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Factors associated with consistent condom use in Ugandan fishing communities' cohort

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Abstract

Introduction: *fishing communities continue to face a heavy burden of HIV-infection. Access to HIV prevention methods remains problematic. Provision of affordable interventions such as condoms can help, but there is limited information on consistent condom use and associated factors among members of fishing communities around Lake Victoria.* ***Methods:*** *we promoted and provided free condoms to HIV negative fisherfolks enrolled in a longitudinal observational cohort between 2012 and 2017 in Uganda. We defined consistent condom use as a participant self-reporting 100% condom use while having sex with a new sexual partner.* ***Results:*** *in total 615 persons were analysed. Of these 63 (10.2%) reported consistent condom use. Being male, Muslim and mobile were independently associated with high consistent condom use while having sex under influence of alcohol and having genital discharge or sores were associated with low use.* ***Conclusion:*** *findings suggest low consistent condom use, calling for attention to barriers to consistent condom use.*

Introduction

Global HIV burden and interventions: according to the UNAIDS, 2018 report, 1.8 million new HIV infections occurred in 2017, worldwide [1]. Nearly two-thirds of these infections happened in sub-Saharan Africa (SSA) [1]. The new HIV infections are highest in key populations, such as fishing communities, people who inject drugs, commercial sex workers and men who have sex with men, who account for nearly half of new HIV infections in SSA [1]. These infections are happening in the presence of several biomedical and behavioral interventions that have been tested and proven effective against HIV and other sexually transmitted infections. The biomedical interventions have included antiretroviral therapy (ART) in the form of treatment for HIV positive individuals as a means of reducing their risk of transmitting HIV, post exposure prophylaxis (PEP), pre-exposure prophylaxis (PrEP), medical male circumcision (MMC) and condoms (could be behavioral as well). While behavioral interventions include abstinence, being faithful to one sexual partner, and HIV testing and counselling. Although gains have been noted over the past 20 years from the peak of the HIV epidemic, available interventions have been affected by sub optimal adherence and/or lack of access especially in SSA [2]. New interventions and strategies may be required to end the epidemic. Therefore, an affordable, safe and effective HIV vaccine is needed to overcome poor adherence and other issues related to access of available interventions.

In the absence of an effective HIV vaccine, promotion and provision of accessible and affordable interventions such as condoms can help improve access and reduce the risk of HIV infections in key populations such as people in fishing communities on the shores of Lake Victoria. In these communities, the HIV prevalence and incidence are four times higher than that estimated in the general population [3-6]. This population is confined to isolated locations with limited or no access to healthcare services, but interacts with the general population through fish trade and could extend the HIV transmission network. Much of the available literature about condom use is drawn from HIV discordant couples, people living with HIV/AIDS or populations with moderate HIV risk, but there is limited information on consistent condom use among HIV negative members of fishing communities around Lake Victoria [7]. Condoms, if correctly and consistently used, are estimated to reduce the risk of HIV transmission by 60% to 96% among heterosexuals in general [8,9] and 78% to 100% in the HIV serodiscordant couples [7,10]. However, condom use in relatively stable populations in SSA is very low and, in most cases, they are inconsistently used due to socio-cultural, economic and environmental factors [11-14]. Even with promotion and provision of free condoms, their use remains low in many sub-Saharan African populations, where HIV infections are very

high [7]. This calls for a study of the factors associated with consistent condom use in order to design targeted interventions to maximize effectiveness, especially in highly mobile key populations with high HIV incidence and prevalence.

In Jan 2012, Medical Research Council/Uganda Virus Research Institute, in collaboration with the International Aids Vaccine Initiative established a fishing population longitudinal observational cohort in Masaka, about 100km Southwest of Kampala, the capital of Uganda, to create a pool of volunteers to participate in future HIV vaccine efficacy trials, understand the risk factors to HIV acquisition and determine retention in follow up. The cohort was established at MRC/UVRI and LSHTM Uganda Research Unit´s field station, located about 50km from the fish landing sites. In this cohort, data on male condom use were collected every six months. We use this data to determine the proportion of participants reporting consistent condom use with a new sexual partner and to study factors associated with self-reported consistent condom use.

