9	10.0
	None	5	17	22	12.5	15.5	14.7
	No response	2	8	10	5	7.3	6.7
<b>Total</b>		<b>40</b>	<b>110</b>	<b>150</b>	<b>100</b>	<b>100.0</b>	<b>100</b>
RELIGIOUS AFFILIATION	Catholic	10	52	62	25	47.3	41.3
	Anglican	7	18	25	17.5	16.4	16.7
	Born again/Pentecostal	6	4	10	15	3.6	6.7
	Moslem	8	32	40	20	29.1	26.7
	Other religions	4	1	5	10	0.9	3.3
<b>Total</b>		<b>40</b>	<b>110</b>	<b>150</b>	<b>100</b>	<b>100.0</b>	<b>100</b>



	Un employed	20	70	90	50	63.6	60.0
	Employed	10	24	34	25	21.8	23
<b>OCCUPATION</b>							
	Self employed	6	14	20	15	12.7	13
	No response	4	2	6	10	1.8	4.0
<b>Total</b>		<b>40</b>	<b>110</b>	<b>150</b>	<b>100</b>	<b>100</b>	<b>100</b>

*Source: Field data (2025).*

**Table 1** shows that the majority of the participants were female, 73.3% (110/150), and the minority of the participants were males, 26.6% (40/150). More than half (86.7%) of the participants were in the age range of 26 to 45 years, and less than half (13.3%) were in the age range of 18-25 years and > 46 years. One third (50%) of participants reported having attended or completed a secondary level of education, and less than a quarter of the participants reported having attended or completed primary (18.7%), tertiary (10%), or none (14.7%). More than a third (56.7%) of respondents were single, and less than two-thirds were married (10/150), divorced (20/150), or widowed (5/150). Almost a third

(41.3%) of the respondents were Catholics, and slightly more than two-thirds were Anglican (25/150), Born again/Pentecostal (10/150), Muslim (40/150), as well as other religions (5/150). On considering employment, 60% reported unemployment, while 23% were employed and 13% self-employed.

### Predisposing factors for Hepatitis B virus infection among psychoactive substance users.

**Table 2. Predisposing factors of Hepatitis B screening and vaccination among respondents.**

VARIABLE	CATEGORY	FREQUENCY (n = 150)			PERCENTAGE (%)		
		Male	Female	Total	Male	Female	Total
<b>AGE</b>							
	18-25	6	9	15	15	8.2	10.0
	26-35	22	48	70	55	43.6	46.7
	36-45	10	50	60	25	45.5	40.0
	> 46	2	3	5	5	2.7	3.3
	<b>Total</b>	<b>40</b>	<b>110</b>	<b>150</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>MARITAL STATUS</b>	<b>Single</b>	18	67	85	45	45	56.7
	<b>Married</b>	6	4	10	15	15	6.7
	<b>Divorced</b>	12	8	20	30	30	13.3
	<b>Widow</b>	3	2	5	7.5	7.5	3.3
	<b>No response</b>	1	29	30	2.5	2.5	20.0
	<b>Total</b>	<b>40</b>	<b>110</b>	<b>150</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>LEVEL OF EDUCATION</b>	<b>Primary</b>	10	18	28	25	16.4	18.7
	<b>Secondary</b>	20	55	75	50	50.0	50.0
	<b>Tertiary</b>	3	12	15	7.5	10.9	10.0
	<b>None</b>	5	17	22	12.5	15.5	14.7
	<b>No response</b>	2	8	10	5	7.3	6.7
	<b>Total</b>	<b>40</b>	<b>110</b>	<b>150</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>OCCUPATION</b>	<b>Un employed</b>	20	70	90	50	63.6	60.0
	<b>Employed</b>	10	24	34	25	21.8	22.7
	<b>Self employed</b>	6	14	20	15	12.7	13.3



