



Rwanda

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HIGHLIGHTS

1. **Drugs and Substance Abuse Amongst Adolescents**
2. **Notification and Testing among Partners of HIV Positive Index Clients**
3. **Predictors of In-Hospital Mortality of Preterm Newborns**
4. **National Health Insurance Scheme (NHIS) in Zambia**



Ministry of Health



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General Information

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Its mission is to serve as a knowledge sharing platform for national and international public health scientific information. Content published under RPHB will be used to control and address potential public health outbreak threats and strengthen health systems through real time availability of information.

This will allow more and effective communication between policy makers, researchers and health practitioners.

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Dear readers,

It is my pleasure to introduce the latest issue of the Rwanda Public Health Bulletin (RPHB), highlighting the concerning topic of drug and substance abuse among Rwandan adolescents and other health problems.



Adolescence is a critical stage in human development, marked by physical, psychological, and social changes that can make young people vulnerable to risky behaviors, including drug and substance abuse. In Rwanda, the prevalence of drug and substance abuse among adolescents has been on the rise, posing a significant public health challenge that requires urgent attention. Drug and substance abuse is a significant public health problem in Rwanda, with devastating consequences for individuals, families, and communities. Adolescents are particularly vulnerable to this problem, as they navigate the complex challenges of adolescence, including peer pressure, stress, and the need for acceptance and belonging.

This issue of the RPHB provides valuable insights into the various dimensions of drug and substance abuse among Rwandan adolescents, including contributing factors, consequences, and potential solutions. It also highlights the need for a multifaceted approach to addressing drug and substance abuse among Rwandan adolescents, one that involves not only healthcare providers and policy-makers but also parents, schools, and communities.

Through this issue, you will also learn about in-hospital neonatal mortality among the preterm infants, notification and testing among partners of HIV-positive patients, and the national health insurance scheme in Zambia, the latter indicating that the RPHB is gaining recognition even outside Rwanda's borders. The information presented in this issue will serve as a valuable resource for all those working to improve healthcare in Rwanda, and will inspire new strategies and initiatives aimed at preventing and addressing health problems presented.

I would like to thank all authors for considering the RPHB, and our readers for their continued interest in the RPHB. I am confident that the insights and recommendations presented in this issue will have a significant impact on efforts to promote the health of Rwandans both now and in the future.

Sincerely,

The seal of the Rwanda Biomedical Center (RBC) is circular. It features a central emblem with a sun, a mountain, and a river, surrounded by the text 'RWANDA BIOMEDICAL CENTER' and 'Rwanda' at the top.

Prof. Claude Mambo Muvunyi, MD, PhD
Editor-In-Chief - The Rwanda Public Health Bulletin (RPHB)
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Drugs and Substance Abuse Amongst Adolescents - A pilot Study in 7 Districts

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ABSTRACT

Introduction: Studies have shown that alcohol and illicit drug abuse are a growing problem in Africa and Rwanda in particular. This study aimed at determining the prevalence of alcohol and drug use by adolescents and young adults in 7 districts in Rwanda.

Methods: This was a cross-sectional study with mixed methods using individual interviews with questions on alcohol and substance abuse, and substance use disorders. We used Mini International Neuropsychiatric Interview (MINI) and other mostly standardized questionnaires to collect data and urine specimens to cross-validate responses.

Results: 3301 adolescents and young adults aged 13 to 24 from 7 selected districts participated in this cross-sectional study. In the past 30 days, 28.5% of adolescents reported to have used alcohol; 4.4% reported to have used cannabis, while the reported prevalence for cigarettes, opiates and cocaine was respectively 2.9%; 0.2%; 0.1%. Urine analysis testing for presence of cannabis and heroin confirmed the reported findings, showing high sensitivity (80%) and specificity (99%). No participant reported the use of amphetamines or methamphetamines. Youth currently using cannabis were more likely to report unprotected sexual practice in the past 12 months (OR=3.4, $p<0.001$) compared to those who did not use cannabis. Alcohol and cannabis were the main factors for youths to have a protected sex at (OR=3.4, $p<0.001$) and (OR=3.3, $p<0.001$).

Conclusions: Alcohol and cannabis are the most used substances among adolescents, and alcohol and drug use are associated with unprotected sexual practice.

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INTRODUCTION

More than 33 percent of the disease burden and almost 60 percent of premature deaths among adults can be associated with behaviors or conditions that

began or occurred during adolescence, including tobacco, alcohol use, poor eating habits, sexual abuse, and risky sex [1].

The use of alcohol, tobacco, cannabis and other psychoactive substances constitutes one of the

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most important public health problems among youth worldwide [2]. Recent studies in African countries have shown that the phenomenon of drug use is also common in this continent and is becoming one of the most disturbing health-related problems among youth [3,4]. Studies show that there is an increasing incidence in the use, and a decreasing age of onset, of these substances. Most young people begin their use of drugs with alcohol and cigarettes and later progress to more dangerous substances such as cannabis and cocaine [5]. A study conducted in 2011 and published in 2015 by Kanyoni et al. [6] on Rwandan youth aged < 35 years revealed that the past-30-day prevalence among youth was 34.0% for alcohol, 8.5% for tobacco smoking, 2.7% for cannabis, 0.2% for glue and 0.1% for drugs such as diazepam. The mean age of onset of drug (alcohol, cannabis, cigarettes, glue and drugs such as diazepam) abuse was 11.4 years. Dependence and misuse on alcohol was found to be significantly associated with male gender, age, being orphan or having one parent alive, and dropping out of school.

Available evidence from two studies in Rwanda indicates that substance use among youth is a phenomenon that exists in Rwanda. Additional data from police reports, rehabilitation centers and hospital records tend to confirm that there are reasons to believe that substance use is prevalent in Rwanda [6,7]. Rwanda National Police crimes figures in 2017 indicates that the number of people arrested for involvement in illicit drug trafficking and abuse was 3941 representing 18.0% of all 21894 crimes recorded in that year [8]. At Ndera Neuropsychiatric Hospital, the main psychiatric institution in Rwanda, the number of patients admitted with mental disorders due to psychoactive substances use increased from 68 patients annually in 2004 to 2804 patients in 2016 [9]. Iwawa Rehabilitation Center was created to provide rehabilitation service, vocational training for youth abusing drugs and support them in reintegrating into the community: since 2010, 12 293 youth have graduated from Iwawa Rehabilitation Center [10].

Substance abuse incurs high psychosocial and economic costs for the young people who experience it, for their families, and for the society in which they live, study, and will work [11]. In this regard, the Ministry in charge of youth to which Iwawa Rehabilitation Center is affiliated estimates the cost for the government for one youth

under rehabilitation at the center to be 591,348 Rwandan francs equivalent to 675.83 USD [10]. The Government of Rwanda is very conscious and aware of the extent and consequences of the drug use and the Prime Minister's order N°113/03 of 19/06/2015 established an interministerial committee responsible to coordinate all efforts in drug use prevention and rehabilitation services. Despite substantive efforts made to fight against drug abuse in Rwanda, gaps remain in the domain of prevention, treatment and rehabilitation services to improve long term outcomes among youth in Rwanda.

In order to have recent and complete information on drug and substance abuse among young people in Rwanda, a pilot assessment was planned by BARAME Project to serve as baseline data in the 7 districts on interventions (Gakenke, Gisagara, Karongi, Nyamasheke, Nyarugenge, Rulindo, and Rusizi). Collected data on prevalence of drug and substance abuse by young people in the mentioned districts will be a benchmark against which progress of indicators shall be assessed during the course of the project implementation. The overall objective of this assessment was to determine the prevalence of drug and substance abuse among and young people (13-24 years) in the 7 districts of BARAME Project. The BARAME Project is a health sector intervention financed by Enabel (Belgian Development Agency) through a bilateral cooperation agreement between the Federal Government of Belgium and the Government of Rwanda

METHODS

Study design: This survey used a cross-sectional analytical design with both quantitative and qualitative approaches. Multistage sampling was used to select participants. The primary sampling units (PSUs) were seven districts supported by BARAME Project and the sample was selected in the following 3 stages.

First stage: The Primary Survey Units (villages /imidugudu) were selected randomly from the villages where project operates its activities. Villages were randomly selected using Excel.

Second stage: Households were systematically selected, and the first sample unit was identified by the random starting point. The second sample unit was matched to the random starting point.

Third stage: At the household level, one household

member aged between 13 and 24 years old was randomly selected and invited to respond to the questionnaire.

The sample size is calculated by using the formula:

$$N = Z^2 \times P(1-P) / e^2$$

Where N= sample size, Z= level of confidence, P= baseline level of the selected indicator and e= margin of error. Given the estimated prevalence risk factors, P=0.50 (recommended when prevalence is unknown), Z= 1.96 (at 95% Confidence Interval), the estimated sample size is 400

Adjusting for: Number of domains = 7 (multiply), the estimated required sample size is therefore N = 400 x 7=2800 and assuming a non-response rate of 20%, the final sample size was therefore adjusted upward to: N = 2800 + 2800 x 20% = 3360.

Due to the non-proportional allocation of the sample to the districts and the possible differences in response rates, sampling weights were required for any analysis using data from this survey to ensure the actual representativeness of the survey results at District level. The weighting process was applied to 463 villages from seven districts. The target population for qualitative survey was the local leaders and stakeholders in the seven Districts (Nyarugenge, Rulindo, Gakenke, Karongi, Nyamasheke, Rusizi and Gisagara). The sample comprised the Vice Mayor in Charge Social Affairs and District Executive Administrator (DEA) in Nyarugenge District only, Director of Health, National Youth Council (NYC) or Youth, Culture and Sport Officer (YCSO), Rwanda Investigation Bureau (RIB) and Rwanda National Police (RNP). Moreover, at the District Hospital level, the study targeted the clinical psychologists, the head of mental health professionals, community health supervisors, and the technicians at Isange One Stop Centers (IOSCs): Rwanda Investigation Bureau (RIB) or Gender-Based Violence Officer. In each District, only one District hospital was selected

Data collection instruments and measures: This study used questionnaires to assess and measure alcohol and substance use. Substance use was measured with a standard set of three questions used to determine the “usability” of a substance on 3 standard time intervals (lifetime, 12 months and past 30 days) and generate the lifetime, annual and monthly (or “current”) prevalence rates: *Have you ever used X substance in your lifetime? Have you*

used the substance X during the last 12 months, and have you used the substance X during the past 30 days?

These standardized questions constitute key indicators that are used in the majority of international surveys [12–15].

To assess binge drinking and harmful use of substances, we added questions related to the frequency (eg. how many times he/ she used the drug during that period) or the quantity (eg. how many drinks in a row). The research team also explored alcohol binge drinking and cannabis frequent use as modalities of misuse pattern among adolescents. The binge drinking is assessed with the following question: *During the past 30 days, on how many days did you have 3 or more drinks of alcohol in a row, that is, within a 3-hour period?* For this study, youth that indicated consumption of alcohol in the last month, were asked to report the number of drinks that they had had in a session.

The cannabis misuse was assessed with the following question: *How many times have you used cannabis in the preceding 12 months? 30 days? Misuse: >5 in the past month.*

The unit used for cannabis on the Rwandan market is called “boule”. We added a question: *How many “boules” of cannabis you generally use per day?* Modalities of use and behaviours related to the use of heroin, cocaine, and other illicit substances abuse were simply explored using 11 criteria to assess substance use disorders (SUDs) [16]. The main instrument used to explore substance use disorders and comorbid conditions was the Mini International Neuropsychiatric Interview (MINI-5).

Heavy alcohol use can lead to negative consequences, including Alcohol Use Disorder (AUD). AUD is a problematic pattern of use accompanied by clinically significant impairment or distress. DSM-5 AUD diagnosis required at least 2 of the following 11 criteria: (1) more use than intended of larger amounts of alcohol; (2) unsuccessful efforts to cut down alcohol use; (3) important activities given up because of use; (4) craving or intense desire of alcohol; failure to fulfil major role obligations at work, school, or home; (6) persistent social or interpersonal problems caused by alcohol; (7) excessive time spent in acquisition of alcohol; (8) use of alcohol in hazardous situation; (9) continued drinking despite problems caused; (10) tolerance; (11) withdrawal symptoms.

While illicit drug use is deemed an important contributor to the global burden of disease, it is well documented that alcohol and tobacco misuse among young adult can also be detrimental to health [17]. Furthermore, despite the fact that alcohol and tobacco are considered as licit substances for adults in Rwanda, it is still illegal to sell alcohol and tobacco to Under 18 in Rwanda (Organic Law implementing the Penal Code N°01/2012/OL Articles 217 and 219). For these reasons, alcohol and tobacco were added among substances to the report.

Qualitative instruments: Interviews were conducted based on a semi-structured interview guide with open-ended questions. The questions discussed during the interviews aimed at exploring participants' perceptions and understanding of three main topics. The first topic covered the perception of prevalence of drug and substance abuse among adolescents and young adults in each District. The second topic explored the main types of drugs and substances consumed by adolescents and young adults. The third topic examined socio-demographic determinants of drug and substance abuse among young people in each of the districts (e.g: sex, residence, education level, age group, marital status, family socio-economic status etc.). The final goal of this survey was to make recommendations rooted in the surveys' findings, on ways to decrease drug and substance abuse in the aforementioned seven Districts.

Lab test: In order to examine the degree of agreement between reported illicit drug use and biological data, a sub sample of adolescents was selected and requested to provide urine specimens using a systematic sampling approach. Using the list of households sampled, the participant selected in the 10th household (regular interval) was requested to voluntarily submit a urine sample. Prior to their consent for study participation, the selected research participants were informed about the interviewer administered questionnaire and the eventual request for a urine sample. When in the consent procedure, the selected youth did not want to provide a urine sample; he/she was replaced by the next on the list for providing a urine sample. Participants were given 2 labeled sterile containers before entering in the collection area (bathroom). Urine specimens collected were tested qualitatively to detect metabolite presence in urines. An onsite

rapid test was conducted for Tetrahydrocannabinol (THC), opiates, Cocaine, Amphetamines and Metamphetamines using HumaDrug test designed for qualitative detection of drugs in human urine for the time between 1–4-week periods [18].

Data collection: The data collection started on 2nd November 2020 and ended the 24th November 2020. The Computer-Assisted Personal Interviewing (CAPI) technique was used to collect data. This system has proved to be more reliable and efficient than the usual Paper and Pencil (PAP) techniques. It also allows for better real-time monitoring of the data collection exercise. The approved questionnaire was uploaded into the tablets using Open Data Kit software (ODK). The latter helps to collect field data on a mobile device and upload it to a server from where they are extracted for analysis. In addition, the GPS incorporated in ODK helps to regularly monitor geographical location and progress of the interviews.

Each enumerator completed five (5) questionnaires per day. Interviews were conducted in a safe and confidential place. The supervisor was responsible for deploying enumerators in the respective villages, validating the collected data before sending them to the server as well as conducting interviews him/herself. Data collection was conducted by 23 enumerators and 7 supervisors in twenty (20) working days. Supervisors conducted regular checks using spot check form for completeness of enumerators while they were still at the respondents' house. At the end of each day, all collected data were sent to the server. The data manager provided regular progress updates to the principal investigator and technical committee during data collection. For key informants' interviews, we have used open end questions and scripts were taken for 3 persons.

Statistical analysis: Data cleaning was processed using STATA 16; and the advanced data analysis was conducted using SPSS V25 software. Descriptive analyses were conducted to generate the prevalence of alcohol and substance use among youth. Bivariate and multivariate analyses were performed for potential determinants using binary regression model to estimate the odds of having engaged in substance use behaviour. The following social demographic characteristics were considered as the potential determinants during the

analysis: education, income distribution, marital status, occupation, age, sex, family size and setting (rural/urban). The factors associated with alcohol and drug abuse were examined by using measurement of associations (i.e., Odds Ratios). The confidence level to confirm the significance of the results was CI 95%.

After the completion of the qualitative survey, themes were identified, subjects interviewed, and representative quotes were grouped. Themes were classified based on topics intended to be explored and topics were explored by analyzing the content of interview quotes. The study team identified different themes that informed on the living experiences of participants and their communities regarding drug and substance abuse.

Ethical considerations: The study received ethical approval by the Rwanda National Ethics Committee (RNEC): No. 940/ RNEC/2020, and participants were asked to sign a consent form before participation in study. Only willing and available respondents were interviewed. For subjects less than 18-years-old to participate, consent from parents of guardians was required and the minors were later asked to assent.

The confidentiality of the participant was particularly guaranteed. The research team ensured that all respondents' participation was conducted at a safe and secure place. Moreover, to ensure privacy, all interviews were conducted in a convenient place where other people were not able to listen or follow the proceedings.

During interviews, if there were indications that the participant is experiencing emotional distress (eg. uncontrolled crying) or exhibit other behaviours suggesting that the interview is too stressful, enumerators followed a stepped protocol: a) offer support and allow the participant to recover and continue b) stop the interview, c) refer to a healthcare provider or mental healthcare provider.

RESULTS

Social demographic description of respondents

The Table 1 describes socio-demographic information of respondents. It summarizes the number of respondents per district, residence area, gender, age group, level of education and marital status. We interviewed 3301 persons in total, and the non-response rate is low in this study (1.8%), Interestingly, non-response was more predominant

in female than in male participants. The most common reason for non-response was an inability to respond due to household work.

The sample included participants residing in villages characterized by the Rwanda National Institute of Statistics (2015) as rural, urban and peri urban. 394 (11.9%) of all respondents lived in urban areas, 1058 (32.1%) lived in peri urban areas, while 1849 (56.0%) lived in rural areas. The peri urban areas correspond to areas where urban and rural characteristics are mixed and located on the periphery of urban areas. Regarding sex, 2023 (61.3%) were male and 1278 (38.7%) were female. The proportion of male participants was larger than the proportion of female because selected female participants were not found in the household at the time of the study (they went out for work or other places such as markets).

Table 2 describes socio-demographic information of the household. It shows that most household heads (73.2%) had no school education or had only attained primary school as their highest level of education. More than half of the selected households fall in the Ubudehe socioeconomic Category 1 (18.1% - Very poor, vulnerable citizens unable to feed themselves without assistance) or Category 2 (39.5% - Can afford to eat once or twice a day and afford some form of rented or low class owned accommodation); while 40.6 % are part of category 3 (Citizens who are employed, farmers who have moved beyond subsistence farming or owners of small and medium scale enterprises).

Lifetime, annual and 30-day alcohol prevalence

Most youth encountered from the 7 districts (56.1%) had tried alcohol at least once in their lifetime and 43.9 % were still primarily abstinent. The lifetime use is an indicator of experimentation which does not necessary lead to harm or specific risk of alcohol misuse. Among all 1851 participants (56.1%) who had taken alcohol at least once in their lifetime, a considerable proportion of them (1336 participants) representing 72.2% of lifetime users reported to have used alcohol at least once in the last 12 months. On assessment for use in the last 30 days, 1044 participants reported the use of alcohol. They represent 78.1% of the past 12 month's users and 56.4% of lifetime users. The findings suggest that once use began, the likelihood of continuing from initiation (lifetime prevalence) to continuing use (current use) is relatively high;

Table 1: Socio-demographic description of respondents

	District	Count	%
District	Gakenke	594	18.0
	Gisagara	383	11.6
	Karongi	598	18.1
	Nyamasheke	385	11.7
	Nyarugenge	311	9.4
	Rulindo	484	14.7
	Rusizi	546	16.5
Location	Urban	394	11.9
	Peri Urban	1058	32.1
	Rural	1849	56.0
Gender	Male	2023	61.3
	Female	1278	38.7
Age group	[13-18]	1557	47.2
	[19-24]	1744	52.8
Education	None	479	14.5
	Primary	2099	63.6
	Secondary	707	21.4
	University	16	0.5
Marital status	Single	3172	96.1
	Married	122	3.7
	Widow/er	1	0.0
	Divorced	6	0.2

although it is important to note many current users can be defined as “moderate users”. Table 3 includes information on the lifetime, annual and monthly prevalence for alcohol.

Binge drinking

Overall, 13.7 % of male and 2.7% of female had at least one binge drinking alcohol consumption episode over the past 30 days. When looking at the proportions of binge drinkers, it appears that adolescent (males and females) aged 17 and below (1.0%) and girls aged 18 and above (1.8%) are less concerned by binge drinking whereas boys aged 18 and above represent the majority of binge drinkers (9.2%) (Table 4).

Alcohol use disorder (AUD) and Tobacco uses among adolescents

The prevalence of AUD that was found to be 3.6% (118) in our sample. Levels of tobacco use among

adolescent were relatively low (97, 2.9%) in the 7 districts. However, some adolescents were regular smokers and 22/112 (19.64% among smokers) had been smoking 1 to 2 packs in the last 30 days (Table 5).

Prevalence of illicit drugs among adolescents

The Table 6 shows the prevalence of drug use in lifetime, past and current period among all 3301 respondents. Cannabis is the most used illegal substance by adolescents in the 7 districts with 306 adolescents (9.3%) reporting to have used cannabis at least once in their lifetime; 227 (6.9%) adolescents consumed cannabis in the past 12 months while 175 (5.3%) used cannabis in the last 30 days preceding the interview.

Illicit drugs such as cocaine and heroin are used in some places, but the overall prevalence of reported ever-used opiates and cocaine remains low; heroin used by 17 (0.5%) respondents and cocaine used

Table 2: Socio-demographic description of household (N=3301)

		Count	%
Highest level of education of household head	None	963	29.1
	Primary	1455	44.1
	Secondary	248	7.5
	University	52	1.5
	Don't know	584	17.7
Occupation of household head	Salary	391	11.8
	Self-employed	1831	55.6
	No paid job	602	18.2
	Living with disability	125	3.8
	Retired	23	0.7
Ubudehe* category of household	No job	323	9.8
	Category I	596	18.1
	Category II	1304	39.5
	Category III	1341	40.9
	Category IV	4	0.1
Member of household	Don't know	56	1.7
	1	88	2.7
	2	221	6.7
	[3-4]	753	22.8
	[5-6]	1084	32.8
	[7-8]	822	24.9
Eligible youth within household	[9+]	333	10.1
	one	931	28.2
	two	1019	30.9
	Three	778	23.6
Male within household	Four or more	573	17.4
	None	126	3.8
	One	586	17.8
	Two	932	28.2
	Three	773	23.4
Female with household	Four or more	884	28.8
	None	160	4.8
	One	476	14.4
	Two	786	23.8
	Three	767	23.2
	Four or more	1112	33.7

*Ubudehe category: Ubudehe is a social stratification programme depending on income among households

by 3 (0.1%) respondents.

