Longitudinal studies of HIV risk perception and condom use in east Zimbabwe 2003-2013

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Background and Objective

Background

- Many HIV prevention interventions and programmes are based on assumptions of social cognitive models of behaviour change (1). Risk perception is central to many theories, and often targeted in interventions (2).
- Studies have identified associations between HIV risk perception and HIV prevention behaviour (3,4); but limited evidence that increased risk perception has a causal effect on engaging in HIV prevention behaviour (5).
- Longitudinal studies can determine temporal relationships between cause and effect, which would support hypothesised causal relationships.

Objective

- Investigate the longitudinal associations between changes in HIV risk perception and condom use as an example of HIV prevention behaviour.
- Estimate the population attributable fraction (PAF) of change in condom use due to change in risk perception.

Results

HIV risk perception and sexual risk

- 2035 males and 3813 females (aged 15-54, HIV-negative, sexually active), contributing 8673 pairs of observations.
- 13.1% (12.2-14.1%) males and 46.6% (45.6-47.6%) females reported risk perception (declining trends for both sexes, Fig. 2A).
- 20.3% (19.1-21.4%) of males and 10.4% (9.76-11.0%) of females reported condom use (declining trends for males, Fig. 2B).
- Low proportions of change between surveys in risk perception (particularly among males) and condom use behaviour (Table 1).

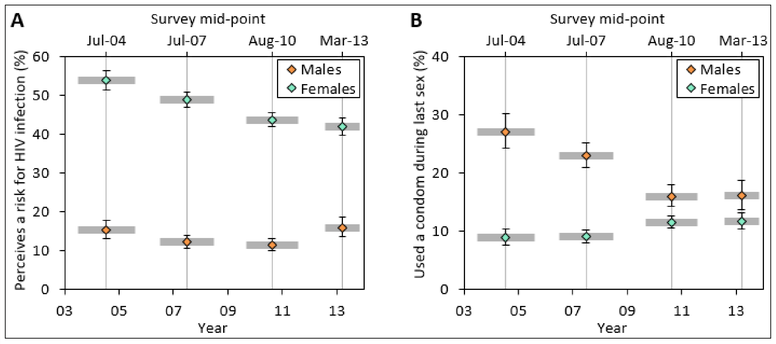

Fig. 2: Trends in proportions and 95% confidence intervals of reporting of perceiving a risk for HIV infection (A) or condom use during last sexual intercourse (B) in each survey (grey area indicates duration of the survey).

Table 1: Changes in risk perception and condom use, Manicaland, Zimbabwe, 2003-13.

	Males				Females			
	Risk perception		Condom use		Risk perception		Condom use	
	Increase	Decrease	Increase	Decrease	Increase	Decrease	Increase	Decrease
3 (2003-05) to 4 (2006-08)	8.34	10.57	7.21	13.2	14.8	18.8	6.47	5.77
4 (2006-08) to 5 (2009-11)	8.74	8.74	6.73	12.3	16.3	20.9	8.06	5.09
5 (2009-11) to 6 (2012-13)	11.9	6.38	8.01	7.04	17.0	19.1	5.99	6.32

Values are percentages (%) of change between two surveys.

Effects of changes in risk perception among those not using condoms (Table 2)

- Increase in risk perception: Higher odds of increase in condoms use (supports hypothesis 1A)
- Increase in condom use: Higher odds of decrease in risk perception (supports hypothesis 1B)
- Majority of those who increased condom use did so without changing risk perception (Table 4).

Effects of changes in risk perception among those using condoms (Table 3)

- Weak associations of decrease in condom use with lower odds of increasing risk perception among males and decreasing risk perception among females.
- Majority of those who decreased condom use did so without changing risk perception (Table 4)

Table 2: Increase in condom use and changes in risk perception, Manicaland, Zimbabwe, 2003-2013.

	Males			Females		
Outcome: Increase in condom use (vs. no change)		Model 1 (N=2194)	Model 2 (N=2148)		Model 1 (N=5084)	Model 2 (N=4830)
Variable	n (%)	aOR (95% CI)	aOR (95% CI)	n (%)	aOR (95% CI)	aOR (95% CI)
Change in risk perception						
No change in risk perception	1812 (82.6)	1 (Reference)	1 (Reference)	3173 (64.4)	1 (Reference)	1 (Reference)
Increased risk perception	206 (9.39)	1.79 (1.16-2.75)	1.40 (0.86-2.30)	822 (16.2)	1.42 (1.08-1.85)	1.44 (1.09-1.92)
Decreased risk perception	176 (8.02)	1.91 (1.22-2.98)	1.75 (1.11-2.77)	989 (19.5)	1.23 (0.95-1.60)	1.23 (0.94-1.62)

Values are: Sample sizes (n) and percentages (%) for categories of change in risk perception (with no missing data for change in condom use); sample sizes for regression models (N); and adjusted odds ratios (aOR) with 95% confidence intervals (95% CI).