Methods

Study setting: we report data from IAVI Protocol B, "a prospective, open observational cohort, to determine HIV incidence in preparation for future preventive HIV vaccine clinical trials", previously described [15,16]. The cohort enrolled participants from five fishing communities on the shores of Lake Victoria in Masaka District, Uganda. Participant identification: Trained field workers went to the fish landing sites and invited adults, aged 18-49 years. Consenting volunteers were provided with HIV counselling and testing (HCT) and screened for high risk of acquiring HIV. High risk was defined as self-report of any of the following in the 3 months preceding the interview: unprotected sex with one or more or new sexual partner(s), history of sexually transmitted infections, use of illicit drugs and/or alcohol, being away from home for two or more nights per week. Those found to be HIV negative and at high risk of HIV infection were referred to the study clinic in Masaka town for further screening and enrolment.

Participant enrolment and follow up: at the study clinic, a study team used an interviewer-administered questionnaire to record a participant´s locator details (physical location and phone contacts). They were re-examined for high risk (same criteria as above), a repeat HCT done, and separate questionnaires were used to record demographics, behavioral risk, and medical assessments. Those eligible (HIV negative, aged 18-49 years and at high risk of HIV infection) were enrolled into a longitudinal observational cohort with visits that included quarterly HCT and HIV behavioral risk assessment, at every six months over a period of two years. At each clinic visit, participants were counselled, trained and provided with condoms enough to last until the next scheduled visit. They were also encouraged to pick more condoms from the cohort clinic if their stock got depleted before the next scheduled clinic visit; this clinic is 50Km away from the landing sites, where the participants reside. At each visit, participants were asked if they had had sex with a new sexual partner, other than the regular partner and, if so, how frequently they used a condom while having sex with this new partner.

Laboratory HIV testing: HIV testing was carried out at the MRC/UVRI and LSHTM clinical diagnostic laboratories. HIV antibody rapid test was performed using Alere Determine TM HIV-1/2 (Alere Medical Co Ltd, Matsuhidai, Matsudo-shi, Chiba, Japan). Rapid HIV positive test results were confirmed by two parallel enzyme linked immunosorbent assay (ELISA) tests (Murex Biotech Limited, Dartford, United Kingdom, and Vironostika, BioMérieux boxtel, The Netherlands). Either Statpak (Chembio Diagnostic Systems Inc., USA) or Western Blot (Cambridge Biotech, USA) was used to break the tie.

Statistical methods

Sample size: the minimum sample size for this research was based on 80% power, two-sided level of statistical significance of 5% to detect a proportion of consistent condom use among fisherfolks of 7% with ± 5% precision (assumed from a study by Smolak *et al.* 2014) [17]. Under these assumptions, a sample size of 290 participants would be sufficient. Because the data were already available in a soft format, we applied the inclusion criteria to the available data and analysed all those records fulfilling the criteria.

Statistical analysis: all the data were managed in MS Access 2003 (Microsoft Corporation, Redmond, WA) and analyzed in Stata 14.0 (Stata Corp, College Station, TX, USA). Participants´ baseline socio-demographic data, risk-behavior and clinical variables were summarized overall and by gender using frequencies and percentages. Our main outcome for this study was a report of consistent condom use. We defined consistent condom use as a participant 100% self-reporting condom use while having sex with a new sexual partner, at all times at the time of follow up within the two years. All the participants that reported irregular use (sometimes (<100%) using condoms with their new partners) or non-use (not using condoms with any new sexual partner) were classified as non-consistent condom users. The proportion of consistent condom use was estimated as the number of participants who reported consistent condom use at all visits, divided by the total number of participants, expressed as a percentage. The proportion of consistent and non- consistent condom use was summarized by participants´ demographic variables. We used generalized estimating equations (GEE) logit models, allowing for intra participant correlation (because participants had multiple records) by using robust standard errors assuming exchangeable correlation matrix. Factors associated with consistent condom use at p<0.20 at univariate analysis (except for age group that was included a priori) were included in a backward elimination multivariable GEE logit model. In the final model, p values less than 5% were considered statistically significant. As a secondary investigation, we estimated HIV incidence as the number of HIV positive cases divided by the total person years at risk (PYAR) expressed as per 100 PYAR. Person years at risk were calculated as the sum of the time from enrolment date to the date of the last HIV seronegative result, or to the estimated date of HIV infection. The date of HIV infection was defined as the midpoint date between last HIV-negative and the first HIV-positive result dates.