Regular cannabis use is defined as those who had been using cannabis 5 times or more in the last 30

days. Of those who used cannabis during the past 30 days (227), a strong majority 176 (77.5 %) used cannabis more than 5 times in the last 30 days

Table 3: Prevalence of alcohol use

		Lifetime		Past*		Current	
		Count	%	Count	%	Count	%
Authorized drinks	Alcoholic beverages	1787	54.1	1264	38.3	960	29.1
Unauthorized drinks	Kanyanga	248	7.5	118	3.6	49	1.5
	Chief Warage	64	1.9	37	1.1	25	0.8
	Igikwangari	101	3.1	98	3.0	90	2.7
	King Warage	26	0.8	49	1.5	26	0.8
	Other	101	3.1	113	3.4	73	2.2
Overall alcohol use (people consuming at least one)		1851	56.1%	1336	40.5%	1044	31.6

Authorized drinks: Legal drinks; Unauthorized drinks: Illegal drinks; *Past 12 months

Substance use disorder associated with illicit drugs

According to the screening interview, 1.2% of the youth in the 7 districts considered, met the diagnosis criteria for non-alcohol psychoactive SUD (Table 7).

The rates of alcohol and substance use in the table below represent the estimated proportion of adolescent and youth who had used the substance at least once in the last month. The weighted 30-day prevalence for alcohol, cannabis, cigarettes,

opiates and cocaine was respectively 28.5%; 4.4%; 2.9%; 0.2%; 0.1% (Table 8). The rates of alcohol and substance use in the table below represent the estimated proportion of adolescent and youth who had used the substance at least once in the last month. The weighted 30-day prevalence for alcohol, cannabis, cigarettes, opiates and cocaine was respectively 28.5%; 4.4%; 2.9%; 0.2%; 0.1% (Table 9). The mean age at onset of alcohol, cannabis, and heroin use was 13.1, 16.8 and 18.5 respectively (Figure 1).

Table 4: Distribution of binge drinking by gender

		Male (n=2,023)		Female (n=1278)	
		Count	%	Count	%
Binge Drinking	No	557	27.5%	163	12.8%
	Yes	278	13.7%	34	2.7%
	Non user (abstinent)	1188	58.7%	1081	84.6%
Binge Drinking (# drinks or more in 3 h)	5 drinks for boys aged 18 and above	186	9.2%	-	-
	4 drinks for girls aged 18 and above	-	-	23	1.8%
	3 drinks for youth aged 17 and below	20	1.0%	3	0.2%
	non binge drinking	72	3.6%	8	0.6%
	Non user (abstinent)	1745	86.3%	1244	97.3%
Frequency	0 days	3	0.1%	1	0.1%
	1 or 2 days	102	5.0%	14	1.1%
	3 to 5 days	90	4.4%	6	0.5%
	6 to 9 days	30	1.5%	4	0.3%
	10 to 19 days	35	1.7%	6	0.5%
	20 to 29 days	11	0.5%	2	0.2%
	All 30 days	7	0.3%	1	0.1%
	Not user	1745	86.3%	1244	97.3%

Table 5: Frequency use of tobacco in 30 days

Use of tobacco in 30 days		
	Count	%
Not user	3204	97.1
One to five cigarettes per day	44	1.3
Two packs or more per month	16	0.5
About one-half pack	7	0.2
One- and one -half packs per month	6	0.2
One pack	5	0.2
Total	3301	100.0

Determinants of alcohol misuse

Binge drinking varies across districts and the proportion of adolescent having binge drinkers are higher in Nyarugenge, Nyamasheke and Gisagara than in other districts (Table 10).

Binge-drinking pattern also increased significantly in youth aged 18 and above. Binge drinking was ascertained using the following criteria: 3 drinks in a row (within a 3-hour period) for youth (boys and girls) aged 17 and below; 4 drinks in a row (within a 3-hour period) for girls aged 18 and above; and 5 drinks in a row (within a 3-hour period) for youth aged 18 and above.

Multivariate logistic regression analysis showed that youth with age above 18 years old, youth who lost parents or relatives, youth with family history of alcohol or drug problem, youth suspended from school, youth who reported history of unintended pregnancy were more likely to report higher rates of binge drinking (Table 11).

Determinants for illicit drugs

The rates of cocaine and heroin use in this study were too small to conduct meaningful statistical analyses. We therefore combined cannabis, heroin,

and cocaine use under the new variable “illicit drugs. Adolescent cannabis-use prevalence rates in Nyarugenge (19.0%) are 3 times higher than the average of other districts (5.3%). Cannabis-use prevalence rates are also elevated in Gisagara (8.1 %) compared to the average of other districts. The lowest average prevalence rates for cannabis use are found in Rusizi (2.2%) and Rulindo (3.1%) (Figure 2).

Adolescents suspended from schools were 4.8 times more likely to use drugs than those who attended school. Other factors such as male gender, older age, living in urban areas, history of family conflict, inability to afford food, suspension from school, availability of drug in the community, family history of alcohol or drug problem were also found to be associated with illicit drug use (Table 12).

Co-occurrence of substance use disorders and other mental illnesses

Logistic regression analysis showed that there was an association between hard drug use and mental illness (i.e., depression, suicidality and anxiety) (95%CI: 1.750-12.20, p=0.002).

Table 6: Prevalence of illicit drug use (n=3301)

	Lifetime		Past*		Current	
	Count	%	Count	%	Count	%
Cannabis	306	9.3	227	6.9	175	5.3
Opiates	17	0.5	13	0.4	7	0.2
Cocaine	3	0.1	3	0.1	3	0.1
Catha Edulis	12	0.4	8	0.2	4	0.1
Datura Stramonium	22	0.7	6	0.2	5	0.2
Shisha	28	0.9	8	0.2	2	0.1

*Past 12 months

Table 7: Frequency use of cannabis in 30 days

Use of cannabis	Frequency	%
<=5	51	1.5
[6-10]	28	0.8
11+	148	4.5
Not user	3074	93.1
Total	3301	100.0

Binary regression results supported this hypothesis: adolescent and youth with major depressive past episode had 1.7 greater odds of using alcohol than those not depressed (95% CI: 1.066-2.066, p=0.025) and those with generalized anxiety disorder had almost 2 times greater odds of using alcohol than those who did not report anxiety symptoms (95%CI: 1.511-2.626, p=0.000) (Table 13).

Results show that having sexual intercourse in the past 12 months was significantly associated with alcohol (OR=3.5, p<0.001) and cannabis

use (OR=2.4, p<0.001). Engaging in unprotected sex was also significantly associated with alcohol (OR=3.0, p<0.001) and cannabis use (OR=2.1, p<0.01). Increased odds of being touched in a sexual way without consent was associated with alcohol use (OR=2.1, p<0.01) (Table 14).

Agreement between rapid tests and confirmatory concentration tests

Largely, quantitative tests confirmed rapid test results: of the 21/376 urine samples tested positive for cannabis with rapid tests, 19/21 remained positive using mass spectrometric immunoassay.

Table 8: S substance use disorder

Substance use disorder (other drugs)	Count	%
No	3261	98.8
Yes	40	1.2
Total	3301	100.0

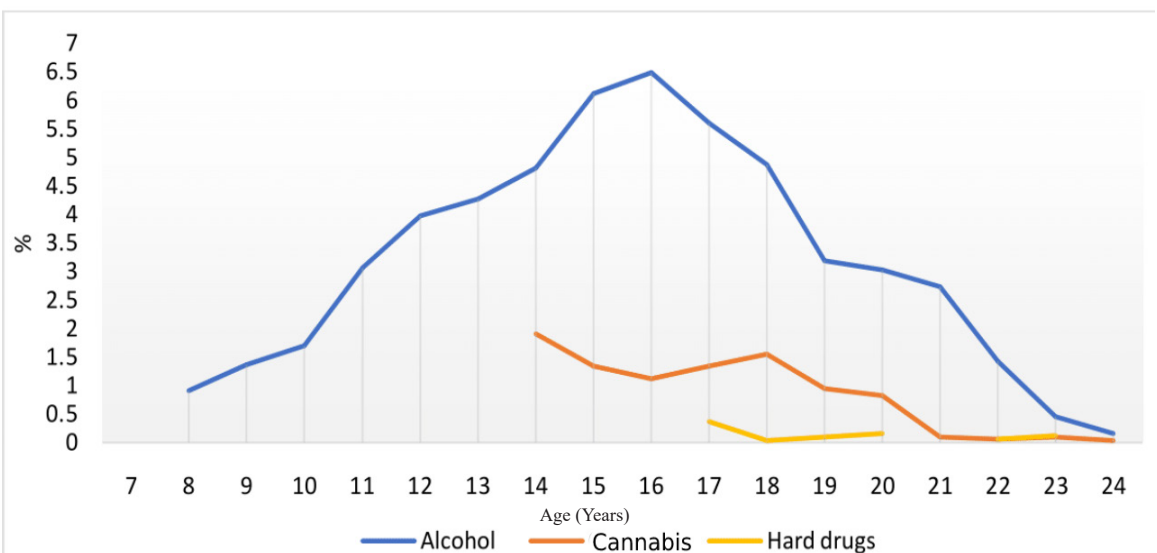


Figure 1: Age of onset of alcohol use and substance use

Table 9: Prevalence by gender

		Male		Female		Overall	
		U (%)	W (%)	U (%)	W (%)	U (%)	W (%)
<i>Past month</i>	User	25.5	20.6	6.1	8.0	31.6	28.5
<i>Alcohol use</i>	Not user	35.7	28.8	32.6	42.6	68.4	71.5
<i>Past month</i>	User	5.1	4.1	0.2	0.2	5.3	4.4
<i>Cannabis use</i>	Not user	56.2	45.3	38.5	50.4	94.7	95.6
<i>Other illicit</i>	User	0.7	0.6	0.3	0.4	1.0	0.9
<i>substance use</i>	Not user	60.6	48.8	38.5	50.2	99.0	99.1

U: Unweighted, W: Weighted

The confirmed positive samples for THC had a concentration varying from 57 ng/ml (minimum) to 300 ng/ml (maximum). For opiates, 2 samples of participants tested positive with rapid tests remained positive with mass spectrometric immunoassay and the concentration was respectively 371 ng/ml and 383 ng/ml.

We cannot determine if the 2-cannabis positive results with rapid test not confirmed with concentration tests were due to the sample degradation during the shipment or the low performance of the rapid test. Regardless of the explanation, it is recommended to consider results from the confirmatory mass spectrometric immunoassay which has a higher performance. The positivity rate for both qualitative and quantitative tests is however nearly equivalent and this suggests that testing with either test produces more or less similar results.

Key Informants' perspectives about alcohol and drug abuse in 7 districts

The findings of this study were based on an in – depth qualitative analysis of the content of all the interviews. The study team adopted a thematic analytical approach to identify the main themes that emerged from participants' perceptions and understanding of the topics under study. The analysis was guided by the main study questions which were (1) the issue of drug and substance

abuse among adolescents and young people in each of the districts; (2) the main type of drugs and substances used by adolescents and young people; (3) socio-demographic determinants of drugs and substance abuse among young people in each of the districts.

Understanding the Prevalence of drug and substance abuse

In general, the study established that the main cause of drug and substance use in the seven Districts is the disintegration of families of majority post genocide youth, especially where parents and adults mistrust the youth. Parents' history and wounds are also indirectly impacting the behavior of majority of the Rwandan youth.

The study established that in Nyarugenge District the problem of drug and substance abuse is mainly instigated by youth bulge and influx of a lot of idle young people from rural areas. Idleness puts them at risk of drug and substance abuse. Another factor is the availability and access to drugs and other substances at the different locations like Gitega, Tarinyota, Bilyogo, Muhima and Nyabugogo Centers. Additional factors that led to drug and substance abuse included family issues such as gender-based violence (GBV) and mental health problems.

The director of Muhima Hospital testified that

Table 10: Abuse of alcohol by districts

	Nyarugenge (n=311)	Rulindo (n=484)	Gakenke (n=594)	Gisagara (n=383)	Karongi (n=598)	Nyamasheke (n=385)	Rusizi (n=546)
Binge Drinking in the last 30 days							
Less than the cutoff	7.4%	37.2%	16.2%	27.7%	25.1%	15.8%	19.0%
Above the cutoff	22.8%	4.5%	4.7%	10.7%	10.2%	11.4%	8.2%
Non user	69.8%	58.3%	79.1%	61.6%	64.7%	72.7%	72.7%

many severe cases of young people's compromised psycho-social and mental health were attributed to drug and substance abuse.

The particularity of Karongi, Rusizi and Nyamasheke Districts was attributed to the close proximity to DRC, the neighboring where controlling human traffic is a big challenge. It was noted that young people are frequently arrested crossing borders for trade in drugs by the

authorities. The study established that Gisagara District had the highest number of prisoners detained on charges of drug and substance abuse. Use of Cannabis was most commonly realized compared to other types of drugs. Those who were arrested were transferred to Rehabilitation Centers for a certain period.

The respondents noted that Gender Based Violence

Table 11: Determinants of current binge drinking

	B	S.E.	OR	CI
Gender of respondent (Female) (base = Male)	-2.105***	0.248	0.122	[0.075-0.198]
Aged above 18 years old (base = below 19)	1.114***	0.189	3.046	[2.104-4.41]
History of unintended pregnancy (base= present)	1.181***	0.211	31.434	[2.155-4.919]
Death of a caregiver or relatives(base=present)	0.373**	0.155	1.452	[1.071-1.969]
Parental Involvement (base= present)	-0.721***	0.167	0.486	[0.350-0.675]
Unable to afford food	0.365**	0.167	1.440	[1.039-1.996]
Family history of alcohol or drug problem (base=present present)	1.307***	0.255	3.694	[2.241-6.090]
Attending youth centers activities (base= present)	-0.599**	0.162	0.549	[0.400-0.754]
Suspended from school (base= present)	1.259***	0.268	3.523	[2.083-5.958]

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, S.E.: Standard Error, OR: Odds Ratio, CI: Confidence Interval

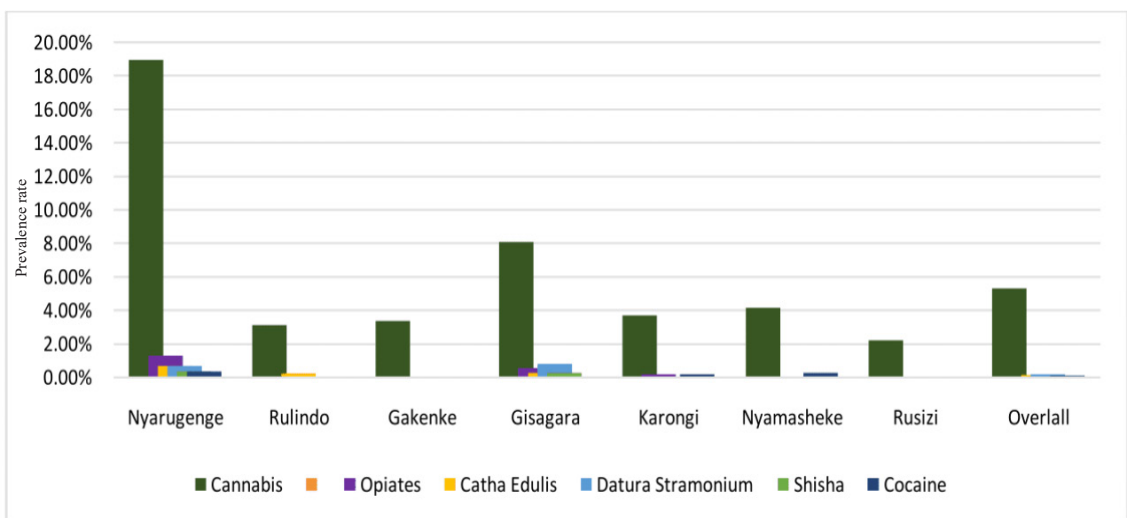


Figure 2: Prevalence non-alcoholic substance use by district

Table 12: Potential determinants of current substance use

	B	S.E.	OR	CI
Gender of respondent (Female) (base = Male)	-1.859***	0.359	0.156	[0.077-0.315]
Aged above 18 years old (base = below 19)	0.555**	0.232	1.743	[1.106-2.747]
Peri Urban (base= Urban)	-0.779**	0.295	0.459	[0.257-0.818]
Rural (base= Urban)	-0.833**	0.296	0.435	[0.243-0.776]
Schooling (base=attending)	-0.513**	0.235	0.599	[0.377-0.949]
Family conflict (base=present)	0.374**	0.222	1.453	[1.940-2.246]
Unable to afford food (base=Absence of enough)	0.630**	0.240	1.878	[1.173-3.009]
Family history of alcohol or drug problem (base= not present)	0.860**	0.330	2.364	[1.238-4.515]
Suspended from school (base=Suspended)	1.562***	0.312	4.766	[2.584-8.79]
Availability on Drugs in community (base=Hard)	-1.369***	0.247	0.254	[0.157-0.413]
Attending youth centers activities (base=attend)	-0.406*	0.230	0.666	[1.345-1.425]
Constant	-2.472	0.426	0.084	

(***) $P=0.000$, (**), $p<0.05$, (*), $p<.10$, S.E.: Standard Error, OR: Odds Ratio, CI: Confidence Interval

in households mainly emanated from drugs and substance use, escalating to mental health issues.

The Security Institutions interviewed noted that a number of adolescents and young people have

Table 13: Alcohol use and other mental illnesses

	Current alcohol use				OR	CI
	Yes		No			
	Count	%	Count	%		
Major depressive current episode						
Yes	94	9.0%	90	4.0%	1.067	[0.653-1.745]
No	950	91.0%	2167	96.0%		
Major depressive past episode						
Yes	110	10.5%	104	4.6%	1.672**	[1.066-2.066]
No	934	89.5%	2153	95.4%		
Suicidality						
Yes	44	4.2%	46	2.0%	1.295	[0.820-2.044]
No	1000	95.8%	2211	98.0%		
Generalized anxiety disorder						
Yes	142	13.6%	134	5.9%	1.992**	[1.511-2.626]
No	902	86.4%	2123	94.1%		

OR: Odds Ratio, CI: Confidence Interval

formed street families and zones with rampant use of alcoholic beverages.

The health workers interviewed at Rutongo District Hospital reported that they commonly received cases of adolescents and young people with psychotic symptoms like hallucinations, delirium and in schizophrenic state due to consumption of drugs and substance use. Some cases received at the Rutongo District Hospital IOSC reported violence and injuries from patients/clients who were under the influence of drugs and other substances. In rural area the most frequently

consumed drugs are a local alcoholic drink called “Kanyanga, Nyirantare, Imanurajipo, etc.” and cannabis.

Here is a verbatim quote from a participant regarding the risk factors: “*Some elements are at the origin: conflicts in family where adolescents and young people are traumatized preferred to flee their families, young people who look easy life, large family with many children who don't have sufficient means where some children flee their family. There are also adolescents and Youths who are born of prostitutes*”.

Table 14: Factors related to Alcohol and substance use

Variables	B	S.E.	OR	CI
Have you had sex in the past 12 months? (base=No)				
current use of alcohol		0.093	3.474	[2.897-4.166]
Current use of cannabis		0.289	2.405	[1.365-4.239]
Other severe and very severe narcotic drugs	0.187	0.311	1.206	[0.656-2.217]
Have you ever had unprotected sex in the past 12 months?				
current use of alcohol		0.108	3.000	[2.426-3.710]
Current use of cannabis	0.756**	0.311	2.129	[1.157-3.918]
Other severe and very severe narcotic drugs	-0.036	0.338	0.964	[0.497-1.871]
Have you ever been pregnant? (for female)				
current use of alcohol	-0.207	0.149	0.813	[0.607-1.088]
Current use of cannabis	-0.731	0.763	0.482	[0.108-2.146]
Other severe and very severe narcotic drugs	-1.224	0.921	0.294	[0.048-1.790]
Have you ever had an abortion in your life?				
current use of alcohol	-0.207	0.149	0.813	[0.569-4.155]
Current use of cannabis	-0.731	0.763	0.482	[0.015-23.91]
Other severe and very severe narcotic drugs	-1.224	0.921	0.294	[0.043-65.73]
Have ever did abortion in your life?				
current use of alcohol	0.43	0.507	1.537	[0.569-4.155]
Current use of cannabis	-0.52	1.885	0.594	[0.015-23.91]
Other severe and very severe narcotic drugs	0.522	1.869	1.685	[0.043-65.73]
Has anyone ever tried to make you have sex against your will but did not succeed				
current use of alcohol		0.102	2.103	[1.721-2.570]
Current use of cannabis	-0.112	0.344	0.894	[0.455-1.754]
Other severe and very severe narcotic drugs	0.381	0.359	1.464	[0.725-2.958]
Has anyone ever physically forced you to have sex and did succeed?				
current use of alcohol		0.126	1.868	[1.459-2.392]
Current use of cannabis	-0.048	0.429	0.953	[0.411-2.207]
Other severe and very severe narcotic drugs	0.085	0.455	1.089	[0.446-2.657]

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, S.E.: Standard Error; OR: Odds Ratio, CI: Confidence Interval

Gender and drug abuse

Some participants from Gakenke and Rulindo Districts expressed that the local liquor called “Kanyanga” was trafficked from Uganda via Gicumbi and Burera Districts, then transported by groups of Youthful Boys called “Abarembetsi” to their destinations.

The security authorities deployed the boys at Transit Centers for systematic screening of the adolescents and young people who were jailed, observed that there were more adolescent boys arrested as compared to adolescent girls.

Here are verbatim quotes from a Respondent on the aspects of gender and substance abuse/trade amongst boys and girls:

“Most of them are boys since they are the ones who are caught in malpractices as a result of taking drugs. Also, boys start drinking beer at early age and this makes them take drugs at young age; boys are even the ones who mostly drop out of school to be engaged in money making activities hence started taking drugs”.

“Adolescent boys and boy youth are affected by drugs and substance use more than adolescent girls and girl youth. During roundup by the authorities, adolescent boys and youth boys are more commonly arrested and transferred to Rushashi Transit Center (Gakenke District)”.

