Combination HIV Prevention and HIV Incidence in a Ugandan Hotspot Fishing Community

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Background

- Targeted combination HIV prevention, including Test and Start, have been advocated in hotspots to control the epidemic in sub-Saharan Africa.
- However, there is limited empirical evidence on successful intervention scale-up in hotspots and the subsequent population-level effects on HIV incidence.
- Since 2011, the Rakai Community Cohort Study (RCCS) conducted by the Rakai Health Sciences Program (RHSP) has surveyed a hotspot fishing community on Lake Victoria (HIV prevalence ~41%) during a period of HIV service scale-up.

Methods

Study Setting: Between November 2011 and May 2015, four rounds of the Rakai Community Cohort Study (RCCS), a population-based longitudinal study of HIV incidence, risk behaviors and HIV service utilization among residents aged 15-49, were conducted in a large Lake Victoria fishing community whose HIV+ residents first gained access to ART irrespective of CD4 count, i.e. Test and Start, in 2012.

Statistical Analysis: HIV incidence was estimated as the number of new infections per 100 person years (py) between visits. We used multivariable Poisson regression models with generalized estimating equations, to estimate adjusted incidence rate ratios (aIRR) and 95% confidence intervals (95%CI) of HIV incidence comparing the period before Test and Start and rapid scale-up of MMC (2011-2012) to periods after 2012.

Results

Study Population and Demographics: 4,071 persons participated in at least one of the four RCCS survey rounds. Characteristics from the first and last survey round are shown in Table 1.

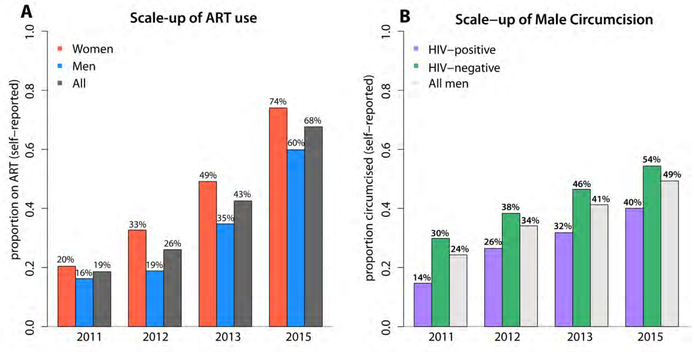
Table 1: Characteristics of RCCS Participants by Gender, 2011 vs. 2015

	Women			Men		
Characteristic	2011 (N=986)	2015 (N=1107)	p-value	2011 (N=1070)	2015 (N=1153)	p-value
Age, years, median (IQR)	28 (23-34)	29 (23-35)	0.600	30 (25-36)	31 (26-37)	<0.001
Marital status						
Never married	94 (10)	123 (11)		220 (21)	193 (17)	
Married	609 (62)	664 (60)		670 (63)	684 (59)	
Previously married	283 (29)	320 (29)	0.465	180 (17)	276 (24)	<0.001
Religion						
Non-Muslim	801 (81)	915 (83)		879 (82)	963 (83)	
Muslim	185 (19)	192 (17)	0.432	191 (18)	190 (16)	0.432
Number of sex partners in the last year						
None	87 (9)	85 (8)		77 (7)	74 (6)	
One	711 (72)	759 (69)		355 (33)	425 (37)	
Two	140 (14)	191 (17)		306 (29)	301 (26)	
Three or more	48 (5)	72 (7)	0.063	332 (31)	353 (31)	0.269
Consistent condom use with non-marital partners*	71 (17)	2019 (24)	0.024	223 (30)	213 (29)	0.762
Self-reported GUD	209 (21)	230 (21)	0.856	199 (19)	137 (12)	<0.001
HIV seropositive	**475 (48)**	**462 (42)**	**0.004**	**396 (34)**	**376 (33)**	**0.381**

*Among those reporting non-marital sexual partners only

ART and Male Circumcision Scale-Up: In 2011, RHSP, working with the Ministry of Health, built and staffed the first dedicated HIV care clinic in the community. Male circumcision services were also offered through referrals to static circumcision sites, camps, and on-site mobile circumcision services. Changes in ART and male circumcision coverage are shown in Figure 1.

Figure 1: Changes in ART and Male Circumcision Coverage.



Results cont'd

Table 2: Virologic Outcomes among HIV+ RCCS Participants, 2011 vs. 2015.

	Viral Load Suppression (<400 copies/μl)			
	2011, N/Total (%)	2015, N/Total (%)	RR (95%CI)	p-value
Women	184/475 (39%)	339/462 (73%)	1.89 (1.68-2.14)	<0.001
Men	96/369 (26%)	216/376 (57%)	2.20 (1.83-2.66)	<0.001
Total	280/844 (33%)	555/838 (66%)	2.00 (1.80-2.21)	<0.001
	Population Prevalence of Detectable Viremia (PPDV)			
	2011, N/Total (%)	2015, N/Total (%)	RR (95%CI)	p-value
Women	291/986 (30%)	123/1107 (11%)	0.38 (0.32-0.45)	<0.001
Men	273/1070 (26%)	160/1153 (14%)	0.54 (0.46-0.64)	<0.001
Total	564/2056 (27%)	283/2260 (13%)	0.46 (0.40-0.52)	<0.001

RR=Relative Risk; RR estimated using Poisson GEE with independent correlation structure; PPDV=HIV+ with viral load >400 / All HIV+ and All HIV-

Table 3: Decline in HIV Incidence with Scale-up of Combination HIV Prevention.

	Women					
Time Period	Events/py	Incidence per 100 py	IRR (95%CI)	p-value	adjIRR (95%CI)	p-value
2011-2012	12/266	4.51	Ref.	-	Ref.	-
2012-2013	18/433	4.16	0.92 (0.44-1.92)	0.830	0.96 (0.45-2.06)	0.916
2013-2015	22/660	3.33	0.73 (0.36-1.50)	0.389	0.73 (0.34-1.50)	0.389
	Men					
2011-2012	14/383	3.66	Ref.	-	Ref.	-
2012-2013	19/663	2.89	0.78 (0.39-1.58)	0.494	0.83 (-.41-166)	0.594
2013-2015	24/953	2.52	0.69 (0.36-1.34)	0.271	0.68 (0.35-1.43)	0.256
	Total					
2011-2012	26/649	4.00	Ref.	-	Ref.	-
2012-2013	37/1096	3.34	0.84 (0.51-1.40)	0.509	0.89 (0.43-148)	0.65
2013-2015	**46/1614**	**2.89**	**0.71 (0.43-1.12)**	**0.169**	**0.71 (0.44-1.15)**	**0.165**

Conclusions

- Scale-up of combination HIV prevention in a very high risk fishing community on Lake Victoria is feasible.
- There is preliminary evidence that these interventions are decreasing HIV incidence.

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