Ethics approval and consent to participate: the Uganda Virus Research Institute (UVRI) Research and Ethics Committee and the Uganda National Council for Science and Technology approved the conduct of the cohort before it was started. Before enrolment, each of the participants signed a written informed consent form. Participants that acquired HIV during follow up were referred to a local antiretroviral therapy provider for HIV care and treatment.

Results

Screening and enrolment: between Jan 2012 and Dec 2017, 1,282 participants (62.3% men), mean age 28 years SD=7.1 were screened (Figure 1). Of these, 981 (67.8% men), mean age 28 years SD=6.9 were enrolled into the cohort. The primary reason for not being enrolled was low risk for HIV acquisition (85.8%) (Figure 1). Compared to the enrolled participants, those not enrolled were older (mean age of 30 years vs 28 years, p<0.01).

Participants included in the analysis: of the 981 participants enrolled, 890 (90.7%) completed at least one follow-up clinic visit (Figure 1). Of the 890 participants, 615 (69.1%) reported having a new sexual partner on at least one visit while participating in the study and were eligible for this analysis. Two hundred and seventy-five participants were excluded from the analysis because they did not report a new sexual partner at any of the follow-up clinic visits, and therefore

were not administered questions on condom use with new partners. Comparing the baseline characteristics of 615 participants included in the analysis to 275 that were not, those included were younger (mean age of 27 years vs. 29 years, p<0.01), and males 75.6% vs 54.9%, p<0.01. They were more likely to be single (divorced or never married) 52.2% vs 30.6%, p<0.01 and more likely to have lived in the community for one year or less 34.3% vs 28.0%, p=0.063.

Analyzed participants´ baseline characteristics: of the 615 participants that reported a new sexual partner, 75.6% were male, 81.8% aged below 35 years, 73.8% had primary education and 81.1% were of Christian faith (Table 1). Less than half, (47.8%) were married, 61.8% reported fishing or fishing related activities as their primary occupation, two thirds had lived in the fishing community for five years or less, 15.9% reported use of illicit drugs and a half reported staying away from home for > 2 nights per week in the three months prior to enrollment (Table 1).

Stratified by gender: majority of the males (82.4%) were aged < 35 years, three quarters had attained primary education, were mostly Christians (81.1%), employed in fishing or fishing related occupations (75.9%), considered themselves married (52.5%), lived in the community for greater than one year (72.9%) and had stayed away from home >2 nights per week in the preceding three months (56.1%) (Table 1). Similarly, (80.0%) of the females were aged <35 years, two thirds had attained primary education, were mostly Christians (81.3%), single (divorced or never married) (66.7%), working in restaurants/hair salon/bar (34.7%) and had lived in the community for one year or less (56.7%) (Table 1).

Consistent condom use: overall, 63 (10.2%) of 615 participants that completed at least one follow-up clinic visit, reported consistent condom use with a new sexual partner at each sexual act in the last three months (Table 2). In total, 552 participants reported non-consistent condom use, with 199 (32.4%) reporting irregular condom use (i.e., sometimes using condoms with their new partners) and 353 (57.4%) reporting never using condoms at all visits. The proportion of consistent condom use with a new sexual partner was higher among males 11.0% compared to females 8.0% and lower among Banyarwanda 5.7% compared to Baganda 11.9%, Banyankole 9.6% and other tribes 11.9% (Table 2). Furthermore, the proportion was lower among those reporting no education at all 6.1% compared to 10.7% and 10.6% in those with secondary and above, and primary education respectively.