“Adolescent's boys and youth's boys are mostly observed because they are jobless, dropped out schools, impact of socio Medias, they are observed in centers where drugs and substances use are reported by Security Institutions. Employments of youths in town are not enough where some zones are the centers of drugs and substances use. Adolescent's boys and young people boys are also observed near streets and roads and are arrested during roundup. Adolescents' girls and youths' girls are also arrested, but few, because their security is guaranteed by their families more than boys”.

At the Nemba District Hospital IOSC, *“I regularly receive many boy clients as a consequence of drugs and substance use. There are other cases I received of Sexual Transmitted Infections (STI) testimonies that they contaminated STI due drugs and substance use”.* Students in secondary schools who consume drugs and others substance are also received and treated in our services brought by

responsible of schools. After in depth conversation with them, some adolescents and youth certified that they abandoned themselves to consume drugs and other substance.

The study also showed that young boys easily became addicted to Betting Games like “Betika” where it was observed that they consumed drugs and other substances due to peer pressure and ease of access in such locations as alternative entertainment/pass time.

The respondents additionally noted that *“Some GBV crimes were committed against children, adolescents and youth girls driven by drug and substance abuse”.*

Prevention and treatment measures for drugs and substance abuse

The study targeted public sector authorities. Some of the respondents noted that they experienced overwhelming cases of young boys and girls heavily immersed in drugs and substance abuse. Here is a verbatim quote from a respondent: *“The authorities have been organizing some sensitization sessions to identify issues of drugs and substance use in households (HH), and dialogue with children facilitated by Inshuti z'Umuryango. This was in collaboration with partners involved in rights and protection of children, and carries out sensitization on how to fight drugs and substance abuse, and sensitization on Gender Based Violence (BGV) in households (HH)”.*

The District Authorities have a schedule applied for repatriation and home visit of adolescents and young people within their families. Adolescents and young people suffering drug addiction and substance abuse are transferred to Rehabilitation Centers. Aspects of drugs and substance use among adolescents and youth are managed by the office in Charge of Social Affairs at Sector level, office in Charge of Social Economic Development (SEDO) at Cell level and Inshuti z'Umuryango (Light Mom and Light Dad).

Other actions include sensitization in both primary and secondary schools through clubs, headed by youth volunteers, created to champion fight against drug and substance use, and during the annual Kagame Cup football tournaments. There were also sensitization sessions during the monthly Public General Assembly meetings where the District authorities provided key messages on

campaign against drugs and substance use.

The crucial draw-back remains the porous land borders (traffickers easily evade/by-pass drug nets) with neighbouring Countries where imported goods are sourced from, that is DRC, Tanzania, Burundi and Uganda).

The study established that there were also other partners involved in providing strong sensitization to youth and adolescents on Drug Demand Reduction (DDR) and substance abuse. The organizations include the African Evangelistic Enterprise Rwanda (AEE), Action Aid Rwanda, World Vision Rwanda and other Development partners. The aforementioned partners worked in strategic collaboration with the Rwanda National Police (RNP) at District level in organizing awareness campaigns.

Main types of drugs and substances used by young people

It was not surprising that the participants in the study ably listed the main types of drugs and substances consumed by young people in their regions without hesitation. Some drugs and other substances were specific to certain Districts such as heroin in Nyarugenge District and other drugs and substances for other Districts.

The respondents mentioned different narcotic drugs as presented in the subsequent section. The respondents expressed that adolescents and young people commonly used drugs and unauthorized drinks. The following excerpts show the verbatim quotes from the respondents:

"I can say adolescents and young people ordinary consume authorized drinks and unauthorized drinks: local liquors like Kanyanga, Muriture, Nyirantare, Vubi and drugs: Mugo Cannabis Sativa, Tunel, glues and paints"

"Adolescents and young people consume also very dangerous: Cannabis Sativa Mugo, others herb they chew on, few cocaine, tablets (Medicines);

Other intoxicants, illicit and local drinks mentioned included: *Muriture, Nyirantare, Vubi and drugs (Mugo Cannabis Sativa, Tunel, glues and paints); Yewemuntu, Ubudungeri, Umunanasi, Isiyane, Suruduwire, Igikwangari, Umutobe, Ruyaza, Igikwangari, Muriture, Munturinde, Kagage, Agatobe, Chief Waragi, Mutarabanyi, Akayuki, Gubwaneza, and authorized drinks like Uganda Waragi etc.*

Many respondents evoked other substances

consumed by adolescents and young people like Essence (through inhalation) and dangerous like Mayirungi and Rwiziringa.

In Nyarugenge District, the most commonly consumed drug was Cannabis Sativa The adolescent youth and boys also chewed Mugo and other herbs, Mayirungi, Cocaine (quite expensive and consumed by adolescent girl and girl youth as well) and some "prescription" tablets.

Reports from the Rulindo District Police Commandant observed that Cannabis Sativa was very common. The study team also established that Rwiziringa and unauthorized drinks such as: Utuyuki, Muriture, Nyirantare and Kanyanga were brought in from the neighboring Gicumbi District. Glue was also observed. Kanyanga and authorized beers named Gin packaged in glass bottles, Rwiziringa on the part of Nyabarongo in Shyorongi Sector (Rutonde, Kijabagwe, Muvumu cells) tobaccos and authorized drinks were consumed at high level. They specialized in making beer cocktails to obtain high liquor saturation in beers.

In Gakenke District, the study team established that there were those who were arrested because of consumption of Kanyanga and Cannabis trafficked from Uganda, besides various other unauthorized drinks rampantly consumed here. At Gisagara District there is Cannabis and unauthorized beers such as Nyirantare and Igikwangari, Chief Waragi and Dunda Ubwonko (all locally brewed gins).

The Drugs identified by the study team as commonly used by young people in Karongi District were Cannabis and illicit alcoholic beverages like "Yewemuntu.". In Nyamasheke District, the most common drugs consumed included Cannabis, and illicit brews included "Umutobe", Ruyaza, Chief Waragi, , Igikwangari, Muriture, Munturinde, Kagage, Agatobe, etc.).

In Rusizi District the common drug is Cannabis, and illicit alcoholic beverages such as Kanyanga, Makwanjari, Mutarabanyi and Muriture. Cannabis and different illicit brews such as "Akayuki", "Gubwaneza", are very common in Bugarama sector and Muganza and also Makwanjari which are very common in Gashonga, Rwimbogo and Nzahaha sector.

Most rampant types of drugs and substances used

The study established that the drugs most rampantly consumed by the adolescents and youth were Cannabis Sativa, Glue, Mugo, and Suruduwire.

Glue was most easily available, accessible and affordable. Its consequences also manifest very quickly. Cannabis is available in different zones as reported by the Security Institutions, and its price of between 100 RwF – 200 RwF is affordable for consumers.

Even though cannabis is consumed at high level, the youth and adolescents who secretly consumed it, can be observed when they begin to manifest its side effects. Rwiziringa, a local herb, was also consumed rampantly. The youth consumed concoctions of beer cocktails with high saturation of alcohol and effectiveness to concoctions. Here is a verbatim quote from a respondent:

“Unauthorized drinks are also mostly used by adolescents and young people because the prices are very low. I also noticed that many adolescents and youth mainly consumed various drinks, such as Dundubwonko, Nyirantare, Umumanurajipo, and Utuginga. Makwanjari is unauthorized alcohol beverage which is brewed by local communities and was thus easily available and affordable” to the youth and adolescents.

Channel of supply of drugs and substances used in the community

The study established that the silence displayed by the community members in regards to drugs and substance use contributed to the spread and distribution in the targeted Districts. The study team noted that parents must contribute enormously to fight against trade in drugs and other substances used in their communities.

Specifically, the respondents mentioned concrete channels of drugs and substances in their respective Districts:

Nyarugenge District: Adolescents and youths supply drugs amongst themselves. Nyarugenge District is located at the center of Kigali City and it is the center for everyone who enters and leaves the District. The really, question would be addressed to Security Institutions because oftentimes drugs such as Cannabis are trafficked from neighbouring countries.

Unauthorized drinks are produced in and by the citizens of Rwanda. Drugs observed are coming from neighbouring Countries: Democratic Republic of Congo and Tanzania for Cannabis Sativa, and Kanyanga from Uganda. Unauthorized drinks manufactured in Rwanda: Nyirantare, Yewemuntu, Vubi and authorized drinks such as Gin. Here are verbatim quotes from respondents:

“I see that drugs are imported by Traders who have distributors in different zones. Some drugs and other substances are trafficked from neighboring countries by unknown businessmen”. “I know of some drugs that were imported from Australia consumed within Nyamirambo, you see that the drugs are brought from Countries that are far away”. Exchange of drugs among adolescents and youth is as a result of keeping bad company and peer pressure. There are unknown businessmen who trade in Cannabis and illicit drinks making huge profits.

“Kanyanga is trafficked from Uganda through Gicumbi and Burera Districts while Cannabis Sativa is from the Democratic Republic of the Congo (DRC) through the Goma – Kigali”.

“Unauthorized/illicit drinks are produced in rural zones on the one hand and authorized drinks are produced in Rwanda and imported as well. If you see well, we observe three routes: (i) Rubavu-Kigali international road from Democratic Republic of the Congo, (ii) From Kigali, (iii) and as neighbour with Gicumbi and Burera Districts where drugs are trafficked from Uganda to neighbouring countries”.

Drugs and other substances are trafficked from neighbouring countries into Rwanda: Kanyanga from Uganda and Cannabis Sativa from the Democratic Republic of the Congo and also locally by citizens who cultivate it in privately secluded environments. Kanyanga is manufactured in rural zones in Rulindo District and Cannabis is distributed by traders in hiding. Rulindo District is neighboring Gicumbi where Kanyanga and Cannabis are trafficked from Uganda and transported by groups of Youths called “Abarembetsi”.

Here are verbatim quotes from some respondents: *“If I check well, I see Cannabis is coming from Uganda, the neighboring Country and additional quantities are coming from Kigali. There is high level businessman who distributed it in Masoro, Ntarabana, Murambi Sectors and small zones of Burega Sectors where there are exploited mining activities”.*

“Drugs and substances (Kanyanga and Uganda Waragi) come from Burera District passing through Kamubuga Sector neighbor with Burera District where they are supplied from Uganda”. There is no wholesaler center of drugs and substance use known in Gakenke District, but this is the transit

area of drugs. The same respondent said “the reasons are that is neighboring with Burera and Musanze Districts which are neighboring with Uganda and Democratic Republic of the Congo”. “I can find some few citizens who cultivate Cannabis who said that It is used to treat some livestock diseases: stunting of goats, gout, diarrhoea and as appetizer”. Many illicit drinks are made in Rwanda: Ngufu and Esperanza. The anatomical physical conditions of young people make them more susceptible to intoxication. The way the drinks are packaged in small quantities makes it accessible and affordable to the youth and adolescents can consume that without problem. Some quantities of Cannabis Sativa come from Kigali and are also distributed in the District”.

The thriving trade in Cannabis is facilitated by the International road that crosses Gakenke District from the Democratic Republic of Congo (Goma), and from Uganda (Cyanika). Some unauthorized drinks are manufactured in the communities of Gakenke District while authorized drinks are manufactured for distribution in the country; other drinks are imported from neighbouring Countries. “Traffickers of cannabis into the country are known and this makes it easy for drug addicts to buy it confidentially. Unauthorized drinks are brewed in the community and are easily available, Cannabis is imported from neighbouring Burundi and the consumers are conversant with the cannabis traffickers making it easy to push”.

“Nyirantare is brewed in their residential areas, and in the rural areas and thus easier access. Most of the sellers do their businesses in bushy areas where the illicit beer is given to clients; therefore, the youth know where to get the illicit beers there is a well-known group of people who traffic it into the country and the youth buy it from these people since information on the whereabouts of cannabis is shared”. Additionally, as Rwandans and Burundians share fields of land by Akanyaru River, they meet and share it easily.

“Unauthorized alcoholic beverages are mostly brewed by local citizens, but Cannabis comes from the Democratic Republic of the Congo (DRC) and generally trafficked through border areas such as Rubavu, Rusizi, Nyamasheke and Rutsiro, but it is not easy to know who imports it into our District”.

“Due to the high cost of Cannabis, everyone wants to invest in Cannabis. Some quantities of Drugs

are coming from Kigali”.

“Young people get Cannabis Sativa easily because there are people who cultivate it in their homes but you don't know the farmers, there are others from the DRC, where unauthorized alcohol is made in the area where they live”. There are also people who cultivate it, said that “claiming that they are feeding their livestock and to increase their appetite to craze”. Drugs are passed on to young people from their grand brothers who buy them from their local traders, often as “Kanyanga” and Cannabis from outside the region while illicit liquor is being made in the community.

“They buy it from producers and importers because they know the traders around the region and they share it with each other due to their friendship, those who want it know where to buy it and it is easy to find”. Traders are often familiar with the consumers, making it is easy to sell.

“They buy it because they travel in groups, so they are exchanging information on where drugs are sold” and continue saying “In addition, an unauthorized alcohol beverage is being brewed by the local population. They often tell us that they have groups which help them in trafficking the drugs but when they come to us, they have already been affected by side effects due drug and substances use”. Some drugs are cheaper; children, adolescent girls and boys, younger girls and boys steal money from their parents and go to buy drugs. But there are also among them who are given drugs by their peers.

Perception of factors of drug and substance use

The study established that drug abusers are observed in different centers and streets. Most adolescents and young people immersed in drugs and substances use are located at the slum's zones. The respondents noticed that most adolescents and young people who consumed drugs and other substances have dropped out school or have completed school and have showed behaviors of delinquencies.

Here is a verbatim quote from a respondent: “I think that more than 90% of them did not attend school, and these who have completed only primary school level, even these who are in Universities and High Institutes consume and they are addicted to drugs and substances use. I observed that adolescents and young people in secondary schools used drugs and substances”.

Socio-economic situation

The study established that families with frequent conflicts often had their adolescent and young adults flee from home to engage in drug and substance abuse. The study also established that adolescents and young people in search of employment within and around public markets often engaged with negatively influential peer Youth groups. It was noted that Adolescents and young people from rural zones often met the challenge of shelter/accommodation on arrival at the urban areas, and they commonly end up being substances abusers themselves as they get integrated into drug addicted groups for survival. The following verbatim quotes describe the situation in terms of socio-economic status of the respondents:

“Adolescents and youth who use drugs and substance use both come from wealthy and poor families, but those who come from wealthy families consumed Mugo which are comparatively very expensive at 2500 RWF per unit, Cocaine, Heroin, Cannabis and various strong tobaccos”. The same respondents confirmed that “Those from poor families consumed unauthorized drinks as follows: Nyirantare, Muritye, and Vubi continued saying”. There are some cases where adolescent and young people fled family because their families have divorced.

“If people observed very well, consumers of drugs and other substances are mostly found both in Ubudehe Category 1 and Category 2 as well as those from wealthy families. For example: If adolescents and youth can go study in China and India is that these people are coming from wealthy families despite taking drugs. It's known that they consumed drugs because they have been expelled by its countries in fact that they had been arrested consuming drugs and other substances. About 98% of adolescents and Youths arrested and transferred in Transit Centers have families. Few orphan's adolescents and youth are observed in drugs and substance use.”

“There are adolescents and youths who have parents who sell street food where their parents do not have sufficient means to feed them, also adolescents and youth who fled families with frequent conflicts and come in urban areas of District to find employments and consume drugs easily.”

“Kanyanga are transported by adolescents and

young people where some of them are motivated by their parents where they expected to obtain a lot of money both from in wealthy and poor families”. This affirmation was supported that two Districts are neighbors with Burera District where the traffickers found easily the ways from the neighbor country (Uganda).

“Adolescents and young people who the head of households (HHH) told me at the (IOSC) and at the same time at the Mental Health service of District Hospital that “His brother is drunkard”. It notices that its adolescents and young people seek refuge in alcoholic beverages.

For adolescents and young people observed living near streets and roads where they are found after fleeing their families due to conflicts, hunger, or still grieving from parental loss, lack of family support or abandoned by their families, majority of them indulged in inhaling glue.

Here is a verbatim quote from a respondent: *“Polygamous observed in Kamubuga sector / Gakenke District where the principal of gender balance is very lack in this sector because the respondent said also that “I received many cases from this sector at the IOSC at Nemba District Hospital.”*

Root causes of the problems of drugs and substances use

The study found that some causes are similar in some Districts, but others are specific to other Districts. The key informants from different Districts noted the following root causes: conflicts in family, harassments, large family with many children and limit resources, lack dialogue between parents and children, misuse of social networks by young people and adolescents, different movies, lack of hope for the future, lack jobs, and bad friend due peer youth company. Other respondents expressed: *“Many adolescents and youths said that there are no people who can take care for them to create employment”*. Faced with large problems with difficult to resolve it, young people prefer to indulge in drugs and other alcoholic beverages.

“I can point out poverty in HH. I observe adolescent and young people from wealthy families due to bad friends of peer youth. Adolescents and youth have been accused that they miss basic moral education and the Problems of orphan's problems”.

At Gisagara the Burundian border makes it easy

for the youth to obtain Cannabis. *“The problem is that the poor thinking of the population, the fact that they live near borders, which makes it easier to get drugs”*.

The fact that population lives near the Nyungwe National Park Forest (Ruharambuga, Bushekero, Rangiro, Cyato and Karambi Sectors), lives in a border area with Democratic Republic of Congo (DRC), these are two elements that make the people to be involved in drug trafficking”.

DISCUSSION

A household based cross-sectional survey was administered to adolescent and young adults aged between 13- and 24-year-old (N=3301) to assess alcohol use, social and hard substance use behaviours across 7 districts implementing the BARAME project. As mentioned in the results section, the 30-day prevalence of alcohol, cigarettes, cannabis and other illicit drugs use was respectively 28.54%; 2.9%; 4.36 %, 0.92%. The WHO average rate of tobacco use among young people aged 15-24 was 17.0% in 2015; estimated to be 15.5% in 2020 and projected to be 14.2% in 2025 [19].

Alcohol abuse or binge drinking varies across districts and the proportion of adolescent having binge drinkers are higher in Nyarugenge, Nyamasheke and Gisagara districts than in other districts. Binge-drinking pattern also increased significantly in youth aged 18 and above.

Cannabis is the most prevalent illicit drug in our sample probably due to its low cost and accessibility (the cannabis ball cost= 500 -1000 Rwandan Francs). Adolescent cannabis-use prevalence rates in Nyarugenge (19.0%) are 3 times higher than the average of other districts (5.3%). Nyarugenge district is in the capital city with a unique socio-demographic profile. Furthermore, the selected villages in Nyarugenge are 90 % urban (much higher than the other districts) where cannabis may be possibly more accessible. Cannabis-use prevalence rates are also elevated in Gisagara (8.1 %) compared to the average of other districts. The lowest average prevalence rates for cannabis use are found in Rusizi (2.2%), Rulindo (3.1%).

Cocaine is certainly the less available and the most expensive drug on the Rwanda market (1 gram of cocaine = 150.000 Rwandan Francs; it can be sold in small cocaine bags with an average bag weight 0.1g). Consequently, the number of cocaine users

is very low (3 respondents = 0.09%) and restricted to the capital city (Nyarugenge) or districts bordering with neighbouring countries (Karongi, Nyamasheke). Heroin is a bit more available and accessible by youth (1 gram of Heroin = 50.000 Rwandan francs; Heroin is also sold in small bags of about 0.1g = 3000- 5000 Rwandan francs) and the adolescent opiates lifetime prevalence (17 respondents = 0.5%) or past 12 months prevalence (13 respondents = 0.39%) is relatively higher than for cocaine. Heroin users were also found in 3 specific districts (Nyarugenge = 1.3%; Gisagara= 0.5% and Karongi =0.2%).

It is very difficult to make exact comparisons of rates of alcohol and substance use behaviours between our study and other investigations because various studies did not necessary used the same age range (13-24), used a different recruitment strategy for the participants, or were not conducted in similar contexts. However, we can explore what others studies found in Rwanda or in sub-Saharan African countries about teen and young population. In a study by Kanyoni, Gishoma & Ndahindwa (2015) conducted in 2011 in Rwanda (5 out of 7 districts selected in the current study were part of sampled districts - Gakenke, Rulindo, Karongi, Nyamasheke, Nyarugenge), the prevalence rate of substance use over the month prior to the survey was 34% for alcohol, 8.5% for tobacco smoking, 2.7% for cannabis and 0.1% for other hard drugs. Although there are some differences, rates of alcohol user remained fairly constant, whereas rates of cannabis use almost doubled from 2.7% to 4.7%. It should be noted that the sample in the current study is younger than youth sampled from the study by Kanyoni et al [6] that considered the age range of 14–35 years old. There is also a marginal increasing trend of opiates (0.08 % of youth aged 14-35 years old reported to have used heroin in the 2011 versus 0.39% of youth aged 13-24 years old who had used heroin in the 2020). The present finding also suggest that there is a decreasing pattern of tobacco smoking.

At the continental level, Olawole-Isaac et al [15] conducted a systematic review and estimated the lifetime prevalence of substance use among adolescents in sub-Saharan Africa based on 27 selected population-based studies across sub-Saharan Africa. These studies included 143 201 adolescents (age 10 – 19; mean age 15.6 years) and were conducted between 2000 and 2016. Authors reported an overall pooled prevalence of 32.8% for

alcohol, 23.5% for tobacco products, 15.9% for cannabis, 4.0% for heroin and 3.9% for cocaine. Levels of lifetime substance use found in our study (54.1% for alcohol; 4.45% for tobacco, 9.3 % for cannabis, 0.5% for opiates, 0.1 % for cocaine) are generally lower than pooled prevalence rates reported in sub-Saharan Africa; except for alcohol (levels of alcohol use are significantly higher for our sample).

Current prevalence's (past month use) of alcohol, cigarettes, cannabis, opiates and cocaine found in our study are also lower than those reported from relatively higher income countries in the sub-Saharan Africa region, e.g., South Africa, Nigeria, Ethiopia and Kenya [2], [20]–[23]. However, the proportion of the youth consuming different substances in our study is relatively comparable to other low-income countries in sub-Saharan Africa region such as Uganda, Tanzania and Sudan [24], [25]. The rates of alcohol and cannabis use are generally comparable to averages found in these low-income countries but estimates of tobacco and hard drug use are a bit lower for our sample.