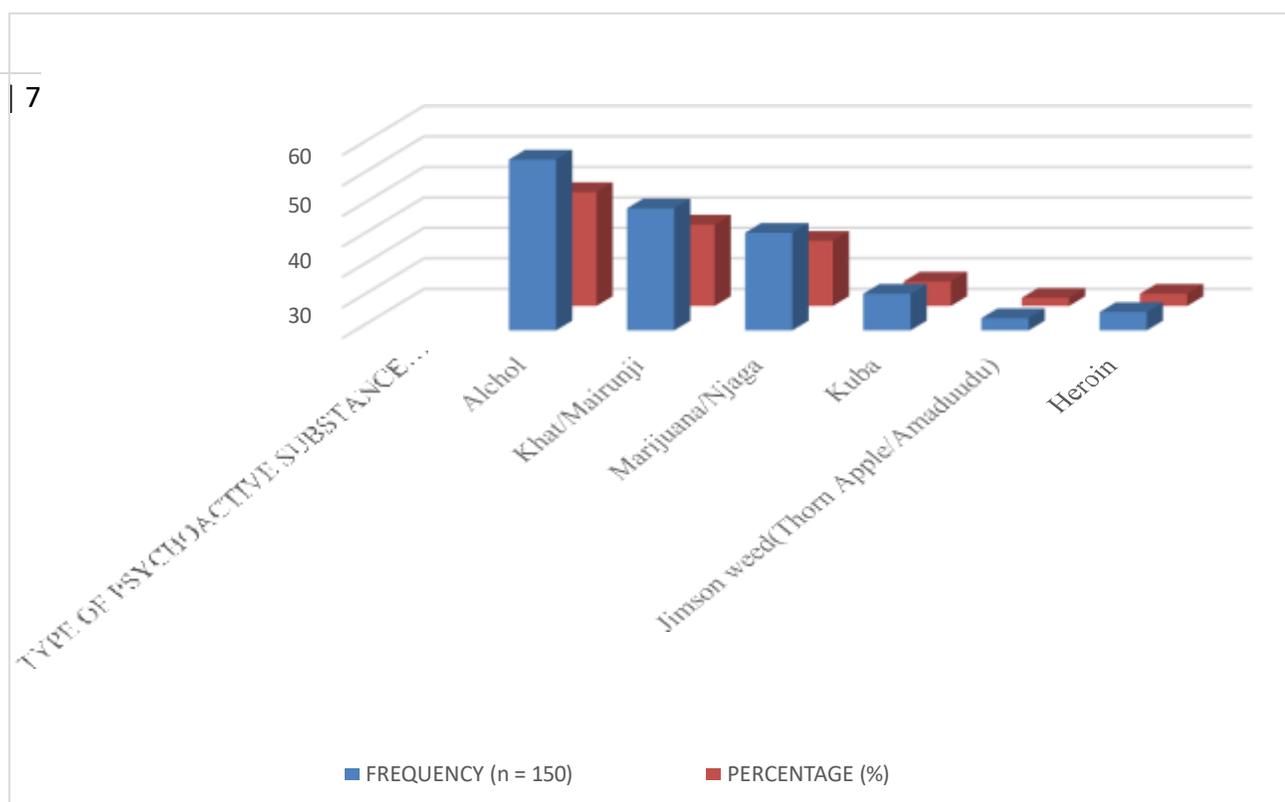
	<b>No response</b>	4	2	6	10	1.8	4.0
	<b>Total</b>	40	110	150	100	100	100
<b>NUMBER SEXUAL PARTNERS</b>	<b>One</b>	10	15	25	25.0	13.6	16.7
	<b>Two</b>	12	28	40	30.0	25.5	26.7
	<b>More than two</b>	9	51	60	22.5	46.4	40.0
	<b>None</b>	6	6	12	15.0	5.5	8.0
	<b>No response</b>	3	10	13	7.5	9.1	8.7
	<b>Total</b>	40	110	150	100	100	100
<b>DURATION OF STAY IN THAT AREA</b>	<b>One day</b>	6	13	19	15.0	11.8	12.7
	<b>One week</b>	10	24	34	25.0	21.8	22.7
	<b>Less than a month</b>	8	13	21	20.0	11.8	14.0
	<b>One month</b>	4	27	31	10.0	24.5	20.7
	<b>Over six months</b>	12	33	45	30.0	30.0	30.0
	<b>Total</b>	40	110	150	100	100	100
<b>AVERAGE MONTHLY INCOME</b>	<b>5,000/=</b>	16	44	60	40	40.0	40
	<b>10,000/=</b>	10	38	48	25	34.5	32
	<b>50,000/=</b>	6	22	28	15	20.0	18.7
	<b>≥ 100,000/=</b>	8	6	14	20	5.5	9.3
	<b>Total</b>	40	110	150	100	100	100
<b>TYPE OF PSYCHOACTIVE SUBSTANCE USED</b>	<b>Alcohol</b>	10	46	56	25.0	41.8	37.3
	<b>Khat/Mairunji</b>	7	33	40	17.5	30.0	26.7
	<b>Marijuana/Njanga</b>	10	22	32	25.0	20.0	21.3
	<b>Kuba</b>	6	6	12	15.0	5.5	8.0
	<b>Jimson weed</b>	3	1	4	7.5	0.9	2.7
	<b>Heroin</b>	4	2	6	10.0	1.8	4.0
	<b>Total</b>	40	110	150	100	100	100