Factors associated with consistent condom use: the crude and adjusted factors associated with consistent condom use are presented in Table 3. Factors significantly associated with consistent condom use at univariate analysis were sex (Male), tribe (Baganda compared to Banyarwanda) and Religion (Muslim, Vs Christians). Other factors included; occupation (working in restaurant/hair salon/bar, and other occupations, all compared to fishing or fishing related occupations), having sex under influence of alcohol (sometimes, compared to never) and having genital ulcer disease in the last three months among others (Table 3). At multivariable analysis, males were more likely to report consistent condom use, adjusted odds ratio (aOR) = 2.51 (95% CI: 1.46-4.30). Muslims were more likely to report consistent condom use than Christians, aOR = 1.54 (95%CI: 1.04-2.30). Similarly, 2 nights/week participants who reported being away from home for >2 nights/week, last three months were more likely to report consistent condom use aOR = 1.25 (95%CI: 1.07-1.45) (Table 3). On the contrary, participants who reported sometimes having sex under influence of alcohol in the last month (compared to never) were less likely to report consistent condom use, aOR = 0.77 (0.63-0.93). Participants who reported having a genital discharge in the last three months were less likely to report consistent condom use, aOR = 0.69 (95%CI: 0.56-0.85) and those reporting having a genital ulcer disease in the last three

months were less likely to report consistent condom use, aOR = 0.56 (95%CI: 0.45-0.69)].

Secondary finding: thirty-six participants seroconverted over 831.3 person years at risk (PYA) of the 615 participants reporting new partners, accounting for an HIV incidence rate of 4.33 per 100 PYO, 95% CI: 3.12-6.00. The HIV incidence was higher among women, 9.52 per 100 PYA, 95%CI: 6.00-15.11 than men 2.42 per 100 PYA, 95% CI: 1.77-4.45. The HIV incidence was 4.49 per 100 PYA, 95% CI: 3.24-6.22 among inconsistent condom users and no seroconversions happened among the 63 participants who reported consistent condom use.

Discussion

In this analysis, we investigated the proportion of consistent condom use while having sex with a new sexual partner and the associated factors amongst fisherfolk participating in a longitudinal observational cohort in five fishing communities on the shores of Lake Victoria in Masaka, Uganda. We found that the proportion of consistent condom use in these communities was low. Our findings of ~10% consistent condom use in this community was similar to that reported among fishermen in Africa and South East Asia, where the authors of a recent meta-analysis found 7% reported consistent condom use during sex with casual partners [17]. In contrast, studies of other key populations like female sex workers, truck drivers, HIV discordant couples and men who have sex with men in Uganda [7,18,19] and elsewhere [20-25], have shown higher consistent condom use but with a very wide reported range, i.e. 16% to 97%. However, most of these studies [18,19,21-25] were cross sectional in nature unlike our analysis that considered consistent condom use in a longitudinal follow up study. The results suggest a number of factors were independently associated with consistent condom use, including gender, religion, being away from home more than two nights per week in the last 3 months, having sex under influence of alcohol in the last month, having a genital discharge or ulcer in the last three months. Gender disparity has previously been associated with consistent condom use in other studies in both HIV positive [26] and negative individuals [27,28] in Africa. Literature also shows that generally women in Africa have limited power in relationships to negotiate condom use during sex [29]. This could have a profound negative effect on consistent condom use by women in fishing communities as well. Consistent condom use with a new sexual partner was twofold higher among Muslims. This is consistent with what has been observed in other HIV high risk populations in which condom use with a non-spousal or non-cohabiting partner was higher among Muslims compared to Christians [30,31]. Relatedly, religiosity has been associated with unsafe sexual behavior among other key populations with Muslims tending to have lower risk sexual behavior compared to other religions [31].