Episodic excessive alcohol consumption or binge drinking was particularly assessed as a variable of interest for adolescent in the present study. Roughly, one in seven male (13.7%) and one in thirty-seven female (2.7 %) among adolescent and young adults sampled were found to engage in binge drinking. These data suggest the importance of prevention programmes for alcohol abuse in Rwanda but are much lower than binge drinking rates found in South Africa where the prevalence for recent binge drinking among youth aged 15-24 years was found to be 31% for male and 17.9 % for female [20].

In the current study, the age of onset of substance use for most of the youth falls in the middle of adolescent period (13-18 years). This finding is in line with other findings across the world, including in Africa [26]. The other key findings of this study is that 3.6% and 1.2% of the youth in the 7 districts considered, met respectively diagnosis criteria for alcohol use disorder and non-alcoholic psychoactive substance use disorders on the M.I.N.I. The use of M.I.N.I. diagnostic criteria concluded a significant substance abuse and dependence problem that may be defined as "a clinical condition" to be referred to health care providers. Our results are consistent with worldwide findings reported in the literature [27].

In order to cross-validate results from self-reports questionnaires, the study team requested to every 10th participant on the sampling list (using a regular interval) to voluntarily submit biologic samples (urines). 376 urine specimens were tested qualitatively using rapid Huma drug tests for marijuana (THC), opiates, Cocaine, Amphetamines and Methamphetamines. Of the 376 participants who had a qualitative urine test, 353 (93.8%) had a negative result for all substances. Of those who tested positive for at least one substance (23/376), urine samples were analysed for confirmation by lab technician of Isange Huye Rehabilitation Center with the Mass Spectrometry Technique. Overall, the prevalence for cannabis was 5.6% (21 participants tested positive) and was slightly higher than the rates from interviews (4.4 %) while the prevalence for recent opiates used was identical (0.5%). Urine tests did not confirm the presence of cocaine, amphetamines and methamphetamines. It is not relevant to compare biological substance use data from this sample to other studies as there is no closest reference study in the sub-Saharan Africa region conducted on the same age range (13-24). The majority of studies using biological samples (urine, hair, or bloodspots) are conducted in adult or in youth in Asia or western countries [28,29].

The study team carried out bivariate and multivariate analyses to assess associations between social and hard substance use behaviours and other relevant variables. The odds of engaging in alcohol and substance use were examined for each of the risk and protective factors. As hypothesized, and consistent with other studies, regression analysis showed that male gender, older age, history of family conflict, serious physical violence in the family circle, history of losing parents or a close relative, family history of alcohol or drug problem, inability to afford food, history of unintended pregnancy, suspension from school, living in urban areas, availability of drug in the community are significant predictors of alcohol and drug use. Our findings also suggest that adolescent and youth who have a history of anxiety and depressive disorders have twice greater odds of using alcohol, cannabis and other hard drugs than those not depressed.

Our findings converge with those reported by other studies. Previous studies have identified demographic, adolescent and youth emotional

health, parental factors, peers and contextual risk factors as determinants for substance use among youth. A study conducted among South African adolescents found an association between substance use and multiple psychosocial factors including, adolescent personal attributes, parental attributes (drug use), and peer factors [30].

Another study conducted in a sample of youth in Ethiopia found that family history of alcohol and substance use, siblings' use of substances and friends' use of substances were factors positively associated with substance [22]. Other studies, mainly conducted in south Africa, found that male gender, history of abuse, presence of internalizing or externalizing disorders, peer or sibling substance use were significantly related to increased risk for substance use [20,31,32]. A number of studies have also established that depression and anxiety often predate substance use behaviour [33].

Our study findings also suggest that there is a clear association between alcohol / substance use and sexual and reproductive health variables. Not surprisingly, adolescent currently abusing alcohol and cannabis had more the risk of having unprotected sex in the past 12 months compared to those who do not use these substances. When developmental changes during adolescent are associated with family issues (such as conflict, parents using alcohol), it creates a conducive environment for alcohol and substance use and makes adolescents vulnerable to SRH risks.

The association between alcohol, substance use, sexual risk behaviours and sexual victimization among adolescents has been documented in previous studies internationally and in Africa. A household survey in South Africa found that alcohol and substance use decreased awareness of social norms or perceptions of acceptable behaviour among youth and was linked with an increased number of sexual partners, regretted sexual relations, inconsistent condom use [34]. Disinhibition resulting from alcohol and substance impairs decision-making around sex and undermines skills for condom negotiation and correct use.

The qualitative interviews conducted with key informants (local stakeholders) revealed that drug and substance abuse among adolescents was a problem in all the surveyed districts. This study identified three common themes that illustrate the

extent of drug and substance abuse problems in the seven districts. First, there is evidence of drug and substance abuse as cases of adolescents and young adults who consume drug are logged into databases in all transit centers. Second, adolescents and young adults arrested during roundups are sent to Iwawa treatment center. Third, participants mentioned several types of drugs and substances used by young people (cannabis, Rwaziringa, illegal drinks: Kanyanga, Muriture, Nyirantare).

Other facts are that there are many zones where adolescents and youth are met using drugs and other substances. There are acute cases addicted by drugs that are brought also to District Hospital by their families to be treated by health professional. The respondents say that Gender Based Violence in households had the origin in drugs and substances use and other cases are received with mental health issues.

Furthermore, participants observed a number of reasons that lead to drug and substance use. Drugs are available and accessible to adolescents and young people in different locations in all districts. Additionally, adolescents and young people consume drug in an attempt to cope with problems especially violence at home (for example gender-based violence) and mental health difficulties. The use of drugs causes a wide range of adverse consequences. It leads to physical health complications that are treated at district hospitals. Consumption of drug and substances among young people lead to mental health problems and disorderly conduct in on the streets and in the community. Moreover, young people who consume drugs are at the risk of committing or enduring sexual violence. Isange One Stop Centers' workers reported having cases of sexually transmitted diseases that young people link to their use of drugs.

From the analysis of the interviews, it becomes apparent that local leaders and stakeholders are aware of the growing problems of drug and substance abuse. Consequently, a number of measures were adopted to reduce the extent of the problems. Local leaders, in collaboration with development partners involved in child rights protection, carried out sensitization activities about the drugs and substance use and its causing factors. These activities are conducted at the community levels and in schools. Particularly, in primary and secondary schools, sensitization clubs and activities have been put in place to educate

young people about the dangers and consequences associated with consuming drugs. It is noteworthy to mention the important involvement of several government institutions' representatives such as the National Council of Children, local leaders in charge of social affairs, socio-economic development.

There seem to be a wide range of illegal alcoholic drinks and some are specific to particular locations. The use of inhaled gasoline, paint and glue was reported in different districts. Further, Nyarugenge presents particularities as participants reported the use of more synthetically sophisticated substances such as heroin (Mugo), cocaine, and prescription tables. The finding that many Rwandan young people use cannabis is in accordance with a 2003 UN report that showed that cannabis is most frequently used illicit substance in all regions of the world. Worldwide, among students who consumed drugs, 90% of them used cannabis [1]. Illegal alcoholic beverages represent a serious problem because they are readily available to young people. Because they are made locally, their prices are cheap and young people can afford them. In some cases, young people learn how to consume these drinks from their parents who also consume them. The issue of drug use concerns border and security authorities especially in terms of drug trafficking. Some drugs are introduced in Rwanda from neighboring countries. Once in the countries, drug traffickers have distributing agents in different areas. Other drugs such as illegal alcoholic drinks and cannabis are produced in Rwanda and distributed in the community. Previous studies have projected that the problem of drug and substance abuse will continue to increase in the future and have concluded that breaking the cycle of production, transportation and consumption of drug remains a high public health priority [35].

About the determinants of drug and substance use among people, participants noted that these problems are common among young people without any occupation, but also among those who are in schools. Drug use is observed among young people from both financially stable as well as disadvantaged families. It also affects young adults who hold low paying jobs such as handymen.

The major limitation of this study is that the sample was limited to youth who were present at home during daytime on the day the study was

undertaken. Thus, the data collected represent the prevalence of youth found at home during the data collection period [November 2020] and thus not represent youth who were not at home during data collection. We cannot exclude that the latter group might have different characteristics, including alcohol and drug behaviours, compared to our sample group.

The limitations of this study also include the design: our findings are based on data from a cross-sectional survey and it is therefore not possible to make causal inferences.

There are also considerable strengths to this study. To our knowledge, there have been few studies that have documented the prevalence of alcohol and substance use among youth in Rwanda. The only existing community-based survey on youth in Rwanda was conducted 10 years ago (November 2011). The present study is also, to our knowledge, the first study on the prevalence of alcohol and substance use among adolescent and youth in Rwanda and East Africa using interview administered questionnaires combined with a biological approach (Urine drug tests).

CONCLUSION

The findings of this study in 7 districts showed that adolescence and young adulthood remains a period of frequent substance use, with high prevalence of alcohol, cigarettes, cannabis and other illicit drugs use. Alcohol and cannabis were the most used substance in the 7 districts considered. The most common factors leading to alcohol and substance use was male gender, older age, history of family conflict, serious physical violence in the family circle, history of losing parents or a close relative, family history of alcohol or drug problem, inability to afford food, history of unintended pregnancy, suspension from school, living in urban areas, availability of drug in the community.

This study points to the need for intervention programs that target adolescent and young adults and the need for continued monitoring of substance use in the future. To reduce both alcohol and substance use and improve sexual and reproductive health in the selected 7 districts, coordinated preventive interventions must operate across multiple levels (individual, family, peers, schools and community levels). Interventions must address a number of factors identified at individual, family, peer, school and community levels. Public

authorities must block ways used by traffickers and map all channels of trading and distribution, keep reinforcing measures to reduce availability and supply of drugs and improve social protection activities for vulnerable households.

MIGEPROF to establish a strong program with key strategies to reach to promote dialogue between children and parents.

Professional medical staff and psychologists

REFERENCES

- [1] WHO, "World health report: 2002", Accessed: Feb. 16, 2022. [Online]. Available: <https://www.who.int/publications/i/item/9241562072>
- [2] O. Oshodi, O. Aina, and A. Onajole, "Substance use among secondary school students in an urban setting in Nigeria: prevalence and associated factors," *Afr. J. Psychiatry*, vol. 13, no. 1, Apr. 2010, doi: 10.4314/ajpsy.v13i1.53430.
- [3] F. O. Fatoye and O. Morakinyo, "Substance use among secondary school students in rural and urban communities in south Western Nigeria," *East Afr. Med. J.*, vol. 79, no. 6, pp. 299–305, Jun. 2002, doi: 10.4314/eamj.v79i6.8849.
- [4] K. Riva, L. Allen-Taylor, W. D. Schupmann, S. Mphele, N. Moshashane, and E. D. Lowenthal, "Prevalence and predictors of alcohol and drug use among secondary school students in Botswana: a cross-sectional study," *BMC Public Health*, vol. 18, no. 1, p. 1396, Dec. 2018, doi: 10.1186/s12889-018-6263-2.
- [5] O. A. Abiodun, M. L. Adelekan, O. O. Ogunremi, G. A. Oni, and A. O. Obayan, "Psychosocial correlates of alcohol, tobacco and cannabis use amongst secondary school students in Ilorin, Nigeria," *West Afr. J. Med.*, vol. 13, no. 4, pp. 213–217, 1994.
- [6] M. Kanyoni, D. Gishoma, and V. Ndahindwa, "Prevalence of psychoactive substance use among youth in Rwanda," *BMC Res. Notes*, vol. 8, no. 1, p. 190, Dec. 2015, doi: 10.1186/s13104-015-1148-2.
- [7] Y. Kayiteshonga, V. Sezibera, L. Mugabo, and J. D. Iyamuremye, "Prevalence of mental disorders, associated co-morbidities, health care knowledge and service utilization in Rwanda – towards a blueprint for promoting mental health care services in low- and middle-income countries?," *BMC Public Health*, vol. 22, no. 1, p. 1858, Oct. 2022, doi: 10.1186/s12889-022-14165-x.
- [8] RNP, "Rwanda National Police-Annual Report," 2018 2017.
- [9] Enabel, "Improving the quality of primary health care and health services in Rwanda - Ubuzima Burambye (Long healthy life)." Accessed: Feb. 16, 2023. [Online]. Available: <https://open.enabel.be/nl/RWA/2098/412/u/putting-the-youth-away-from-the-danger-of-drugs.html>
- [10] NRS, "IWAWA REHABILITATION CENTER (IRC)." <https://nrs.gov.rw/index.php?id=138> (accessed Feb. 16, 2023).
- [11] Preventing Mental, Emotional, and Behavioral Disorders Among Young People: Progress and Possibilities. Washington, D.C.: National Academies Press, 2009, p. 12480. doi: 10.17226/12480.
- [12] WHO, "The Alcohol, Smoking and Substance Involvement Screening Test (ASSIST)," 2010. [Online]. Available: <https://www.who.int/publications/i/item/978924159938-2>
- [13] WHO, "Noncommunicable Disease Surveillance, Monitoring and Reporting." Accessed: Feb. 16, 2023. [Online]. Available: <https://www.who.int/teams/noncommunicable-diseases/surveillance/systems-tools/steps>
- [14] NHS, "Smoking, Drinking and Drug Use among Young People in England 2018," 2018. [Online]. Available: <https://digital.nhs.uk/data-and-information/publications/statistical/smoking-drinking-and-drug-use-among-young-people-in-england/2018>
- [15] A. Olawole-Isaac, O. Ogundipe, E. O. Amoo, and D. O. Adeloye, "Substance use among adolescents in sub-Saharan Africa: a systematic review and meta-analysis," *South Afr. J. Child Health*, vol. 12, no. 2b, p. 79, Sep. 2018, doi: 10.7196/SAJCH.2018.v12i2b.1524.
- [16] D. S. Hasin et al., "DSM-5 criteria for substance use disorders: recommendations and rationale," *Am. J. Psychiatry*, vol. 170, no. 8, pp. 834–851, Aug. 2013, doi: 10.1176/appi.ajp.2013.12060782.
- [17] I. Lund, I. S. Moan, and H. M. E. Edvardsen,

- “The relative impact of smoking, alcohol use and drug use on general sickness absence among Norwegian employees,” *BMC Public Health*, vol. 19, no. 1, p. 500, Dec. 2019, doi: 10.1186/s12889-019-6891-1.
- [18] M. R. Peace, L. D. Tarnai, and A. Poklis, “Performance Evaluation of Four On-Site Drug-Testing Devices for Detection of Drugs of Abuse in Urine,” *J. Anal. Toxicol.*, vol. 24, no. 7, pp. 589–594, Oct. 2000, doi: 10.1093/jat/24.7.589.
- [19] WHO, “WHO global report on trends in prevalence of tobacco use 2000-2025, third edition,” 2019. [Online]. Available: <https://www.who.int/publications/i/item/who-global-report-on-trends-in-prevalence-of-tobacco-use-2000-2025-third-edition>
- [20] K. Peltzer and S. Ramlagan, “Alcohol Use Trends in South Africa,” *J. Soc. Sci.*, vol. 18, no. 1, pp. 1–12, Jan. 2009, doi: 10.1080/09718923.2009.11892661.
- [21] A. J. Flisher, C. D. H. Parry, J. Evans, M. Muller, and C. Lombard, “Substance use by adolescents in Cape Town: prevalence and correlates,” *J. Adolesc. Health Off. Publ. Soc. Adolesc. Med.*, vol. 32, no. 1, pp. 58–65, Jan. 2003, doi: 10.1016/s1054-139x(02)00445-7.
- [22] A. M. Birhanu, T. A. Bisetegn, and S. M. Woldeyohannes, “High prevalence of substance use and associated factors among high school adolescents in Woreta Town, Northwest Ethiopia: multi-domain factor analysis,” *BMC Public Health*, vol. 14, no. 1, p. 1186, Dec. 2014, doi: 10.1186/1471-2458-14-1186.
- [23] T. Amare and W. Getinet, “Alcohol use and associated factors among high school, college and university students in Ethiopia, systematic review, and meta-analysis, 2018,” *J Ment Health*, vol. 29, no. 4, pp. 455–463, Jul. 2020, doi: 10.1080/09638237.2019.1677871.
- [24] C. Abbo, E. S. Okello, W. Muhwezi, G. Akello, and E. Ovuga, “Alcohol, Substance Use and Psychosocial Competence of Adolescents in Selected Secondary Schools in Uganda: A Cross Sectional Survey,” *Int. Neuropsychiatr. Dis. J.*, vol. 7, no. 2, p. 25387, 2016, doi: 10.9734/INDJ/2016/25387.
- [25] T. Osman et al., “Epidemiology of Substance Use among University Students in Sudan,” *J. Addict.*, vol. 2016, p. 2476164, 2016, doi: 10.1155/2016/2476164.
- [26] T. G. Tshitangano and O. H. Tosin, “Substance use amongst secondary school students in a rural setting in South Africa: Prevalence and possible contributing factors,” *Afr. J. Prim. Health Care Fam. Med.*, vol. 8, no. 2, pp. e1-6, Apr. 2016, doi: 10.4102/phcfm.v8i2.934.
- [27] K. R. Merikangas and V. L. McClair, “Epidemiology of substance use disorders,” *Hum. Genet.*, vol. 131, no. 6, pp. 779–789, Jun. 2012, doi: 10.1007/s00439-012-1168-0.
- [28] N. D. Kapusta et al., “Epidemiology of substance use in a representative sample of 18-year-old males,” *Alcohol Alcohol. Oxf. Oxf.*, vol. 41, no. 2, pp. 188–192, 2006, doi: 10.1093/alcalc/agh251.
- [29] M. V. Sattah et al., “Prevalence of and risk factors for methamphetamine use in northern Thai youth: results of an audio-computer-assisted self-interviewing survey with urine testing: Methamphetamine use in Thai youth,” *Addiction*, vol. 97, no. 7, pp. 801–808, Jul. 2002, doi: 10.1046/j.1360-0443.2002.00131.x.
- [30] J. S. Brook, D. W. Brook, and K. Pahl, “The developmental context for adolescent substance abuse intervention,” in *Adolescent Substance Abuse*, 1st ed., H. A. Liddle and C. L. Rowe, Eds. Cambridge University Press, 2006, pp. 25–51. doi: 10.1017/CBO9780511543968.003.
- [31] S. V. Moodley, M. J. Matjila, and M. Y. H. Moosa, “Epidemiology of substance use among secondary school learners in Atteridgeville, Gauteng,” *South Afr. J. Psychiatry*, vol. 18, no. 1, p. 6, Feb. 2012, doi: 10.4102/sajpsy.2012.18i1.320.
- [32] D. E. Traube, S. James, J. Zhang, and J. Landsverk, “A national study of risk and protective factors for substance use among youth in the child welfare system,” *Addict. Behav.*, vol. 37, no. 5, pp. 641–650, May 2012, doi: 10.1016/j.addbeh.2012.01.015.
- [33] D. Deas and E. S. Brown, “Adolescent Substance Abuse and Psychiatric Comorbidities,” *J. Clin. Psychiatry*, vol. 67, no. 07, p. e02, Jul. 2006, doi: 10.4088/JCP.0706e02.
- [34] M. F. Chersich and H. V. Rees, “Causal links between binge drinking patterns, unsafe sex and HIV in South Africa: its time to intervene,” *Int. J. STD AIDS*, vol. 21, no. 1, pp. 2–7, Jan. 2010, doi: 10.1258/ijsa.2000.009432.
- [35] Z. F. Meisel et al., “Strengthening partnerships between substance use researchers and policy makers to take advantage of a window of opportunity,” *Subst. Abuse Treat. Prev. Policy*, vol. 14, no. 1, p. 12, Dec. 2019.

Factors Associated with Notification and Testing among Partners of HIV Positive Index Clients in Kigali City

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ABSTRACT

Introduction: Notification of sexual partners of persons diagnosed HIV infection is a vital tool in identifying those at risk of infection. This study assessed determinants of being notified and case-finding effectiveness among sexual partners of HIV infected individuals in Rwanda.

Methods: A cross-sectional study was conducted in Kigali city, Rwanda analyzing data of individuals newly diagnosed HIV infection who listed their sexual partners for referral to HIV test services (HTS) through one of three methods of partner notification: passive referral, contract referral, or provider referral. Data were extracted from the national HIV case-based surveillance dataset.

Results: In this study, 2104 index patients named 3791 sexual partners and provided locator information for 2689 partners. Among successfully notified partners, 2402 returned for HIV counseling and testing; among them, 267/2409 were spouses (aOR: 1.43; 95% CI: 1.11–1.82). Index clients with 2-5 partners were 2.53 times more likely (95%CI 1.60-3.99) to successfully notify their sexual partners; also, partners that had been listed as spouses of index clients were 2.1 times more likely to get notified of their exposure to HIV than any other partners (95%CI; 1.54-2.89) (p=0.000).

Conclusion: This study's findings support the notion that partner notification among index clients is associated with the relation between HIV positive patients and their partners, marital status, number of sexual partners, and referral method used.

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INTRODUCTION

HIV/AIDS continues to be one of the major public health problems today. The number of people infected with HIV globally was estimated to be 36 million by the end of 2017. Of these, 75% remained undiagnosed [1]. To address this gap in knowledge of HIV status and to achieve United Nations (UN) testing and treatment goals, in particular, the first of the 90–90–90 goals to diagnose 90% of people with HIV infection by 2020, new approaches such as notification of sexual partners of HIV-positive

index clients were put in place to enhance the efficiency and coverage of testing [2]. Partner referral or notification is an essential component of HIV control programs and one of the few means of tracking, identifying, and notifying sexual partners of people living with HIV (Index clients) with the sole aim of testing them to determine their HIV status and linking partners who are positive to antiretroviral therapy (ART). This approach provides an opportunity for prevention and an entry point to clinical care. The Sub-Saharan Africa region itself is home to almost 70% of all

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HIV infections. These individuals may not know that they are at risk of HIV infection and hence miss the opportunity to receive life-prolonging antiretroviral therapy and continue engaging in risky behaviors leading to ongoing HIV transmission. One of the reasons why HIV control is hampered in this region is the difficulty in reaching high-risk individuals for treatment, particularly those with asymptomatic infections. One way to reach this group is through tracing partners of patients who present with HIV. Increasing counseling and testing rates among high-risk populations provides an opportunity to increase early diagnosis and treatment outcomes. Partners of individuals testing positive while seeking treatment for sexually transmitted infections are an important population to target for increased counseling and testing, as HIV discordance within couples is common in Africa, and infectiousness is high in HIV-infected individuals with a concurrent STI. Providing counseling and testing to partners of individuals recently diagnosed with HIV infection is an important way to target prevention strategies and provide early care to a very high-risk population [1].