**Source: Field data (2025).**

As seen in **Table 2**, gender, marital status, level of education, occupation, number of sexual partners, duration of stay in the area, and average monthly income are the major predisposing factors for Hepatitis B, whereby 73.3% of the participants were females and 26.7% males. Of the 73.3%, 56.7% were singles, while the married were at 6.7%. Considering the level of education, the majority of the respondents (50%) had completed their secondary school level of education, while the minority (10%) had completed their tertiary level of education, 18.7% primary level of education, and 14.7% secondary level of education. Out of 150 respondents, an alarming percentage of 60% were

unemployed, and only 13.3% were self-employed. Almost half of the respondents (60/150) had more than two partners, as compared to those having one partner, with a 16.7% (25/150). Interestingly, 13.3% of the respondents had stayed in Nateete for only one day, and 30.7% had dwelled in the same area for over 6 months. Financially, 40% of these substance users had an average monthly income of 5,000/= while only 9.3% earned over 100,000/=. The most consumed type of psychoactive substance was alcohol, with 37.3%, while Jimson weed was the least consumed, 2.7% by the respondents.

**Figure 1. Demonstrating the percentage and frequency of occurrence of the types of psychoactive substances used among respondents**



As represented in **Figure 1**, alcohol was the most consumed psychoactive substance.

### Discussion of results.

#### Predisposing factors for Hepatitis B virus infection among psychoactive substance users.

This included gender, level of education, occupation, number of sexual partners, duration of stay in the area, and average monthly income. From the findings of the current study, most of the participants were females because psychoactive substance use is often linked to drug-sex exchanges, a behavior where females engage in sex to obtain drugs or money for drugs, thereby further increasing their risk of HBV transmission. In comparison, a study in the USA revealed that female sex was also significantly associated with HBV exposure. After adjustment for all covariates, the

odds of Hepatitis B exposure for female participants who reported using methamphetamine were nearly 4 times than that for male participants (Tressler *et al.*, 2022). Further still, findings of this study revealed that the majority of psychoactive substance users had a secondary level of education; just as was the case in Eastern Ethiopia, whose study findings revealed that khat may enhance concentration, performance motivation, and socialization, which attract many adolescents and secondary school students to consume khat (Nigussie *et al.*, 2023). This might be credited to the need of fitting among peers and the myths that psychoactive substance use can make one excel in school. However, from the findings of the current study, more than half of the respondents reported having been unemployed, which increases the chances of the substance



user engaging in behaviors that expose him or her to HBV infection. A study review by Lin et al (2024) reported nineteen articles that revealed unemployment as one of the factors that escalate substance use.