Participants that had never had sex under the influence of alcohol were more likely to use condoms consistently. The association of decreased consistent condom use with alcohol consumption has previously been reported in other key populations in China [24,32] and Malawi [26]. Alcohol use impairs judgement [33] and its use before sex may influence one´s decision to use a condom. In our study, consistent condom use was inversely associated to genital ulcer disease and genital discharge in this community. Low consistent condom use among HIV high risk groups with genital ulcerations and or discharge has been reported previously [34]. Fishermen, on Lake Victoria, are known to be more concerned with the risk of death from drowning in the water while fishing than HIV infection [35]. This attitude could make it difficult to encourage them to prevent HIV infection through consistent condom use during sex. Secondary findings on HIV incidence suggests that throughout follow up, there was not a single case of HIV infection among the sixty-three participants that self-reported consistent condom use while

having sex with a new sexual partner. In a Cochrane review of condom use during sex, 100% use of condom at each sex act was associated with 83% reduction in HIV incidence in HIV serodiscordant couples [36]. Furthermore, in an HIV serodiscordant couples´ cohort in the neighboring non-fishing communities in Masaka, consistent condom use was associated with 100% reduction in HIV incidence [7]. Therefore, it is not surprising that in this analysis, no incident cases of HIV were found among those reporting consistent condom use. Although consistent condom use was two-fold higher among men compared to women, HIV incidence was four-fold higher among women and the gender HIV incidence disparity in the fishing population is well documented [15,37]. The strength of this analysis is the use of longitudinal observational cohort data as opposed to cross sectional data. Most literature on consistent condom use or other forms of condom use in key populations come from cross sectional studies. Secondly, the adequate sample size in a longitudinal observational cohort of Fisherfolk is a rare opportunity and enabled us to study a number of factors.

There were a few limitations. First, condom use data were collected every six months through participants self-reporting. It is possible that recall bias affected the reporting. However, even with self-reporting there was a very low rate of consistent condom use reported in this study population; and no incident HIV infections among those reporting consistent condom use as seen in this study is what we would expect if the self-reports were accurate. Additionally, the small number of volunteers reporting consistent condom use affected our statistical power to see independent predictors of condom use. Secondly, volunteers that were referred to the clinic for further screening and enrolment and actually presented themselves may have been different from those that did not turn up. Unfortunately, we could not collect any data on those that never turned up and therefore missed an opportunity to compare the characteristics of the two groups. This could have limited generalizability of our findings to the general fishing community. Lastly, participants could have run out of condoms but did not return to get more because of the distance between the clinic and the fishing communities. Unfortunately, we did not collect data on whether a participant ever ran out of condoms and needed to refill. In the same way, access to condoms in the fishing communities was not assessed.

Conclusion

In conclusion, in this key population of fisherfolk, we saw that nearly three-quarters of the people in this community reported having a new sexual partner during the follow-up period. The proportion of consistent condom use with this new sexual partner is very low, even with free access to condoms. This calls for attention to the internal and external barriers to consistent condom use. Females were less likely to report consistent condom use. Females in this community need to be empowered to negotiate condom use during sex with a new or other casual sex partners. This leads us to a recommendation for community engagement to improve the females´ ability to negotiate for and use condoms consistently. Our findings on consistent condom use in relation to alcohol use before sex could be related to impaired judgment because of intoxication. Similar to other communities, Muslims in this community are more likely to practice safe sexual behaviour through consistent condom use with a new sexual partner. There is need to investigate why Christians are less likely to use condoms consistently and whether this is linked to religious beliefs. As expected, the odds of genital ulcer disease and genital discharge were lower among consistent condom users. It was particularly very encouraging that there were no HIV infections among participants that self-reported consistent condom use with a new sexual partner. However, this study was not designed to detect the difference in HIV incidence between consistent and non-consistent condom users. Such results need to be interpreted with caution. We

therefore recommend further research into the barriers for consistent condom use among fisherfolk.