Partner notification involves informing the sexual partners of HIV-positive persons that they have been exposed to HIV and encouraging them to seek counseling, testing, and other prevention and treatment services in case they are found HIV positive. The effectiveness of partner notification is unknown in low-income countries. However, disclosure of HIV status by women in antenatal and post-partum clinics often increases prevention behaviors since its obligatory. In these settings, successful partner notification leads to greater use of antiretroviral drugs to avoid perinatal HIV transmission, greater adherence to advice to avoid breastfeeding, and higher levels of condom use. Despite the potential benefits, very little is known about the effectiveness of partner notification by men and non-pregnant women in increasing counseling and HIV testing rates in Africa. In Cameroon, an evaluation of the partner services program showed that partner notification yielded a high proportion of partners where 67% of sexual partners of HIV positive index clients came in for testing, and 50% of them tested HIV positive [3]. Also, studies conducted in the East African region have shown that the implementation of targeted index testing and partner notification services

have yielded high HIV positivity rates in Uganda (32%) [4], Kenya (67%), and Tanzania (54%) [5]. Multiple studies reported having linked HIV partner notification to factors such as; gender, marital status, number of sexual partners [6], level of education [5], stage of disease [6], duration of illness, being on ART and others [8].

Rwanda, as one of the few countries in Africa that have adopted partner notification strategies, has an HIV prevalence of 3% among the general population, 3.7% among women, and 2.2% among men aged from 15 to 49 years [9]. Although Rwanda has registered a decline in HIV prevalence within the last two decades, identifying new HIV cases remains challenging and grossly inadequate. According to the Joint United Nations Programs on HIV/AIDS UNAIDS report of 2017, Rwanda had 7400 new HIV infections and 3100 AIDS-related deaths [10]. Many HIV infected clients in Rwanda remain unaware of their HIV status; this is because HIV Testing Service (HTS) is more often offered to specific high risk and priority population groups. There is an increasing focus on key Population groups such as Men who have Sex with Men (MSM) and Female Sex Workers (FSW). However sexual partners of positive index clients have been largely kept unnotified in Rwanda due to the unwillingness of HIV positive patients to disclose their HIV status information to them or health workers seeing the disclosure as an extra workload. This high-risk group constitutes a critical mass that must be reached in order to attain HIV epidemic control. Achieving the UNAIDS vision 90-90-90 target to end HIV/AIDS by 2030 requires that 90 percent of those living with HIV are identified and offered Antiretroviral Therapy (ART).

There's hardly any data on factors associated with the notification of sexual partners among HIV-positive index clients in Rwanda. Therefore, this study on HIV index clients was conducted to determine the factors of HIV partner notification to sexual partners among HIV positive index clients in Kigali, Rwanda.

METHODS

Study Design and Setting: A cross sectional study was conducted from October 2018 to June 2019 analysing data from the national HIV case-based surveillance dataset. Data were collected

prospectively from 22 health facilities located in Kigali city and reported to the surveillance system through DHIS2. Kigali has the highest HIV prevalence in Rwanda with 6.3% of its population being infected with HIV (HIV annual report). At each health facility, partner notification services were provided at dedicated Voluntary Counselling and Testing (VCT) centers, and provider-initiated testing (PIT) was offered to inpatients and outpatients.

Study Population: Men and women diagnosed with HIV through VCT or PIT at the 22 study sites newly diagnosed with HIV, 18 years or older, not pregnant, had a current sexual partner, or had a partner in the past 12 months were included. Pregnant women and individuals who consulted through Post-Natal Consultations (CPN) were excluded from the study since partner services already exist within antenatal and postnatal care services in Rwanda—pregnant women are requested to bring their sexual partner in for HIV testing. Referred sexual partners were enrolled in this study if they met the eligibility criteria: 18 years or older, were listed by an index client as having been a sexual partner within the last 12 months, had locator information, and consented to participate.

Study Procedures: During data collection for case-based surveillance, enrolled index clients were interviewed using a questionnaire that collected socio-demographic information, and general clinical and sexual history and then was asked to list current or past (within 12 months) sexual partners. During the process, index clients also included locator information (most relevant being the partner's phone number, and type of relationship for each partner and decided how each partner was to be contacted for the referral to HIV test services (HTS) using one of the three partner notification approaches (passive, contract, and provider referral). For passive referral, the healthcare provider and the index client agreed on a timeline for when the index client would bring in or refer listed partners. If they chose, index clients received a pre-printed referral card to give to partners. If index clients did not bring in partners by the agreed date, the healthcare provider contacted the index client by phone to encourage him or her to complete the referral. For contract referral, the healthcare worker initiated partner notification if, after 2 weeks, the index client had failed to bring in their sexual partner for testing.

Whereas provider referral, the healthcare provider contacted partners directly by phone within 24 hours, requesting partners to come for HTS. No information on the identity of the index client was provided to the partner. Partners that came in for HTS were informed of the program, consented, and were linked to the index client using a UPID code and recorded as successful referrals.

Data Management and Analysis: Data were extracted from the Case-based surveillance dataset, cleaned, and analyzed using STATA version 13.1 (StataCorp, College Station, TX). Descriptive statistics were performed to describe the socio-demographic characteristics of index clients and successfully referred partners. Partners were considered successfully referred if they had been informed of their exposure as a result of any notification method, whether or not they tested for HIV. Analysis entailed running frequencies of the main study outcomes. To identify potential factors that predict successful partner notification among index clients, stepwise binary logistic regression was done. Independent variables found to be statistically significant in preliminary analysis by Pearson's chi-square test of independence were entered into the regression model. Odds ratios (OR) with 95% confidence intervals (CI) were calculated. In this study, the significance level was set at a P-value of less than 0.05. Variables dropped out of the original model if they had a P-value greater than 0.05 or a confidence interval including 1.

Ethical consideration: The study was conducted with ethical clearance from the Institutional Review Board (IRB) of the University of Rwanda, College of Medicine and Health Sciences. At every clinic, consent forms had been signed by index clients who were willing to list their partners. UPID codes were used instead of individual names to keep index clients and their partners anonymous. The highest standards of confidentiality, quality assurance and control were maintained in data collection, storage and processing.

RESULTS

Figure 1 shows the number of HIV positive enrolled index clients listed and successfully referred sexual partners by sex. From October 2018 to June 2019, the HIV case-based surveillance system registered a total of 2670 index clients, of whom 566 (21.1%) cases were

discarded due to reasons such as: Having not had a sexual partner within the last 12 months (n=271, 10.1%), having insufficient contact information on a partner (n =142, 5.3%), being pregnant (n = 32, 1.19%), or having consulted through CPN (n = 121, 4.5%). Newly diagnosed HIV patients who consulted through Maternity and PNC were excluded from the analysis as another form of partner notification exists within the antenatal and postnatal care services. The remaining 2104 index clients listed a total of 3791 sexual partners (n=2278, 60.0% female partners and n=1513, 39.9% male partners). The average number of partners listed per index client was 1.8. Of the listed partners, 2689 (70.9%) were successfully notified (i.e., were informed of their exposure to HIV). Overall, 58.4% of female partners and 41.5% of male partners were successfully notified. Among partners who were successfully notified, 2409(89.5%) came in for HIV testing. HIV testing was higher in female partners than males (90.0% and 88.9%, respectively). Among partners who were tested for HIV, 261 (10.8%) tested positive (142 Male vs 119 female). A total of 2015 (83.6%) tested negative and 133 (5.5%) of the referred sexual partners were not tested, and they had previously been diagnosed HIV positive, of which the index client was unaware.

As shown in Table 1 and 2, the proportion of eligible female index clients enrolled compared

to males was higher (62.5% of females vs. 37.4% of males), and the proportion of HIV index clients reporting they were single compared to those who were married/cohabiting was much lower (16.4% single vs. 49.0% Married/Cohabiting, p=0.000). The majority of enrolled index clients were adults aged between 25-44 years, whereby they accounted for 68.5% of the total population (1442 of 2104), and the mean age was 36.8 years ranging from 18 to 79 years. Most index clients (64.3%) were unemployed. Most index clients successfully referred 848 (31.5%) sexual partners who were their occasional partners, and most index clients chose client referral for 1,366 (36.0%) partners, provider referral for 1213 (31.9%) partners, and contract referral for 805 (21.2%) partners. (Table 2).

Among index clients, the referral success significantly correlated with marital status (p=0.000) and being married was correlated with higher success (51.4%). occupation especially small scale business was associated with unsuccessful referral (34.4%) among HIV positive index clients (p=0.000), while among sexual partners it significantly correlated with the gender (p=0.003), relationship to index client (mostly occasional partners (31.5%) (p=0.000), type of notification used (p=0.000), sex without condom in last 12 months (p=0.004), and number of sexual partners (p=0.007) (Table 2).

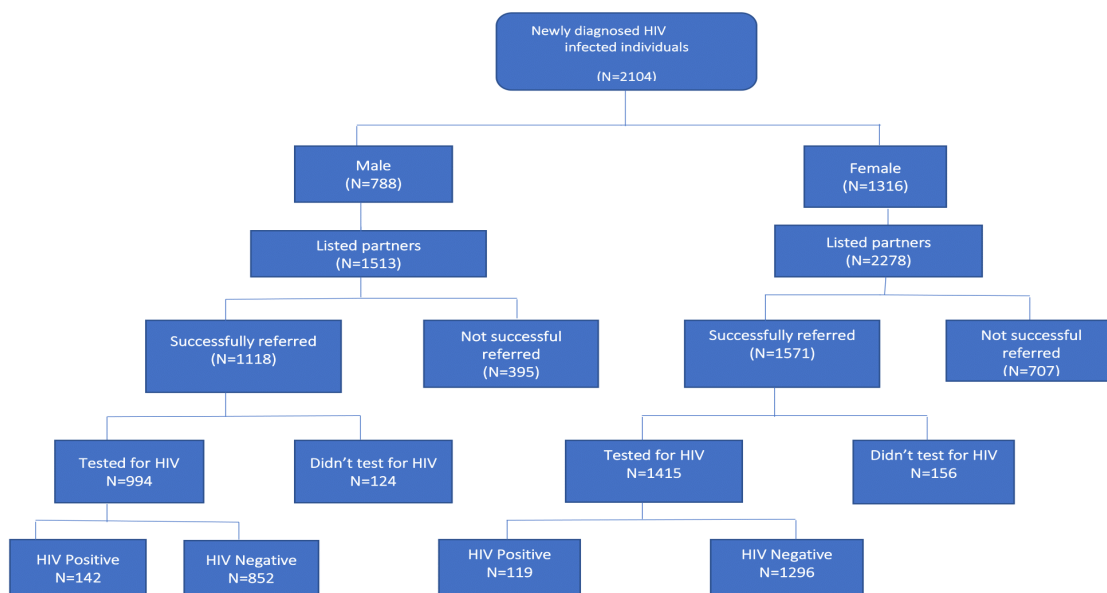


Figure 1: Socio-demographic characteristics of enrolled index clients and their sexual partners

Table 1: Socio-demographic and sexual risk behaviors of HIV positive index clients

Index client characteristics	Successful referral (n=1643)		Unsuccessful referral (n=461)		Total (N=2104)		P-value	
	N	%	N	%	N	%		
Gender								
Female	1008	61.3%	308	66.8%	1316	62.5%	0.033	
Male	635	38.6%	153	33.1%	788	37.4%		
Marital status								
Divorced/Separated	196	11.9%	67	14.5%	263	12.5%	0.000	
Married/Cohabitant	845	51.4%	187	40.5%	1032	49.0%		
Single	282	17.1%	65	14.1%	347	16.4%		
Widow(er)	169	10.2%	55	11.9%	224	10.6%		
Missing	151	9.19%	87	18.8%	238	11.3%		
Age group								
18-24 years	154	9.38%	51	11.04%	205	9.74%	0.027	
25-34 years	545	33.1%	172	37.3%	717	34.08%		
35-44 years	563	34.2%	162	35.1%	725	34.4%		
45-54 years	284	17.3%	60	12.9%	344	16.3%		
55+ years	97	5.91%	16	3.46%	113	5.37%		
Employment status								
Employed	597	36.3%	153	33.1%	750	35.6%	0.212	
Unemployed	1,046	63.6%	308	66%	1354	64.3%		
Occupation								
Small scale business	176	29.5%	53	34.4%	229	30.5%	0.000	
Farmer	90	15.1%	6	3.90%	96	12.8%		
Construction worker	65	10.8%	7	4.58%	72	9.60%		
Driver	50	8.39%	11	7.14%	61	8.13%		
Domestic worker	35	5.87%	9	5.84%	44	5.87%		
Other	181	30.3%	67	43.5%	248	33.07%		

p<0.05: Statistically significant

Table 3 shows the tendency of index clients to list or notify multiple partners by sex and marital status of index clients. Among 2104 index clients, 1044 listed more than one sexual partner. In bivariate analysis, successful notification of partners was lower in male index clients that had listed more than one sexual partner than in females [OR=0.99; (95% CI: 0.83-1.18); *p*=0.928]. Married index clients were 1.30 times more likely than unmarried index clients to successfully notify at least one partner (95% CI: 1.04-1.63); *p*=0.021]. Among other factors, age was found to be associated with successful partner notification among index clients aged ≥55years [OR=2.00; (95% CI: 1.08-3.71); *p*=0.027], followed by 45-54 years [OR=1.56;

(95% CI: 1.02-2.38); *p*=0.037]. Successful partner notification also differed according to occupation, with the highest association observed in farmers [OR=4.5; (95% CI: 1.87-10.9); *p*=0.001], followed by construction workers [OR=2.7; (95% CI: 1.20-6.46); *p*=0.016]. Other factors that revealed significant association were; Gender [Male, OR=1.26; (95% CI: 1.01-1.57); *p*=0.033], Married or cohabiting [OR=1.04;(95% CI:0.76-1.42); *p*=0.799] and having had 2-5 sexual partners in the last 12 months [OR=1.37 ;(95% CI:1.11-1.69); *p*=0.003] compared to those that had ≥5 sexual partners [OR=0.66; (95% CI:0.19-2.21); *p*=0.501]. Successful partner notification was also higher among partners that had been listed as spouses

Table 2: Socio-demographic and sexual risk behaviors of HIV positive index clients' sexual partners

Partner Characteristics	Successful referred partners (n=2689)		Unsuccessful referred partners (n=1102)		Total (N=3791)		P-value
	n	%	N	%	N	%	
Gender of Partner							
Female	1,571	58.4%	707	64.1%	2,278	60.1%	0.003
Male	1,118	41.5%	395	35.8%	1,513	39.8%	
Partner relationship to index client							
Boyfriend/Girlfriend	374	13.9%	112	10.1%	486	12.8%	0.000
Cohabitant	379	14.0%	110	9.98%	489	12.9%	
Occasional Partner	848	31.5%	394	35.7%	1,242	32.7%	
Other	354	13.1%	156	14.1%	510	13.4%	
Paid to have sexual intercourse	432	16.0%	260	23.5%	692	18.2%	
Spouse or fiancé(e)	302	11.2%	70	6.35%	372	9.81%	
Type of notification used							
Client referral	1,060	39.4%	331	30.0%	1,391	36.6%	0.000
Provider referral	1,018	37.8%	269	24.4%	1,287	33.9%	
Contract referral	610	22.7%	338	30.6%	949	25.0%	
Missing	1	0.04%	164	14.8%	165	4.35%	
Sexual risk behaviors of Index clients							
Sex without condom in last 12 months							
Yes	1182	71.9%	300	65.0%	1482	70.4%	0.004
No	461	28.0%	161	34.8%	622	29.5%	
Number of sexual partners in the last 12 month							
1 partner	718	43.7%	237	51.3%	955	45.3%	0.007
2-5 partners	917	55.8%	220	49.7%	1137	54.0%	
> 5 partners	8	0.49%	4	0.87%	12	0.57%	
Sex with multiple partners							
Yes	1198	72.9%	363	78.7%	1561	74.1%	0.012
No	445	27.1%	98	21.2%	543	25.8%	

p<0.05: Statistically significant

of index clients [OR=2.00; (95% CI: 1.50-2.67); *p*=0.000] compared to boyfriends and girlfriends of index clients [OR=1.55; (95% CI: 1.22-1.98); *p*=0.000]. Index clients that used the provider referral method were 2.06 times more likely to notify their partners than those that opted for the contract referral method (95% CI: 1.66-2.55); *p*=0.000] (Table 5 and 6).

Successful partner notification continued to be the dependent variable, while residence, number of sexual partners, gender of partner, type of relationship, and type of notification option used were considered independent variables.

The strongest predictors of successful partner notification were: having 2-5 partners, which was associated with an adjusted odds ratio (aOR) of 2.53 (95% CI: 1.60-3.99), followed by the type of relationship whereby partners who were listed as being spouses to index clients were 2.11 times more likely to be notified (95% CI: 1.54-2.89) compared to boyfriends or girlfriends (aOR = 1.50, 95% CI: 1.16-1.95). Controlling for other factors, index clients from Gasabo were associated with higher odds of successful notification (aOR=2.06; 95% CI, 1.05-4.05); *p*=0.035] compared to those who lived in Kicukiro or Nyarugenge districts. Female sexual partners were less likely to be

Table 3: Successful notification and multiple partner listing by sex and marital status of index clients

Study outcome	Yes		No		Total		Bivariate	
	N	%	N	%	N	%	Crude OR	P-value
Index client listed more than one sexual partner by sex								
Female (Ref.)	654	62.6%	662	62.4%	1316	62.5%	1	-
Male	390	37.3%	398	37.5%	788	37.4%	0.99{0.83-1.18}	0.928
Index client listed more than one sexual partner by marital status								
Not Married (Ref.)	441	42.2%	393	37.0%	834	39.6%	1	-
Married	513	49.1%	519	48.9%	1032	49.0%	0.88{0.73-1.05}	0.174
Missing	90	8.62%	148	13.9%	238	11.3%	0.54{0.40-0.72}	0.000
Index client notified at least one listed sexual partner by sex								
Female (Ref.)	1008	61.3%	308	66.8%	1316	62.5%	1	-
Male	635	38.6%	153	33.1%	788	37.4%	1.26{1.01-1.57}	0.033
Index client notified at least one listed sexual partner by marital status								
Not Married (Ref.)	647	39.3%	187	40.6%	834	39.6%	1	-
Married	845	51.4%	187	40.4%	1032	49.1%	1.30{1.04-1.63}	0.021
Missing	151	9.20%	87	18.8%	238	11.3%	0.50{0.36-0.68}	0.000

Ref.: Reference variable

successfully notified compared to male sexual partners (aOR = 0.80, 95% CI: 0.69–0.94). The effects of factors such as age, gender, occupation, condom use in the last 12 months, having had sex with multiple partners in the last 12 months, having been a commercial sex worker or having had the experience of intimate partner violence, among many other factors were found not to be statistically significant and were not retained in the final model. Other factors that were associated with successful partner notification were: the type of notification option used; index clients that opted for provider referral were 1.92 times more likely to notify their partners [95% CI, 1.54–2.39; p=0.000] than those that opted for a passive referral or contract referral (Table 4).

Table 4 presents HIV testing rates and HIV serostatus of successfully notified sexual partners by sex and relationship status. Among 2409 tested sexual partners, the majority were females, accounting for 60.1% of tested sexual partners. Being a female sexual partner was associated with lower successful notification (OR=0.85; 95% CI, 0.74-0.98). In multivariate analysis, sexual partners listed as spouses were 1.4 times more likely to get tested compared to occasional partners (OR=1.43; 95% CI, 1.11-1.82), followed

by cohabitants (OR=1.32; 95% CI, 1.07-1.64). Of the tested sexual partners, men tested positive at a higher rate than females (54.4% men vs. 45.5% female). In bivariate analysis, the highest HIV infection rate was seen among spouses (OR=1.87; 95% CI 1.26-2.77), followed by those listed as boyfriend/girlfriend (OR=1.12; 95% CI 0.74-1.71). Only sexual partners listed as spouses remained significantly associated with HIV positivity in multivariate analysis (OR=1.83; 95% CI; 1.26-2.55) (Table 7).

DISCUSSION

The study aimed at identifying the independent predictors of successful notification of sexual partners among HIV positive index clients. Our findings demonstrated that the proportion of partners notified in this study (70.9%) is slightly above the range than what has been described elsewhere in Africa and in other parts of the world [11-13].

Furthermore, previous studies have shown that 17-68% of persons diagnosed with HIV disclose their status to at least 1 sexual partner [14–17]. This was also reflected in our study, whereby the majority (44.5%) of the enrolled index clients notified one sexual partner, highlighting the need to increase

Table 4: Multivariate analysis showing factors associated with partner notification by background characteristics of index clients and their partners

Variable	Successful notification N(%)	Univariate Analysis		Multivariate analysis	
		Crude Odds ratio	P-value	Adjusted Odds ratio	P-value
Socio-demographic characteristics (N=2104)					
1. Current address(N=2104)					
Kicukiro	627/1643(0.38)	1	-	1	
Gasabo	384/1643(0.23)	1.05 {0.76-1.44}	0.742	2.06 {1.05-4.05}	0.035
Nyarugenge	599/1643(0.36)	0.45 {0.35-0.58}	0.000		
Other	33/1643(0.02)	1.08 {0.44-2.65}	0.853		
Sexual risk behaviors (N=2104)					
2. Number of sexual partners in the last 12 months					
1 partner	718/1643(0.43)	1	-	1	-
2-5 partners	917/1643(0.55)	1.37 {1.11-1.69}	0.003	2.53 {1.60-3.99}	<0.001
> 5 partners	8/1643(0.004)	0.66 {0.19-2.21}	0.501		
Partner Characteristics					
3. Gender of partner					
Male sexual partners	1,118/2689(0.41)	1	-	1	-
Female sexual partners	1,571/2689(0.58)	0.78 {0.67-0.90}	0.001	0.80 {0.69-0.94}	0.009
4. Index relationship to partner					
Occasional Partner	848/2689(0.31)	1	-	1	-
Boyfriend/ Girlfriend	374/2689(0.13)	1.55 {1.22-1.98}	0.000	1.50 {1.16-1.95}	0.002
Cohabitant	379/2689(0.14)	1.60 {1.25-2.04}	0.000	1.43 {1.11-1.84}	0.005
Spouse or fiancé(e)	302/2689(0.11)	2.00 {1.50- 2.67}	0.000	2.11 {1.54-2.89}	0.000
5.Type of notification option					
Contract referral	610/2689(0.22)	1	-	1	-
Provider referral	1,018/2689(0.37)	2.06 {1.66-1.2.55}	0.000	1.92 {1.54-2.39}	0.000
Client referral	1060/2689(0.39)	1.89 {1.54-2.32}	0.000	1.73 {1.39-2.15}	0.000

the number of notified and tested partners. This could be achieved considering notification steps, including assessing one's notification skills, adjusting to the diagnosis, deciding whom to notify, evaluating partner's reaction and establishing effective notification strategies. Counseling and education of both partners and HIV patients before notification could also help increase partner notification rates [10].

