Effective use and barriers to effective use of male condoms among HIV negative people in Manicaland, Zimbabwe: An HIV Prevention Cascade analysis

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Introduction

HIV incidence has declined in eastern and southern Africa, including in Manicaland, Zimbabwe[1] due to changes in sexual behaviours, awareness of HIV[2,3] and widespread availability of antiretroviral therapy (ART) acting as 'treatment-as-prevention' by reducing HIV infectiousness[4,5]. UNAIDS estimate adult HIV incidence in Zimbabwe to be 2.81 per 1000 in 2019[6]. However, reductions in incidence have been slower than anticipated and the UNAIDS milestone of reducing global new infections to fewer than 500,000 per year by 2020[7] was missed[8,9]. Incidence declines have varied between high-risk groups across eastern and southern Africa[10 11], which has been attributed to variation in HIV prevention programmes and uptake of preventive behaviour[12], emphasising the need to improve understanding of why people are not adopting HIV preventive behaviours in different settings and for novel approaches to improve HIV prevention interventions.

Certain behaviours have been associated with increased risk of HIV acquisition, including greater number of partners, casual and non-regular partners, age disparate relationships and attending bars and beer halls[13–18]. Male condoms have been made widely available through prevention programmes in Zimbabwe. When used correctly, condoms are highly effective in preventing transmission of HIV, giving an estimated reduction in transmission of 90-95%[19,20]. HIV-negative individuals who engage in sexual risk-behaviours contribute to ongoing HIV acquisition and transmission and are a priority population for prevention.

The HIV Prevention Cascade (HPC) has been proposed as a tool to monitor and improve implementation of primary HIV prevention methods[21,22]. Schaefer et al proposed a standardised cascade which could be applied to multiple populations and prevention methods[22].This HPC focuses on identification of a priority population followed by three core steps: motivation to use, access to, and effective use of the prevention method. Effective use is the endpoint of the cascade and is defined as those who adhere to using the prevention method[21–23]. The Manicaland Centre for Public Health has collected data to populate the HPC framework (main bars and explanatory sub-bars)[23–25].

The aim of this paper is to measure levels of and barriers to male condom use among those who are at increased risk of HIV acquisition through the following objectives:

1) Describe recently reported HIV risk behaviours among HIV-negative individuals in Manicaland.
2) Populate the HPC framework for HIV-negative individuals indicating motivation, access and effective use of male condoms, as well as the corresponding barriers to each of these steps.
3) Measure the association of explanatory variables hypothesised as barriers to effective use through the HPC framework with effective use of male condoms.

Methods

Data source

Data were used from the Manicaland HPC Study, conducted across eight sites in Manicaland, east Zimbabwe, between July 2018 and December 2019, collected in a pilot questionnaire designed specifically to populate HPCs. Participants were identified in a household census of the eight study sites which represented urban, peri-urban, farming estates and subsistence farming areas[1]. Household members, aged 15 and above, were invited to participate in individual interviews. Young people (females 15-24; males 15-29) were oversampled, with only 2/3 of eligible older people selected for individual interview. HIV status was assessed using the Zimbabwe Ministry of Health rapid testing algorithm based on the 2015 WHO recommendation[26,27]. All participants completing the individual questionnaire were

asked to provide a dried blood sample (DBS). Additionally, individuals were invited to participate in provider-initiated testing and counselling (PITC) and, where present, the result of this was used as the final HIV result. If PITC was not completed, then the same testing algorithm was completed in a laboratory using the DBS.

Data analysis

Data were restricted to individuals aged 15-54 years, completing the individual questionnaire, for whom a negative HIV status was determined. Descriptive statistics (proportions and 95% confidence intervals) for sociodemographic characteristics and risk behaviours were calculated for the HIV-negative study population who self-reported having started sex. HIV prevention cascades were populated for those who self-reported at least one risk behaviour in the last 12 months, calculating proportions of the priority population reporting motivation, access, and effective use. Risk behaviours for males were: having multiple partners in the last 12 months; concurrent partners at the time of interview; recent transactional sex in the last month with any of the last three partners; use of alcohol or drugs or visiting a bar or beer hall in the last 12 months; and having an age-disparate relationship with one of their last three partners in the last 12 months with someone ≥10 years older in women. Logistic regression models were used to test for associations between the explanatory sub-bar variables in the HPCs and the outcome of effectively using male condoms amongst all in the priority population.