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What is known about this topic

- *To date, many HIV prevention products are available but inaccessible by hard to reach communities such as fishing communities because of cost & complexity;*
- *In the absence of an effective HIV vaccine to help end the epidemic, promotion and provision of accessible and affordable interventions such as condoms can help improve access and reduce the risk of HIV infections in mobile key populations such as people in fishing communities on the shores of Lake Victoria. In these communities, the HIV prevalence and incidence are four times higher than that estimated in the general population. This population is confined to isolated locations with limited or no access to healthcare services, but interacts with the general population and could extend the HIV transmission network;*
- *What we also know is that much of the available literature about condom use is drawn from HIV discordant couples, people living with HIV/AIDS or populations with moderate HIV risk.*

What this study adds

- *This study adds data on consistent condom use from highly mobile but at high risk of HIV infection populations. Currently, there is limited or no information on consistent condom use among HIV negative members of fishing communities around Lake Victoria which was the primary focus of this research.*

Competing interests

The authors declare no competing interests.

Authors' contributions

HGN: lead author, drafted initial manuscript draft and interpreted the data. VMK contributed to interpretation of the data. AA contributed to data management, data analysis and interpretation. FK contributed to study coordination, implementation and data collection. PH contributed to project implementation and led HIV testing in the laboratory. MP contributed to the design of the cohort and interpreted the data. All authors critically commented, provided revisions to the manuscript and approved the final version. They equally read and agreed to the final manuscript.

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Tables and figures

Table 1: participants baseline characteristics stratified by gender in the fishing population cohort 2012-2017 in Masaka, Uganda (N=615)

Table 2: consistent condom use with a new sexual partner in the last 3 months by participant characteristics in the fishing population cohort 2012-2017 in Masaka, Uganda (N=615)

Table 3: unadjusted and adjusted association of factors with consistent condom use with a new sexual partner in the last 3 months in fishing population cohort 2012-2017 in Masaka, Uganda (n=615)

Figure 1: screening, enrolment and follow up of the participants in the observational cohort

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Table 1: participants baseline characteristics stratified by gender in the fishing population cohort 2012-2017 in Masaka, Uganda (N=615)

Variable	Sub category	Total (N=615)		Female (n=150)		Male (n=465)	
		N	%	n	%	n	%
Age group(years)	18-24	246	40.0	71	47.3	175	37.6
	25-34	257	41.8	49	32.7	208	44.8
	35+	112	18.2	30	20.0	82	17.6
Tribe	Banyarwanda	122	19.8	42	28.0	80	17.2
	Baganda	286	46.5	72	48.0	214	46.0
	Banyankole	83	13.5	16	10.7	67	14.4
	Other	124	20.2	20	13.2	104	22.4
Education	Secondary and above	112	18.2	36	24.0	76	16.3
	Primary	454	73.8	102	68.0	352	75.7
	None	49	8.0	12	8.0	37	8.0
Religion	Christian	499	81.1	122	81.3	377	81.1
	Muslim	116	18.9	28	18.7	88	18.9
Marital status	Single, never married	172	28.0	28	18.7	144	31.0
	Married	294	47.8	50	33.3	244	52.5
	Single, ever married	149	24.2	72	48.0	77	16.5
Primary occupation	Fishing/related†	380	61.8	27	18.0	353	75.9
	Small scale business	94	15.3	34	22.7	60	12.9
	Services (restaurant/hair salon/bar)	56	9.1	52	34.7	4	0.9
	Other(peasant farmer/house wife)	85	13.8	37	24.6	48	10.3
Duration in community(years)	0-1	211	34.3	85	56.7	126	27.1
	>1-5	207	33.7	34	22.7	173	37.2
	>5	197	32.0	31	16.6	166	35.7
illicit drug use in the last month	No	517	84.1	141	94.0	376	80.9
	Yes	98	15.9	9	6.0	89	19.1
Away from home,>2 nights /week, last 3 months	No	313	50.9	109	72.7	204	43.9
	Yes	302	49.1	41	27.3	261	56.1
Alcohol use in the last month	Never	222	36.1	61	40.7	161	34.6
	Sometimes	328	53.3	76	50.7	252	54.2
	Daily	65	10.6	13	8.6	52	11.2
Having sex under alcohol influence in the last month	Never	320	52.0	88	58.7	232	49.9
	Sometimes	280	45.5	60	40.0	220	47.3
	Always	15	2.5	2	1.3	13	2.8
Genital discharge in the last 3 months	No	385	62.6	62	41.3	323	69.5
	Yes	230	37.4	88	58.7	142	30.5
Genital ulcer disease in the last 3 months	No	416	67.6	89	59.3	327	70.3
	Yes	199	32.4	61	40.7	138	29.7