In the quest to assess the issue of having multiple sexual partners, having more than one sexual partner exposed psychoactive substance users to the risk of acquiring Hep B. This is because Hep B can be sexually transmitted. This is similar to the outcomes from the study carried out in Tanzania, where a higher prevalence of HBV in males was attributed to a number of factors, including their greater likelihood of engaging in risky behaviors such as sharing needles or other sharp objects, having multiple sexual partners, and getting tattoos or piercings (Mangowi *et al.*, 2024).

### **Conclusion**

The study findings demonstrate that psychoactive substance users in Nateete, Kampala District, are exposed to multiple socio-demographic and behavioral factors that predispose them to Hepatitis B virus (HBV) infection. The majority of participants were females, young to middle-aged adults (26–45 years), single, and unemployed, indicating significant socioeconomic vulnerability within this population. Low educational attainment, low monthly income, and unstable living conditions further increased susceptibility to risky behaviors associated with HBV transmission.

Behavioral factors such as having multiple sexual partners and prolonged engagement in substance use environments were prominent contributors to infection risk. Alcohol was identified as the most commonly used psychoactive substance, which may contribute to impaired judgment and increased likelihood of unsafe sexual practices. Overall, the combination of socioeconomic disadvantage, risky sexual behavior, and substance use patterns places psychoactive substance users at heightened risk of HBV infection and highlights gaps in preventive health service access within informal urban communities.

### **Study limitations.**

Fear of reaching the core central point of residence. Influenced by factors like tolerance, withdrawal or polydrug use, obtaining informed consent from substance users was complicated due to impaired decision-making capacity, there was necessity to balance between need for response with potential risks and harm to participants, recruiting representative samples of substance users was a challenge,

response was unreliable due to user' impaired cognitive function or memory lapses, substance users under or over reported drug use due to social stigma or fear of consequences.

### **Recommendations.**

Strengthen targeted HBV screening and vaccination programs: Health authorities and implementing partners should scale up outreach-based Hepatitis B testing and vaccination services specifically targeting psychoactive substance users in high-risk urban settings such as Nateete. Integrate harm-reduction and sexual health services: Programs addressing substance use should incorporate HBV education, condom distribution, and counseling on safe sexual practices to reduce transmission risks.

Improve health education and awareness: Community-based sensitization campaigns should be conducted to increase knowledge about Hepatitis B transmission, prevention, and the importance of completing the vaccination schedule among substance users.

Address socioeconomic vulnerabilities: Government and non-governmental organizations should implement livelihood support programs, vocational training, and employment opportunities to reduce economic dependence that may drive risky behaviors such as transactional sex.

Enhance accessibility of services: Efforts should be made to reduce barriers such as cost, stigma, distance to health facilities, and negative healthcare provider attitudes by providing friendly, affordable, and accessible services.

Further research: Longitudinal and qualitative studies are recommended to explore causal relationships and deeper contextual factors influencing HBV risk among psychoactive substance users in Uganda.

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Thank you all for making this research possible.

### List of abbreviations and acronyms

HBV-Hepatitis B Virus

PWID — People Who Inject Drugs

FSWs — Female Sex Workers

PWUD — People Who Use Drugs

WHO — World Health Organization

GAVI — Global Alliance for Vaccines and Immunization

HBsAg — Hepatitis B Surface Antigen

IDU — Injection Drug Use

MSM — Men Who Have Sex with Men

### Source of funding.

The study was not funded.

### Conflict of interest.

There is no conflict of interest.

### Availability of data.

Data used in this study are available upon request from the corresponding author.

### Authors contribution.

DMTL designed the study, conducted data collection, cleaned and analyzed data, and drafted the manuscript.

EK supervised all stages of the study from conceptualization of the topic to manuscript writing and submission.

FA supervised the research.

HN supervised the research.

JFN supervised the research.

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