Results

9803 individuals completed the individual questionnaire. 9339 (95%) of the individuals completing the individual questionnaire had an HIV result, either from PITC or DBS laboratory testing.

HIV risk behaviours

Almost all older men and women had started sex. 55% of young women (15-24 years) and 46% of young men (15-29 years) had started sex (Table 1**¡Error! No se encuentra el origen de la referencia.**). Overall proportions reporting ≥1 recent risk-behaviour were similar between younger *versus* older women and younger *versus* older men; however, a markedly higher proportion of men reported ≥1 risk-behaviour (63% of younger men; 67% of older men). Proportions of men reporting ≥2 risk-behaviours were much higher than in women with the highest proportion (33%) observed in young men.

HIV prevention cascades

Within the male priority population, 60% were motivated to use, 59% had access to, and 42% were effectively using male condoms (Figure 1A). All men lacking motivation perceived negative consequences of condom use (reporting reduced sexual pleasure) and 95% lacked perception of future risk of HIV infection. The drop between the motivation and access bar is low, with only 7 out of 788 motivated individuals reporting lack of access. 30% of men in the priority population who were motivated to use and had access to male condoms were not using them effectively. Of the female priority population, 49% were motivated to use, 48% had access to, and 19% were effectively using male condoms (Figure 1B). Lack of risk perception was the most common barrier to motivation with 94% of unmotivated women reporting not being at risk; however, negative perceived consequences of use (reduced sexual pleasure) were also high (89%). Lack of partner acceptance was the biggest barrier to effective use (79% of those not effectively using), although 65% of those who were motivated and had access but were not effectively using reported lacking self-efficacy to use male condoms. Self-efficacy to effectively use male condoms was a larger barrier in females who were motivated and had access to male condoms but were not effectively using them than in equivalent males: 65% of females vs. 37% of males.

Gaps in the HIV prevention cascades.

Explanatory variables associated with primary prevention method use ($p<0.2$) were fitted to models adjusting for sociodemographic characteristics also associated with primary prevention method use ($p<0.2$) (Figure). Lack of knowledge was associated with reduced odds of condom use in men (OR=0.66;

95%CI: 0.50-0.86, p<0.01). After adjusting for marital status, partner was no longer a barrier significantly associated with reduced odds of condom use in men and women. Lack of future risk perception was strongly associated with lower odds of condom use compared to those who do perceive future risk perception in both men (OR=0.33; 95%CI: 0.23-0.50, p<0.01) and women (OR=0.39; 95%CI: 0.24-0.63, p<0.01).

Discussion

Summary of findings

This study shows high levels of self-reported risk behaviours for HIV acquisition and gaps in effective use of male condoms. 65% of men and 37% of women who have started sex reported at least one risk behaviour in the last 12 months. Motivation, access and effective use were consistently lower in females than males - a key issue to address given the excess incidence observed in adolescent girls and young women[10,28]. Barriers identified through the HPC framework varied by sex, highlighting the need to design interventions to increase use specific to the population. Lack of self-perceived future risk of HIV was a common explanatory variable across prevention methods and has been shown to be associated with high HIV incidence[29].

Conclusion

The development of the HPC framework has proved valuable for identifying barriers to motivation, access, and, ultimately, effective use of male condoms. It has aided identification of barriers which vary by priority population and prevention method and which could be targeted by interventions to improve effective use. High proportions of individuals engaging in risky behaviour remain, indicating a need to improve HIV prevention method use to prevent acquisition of HIV. Interventions, in HIV-negative adults engaging in sexual risk behaviours, that focus on the HIV risk perception, social acceptability of condom use and strengthening self-efficacy to negotiate condom use with sexual partners could increase effective use of condoms and accelerate reductions in HIV incidence in east Zimbabwe. Certain barriers, such as consequences of use – capturing loss of sexual pleasure - would be difficult to change via an intervention highlighting the need for availability of alternative prevention methods.