†drying fish, salting or smoking fish

Table 2: consistent condom use with a new sexual partner in the last 3 months by participant characteristics in the fishing population cohort 2012-2017 in Masaka, Uganda (N=615)							
				Condom use status			
Variable	**Sub category**	**Total (N=615)**		**Inconsistent (n=552)**		**Consistent (n=63)**	
		N	%	n	%	n	%
Sex	Female	150	24.4	138	92.0	12	8.0
	Male	465	75.6	414	89.0	51	11.0
Age group (years)	18-24	246	40.0	218	88.6	28	11.4
	25-34	257	41.8	238	92.6	19	7.4
	35+	112	18.2	96	85.7	16	14.3
Tribe	Banyarwanda	122	19.8	115	94.3	7	5.7
	Baganda	286	46.5	252	88.1	34	11.9
	Banyankole	83	13.5	75	90.4	8	9.6
	Other	124	20.2	110	88.7	14	11.3
Education	Secondary and above	112	18.2	100	89.3	12	10.7
	Primary	454	73.8	406	89.4	48	10.6
	None	49	8.0	46	93.9	3	6.1
Religion							
	Christian	499	81.1	454	91.0	45	9.0
	Muslim	116	18.9	98	84.5	18	15.5
Marital status	Single, never married	172	28.0	154	89.5	18	10.5
	Married	294	47.8	266	90.5	28	9.5
	Single, ever married	149	24.2	132	88.6	17	11.4
Primary occupation	Fishing/related†	380	61.8	342	90.0	38	10.0
	Small scale business	94	15.3	84	89.4	10	10.6
	Services (restaurant/hair salon/bar)	56	9.1	49	87.5	7	12.5
	Other (peasant farmer/house wife)	85	13.8	77	90.6	8	9.4
Duration in community(years)	0-1	211	34.3	191	90.5	20	9.5
	>1-5	207	33.7	189	91.3	18	8.7
	>5	197	32.0	172	87.3	25	12.7
illicit drug use in the last month	No	517	84.1	464	89.7	53	10.3
	Yes	98	15.9	88	89.8	10	10.2
n- number of, †drying fish, salting or smoking fish							

Table 3: unadjusted and adjusted association of factors with consistent condom use with a new sexual partner in the last 3 months in fishing population cohort 2012-2017 in Masaka, Uganda (n=615)