Most previous studies evaluating determinants

for successful notification of sexual partners of HIV index clients have mainly measured socio-demographic, type of relationship or sexual risk behavior as predictor variables. Among factors reported to have favored sexual partner notification are: steady relationships or partnerships [11,12], [18], index clients being male [19], being married, older age [12,20] and a number of sexual partners [13]. Most of these factors were also statistically significant in our study, where married index

clients were 2.1 times more likely to successfully notify their partners than unmarried index clients, while male index clients were 1.26 times more likely than female index clients to successfully notify at least one sexual partner. These findings are also in line with other studies previously conducted among HIV index clients in countries such as South Africa and Tanzania that showed at gender dynamics as one of the major factors influencing partner notification. These studies

indicated that some female index clients were reluctant to discuss partner notification issues to avoid negative reactions such as social harm, stigma, discrimination and fear of male partner violence to mention but a few [20,21]. This might be attributed to the varying gender norms among different cultures and societies where masculinity is equated with dominance and femininity is equated with subordination and dependency to men [22]. Though sex and gender power differentials have

Table 5: Bivariate analysis on factors associated with successful partner notification by background characteristics of index clients

Variable	Successful notification n /N (%)	Univariate Analysis	
Index client socio-demographic characteristics			
1. Gender(N=2104)		Crude Odds ratio	P-value
Female	1008/1643(0.61)	1	-
Male	635/1643(0.38)	1.26{1.01-1.57}	0.033
2. Age group(N=2104)		1	-
18-24 years	154/1643(0.09)	1	-
25-34 years	545/1643(0.33)	1.04{0.73-1.50}	0.793
35-44 years	563/1643(0.34)	1.15{0.80-1.65}	0.446
45-54 years	284/1643(0.17)	1.56{1.02-2.38}	0.037
55+ years	97/1643(0.05)	2.00{1.08-3.71}	0.027
3. Marital status(N=2104)		1	-
Single	282/1643(0.17)	1	-
Married/Cohabitant	845/1643(0.51)	1.04{0.76-1.42}	0.799
Divorced/Separated	196/1643(0.11)	0.67{0.45-0.99}	0.046
Widow(er)	169/1643(0.10)	0.70{0.47-1.06}	0.096
Missing	151/1643(0.09)	0.40{0.27-0.58}	0.000
4. Occupation (N=2104)		1	-
Small scale business	176/1643(0.10)	1	-
Farmer	90/1643(0.05)	4.5{1.87-10.9}	0.001
Construction worker	65/1643(0.039)	2.7{1.20-6.46}	0.016
Driver	50/1643(0.03)	1.36{0.66-2.81}	0.697
Domestic worker	35/1643(0.02)	1.17{0.52-2.59}	0.394
Other	181/1643(0.11)	0.81{0.53-1.23}	0.331
5. Sexual risk behaviors (N=2104)			
Number of sexual partners in the last 12 months			
1 partner	718/1643(0.43)	1	-
2-5 partners	917/1643(0.55)	1.37{1.11-1.69}	0.003
> 5 partners	8/1643(0.004)	0.66{0.19-2.21}	0.501
Sex without condom in last 12 months	1182/1643(0.71)	1.37{1.10-1.71}	0.004
Sex with HIV+ person	561/1643(0.34)	1.63{1.18-2.25}	0.003

long been associated with HIV-related risk factors, decision-making, testing, and partner notification consequences, our study did not measure or analyze these gender norms, attitudes, or power dynamics in relationships as one of the factors related to the willingness of index clients to notify their partners. However, other studies found evidence that these attitudes are one of the impacting factors to HIV disclosure and partner notification [5,24].

This study also suggested that sexual risk behavior factors are more critical in influencing sexual partner notification. Although variables such as having anal or vaginal sex without condom use, having sex with an HIV positive, having sex with a commercial sex worker, having had sex with multiple partners, and having had sex with injecting drug users, among many others, were statistically significant in univariate analysis, none of these variables reached significance in the multivariate analysis except the number of sexual partners had by the index client in the past

12 months. This means that the effect of socio-demographic variables is mediated through the sexual risk behavior factors as assumed by applied socio-sexual risk behavior models [25].

In Multivariate analysis, characteristics such as index client's relationship to partner, type of notification approach used, index client's residency, number of sexual partners had in the last 12 months, and partner's gender were also statistically associated with successful partner notification. Spouses were more likely to be notified by their partners, indicating that partner notification in Rwanda could be particularly effective. Since most partners (848/2689) were occasional partners (i.e., were having a sexual relationship with the index client while also having an ongoing relationship), this indicates that index clients could also reach these occasional partners; however, there is more need to assist index clients in reaching this group of partners. These findings are inconsistent with most other studies, which indicate that most index

Table 6: Bivariate analysis on factors associated with successful partner notification for partners of index clients

	Successful referred partners (n=2689)	Univariate	
		Crude Odds ratio	P-value
Partner Characteristics			
6. Gender of partner			
Female	1,571/2689(0.58)	1	-
Male	1,118/2689(0.41)	1.27 {1.10-1.47}	0.001
7. Index relationship to partner			
Occasional Partner	848/2689(0.31)	1	-
Boyfriend/Girlfriend	374/2689(0.13)	1.55 {1.22-1.98}	0.000
Cohabitant	379/2689(0.14)	1.60 {1.25-2.04}	0.000
Other	354/2689(0.13)	1.05 {0.84-1.32}	0.626
Paid to have sexual intercourse	432/2689(0.16)	0.77 {0.64- 0.94}	0.012
Spouse or fiancé(e)	302/2689(0.11)	2.00 {1.50- 2.67}	0.000
8. Risk of Intimate Partner Violence			
Yes	121/2689(0.04)	1	
No	2545/2689(0.94)	3.46 {2.70-4.45}	0.000
Missing	24/2689(0.008)	2.18 {1.08-4.39}	0.029
9. Type of notification option			
Contract referral	610/2689(0.22)	1	-
Provider referral	1,018/2689(0.37)	2.06 {1.66-2.55}	0.000
Client referral	1060/2689(0.39)	1.89 {1.54-2.32}	0.000
Missing	1/2689(0.04)	0.00 {0.00-0.01}	0.000

Table 7: HIV serostatus among notified sexual partners by sex and relationship status

Study outcome	Yes		No		Total		Bivariate	Multivariate
	N	%	N	%	N	%		
Partners successfully tested for HIV (n=2409)								
1. Sex								
Male sexual partner	994	41.2%	519	37.5%	1,513	39.9%	1	1
Female sexual partner	1,415	58.7%	863	62.4%	2,278	60.1%	0.85 {0.74-0.98}	
2. Relationship status								
Occasional Partner	789	32.7%	453	32.7%	1,242	32.7%	1	1
Boyfriend/Girlfriend	323	13.3%	163	11.9%	486	12.8%	1.13 {0.91-1.41}	
Cohabitant	348	14.4%	141	10.1%	489	12.9%	1.41 {1.12-1.77}	1.32 {1.07-1.64}
Other	342	14.1%	168	12.3%	510	13.4%	1.16 {0.94-1.45}	
Paid to have sexual intercourse	340	14.1%	352	25.4%	692	18.2%	0.55 {0.45-0.66}	0.49 {0.41-0.59}
Spouse or fiancé(e)	267	11.0%	105	7.60%	372	9.81%	1.45 {1.13-1.88}	1.43 {1.11- 1.82}
Partners diagnosed with HIV infection (n=261)								
1. Sex								
Male sexual partner	142	54.4%	852	39.6%	994	41.2%	1	1
Female sexual partner	119	45.5%	1296	60.3%	1415	58.7%	0.55 {0.42-0.71}	0.56 {0.43- 0.72}
2. Relationship status								
Occasional Partner	79	30.2%	710	33.0%	789	32.7%	1	1
Boyfriend/Girlfriend	36	13.7%	287	13.3%	323	13.3%	1.12 {0.74-1.71}	
Cohabitant	32	12.2%	316	14.7%	348	14.4%	0.91 {0.59-1.40}	
Other	36	13.7%	306	14.2%	342	14.1%	1.05 {0.69-1.60}	
Paid to have sexual intercourse	32	12.2%	308	14.3%	340	14.1%	0.93 {0.60-1.43}	
Spouse or fiancé(e)	46	17.6%	221	10.2%	267	11.0%	1.87 {1.26-2.77}	1.80 {1.26-2.55}

patients are reluctant to notify other partners who are not their spouses about their exposure to HIV [26]. This may be explained as a lack of emotional attachment or emotional responsibility to these partners. Another possible reason would be index clients are likely to notify their partner if their financial support depends on their spouses. Several studies have also shown strong evidence that key populations [27] and people with casual/occasional partners [14] may be less able or willing to notify partners, while partners listed as spouses or steady partners are more likely to get notified [7,14]. This may be due to the inability to recall contact information for partners, since recall of partner information is reported to be better among steady partners than unsteady partners [28,29]. Strategies to reach spouses and other partners should include providing good counseling, assessing one's notification skills, deciding whom to notify, and evaluating partner's reaction.

Our study also indicated an association between successful partner notification and the type of referral approach used, indicating that provider referral had a comparatively good uptake as a passive referral. In our study, partners who were notified via provider referral approach (37.8%, aOR: 1.92) and passive or client referral (39.4%, aOR: 1.73) were more likely to return for HIV testing and counseling than those that were notified via contract referral approach. This shows that there is room for success in the application of both provider and passive referral approaches to partner notification. Results obtained from this study are generally consistent with other studies. For example, a randomized trial study conducted in North Carolina, USA, showed 50% of partners notified via the provider referral arm returned for HIV testing and counseling. Another study in Kenya revealed that provider referral was more effective at increasing partner testing, and 67% of sexual partners came in for HIV testing following contact with a healthcare provider. In addition to this, recent studies conducted in low and middle-income countries revealed that the pooled proportion of partners returning for HIV testing after partner notification was above 50% [14,30–33]. Although most index clients in our study preferred passive referral over provider referral, there was a greater successful notification among partners who were notified via provider notification approach as opposed to those who were notified via the passive referral approach. It is, therefore, evident

that, even though passive referral was the most preferred approach, the majority of index clients still lack the confidence to approach their sexual partner. This may be brought about by fears of rejection, abandonment or gender-related barriers, which may prevent them from following through with self-disclosure. Other studies conducted on the effectiveness of different referral methods have shown varying results, highlighting that assisted notification (provider or contract referral) results in more partners receiving testing and counseling services than in the passive referral method. For example, a study conducted in Malawi highlighted passive referral as one of the approaches that was not yielding promising outcomes with only 24% of partners notified compared to 51% in the provider referral and contract referral arm, respectively [7]. A study in Kenya showed that 67% of sexual partners contacted using via provider-assisted partner notification came in for testing, when offered the service early [34], and only 6.7% of partners in the Cameroon study were notified by passive referral [14].

Our study did not assess uptake or compare different referral methods but evaluated which method would effectively increase HIV notification to partners. Our study showed that establishing more purposeful provider partner notification strategies that would be helpful in increasing partner notification rates. Majority of index clients (56.2%) had more than one sexual partner and both bivariate and multivariate analysis, showed that the number of sexual partners had by an index client within the past 12 months was significantly associated with partner notification.

Generally, we found that nearly 90% of referred index clients came in for testing. The increase in the number of partners tested may be due to counseling opportunities and support provided to partners. However, findings from our study also showed that there is still a need to bring in female partners for testing. Globally, sex and gender norms have long been known to be relevant in decision-making around HIV testing and treatment, whereby characteristics such as male masculinity, self-reliance, and power are known to be associated with poor health outcomes, including decisions on HIV testing. In Lesotho and South Africa, a study pointed out that men were found to have an individual-held stigma around HIV testing because they are perceived as powerful, dominant, and controlling; hence illnesses due to HIV would

be interpreted as “weakness” [23]. In our study, female partners had lower odds of testing for HIV (aOR=0.85) compared to male partners, contrary to evidence from most studies [23,35]. The possible explanation for this difference could be fear of relationship disruptions or fear of physical and emotional violence that women could encounter if found to be HIV positive. Previous studies have also shown that women cannot openly discuss sex and HIV testing with their partners due to the notion that HIV is seen as a disease brought into relationships by women, reducing testing acceptance among women to avoid conflicts within their relationships [35,36]. Our study also showed that spouses of HIV index clients were more likely to undergo HIV testing than unmarried partners. Similar findings have been documented elsewhere in the world [37]. This could be due to the level of comfort and increased spousal communication in discussing sex and HIV. Also, death or illness of a spouse from suspected AIDS may motivate the surviving spouse to seek testing for HIV. However, our study didn’t assess factors motivating partners to test for HIV. This could be a gap to be addressed by future studies.

Our study had some limitations. Our sample was only limited to Kigali city; thus, this may not represent the true picture of all the index clients and partners involved in Rwanda. Secondly, the data was collected from an HIV case-based surveillance system for which individual patient-level data were routinely reported. As such, not all desired variables were available. In addition, there was a lot of missing or poorly collected data. The data also consisted of a high number of HIV positive individuals ineligible because they did not have a partner in the last 24 months. However, some HIV positive individuals may have been using this response as a way to politely opt out of the partner notification process.

Additionally, this study was not designed to capture testing or referral outside the study facilities. If partners went to another facility to test following partner notification, we would not know about that partner’s decision to test. This could mean that our estimates of the successful notifications in the

study could be lower than the actual ones.

Finally, our study was not designed to assess the safety of the partner notification approach regarding intimate partner violence (IPV). We recognize that even though no cases of IPV were reported, unreported cases may have occurred. Our findings on the sex-related differences that create barriers to partner notification and HIV serostatus disclosure undermine the importance of principles described in the World Health Organization tool for integrating gender into HIV/AIDS programs in the health sector. Programs scaling up partner notification should consult this tool closely. For example, by discussing the benefits and potential disadvantages of disclosure, programs can help women disclose their HIV status safely. Programs can also help those at risk of violence with safety planning and mediated disclosure

CONCLUSION

As the proportion of undiagnosed PLHIV decreases, reaching those who are asymptomatic and not engaged with the health system is a critical challenge. Our study confirms that partner notification could dramatically increase the number of previously undiagnosed PLHIV who learn their status and are linked to care. Expanding partner notification services to be performed in health facilities outside Kigali could also reduce the burden of HIV and greatly expand access to testing and linkage to care among people at high risk of infection. Allowing index clients to choose their preferred referral method may also have led to increased notification success, resulting in more partners being tested.

We recommend partner notification as a priority HIV testing strategy and that provision of a package for prevention for serodiscordant couples be included as part of the service. Because of the heterogeneity in the successes and preferences associated with partner notification in different studies, no single partner notification strategy stands out as the recommended approach. Majority of index clients only limited notification to one partner. Therefore, further research is needed to evaluate partner notification strategies that could

REFERENCES

[1] A. S. Kanekar, ‘HIV/AIDS Counseling Skills and Strategies: Can Testing and Counseling Curb the Epidemic?’, *Int J Prev Med*, vol. 2, no. 1, pp. 10–14,

Jan. 2011.

[2] “UNAIDS Issues New Fast-Track Strategy to End AIDS by 2030 - Elizabeth Glaser Pediatric AIDS Foundation.”

[3] P. M. Tih et al., ‘Assisted HIV partner notification

- services in resource-limited settings: experiences and achievements from Cameroon', *J Intern AIDS Soc*, vol. 22, no. S3, Jul. 2019, doi: 10.1002/jia2.25310.
- [4] N. Mahachi et al., "Sustained high HIV case-finding through index testing and partner notification services : experiences from three provinces in Zimbabwe," pp. 23–30, 2019, doi: 10.1002/jia2.25321.
- [5] M. Plotkin et al., "Outcomes and Experiences of Men and Women with Partner Notification for HIV Testing in Tanzania : Results from a Mixed Method Study," *AIDS and Behavior*, vol. 22, no. 1, pp. 102–116, 2018, doi: 10.1007/s10461-017-1936-x.
- [6] S. J. Masyuko et al., "Index participant characteristics and HIV assisted partner services efficacy in Kenya : results of a cluster randomized trial," vol. 22, pp. 49–56, 2019, doi: 10.1002/jia2.25305.
- [7] L. B. Brown et al., "Africa : Opportunities for HIV treatment and prevention," vol. 56, no. 5, pp. 437–442, 2012.
- [8] B. T. Chan, A. C. Tsai, and M. J. Siedner, "RESEARCH AND PRACTICE HIV Treatment Scale-Up and HIV-Related Stigma in Sub-Saharan Africa : A Longitudinal Cross-Country Analysis," vol. 105, no. 8, pp. 1581–1587, 2015, doi: 10.2105/AJPH.2015.302716.
- [9] N. Mahachi et al., "Sustained high HIV case-finding through index testing and partner notification services : experiences from three provinces in Zimbabwe," pp. 23–30, 2019, doi: 10.1002/jia2.25321
- [10] G. Kamanga, L. Brown, P. Jawati, D. Chiwanda, and N. Nyirenda, 'Maximizing HIV partner notification opportunities for index patients and their sexual partners in Malawi', *Malawi Med J*, vol. 27, no. 4, pp. 140–144, Dec. 2015.
- [11] R. Steen, C. Soliman, S. Bucyana, and G. Dallabetta, "Partner referral," pp. 56–59, 1996.
- [12] Y. T. H. P. Van Duynhoven, W. A. Schop, and W. I. Van Der Meijden, "Patient referral outcome in gonorrhoea and chlamydial infections," no. December 1994, pp. 323–330, 1998.
- [13] F. Nuwaha, F. Kambugu, and P. S. J. Nsubuga, "Factors Influencing Sexual Partner Referral for Sexually Transmitted Diseases in Uganda:," *Sexually Transmitted Diseases*, vol. 26, no. 8, pp. 483–489, Sep. 1999, doi: 10.1097/00007435-199909000-00011.
- [14] C. Henley et al., "Scale-Up and Case-Finding Effectiveness of an HIV Partner Services Program in Cameroon: An Innovative HIV Prevention Intervention for Developing Countries," *Sexually Transmitted Diseases*, vol. 40, no. 12, pp. 909–914, Dec. 2013, doi: 10.1097/OLQ.0000000000000032.
- [15] A. Medley, C. Garcia-moreno, S. McGill, and S. Maman, "Rates , barriers and outcomes of HIV serostatus disclosure among women in developing countries : implications for prevention of mother-to-child transmission programmes," vol. 003913, no. 03, pp. 299–307, 2004.
- [16] J. C. Mutabazi, C. Zarowsky, and H. Trottier, "The impact of programs for prevention of mother-to-child transmission of HIV on health care services and systems in sub-Saharan Africa - A review," pp. 1–27, 2017, doi: 10.1186/s40985-017-0072-5.
- [17] A. Neville and M. Æ. Donald, "Motivations and Methods for Self-disclosure of HIV Seropositivity in Nairobi , Motivations and Methods for Self-disclosure of HIV Seropositivity in Nairobi , Kenya," no. October, 2007, doi: 10.1007/s10461-006-9198-z.
- [18] "E. K. Njeru, G. D. Eldridge, E. N. Ngugi, F. A. Plummer, and S. Moses, "STD partner notification and referral in primary level health centers in Nairobi, Kenya," *Sex Transm Dis*, vol. 22, no. 4, pp. 231–235, 1995, doi: 10.1097/00007435-199507000-00006.
- [19] M. J. W. van de LAAR, F. Termorshuizen, and A. van den HOEK, "Partner Referral by Patients With Gonorrhoea and Chlamydial Infection: Case-Finding Observations," *Sexually Transmitted Diseases*, vol. 24, no. 6, pp. 334–342, Jul. 1997, doi: 10.1097/00007435-199707000-00005.
- [20] B. P. Katz, V. A. Caine, and R. B. Jones, "Evaluation of field follow-up in a sexually transmitted disease clinic for patients at risk for infection with *Neisseria gonorrhoeae* and *Chlamydia trachomatis*," *Sex Transm Dis*, vol. 19, no. 2, pp. 99–104, 1992.
- [21] D. S. Bhatia, A. D. Harrison, M. Kubeka, C. Milford, A. Kaida, and A. D. Harrison, "The role of relationship Dynamics and gender inequalities as Barriers to hiV-serostatus Disclosure : Qualitative study among Women and Men living with hiV in Durban , south africa," vol. 5, no. July, pp. 1–9, 2017, doi: 10.3389/fpubh.2017.00188.
- [22] L. Li, L. Angeles, Y. Ding, J. Tian, and L. Angeles, "A Multilevel Intervention for HIV-Affected Families in China : Together for Empowerment Activities (TEA)," no. November 2018, 2011, doi: 10.1016/j.socscimed.2011.07.013.
- [23] A. L. DiCarlo et al., "'Men usually say that HIV testing is for women': gender dynamics and perceptions of HIV testing in Lesotho." *Culture, Health & Sexuality*, vol. 16, no. 8, pp. 867–882, Sep. 2014, doi: 10.1080/13691058.2014.913812.
- [24] A. A. Conroy, "The influence of relationship power dynamics on HIV testing in rural Malawi," *J Sex Res*, vol. 52, no. 3, pp. 347–359, 2015, doi: 10.1080/00224499.2014.883590.
- [25] M. Mokgatle, S. Madiba, and N. Hlongwane, "Differences in Sexual Behavior and Partner Notification for Sexually Transmitted Infections Between the Out of School Youth and University Students in a Peri-Urban District in South Africa-A Cross-Sectional Survey," *Front Public Health*, vol. 10, p. 793702, 2022, doi: 10.3389/fpubh.2022.793702.
- [26] C. Mathews et al., "Sexual relationships , intimate partner violence and STI partner notification in Cape Town , South Africa : an observational study," pp. 144–150, 2018, doi: 10.1136/sextrans-2017-053434.
- [27] R. H. Remien, D. A. Benson, C. Dolezal, A. Carballo-die, C. U. Decena, and S. Blank, "Among New York City STD Clinics ' Clients," no. chapter 163, 1998.