Table 1 – Self-reported behavioural characteristics by age and sex of HIV-negative participants completing the individual questionnaire in Manicaland 2018-19

	Female		Male	
	15-24 years N = 2148	25-54 years N = 2532	15-29 years N = 2138	30-54 years N = 1324
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
Number who had sexual debut[ǂ]	1233	2667	1022	1391
Had sexual debut	55.1 (53.0-57.2)	99.2 (98.7-99.5)	46.3 (44.2-48.4)	99.5 (98.9-99.8)
Age at first sex <18yrs*	46.1 (43.3-49.0)	26.4 (24.7-28.2)	32.6 (29.7-35.6)	16.3 (14.4-18.3)
Had multiple partners in last 12 months*	5.1 (4.0-6.5)	2.9 (2.3-3.6)	21.5 (19.1-24.2)	13.3 (11.6-15.2)
Concurrent partners*	1.4 (0.9-2.3)	1.3 (0.9-1.8)	6.7 (5.3-8.4)	6.8 (5.6-8.3)
1 or more non-regular partners in last 12 months*	13.7 (11.8-15.8)	7.5 (6.6-8.6)	32.0 (29.1-34.9)	13.0 (11.3-14.9)
Ever engaged in transactional sex*	9.1 (7.6-10.9)	9.5 (8.4-10.7)	15.2 (13.1-17.5)	20.3 (18.2-22.5)
Transactional sex in last month with any of last 3 partners*	8.4 (7.0-10.2)	7.8 (6.9-9.0)	7.3 (5.8-9.1)	7.4 (6.1-9.0)
Age disparate relationships*				
5 or more years to any of last 3 partners	68.2 (65.4-70.9)	65.2 (63.2-67.1)		
10 or more years to any of last 3 partners	23.8 (21.3-26.4)	30.0 (28.1-31.9)		
Alcohol use/beer hall visit in last 12 months	2.5 (1.9-3.3)	2.6 (2.1-3.3)	26.4 (24.6-28.3)	45.6 (42.9-48.2)
Drug use for pleasure	0.2 (0.1-0.6)	0.2 (0.1-5.3)	4.7 (3.8-5.6)	5.1 (4.0-6.4)
1 or more of above risk behaviours[¥]*	36.6 (33.9-39.4)	36.6 (34.7-38.5)	63.4 (60.3-66.4)	66.5 (63.9-69.0)
2 or more of above risk behaviours[¥]*	10.0 (8.4-11.8)	7.9 (6.9-9.1)	32.9 (30.0-38.9)	31.8 (29.4-34.4)

ǂ reported as actual number not %

** % and 95% CI are within those who have had sexual debut*

¥ combining age disparate relationships of 10 or more years (female only), drug use, alcohol use, transactional sex, non-regular partners, multiple partners and concurrent partners.

Figure 1 - HIV Prevention Cascades for HIV-negative men who have started sex, aged 15-54 years and reporting at least one risk behaviour in the last 12 months for (A) men and (B) women.