Table 3: Decrease in condom use and changes in risk perception, Manicaland, Zimbabwe, 2003-2013.

	Males			Females		
Outcome: Decrease in condom use (vs. no change)		Model 1 (N=594)	Model 2 (N=580)		Model 1 (N=554)	Model 2 (N=520)
Variable	n (%)	aOR (95% CI)	aOR (95% CI)	n (%)	aOR (95% CI)	aOR (95% CI)
Change in risk perception						
No change in risk perception	472 (79.5)	1 (Reference)	1 (Reference)	340 (61.4)	1 (Reference)	1 (Reference)
Increased risk perception	57 (9.60)	0.71 (0.40-1.24)	0.79 (0.41-1.51)	91 (16.4)	1.02 (0.60-1.73)	0.90 (0.49-1.65)
Decreased risk perception	65 (10.9)	1.12 (0.65-1.92)	0.92 (0.48-1.78)	123 (22.2)	0.74 (0.47-1.14)	0.71 (0.43-1.18)

Values are: Sample sizes (n) and percentages (%) for categories of change in risk perception (with no missing data for change in condom use); sample sizes for regression models (N); and adjusted odds ratios (aOR) with 95% confidence intervals (95% CI).

Table 4: Population attributable fractions for changes in condoms due to changes in risk perception, Manicaland, Zimbabwe, 2003-13 .

	Increase in condom use					
	Males			Females		
	n/N (%)	PAF	(95% CI)	n/N (%)	PAF	(95% CI)
Increased risk perception	28/201 (13.9)	3.46%	(-2.15-8.77%)	77/390 (19.7)	7.04%	(0.97-12.7%)
Decreased risk perception	26/201 (12.9)	5.26%	(0.28-9.99%)	85/390 (21.8)	4.68%	(-1.91-10.8%)
	Decrease in condom use					
	Males			Females		
	n/N (%)	PAF	(95% CI)	n/N (%)	PAF	(95% CI)
Increased risk perception	25/308 (8.12)	-0.88%	(-3.30-14.9%)	58/319 (18.2)	-0.71%	(-4.97-3.37 %)
Decreased risk perception	36/308 (11.7)	-0.30%	(-2.75-2.10%)	66/319 (20.7)	-3.19%	(-8.02-14.4%)

Values are: Number of people who increased or decreased risk perception (n) and their percentage (%) among everyone who increased or decreased condom use (N); and population attributable fraction (PAF) and 95% confidence interval (95% CI). These estimates are based on adjusted odds ratios (model 2 estimates in Tables 2 and 3).

Methods

Data

- Manicaland General-Population Cohort Study (6): 6 surveys in 3 districts in Manicaland, Zimbabwe (Fig. 1), including HIV sero-testing. Data on demographic/socio-economic factors, sexual behaviour, and perceptions about HIV/AIDS.
- Periods between surveys: 3 years; 8000-15000 adults (15-54 years), selected from a household census in 12 sites (8 in most recent survey in 2012-13).
- Surveys 3-6 used (2003-05 to 2012-13); risk perception and condom use measures differed in earlier surveys.
- Risk perception measured: "If you are not infected, do you think you are in danger of getting infected now or in the future?" (yes/no/don't know); 'don't know' (9.6%) excluded. Condom use measure: Last sex

Fig. 1: Study districts in Zimbabwe

Hypotheses

1) If not using condoms: A) increase in risk perception leads to increase in condom use; B) increase in condom use leads to decrease in risk perception.
2) If using condoms: A) decrease in condom use leads to increase in risk perception; B) decrease in risk perception leads to decrease in condom use.

Data analysis

- Inter-survey change (condom use, risk perception) (no change; increase; decrease) modelled in generalised estimating equations (logit link; exchangeable correlation).
- Analyses separately restricted to those not reporting and reporting condom use at the beginning between surveys.
- Time-variant factors may confound the relationship between changes in risk perception and condom use; model 1: Change in age group; model 2: Change in age group, marital status, school enrolment, education, STD symptoms, SES, HIV testing, sexual risk factors, perceived partner risk.

Discussion

- Hypothesised links between risk perception and condom use supported: Increased risk perception, increased condom use (implausible that condom use causes risk perception); increased condom use, decreased risk perception (implausible that decreased risk perception causes condom use)
- No support for hypotheses for those using condoms, but sample sizes small.
- Low PAF: Small proportion of change in condom use attributable to change in risk perception.

Limitations

- Long time periods between surveys, may not capture changes
- Condom use during last sex, not longer time periods
- Biased reporting, despite confidential voting methods.
- Risk perception measure does not capture perceived severity.

Conclusion

- Low PAF of risk perception change underscores need for comprehensive approach to HIV prevention. Partner, social, structural factors are important determinants of prevention use
- Addressing social norms to create conducive environments for HIV prevention use is crucial; community-owned prevention programmes central.

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