Variable	Sub category	uOR (95%CI)	p-value	aOR (95%CI)	p-value
Sex	Female	1.00		1.00	
	Male	3.03 (1.96-4.69)	<0.001	2.51 (1.46-4.30)	0.001
Age group(years)	18-24	1.00		1.00	
	25-34	1.17 (0.84-1.62)	0.358	1.01 (0.71-1.44)	0.957
	35+	1.40 (0.93-2.13)	0.109	1.29 (0.82-2.02)	0.265
Tribe	Banyarwanda	1.00		1.00	
	Baganda	1.54 (1.02-2.33)	0.040	1.40 (0.91-2.17)	0.128
	Banyankole	1.64 (0.98-2.76)	0.059	1.31 (0.76-2.28)	0.334
	Other	1.58 (0.98-2.54)	0.060	1.30 (0.78-2.16)	0.322
Education	Secondary and above	1.00			
	Primary	1.13 (0.76-1.68)	0.549		
	None	0.85 (0.44-1.64)	0.635		
Religion	Christian	1.00		1.00	
	Muslim	1.52 (1.06-2.19)	0.024	1.54 (1.04-2.30)	0.031
Marital status	Single, never married	1.00			
	Married	0.89 (0.63-1.25)	0.498		
	Single, ever married	1.08 (0.72-1.61)	0.713		
Primary occupation	Fishing/related†	1.00		1.00	
	Small scale business	0.73 (0.47-1.13)	0.162	0.88 (0.55-1.41)	0.605
	Services(restaurant/hair salon/bar)	0.39 (0.19-0.76)	0.006	0.83 (0.35-1.96)	0.668
	Other(peasant farmer/house wife)	0.57 (0.35-0.93)	0.024	0.73 (0.43-1.26)	0.262
Duration in community(years)	0-1	1.00			
	>1-5	1.10 (0.77-1.58)	0.605		
	>5	1.35 (0.94-1.95)	0.104		
illicit drug use in the last month	No	1.00			
	Yes	0.85 (0.62-1.17)	0.321		
Away from home,>2 nights/week ,last 3 months	No	1.00		1.00	
	Yes	1.29 (1.11-1.50)	0.001	1.25 (1.07-1.45)	0.005
Alcohol use in the last month	Never	1.00			
	Sometimes	1.10 (0.90-1.35)	0.334		
	Daily	0.95 (0.67-1.36)	0.784		
Sex under alcohol influence	Never	1.00		1.00	
	Sometimes	0.75 (0.62-0.90)	0.002	0.77 (0.63-0.93)	0.007
	Always	0.83 (0.55-1.26)	0.381	0.86 (0.58-1.26)	0.436
Genital discharge in the last 3 months	No	1.00		1.00	
	Yes	0.59 (0.48-0.71)	<0.001	0.69 (0.56-0.85)	<0.001
Genital ulcer disease in the last 3 months	No	1.00		1.00	
	Yes	0.51 (0.42-0.62)	<0.001	0.56 (0.45-0.69)	<0.001

†drying fish, salting or smoking fish, uOR-unadjusted odds ratio, aOR-adjusted odds ratio, CI-confidence interval

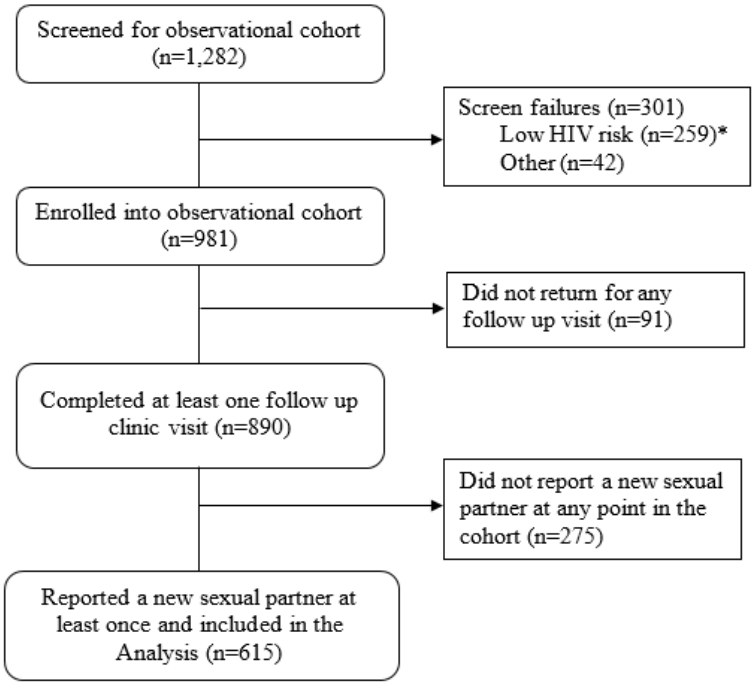

Figure 1: screening, enrolment and follow up of the participants in the observational cohort