Dashed lines indicate 95% confidence intervals

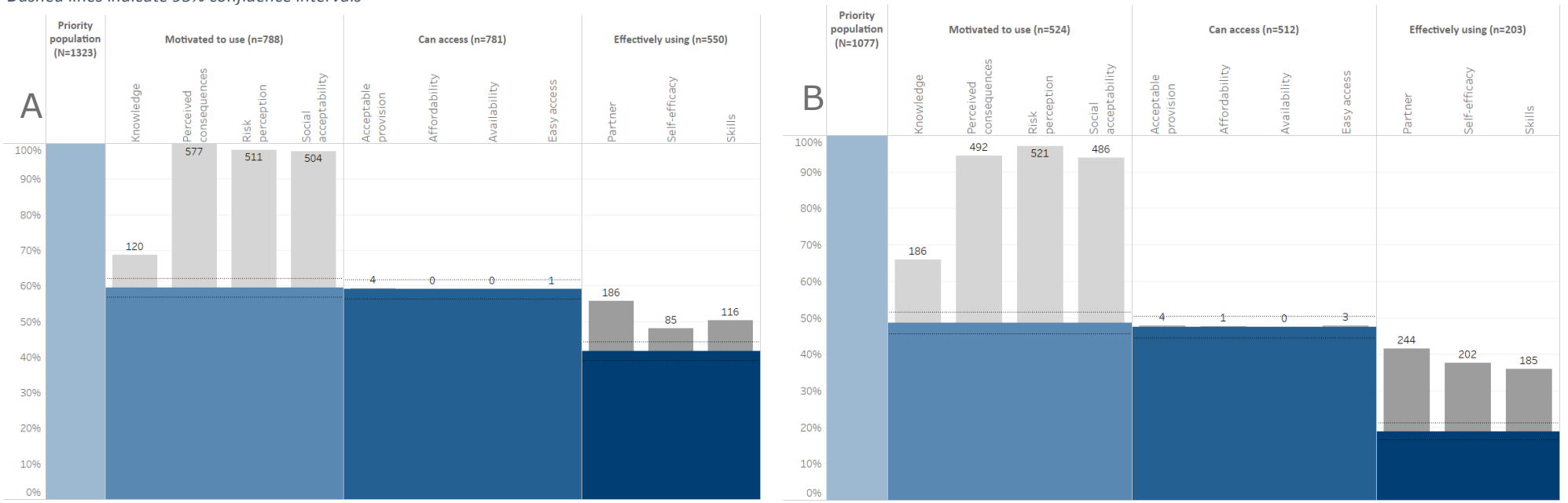
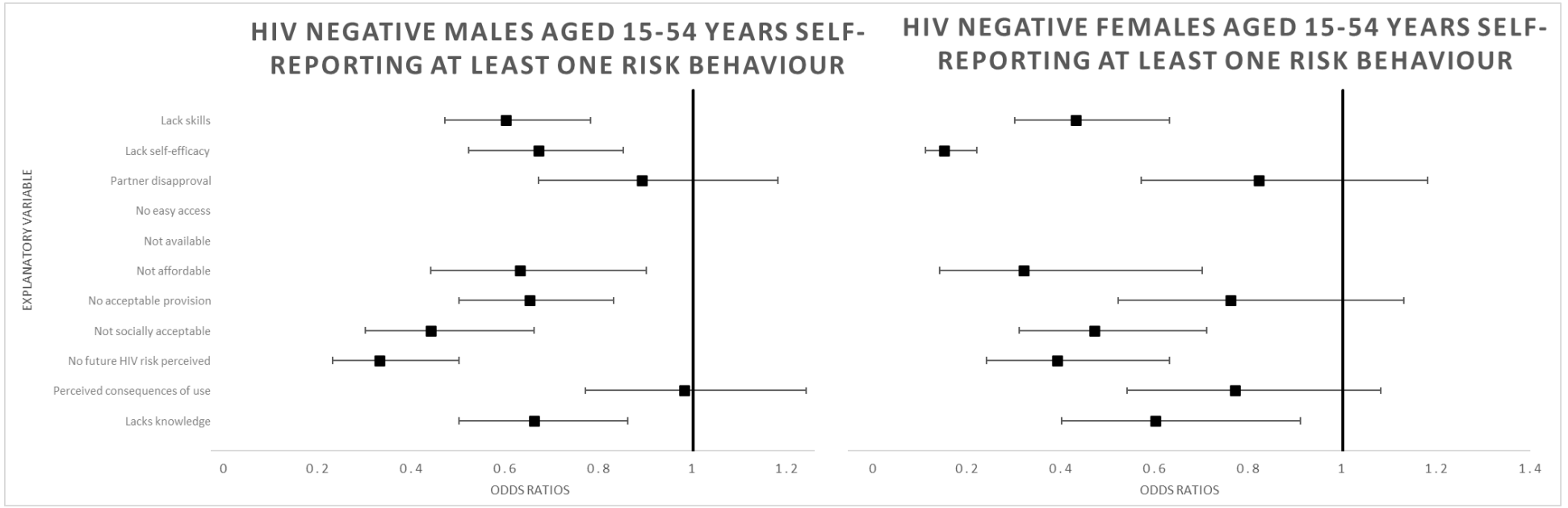


Figure 2 - associations using logistic regression of explanatory sub-bar barriers with effective use of male condoms adjusted for sociodemographic characteristics associated with prevention method use among those in the male and female priority population. Each explanatory barrier is a binary variable and the odds ratios presented are for lacking the explanatory barrier. there were insufficient numbers of cases where respondents reported no easy access or non-availability of condoms to measure the associations with use for these variables



Adjusted for site type, education, marital status and socioeconomic status.

Adjusted for site type and marital status.

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