- [28] W. C. Jordan, "Reaching Lost-to-Care Populations," vol. 90059, pp. 275–280, 2007, doi: 10.1086/522550.
- [29] I. International, "Hidden No More : Innovative Approaches for Reaching Key Populations for HIV Care and Treatment in Ghana," 2019.
- [30] C. E. Kennedy, V. A. Fonner, K. A. Armstrong, R. O. Kevin, and M. D. Sweat, "countries : a systematic review of intervention evaluations," vol. 29, no. Suppl 1, pp. 1–20, 2017, doi: 10.1097/QAD.0000000000000671. Increasing.
- [31] K. R. O. Reilly, "NIH Public Access," vol. 17, no. 5, pp. 1571–1590, 2014, doi: 10.1007/s10461-012-0241-y.Provider-Initiated.
- [32] G. Kamanga, L. Brown, P. Jawati, D. Chiwanda, and N. Nyirenda, "Maximizing HIV partner notification opportunities for index patients and their sexual partners in Malawi," vol. 27, no. December, pp. 140–144, 2015.
- [33] "The New England Journal of Medicine Downloaded from nejm.org on October 11, 2019. For personal use only. No other uses without permission.
- Copyright © 1992 Massachusetts Medical Society. All rights reserved.," 1992.
- [34] P. Cherutich et al., "Assisted partner services for HIV in Kenya: a cluster randomised controlled trial," *The Lancet HIV*, vol. 4, no. 2, pp. e74–e82, Feb. 2017, doi: 10.1016/S2352-3018(16)30214-4.
- [35] S. Treves-Kagan et al., "Gender, HIV Testing and Stigma: The Association of HIV Testing Behaviors and Community-Level and Individual-Level Stigma in Rural South Africa Differ for Men and Women," *AIDS Behav*, vol. 21, no. 9, pp. 2579–2588, Sep. 2017, doi: 10.1007/s10461-016-1671-8.
- [36] M. M. Walcott, A. M. Hatcher, Z. Kwena, and J. M. Turan, "Facilitating HIV status disclosure for pregnant women and partners in rural Kenya: a qualitative study," *BMC Public Health*, vol. 13, no. 1, p. 1115, Dec. 2013, doi: 10.1186/1471-2458-13-1115.
- [37] P. B. Verma et al., "Public Health Action," vol. 1, no. 1, pp. 46–54, 2017.

Predictors of In-Hospital Mortality of Preterm Newborns at University Teaching Hospital of Butare Neonatology Department

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ABSTRACT

Introduction: Neonatal mortality in Rwanda is still high, especially among preterm infants, despite the improvements in mortality rate among other neonates attributed to the implemented measures and strategies since the mid-2000s in Rwanda. This study is aimed to determine predictors of mortality at the University Teaching Hospital of Butare (CHUB), Huye, Rwanda

Methods: This retrospective cross-sectional study was conducted on 427 participants from July 2018 to June 2019.

Results: Of all infants enrolled in this study, 51.1% of newborns were female. The mean birth weight, maternal age, and duration of labor were 1.58 ± 0.52 kg, 30.7 ± 6.8 years, and 3.16 ± 6.59 hours, respectively. Most participants had attended antenatal care services (ANC) (95.1%) and had no concerning obstetrical history (83.1%). The most common mode of delivery was spontaneous vaginal delivery (SVD) (51.5%) at the hospital (93.1%). Receiving Kangaroo mother care (KMC) was a protective factor in in-hospital mortality (OR: 0.63; 95CI: 0.028-0.140, $p < 0.001$). Respiratory distress was associated with a 3-time high risk of mortality (OR: 3.132; 95CI: 1.26-7.745, $p = 0.013$).

Conclusion: This study showed that KMC and respiratory distress were the only studied factors associated with in-hospital mortality of preterm infants at the CHUB.

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INTRODUCTION

The neonatal mortality rate is the probability that a child will die before reaching 28 completed days of life, expressed per 1,000 live births [1]. The neonatal mortality rate is a closely watched public health indicator because it reflects the access of children and communities to basic health interventions such as vaccination, medical treatment of infectious diseases, and adequate nutrition [1]. In Rwanda, the neonatal mortality rate is 17.9% deaths per 1,000 live births, slightly higher than the global

neonatal mortality of 16.8% deaths per 1000 live births [1]. Rwanda Four-Year summary Report of Maternal and Newborn Deaths, 2012-2015 showed that 61% of neonatal mortalities were from low birthweight (<2500g), and most (63%) occurred in district/provincial hospitals, with major causes of death being birth asphyxia (39%), prematurity (32%) and sepsis/infection (10%) [2].

Golden hour (first hour of life of newborn) activities, such as antenatal counseling and team briefing, delayed cord clamp, preventing hypothermia, respiratory support, cardiovascular system support,

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early nutritional care, prevention of infection, monitoring/recording as well as communication with the family has been found to decrease the prevalence of hypothermia, hypoglycemia, intraventricular hemorrhage, bronchopulmonary dysplasia, decreasing mortality [3].

Worldwide, all countries have missed the (Millennial Development Goal 5 (MDG5) of reducing child mortality by a third by 2015. To achieve this goal, quality improvement projects have been implemented to improve neonatal morbidity and mortality of preterm babies [4]. In Rwanda, some policies like ushering in community health workers, evidence-based practices, strong political leadership have led to reducing maternal mortality rate but not the neonatal mortality rate of preterm newborns [2]. Therefore, this study evaluated the predictors of in-hospital mortality of preterm newborns at the University Teaching Hospital of Butare (CHUB), Huye, Rwanda, which is one of the high-level healthcare facilities in Rwanda.

METHODS

Research design: This a retrospective follow-up study with quantitative methods targeting all preterm (<37 gestational weeks) newborns admitted at CHUB neonatology department from July 2019 to June 2020.

Data have been collected from patients' files (from an archive of the hospital).

Data were extracted from the newborn personal medical file using a data collection sheet. The sheet was pilot-tested on 40 28-day-old preterm birth newborns to ensure consistency, and the finding was used to make questions clear. A Cronbach alpha has been found to be 0.74.

Data analysis: Data were entered into excel and then imported into SPSS version 24. Descriptive statistics [percentages, mean, and standard deviation (SD)] was computed, and a comparison of survival curves was made (Log-rank test and p-value <0.05 was considered as significant). Measurement of association between predictors of survival and time to death was done using cox-regression analysis.

Ethical considerations: Ethical approval was obtained from CHUB ethical committee.

Confidentiality, as well as anonymity, were insured during this study

RESULTS

We collected data of 427 neonates admitted to the CHUB neonatology department. The mean birth weight, maternal age, and duration of labor were 1.58 ± 0.52 kg, 30.7 ± 6.8 years, and 3.16 ± 6.59 hours, respectively. The majority (26.2%) were from the Huye district (where the hospital is built), followed by Gisagara (24.6%). Most participants had attended antenatal care services (ANC) (95.1%) and had no bad obstetrical history (83.1%). The most common mode of delivery was spontaneous vaginal delivery (SVD) (51.5%) at the hospital (93.1%). Almost half (51.1%) of newborns were female. Table 1 and 2 shows further details of the participants' characteristics.

Table 1: Maternal and neonatal characteristics of study participants

Variables	Mean \pm SD
Maternal age (Years)	30.71 \pm 6.827
Weight at birth (Kg)	1.58 \pm 0.52
Labor (Hours)	3.16 \pm 6.59

SD: Standard deviation

As shown in Table 3, KMC and respiratory distress were significantly associated with in-hospital mortality. KMC was associated with a significant decrease in mortality (OR = 0.63; 95CI = 0.028-0.140) ($p < 0.001$), while respiratory distress was associated with three times increased risks of mortality (OR = 3.132; 95CI = 1.26-7.745) ($p = 0.013$).

This study showed that gestational age (GA) influenced survival of preterm newborns. The preterm newborns with > 32 weeks GA are more likely to survive than those with < 37 week GA (Figure 1).

DISCUSSION

The mortality of premature babies is a major public health concern, highlighting the need to identify the factors that contribute to the infant mortality of these populations in order to effectively direct local intervention programs. Therefore, this study evaluated the predictors of in-hospital mortality of preterm newborns at the CHUB.

Table 2: Socio-demographic characteristics of study participants

Variable	Number (%)
Residence	
Huye	112 (26.2)
Gisagara	105 (24.6)
Nyanza	54 (12.6)
Ruhango	51 (11.9)
Nyamagabe	39 (9.1)
Nyaruguru	26 ((6.1)
Muhanga	8 (1.9)
Karongi	12 (2.8)
Rusizi	11 (2.6)
Nyamasheke	2 (0.5)
Nyarugenge	1 (0.2)
Kamonyi	4 (0.9)
Attendance of at least one ANC	
No	5 (1.2)
Yes	406 (95.1)
Previous bad obstetrical history	
No	355 (83.1)
Yes	62(14.5)
Mode of delivery	
SVD	220 (51.5)
Emergency cesarean section	140 (32.8)
Elective cesarean section	50 (11.7)
Place of birth	
Hospital	400 (93.7)
Health center	7 (1.6)
Sex of neonate	
Female	218 (51.1)
Male	207 (48.9)
Neonate cried immediately at birth	
No	83 (19.4)
Yes	340 (79.4)
Bag and mask resuscitation	
No	352 (82.1)
Yes	71 (16.6)
Perinatal asphyxia	
No	404 (94.6)
Yes	21 (4.9)
Respiratory distress	
No	175 (41.0)
Yes	251 (58.8)
Hypoglycemia on admission	
No	392 91.8)
Yes	34 (8.0)

Findings showed that KMC associated with up to 40% decrease in mortality and respiratory distress tripled the risk of mortality among premature babies. This aligns with previous studies indicating that KMC decreased mortality in premature and low birth weight babies. A systematic literature review

comparing KMC and conventional neonatal care showed that KMC leads to a 40% reduction in the mortality of infants [5]. This review also showed that KMC reduces hypothermia, nosocomial infection, and hospital length of stay, benefiting the infant in growth breastfeeding and enhancing

Table 3: Factors associated with in-hospital mortality

Variables	p-value	OR	95.0% CI	
			Lower	Upper
Newborn heated with radiant	0.089	1.468	0.943	2.286
Newborn received KMC	0.000*	0.63	0.028	0.140
Neonate received phototherapy	0.609	0.798	0.337	1.891
Newborn diagnosed with sepsis	0.287	0.762	0.462	1.257
Jaundice	0.563	1.265	0.57	2.808
Neonatal hypoglycemia on admission	0.349	1.389	0.698	2.762
Neonatal hypothermia on admission	0.104	1.494	0.921	2.426
Newborn diagnosed with respiratory distress	0.013*	3.132	1.26	7.745
Perinatal asphyxia	0.651	1.201	0.544	2.651
Bag and mask resuscitation	0.587	1.359	0.45	4.104
Newborn cries immediately at birth	0.722	1.211	0.422	3.472

OR: Odd ratio; CI: Confidence interval; KMC: Kangaroo mother care; * Statistically significant

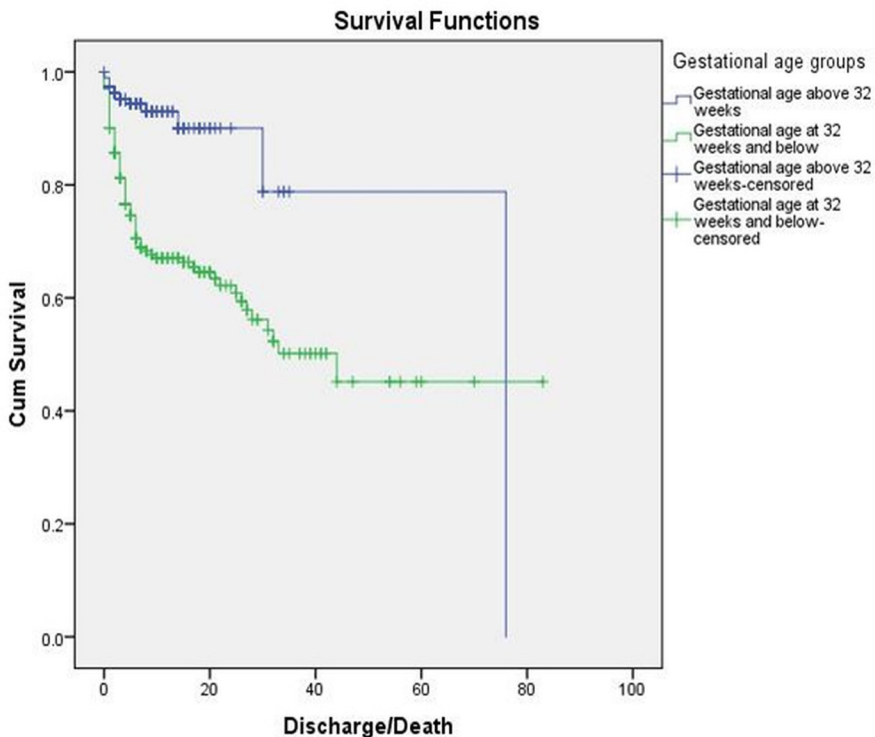


Figure 1: Survival analysis between extreme and very preterm and preterm newborns

mother-infant attachment [5]. KMC is a type of newborn care that involves skin-to-skin contact with the mother or another caregiver [6]. A study in Uganda found that KMC reduced mortality in preterm infants by 6 times [7]. One of the well-known risk factors is distress syndrome and our study confirmed it [8,9]. Our findings are also the same as found by Cupen, Barran and Singh in Trinidad and Tobago, where the length of time on a ventilator machine has been found to be associated with time to death among preterm neonates [10]. This may not be due to the harmful effects of ventilator machines or ventilator techniques but rather to the fact that preterm neonates requiring ventilation are the ones having respiratory problems, including respiratory distress syndrome, and they are known to be associated with mortality among preterm neonates. Apart from respiratory distress, there are other factors identified by previous research studies. A Ugandan study found that preterm infants born to HIV-positive mothers had 5 times higher mortality risks, and newborns not exclusively breastfed had 4 times increased mortality risks [7].

A study conducted in Iran by Haghghi et al. [11] found that gestational age is associated with mortality, and extremely preterm neonates (those born at 28 weeks and below) were less likely to survive than other groups aligning with our findings that < 32 weeks GA preterm neonates were less likely to survive compared to > 32 weeks GA preterm neonates. Similar findings were reported in other previous studies [12]. This may be due to insufficient surfactant production among < 32 weeks GA preterm newborns [13]. Surfactant is a protein produced by lung cells starting 24-28

weeks GA of pregnancy, and by 35 week GA, most neonates have an adequate amount [14]. The lack of surfactant is also associated with an increased risk of respiratory distress syndrome, which might explain higher mortality rates among newborns with lower GA [13,15].

This study was limited by its design which has limitations in determining causal-effect relationships as it is cross-sectional. This study was also conducted in one hospital, which might affect the generalizability of its findings. Finally, we have not exhaustively studied all factors determining the in-hospital mortality of newborns, and we recommend more extensive multi-center studies to deeply explore this area.

CONCLUSION

In this study, predictors of death among preterm neonates included respiratory distress syndrome. Meanwhile, receiving KMC (Kangaroo mother care) has been to be protective (preventive predictor) for time to death. This highlights that measures and strategies are needed to prevent mortality for preterm babies by tackling the factors identified. We recommend the CHUB authorities, the Rwanda Ministry of Health and partners take measures such as promoting maternal health, increasing access to quality care during pregnancy and childbirth, improving neonatal care, and promoting and encouraging KMC and family education. There should be further studies extending beyond one institution in order to better understand and fight against neonatal mortality in Rwanda.

REFERENCES

- [1] T. Van An, N. Van Dung, Z. Kadelburg, and S. Radenović, "Various generalizations of metric spaces and fixed point theorems," *RACSAM*, vol. 109, no. 1, pp. 175–198, Mar. 2015, doi: 10.1007/s13398-014-0173-7.
- [2] M. S. Khurmi, MBBS, MPH et al., "Newborn Survival Case Study in Rwanda - Bottleneck Analysis and Projections in Key Maternal and Child Mortality Rates Using Lives Saved Tool (LiST)," *Int J MCH AIDS*, vol. 6, no. 2, pp. 93–108, Oct. 2017, doi: 10.21106/ijma.214.
- [3] D. Sharma, "Golden hour of neonatal life: Need of the hour," *matern health, neonatol and perinatol*, vol. 3, no. 1, p. 16, Dec. 2017, doi: 10.1186/s40748-017-0057-x.
- [4] P. S. Shah et al., "Sustained quality improvement in outcomes of preterm neonates with a gestational age less than 29 weeks: results from the Evidence-based Practice for Improving Quality Phase 3," *Can. J. Physiol. Pharmacol.*, vol. 97, no. 3, pp. 213–221, Mar. 2019, doi: 10.1139/cjpp-2018-0439.
- [5] A. Conde-Agudelo, J. M. Belizán, and J. Diaz-Rossello, "Kangaroo mother care to reduce morbidity and mortality in low birthweight infants," *Cochrane Database Syst Rev*, no. 3, p. CD002771, Mar. 2011, doi: 10.1002/14651858.CD002771.pub2.
- [6] WHO Immediate KMC Study Group, "Immediate 'Kangaroo Mother Care' and Survival of Infants with Low Birth Weight," *N Engl J Med*, vol. 384, no. 21, pp. 2028–2038, May 2021, doi: 10.1056/NEJMoa2026486.
- [7] C. Opio et al., "Survival time and its predictors in preterm infants in the post-discharge neonatal period: a

- prospective cohort study in Busoga Region, Uganda,” *The Lancet Global Health*, vol. 8, p. S6, Apr. 2020, doi: 10.1016/S2214-109X(20)30147-9.
- [8] A. S. S. Marinonio et al., “Clusters of preterm live births and respiratory distress syndrome-associated neonatal deaths: spatial distribution and cooccurrence patterns,” *BMC Public Health*, vol. 22, no. 1, p. 1226, Jun. 2022, doi: 10.1186/s12889-022-13629-4.
- [9] B. D. Kamath, E. R. MacGuire, E. M. McClure, R. L. Goldenberg, and A. H. Jobe, “Neonatal Mortality From Respiratory Distress Syndrome: Lessons for Low-Resource Countries,” *Pediatrics*, vol. 127, no. 6, pp. 1139–1146, Jun. 2011, doi: 10.1542/peds.2010-3212.
- [10] K. Cupen, A. Barran, V. Singh, and I. Dialsingh, “Risk Factors Associated with Preterm Neonatal Mortality: A Case Study Using Data from Mt. Hope Women’s Hospital in Trinidad and Tobago,” *Children*, vol. 4, no. 12, p. 108, Dec. 2017, doi: 10.3390/children4120108.
- [11] L. Haghghi, M. Nojomi, B. Mohabbatian, and Z. Najmi, “Survival predictors of preterm neonates: Hospital based study in Iran (2010-2011),” *Iran J Reprod Med*, vol. 11, no. 12, pp. 957–964, Dec. 2013.
- [12] M. C. Walsh et al., “Neonatal outcomes of moderately preterm infants compared to extremely preterm infants,” *Pediatr Res*, vol. 82, no. 2, pp. 297–304, Aug. 2017, doi: 10.1038/pr.2017.46.
- [13] N. Kültürsay, Ö. Uygur, and M. Yalaz, “The use of surfactant in the neonatal period- the known aspects, those still under research and those which need to be investigated further,” *Turk Pediatri Ars*, vol. 49, no. 1, pp. 1–12, Mar. 2014, doi: 10.5152/tpa.2014.963.
- [14] L. Wang et al., “Efficacy of surfactant at different gestational ages for infants with respiratory distress syndrome,” *Int J Clin Exp Med*, vol. 8, no. 8, pp. 13783–13789, 2015.
- [15] C. C.-H. Ma and S. Ma, “The role of surfactant in respiratory distress syndrome,” *Open Respir Med J*, vol. 6, pp. 44–53, 2012, doi: 10.2174/1874306401206010044.

The National Health Insurance Scheme (NHIS) and the Attainment of Universal Health Coverage in Zambia

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INTRODUCTION

Zambia, together with over 133 other members of the World Health Organization (WHO), became a signatory to the historic Alma-Ata Declaration of 1978, which was a WHO blueprint that enabled Primary Health Care (PHC) to become the official health policy for all member countries at the International Conference on PHC which was held in Alma-Ata, USSR, on 6-12 September 1978 [1]. PHC is defined as the essential health care made accessible universally to all families and individuals in a community in ways that are acceptable to them. It involves their full participation and is done at a cost that the community and country can afford [2]. PHC addresses the main health problems faced in communities by providing a wide range of preventive, curative, promotive, and rehabilitative services to the members. As these services evolve from a particular country's economic and social values and the characteristics of its communities, they are thus bound to vary country by country and community by community. Despite the existence of these variations, they must include however at least; the promotion of proper nutrition, the supply of adequate safe and clean water, the improvement

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of basic sanitation, maternal and child healthcare which is to include family planning, antenatal services, immunization of children against the major infectious diseases they face, the prevention and control of locally endemic diseases, the education of citizens concerning prevailing health problems and also methods of disease control [3]. Globally, this PHC concept is regarded as being very important and the cornerstone of building strong health systems and a vital pillar in ensuring that every individual has access to essential healthcare services at as little a cost or no cost at all.

On this background, the principle of Universal Health Coverage (UHC) was built. The UHC concept means that every individual and

community is able to receive the health services they need without suffering much financial hardship and challenges [4]. The UHC implies that patients receive a comprehensive package offering a full spectrum of essential and quality health services, which start from health promotion in order to encourage healthy lifestyles among citizens to health prevention which focuses on helping people not to get sick; then, the treatment, rehabilitation, and indeed palliative care services across the life course of citizens. In essence, the UHC concept rides on ensuring that PHC is first attained; citizens in the most rural places receive the highest attainable form of basic healthcare needs, and when the need to go for advanced healthcare services arises, they are able to access

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them without suffering catastrophic out-of-pocket healthcare expenditure. This UHC concept is derived from the 1948 Constitution of the WHO, which declares and establishes health as a fundamental human right and equally commits to ensuring the highest attainable level of health for all [4]. The achievement of UHC is a major health target for governments across the globe which was firmly set when members adopted the Sustainable Development Goals (SDGs) in 2015 [5]. To attain UHC, a nation must first make PHC services available to its citizens and then come up with ways its citizens can attain an advanced continuum of care without suffering catastrophic healthcare expenditure.

Inequality of access to health care remains a major threat to many poor and underprivileged individuals around the world; it is estimated that over 400 million people around the world do not have proper means to access quality healthcare services while another 150 million individuals are plunged into financial debt every year due to the amount of debt incurred from healthcare spending [6]. Providing affordable healthcare services to citizens worldwide remains a major priority for most governments.

Zambia, being a developing country with a high proportion of its citizens living in poverty, is one such nation that has struggled to make provision of PHC for all its citizens possible and subsequently attains UHC. However, challenges have ranged from inadequate funding to the Ministry of Health (MOH), lack of proper infrastructure across the country, and lack of human capital.

THE NATIONAL HEALTH INSURANCE SCHEME (NHIS)

The introduction of the National Health Insurance Scheme (NHIS) in 2018 was a product of many years of planning and preparation for the country to have a sound and reliable healthcare financing model for Zambian households to provide UHC accessible to all. The National Health Insurance Management Authority (NHIMA) is the statutory body established to manage the NHIS. The NHIMA holds a pool of funds meant to be used to improve the efficiency, delivery, and management of health resources to protect the Zambian people against catastrophic expenditures on health in times of need [7].

The NHIS, initially run under the Ministry of

Health, is now under the Zambian Ministry of Labor and Social Security. The scheme is designed to provide a reliable financing method for Zambia's healthcare system, which for many years proved to be very costly for the government. The NHIS is a result of the government's efforts to achieve UHC [8,9]. This scheme was set to become the main provider of national health insurance in Zambia, compulsory for all citizens in the country in contrast to those provided for and run by private companies. The scheme is mandated by law to provide access to quality but affordable healthcare for all citizens.

Through the NHIS Act No. 2 of 2018 by the Zambian government [10], the financing plan is that all salaried employees have a one percent premium cut from their salaries on a graduated scale. These deductions of one percent of earnings for all those in formal employment are then matched by a further one percent contribution from the employer. Thus, a total of two percent (2%) of an employee's contribution will subsequently be given to NHIMA as an individual's premium. For the self-employed and others in the informal sector, only 1% of their declared income is deducted. However, all citizens above 65 years of age and all those below 18 years are exempted from paying the scheme contributions to NHIMA [10].

As of October 2019, a month after operationalization, enrollment for formal and informal sector populations stood at 950,000 members out of NHIMA's target of 3.4 million members it had planned to have in its database [11]. By the end of 2021, a total of 1,200,000 were registered. This registration translated into the eligibility of an estimated seven million beneficiaries who were to be registered on the scheme, considering the registration of a legal spouse as a principal member and up to five children and the inclusion of dependents who are below the age of 18 entitled to benefits under one principal member's account [11,12].

The formal sector accounts for the highest number of individuals covered (98%). However, the coverage of individuals in the informal sector, which today makes up over 80% of the Zambian workforce, has proven to be more challenging and still remains very low (16%). However, the introduction of NHIMA resulted in a significant increase of Zambians with access to health

insurance from 4% before the implementation of NHIS to an estimated 40% [12].

To grow the number of individuals covered under the NHIS and encourage those largely in the informal sector who have not been captured to come forth and register, NHIMA has set an ambitious target of widening the scope of services it offers so as to make it more competitive than other schemes offered by other insurance companies in Zambia. Under the NHIS, clients have access to out-patient department registration and consultation, pharmaceuticals and blood products services, surgical services, maternal, new-born and pediatric services, inpatient care services, vision care and spectacles, physiotherapy and rehabilitation services, dental and oral health services, cancer/oncology services, medical/orthopedic appliances, and prosthesis [13]. When analyzed broadly, this scope does fulfill the UHC implication that patients receive the full spectrum of essential, quality health services, starting from health promotion to encourage healthy lifestyles, prevention, treatment, rehabilitation, and indeed palliative care services across the life course of citizens. To bring this UHC concept as close as possible to the people, NHIMA aims to enroll over 10 million Zambians or approximately 3 million people, in the informal sector by the end of 2023 [12]. To achieve this goal, NHIMA continues to increase facilities accredited to it and has been carrying out massive advertisements and awareness programs to educate the general public on how NHIS functions and the services offered. As a result, NHIMA had a total of 275 accredited health facilities across the country, both private and government-owned, as of June 2022, which grew to 316 as of December 2022 [12].

According to the Living Conditions Monitoring Survey report by the Central Statistical Office of Zambia of 2015, 54.4% of the total Zambian population lives below the poverty line (USD1.09 a day), of which 40.8% are classified as living in extreme poverty [10]. These extremely high levels of inequality divide the country, especially between urban and rural areas [14]. To provide poor people with access to UHC, the NHIS-accredited facilities include clinics, mini-hospitals, district hospitals, and tertiary hospitals. Low-level health facilities such as clinics and rural health posts exempt patients with limited resources from paying any fees and act as the primary point of access to care.

Patients that cannot be managed at these facilities are then referred to higher-level hospitals to benefit from the further affordable NHIS services

MAKING THE NHIS INCLUSIVE

To mitigate the challenge from levied amounts for those with financial difficulties, the NHIMA has embarked on the development of a policy through a project called “Accelerating the extension of the Zambia National Health Insurance scheme to the poor and vulnerable” in collaboration with International Labor Organization, the Ministries of Labor & Social Security in Zambia, the Ministry of Community Development and Social Welfare, the ministry of health, and that of Finance. Through this initiative, those deemed poor and vulnerable under the Zambian Social Cash Transfer (SCT) scheme program are boarded onto the scheme with exemption [15]. This policy's successful introduction and implementation eliminated the barriers for those with limited resources to access healthcare services through NHIS. The SCT scheme in Zambia started in 2003, targeting the most vulnerable in society to enable them to meet their basic needs in areas such as shelter, health, food, and education [16]. In Zambia, SCT beneficiaries receive 90 Kwacha, which is paid bimonthly, for a total of 180 Kwacha per payment. Persons with disabilities receive 300 Kwacha, twice as much as other vulnerable people [16].

CONCLUSION

Zambia has taken multiple deliberate steps over the years to attain UHC in the country, including enhancing PHC, recruiting more staff, and developing an NHIS. The implementation of the NHIS in Zambia has significantly changed healthcare financing in Zambia by providing a predictable means of paying for healthcare. Despite the challenges the scheme might experience in its infancy, progressive strides are being made to ensure Zambians have access to affordable healthcare as much as possible. Initiatives such as enrolling vulnerable people into the NHIS through the SCT scheme make it inclusive, leaving no one behind in attaining UHC in the country. The health authorities in Zambia should establish strategies and measures to keep developing, improving, and expanding the UHC through NHIS. Affordable healthcare is a human right, and none should be

left behind, especially in developing countries like Zambia, with a resource-limited population.

REFERENCES

- [1] WHO, “Declaration of Astana,” Who, pp. 2893–2894, 2018.
- [2] S. B. Rifkin, “Alma Ata after 40 years: Primary Health Care and Health for All—from consensus to complexity,” *BMJ Glob. Health*, vol. 3, Jan. 2018, doi: 10.1136/BMJGH-2018-001188.
- [3] World Health Organization and UNICEF, “Primary health care: a joint report by the director-general of the WHO and the executive director of the UN children’s fund,” *Int. Conf. Prim. Health Care*, p. 80, 1978.
- [4] “WHO | What is universal coverage?” https://www.who.int/health_financing/universal_coverage_definition/en/ (accessed May 22, 2020).
- [5] UHC2030, “Moving Together to Build a Healthier World: Key Asks from the UHC Movement UN High-Level Meeting on Universal Health Coverage,” 2019.
- [6] Ifeagwu, S. C., Yang, J. C., Parkes-Ratanshi, R., & Brayne, C. (2021). Health financing for universal health coverage in Sub-Saharan Africa: A systematic review. *Global Health Research and Policy*, 6(1), 1–9. <https://doi.org/10.1186/S41256-021-00190-7/FIGURES/4>
- [7] “Ministerial Statement on NHIMA.” https://www.parliament.gov.zm/sites/default/files/images/publication_docs/Ministerial Statement on National Health Insurance Scheme_1.pdf (accessed Jun. 08, 2022).
- [8] “Rifkin, S. B. (2018). Alma Ata after 40 years: Primary Health Care and Health for All—from consensus to complexity. *BMJ Global Health*, 3. <https://doi.org/10.1136/BMJGH-2018-001188>”.
- [9] “NHIMA.” <https://www.nhima.co.zm/health-care-providers> (accessed Jan. 04, 2023).
- [10] “THE NATIONAL HEALTH INSURANCE ACT 2018 ARRANGEMENT OF SECTIONS PART I PRELIMINARY PROVISIONS 1. Short title and Commencement 2. Interpretation 3. Application and power of exemption”.
- [11] NHIMA, “National Health Insurance Management Authority Press Release,” no. January, pp. 1–41, 2020.
- [12] NHIMA, “NHIMA Newsletter,” 2021. [Online]. Available: <https://www.nhima.co.zm/download/document/dc79822b1e202201077c54f895.pdf>
- [13] “Insurance, H., & Package, B. (n.d.). Protect your family’s future. Insure and enjoy peace of mind.”
- [14] A. Lysén, “Poverty analysis Zambia 2018”.
- [15] “Moono, J. 2022. Zambia—Socialprotection-pfm. (n.d.). Retrieved January 4, 2023, from <https://socialprotection-pfm.org/partner-countries/zambia/>”
- [16] P. Arruda and L. Dubois, “A brief history of Zambia’s”.

About the Rwanda Public Health Bulletin (RPHB)

The Rwanda Public Health Bulletin (RPHB) is a printed and open access, peer-reviewed journal, published as the flagship scientific and technical periodical publication. RPHB is a public health bulletin launched in March 2019 by the Rwandan Ministry of Health, through the Rwanda Biomedical Centre (RBC) in collaboration with the CDC Foundation and with support from Bloomberg Philanthropies Data for Health Initiative.

Mission

To serve as a scientific information dissemination platform of national and international significance, mainly in areas related to the Rwanda Ministry of Health's essential mission to strengthen national and local health systems and improve the health of the people of Rwanda. The Rwanda Public Health Bulletin publishes disease surveillance summaries, public health response guidelines, public health notices, case reports, outbreak reports, original research papers, and policy briefs among others. It generally features issues of importance to its targeted audience, which is health professionals, academic researchers, policymakers and anybody interested in health issues. Articles for publication are received from doctors, nurses, allied health professionals, students, policymakers, government bodies, non-governmental bodies and others.

Aim

To bridge the gap in public health information sharing between policy-makers, researchers, health professionals and practitioners.

Publisher

RPHB is a publication of the Rwanda Health Communication Centre (RHCC) which is the communication arm of the Rwanda Ministry of Health and operating under the Rwanda Biomedical Centre (RBC).

Registration

Online ISSN: 2663 - 4651

INSTRUCTIONS TO AUTHORS

All works submitted to this bulletin will have to belong to the types of articles stated below:

1. ORIGINAL RESEARCH

Referred to as “Primary Research” pioneer in a determined domain. It can be from various aspects: Clinical features, pathophysiology, biochemistry, molecular biology, etc...

THE TITLE

The title of the article should be concise and informative. It should contain enough thoughts on the subject.

ABSTRACT

Abstract of 250 words maximum must accompany each manuscript and be divided into 4 paragraphs with the following headings and MeSH keywords:

Introduction: stating the purposes/aims of the work; the research undertaken, the hypothesis tested or the procedure evaluated.

Materials and methods: briefly stating what was done and what materials were used, including the number of subjects, the methods to assess the data and to control bias.

Results: Providing key findings of the study, including indicators of statistical significance, actual numbers, as well as percentages.

Conclusion: Summarizing in 1 or 2 sentences the work on the basis of the findings. It emphasizes new and important aspects of the study or observations.

THE MAIN TEXT

The text of observational and experimental articles is divided into sections with the following headings: Introduction: should always begin the text, and requires brevity and focuses. It conveys the nature and purpose of the work, and quotes the relevant literature. Only strictly pertinent background

information is necessary for understanding why the topic is important. We suggest the final paragraph clearly states the hypothesis or purpose of the study.

METHODS

Details of clinical and technical procedures should follow the introduction. A clear description of the selection of the observational or experimental subjects should be given. The identification of all aspects of the study, its reasoning, and the related relevance should be explicitly justified. In case, the study was done in a particular way, the guiding principles should all be clarified. Exclusion and inclusion criteria or partial inclusion, the reliability index, the confidentiality index, the analysis step, and the data collection processes should be also carefully specified. This section should provide sufficient details on the methods, instrumentation, procedures, all drugs and chemicals used (including generic names, doses, routes of administration). It should allow other workers to reproduce the study if necessary.

This section should also state the self-evaluation of the study by: independent/consensus readings blinded or unblinded to other information and estimate the fluctuation of recall biases by random ordering of studies.

Be clear about the retrospective or prospective nature of the study. Finally, provide references to established methods, including statistical methods that have been published, forthcoming, or that may not be well known. New description or substantially modified methods may be used however, give reasons for the use of these techniques, and evaluate their limitations. Statistical methods should be described with enough details to enable a knowledgeable reader with access to the original data to verify the reported results. A general description of methods would be defined in the methods section, whereas a specific statistical method used into analysis would be summarized in the results section. Any general use of the computer program should be

specified, and more details have to be clarified about any randomization issues.

RESULTS

Logical sequence of presentation of results is required in the text; along with tables, and illustrations. Repetition of data from illustrations into the text should be avoided; however, emphasize or summary of only important observations would be helpful. Avoid the “non-technical use” of technical terms in statistics which should be defined and reserved for the right purpose. Moreover, define all those statistical terms aside with or including abbreviations and/or most used symbols. Any complication and/or unexpected finding should be reported and the more possibly explained and the author should report lost to follow up and dropouts from a clinical trial.

DISCUSSION

Use ample subheadings. Emphasize the new and important aspects of the study and the conclusions that follow from them. Avoid repetition of details included in other parts. This section requires the mention of the implication of the findings, and their limitations for future research, involving relating the observations to other relevant studies.

Finally, the conclusions should be linked to the goals of the study; though mostly avoiding:

Unqualified statement not completely supported by the data

Statement on economic benefits and costs unless the report includes economic data and analyses

Claim of priority and alluding to work that has not been completed.

Whereas new hypotheses could be suggested when warranted, but they should be clearly labeled as such and recommendations, when appropriate and needed, may be given.

Acknowledgments

List all contributors who do not meet the criteria of authorship, such as those who provided purely technical help, writing assistance, or a department chair who provided only general support; and their respective contribution will be headed as provided. Everybody must have given written permission to be acknowledged. References: References should be numbered consecutively in the order in which they were first mentioned in the text. They will be identified in the text, tables, and legends by Arabic numbers. This bulletin uses the IEEE style (Institute of Electrical and Electronics Engineers) for referencing the citations. It is advised to avoid citations or personal communication unless they provide essential and pertinent information. In all case, the name of the person and date of communication should be cited in parentheses in the text.

2. CHECKLIST FOR SURVEILLANCE REPORTS

Disease surveillance summaries are reported following the checklist below:

Title: Compose a title that includes the name of the health condition, population, time and place.

Abstract: Provide a structured abstract including the following sub-headings: Background; Objectives; Methods; Results; and Conclusion.

INTRODUCTION

Context: Summarize the current situation regarding the health condition under surveillance and identify why it is important. Objectives: State the objective of the surveillance report.

METHODS

Setting: Describe the setting, locations and dates of the surveillance period.

Population: Describe the population under surveillance. Definitions: Provide definitions for each health event under surveillance, including

case definitions and any public health interventions.

Information sources: Describe all data sources, including the objective of any surveillance systems, what data were collected and how data were gathered, transferred and stored. Supplementary data: If appropriate, note where to access supplemental material (e.g., www.opendata.gc.ca).

Data quality, missing data and reporting delays: Describe how the data quality was assessed. Explain how missing data were addressed. If data is reported by date of diagnosis or symptom onset, include a statement about whether the data for the most recent periods may be revised.

DATA ANALYSIS

Describe any analytical methods used providing sufficient detail to enable a knowledgeable reader with access to the original data to judge its appropriateness and to assess the reported results.

RESULTS

Descriptive: Provide a summary of the descriptive data, including demographics.

Data Quality: Report on data quality (e.g., completeness, missing data, under reporting)

Analytic data: Provide a summary of the analysis including (when indicated) estimates of trends. When applicable, point estimates should include appropriate indicators of measurement error such as 95% confidence intervals (e.g., average annual percentage change used to describe trends or odds ratios used to describe subgroup differences).

Figures: Create the minimum number of figures to highlight key results. Create a title that includes person, time and place.

DISCUSSION

Key results: Summarize key results with reference to study objectives

Comparison: Consider these findings in relation to the current literature. Strengths and weaknesses: Discuss the strengths and weaknesses of the study (data quality, completeness, sources of

potential bias). Interpretation and generalizability: Provide a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies and other relevant evidence.

Conclusion: Ensure conclusions address objectives and follow from the results.

3. PUBLIC HEALTH NOTICES / OUTBREAK REPORTS

Following the Center for Disease Control recommendations, for public health notices and outbreak reports to be published they need to cover all four components as stated below:

INTRODUCTION

Generally, the introductory paragraph should begin with 1 to 3 sentences establishing the existence of the outbreak or underlying public health problem (e.g., “On January 2, 2008, the Nevada State Health Division contacted CDC concerning surveillance reports received regarding two persons recently diagnosed with acute hepatitis C.”). The introductory paragraph also usually contains: a) a statement that an investigation was conducted, when and by whom; b) the most important finding(s); c) the actions taken to stem the outbreak; and d) a statement of the public health implications and actions that should be taken in response to the investigation. Investigation and results: First, present the initial investigation and its findings. This might include: 1) a description of the setting and a statement of how the outbreak came to the attention of health authorities; 2) a clinical description of the index case or initial cases; 3) initial key test results; and 4) hypothesis generation activities and results. Next, summarize the full investigation, including: case definition, case-finding activities, method of investigation, and results. Cases should be counted and described by clinical characteristics, treatment, and outcome, as well as time, place, and person descriptive results. Next, present the methods and results of any analytic epidemiologic studies (e.g.,

cohort or case-control studies). Finally, provide the results of any relevant microbiologic, genetic, or toxicologic results, followed by the results of any testing of environmental samples. Public health response: When appropriate, a brief description summarizing any public health interventions taken and the results of the interventions follows.

DISCUSSION

Same as for a Full Report, except that a Limitations paragraph might not be required for an Outbreak Report.

4. POLICY BRIEFS

This bulletin will use guidelines on reporting/publishing policy notes as they are suggested by the Center for Disease Control (CDC). As the CDC defines them; Policy Notes are intended to announce new official policies or recommendations (e.g., from ACIP or CDC). These reports can be thought of as briefs. Maximum word count at submission is 1,400 words. Up to three tables, figures, or boxes may be included. Policy Notes contain no Discussion or Limitations, and a summary box is not required. Although policy notes or brief might vary, following is a rough guide of what basic notes should have: Introduction: The introductory paragraph should be limited to 150–200 words. It might contain all or some of the following components: a brief introductory statement orienting the reader to the topic and placing it in context, a brief description of the public health problem, a brief statement of the rationale for the policy or recommendation, mention of the most important parts of the policy or recommendations, and one or two sentences stating the conclusions and the public health implications of the new policy or recommendations.

BACKGROUND

The Policy Note should include a paragraph after the introduction that summarizes background information relevant to the policy

or recommendation that can help the reader understand the context and need for the policy or recommendation.

Methods: Should include a summary of the methods used to establish the policy or recommendation, including answers to some or all of these questions: Who was involved in the production of the guidelines or recommendations, and how? What evidence base was considered? What was the rationale for considering this evidence base? Was other evidence excluded from consideration and, if so, why? **Rationale and evidence:** The Policy Note should provide a concise review of the rationale for the policy or recommendation and a descriptive review of the scientific evidence used to establish it. It should include an explanation of how the policy or recommendation adds to, or differs from, relevant policies or recommendations established previously. **Presentation of the policy or recommendation:** The policy or recommendation should state clearly when it takes effect and to whom and under what circumstances it applies.

DISCUSSION OR COMMENT

The Policy Note should comment on the likely impact of the new policy or recommendation and plans for assessment of the policy or recommendation

5. CASE REPORTS

These are reports of an individual patient on their symptoms, treatment reactions on a disease or condition of interest. These reports normally focus on unusual reactions or occurrences. Similar cases to other research reports, case reports might include a literature review of previous similar. Case reports might also address positive patient outcome on particular treatment guidelines or individual impact of a particular intervention. These are mainly used for educational and decision-making purposes. Case reports are normally reported following a checklist found at the CARE Guidelines.

6. CASE STUDIES

We recommend authors to follow the “EQUATOR Network” for ample explanations and guidelines in the writing of such articles. They have to be well-described case studies on health care interventions of public health concern. These could be:

Rigorous assessments of processes and program interventions.

Recommendations on possible health interventions.

Never on individual patient (= case report)

7. COMMENTARIES / OPINION / METHODOLOGY ARTICLES

We recommend authors to follow the “EQUATOR Network” for ample explanations and guidelines in the writing of such articles. Though these articles are moderated, they should be:

Short, focused, opinionated to previous articles or any subject related to the journal entirely. Contemporary and focusing on specific issues. Normally up to 800 words.

Frank critics to the journal are bravely motivated and would be as much as possible published.

8. FORMATTING THE MANUSCRIPT

Please note that articles which are not correctly formatted will be returned to the authors

Format text: Style: No Spacing, Single column, Single Spacing

Font: Single Spacing, Times New Roman - size 12

Titles: Capitals and bold, size 14

Format tables: Times New Roman, Font size 9

No vertical lines. Horizontal lines in the table can be removed. No table should be larger than a single A4 page. Footnote should be size 9 and italic

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