The impact of HIV self-testing on recent testing, status knowledge, and linkage to care among female sex workers in Kampala, Uganda: a randomized controlled trial

Katrina Ortblad[1], Daniel Kibuuka Musoke[2], Thomson Ngabirano[3], Aidah Nakitende[2], Jonathan Magoola[3], Prossy Kayiira[3], Geoffrey Taasi[4], Leah Barresi[1], Catherine Oldenburg[5], Till Barnighausen[6,7,1]

Background

Oral HIV self-testing (HIVST) is a promising new testing strategy for female sex workers (FSW) because it has the potential to reduce testing barriers for this population.
- FSWs are at increased risk of infection; HIV testing barriers include facility hours, transport costs, and healthcare provider stigma and discrimination.
- HIV self-tests can be used at home, ensuring privacy and enhancing convenience.

How HIV self-tests are delivered may impact the effectiveness of the intervention.
- Direct delivery may reduce more barriers to healthcare but might be more expensive and less feasible than HIV self-test coupons.

The objectives of this analysis were to explore the impact of two HIVST peer educator facilitated delivery platforms (direct delivery and coupons) on:
(1) Recent HIV testing
(2) Correct HIV status knowledge
(3) Linkage to care, among individuals who test HIV-positive

Methods

Study design
- 1:1:1 cluster (1 peer educator, 8 eligible FSWs) randomized controlled trial (N=960)
- Study arms: (1) direct *delivery* of HIVST, (2) a *coupon* for a HIVST, exchangeable at specified private health facilities, and (3) *standard-of-care* HIV testing.

Participants and procedures
- Participants recruited by trained FSW peer educators, recruited through FSW peer groups
- Eligibility criteria: (1) ≥18 yrs, (2) exchanged sex for money or goods, past month, (3) HIV status unknown or HIV-negative (last test >3 mos prior), and (4) Kampala-based.

Interventions
- Four peer educator visits; HIV self-tests or coupons distributed at first and last visit for those in the intervention arms (these individual received two HIV self-tests or coupons in total).
- First visit shortly after randomization, subsequent ones 0.5, 1.5, and 3 months later.
- All visits included referral to free HIV testing and counseling at private UHMG facilities and distribution of condoms

Assessments
- Three quantitative questionnaires: (1) baseline, (2) one-month, and (3) four-month follow-up
- *Baseline* assessment: sociodemographic characteristics, sex work history, HIV testing, intimate partner violence
- *Follow-up* assessments: HIV testing, intimate partner violence, HIV test use, and linkage to care (among individuals who reported testing HIV-positive at last test)
- "HIV knowledge" game at four-months a conditional cash transfer; participants received US$1 if their guessed HIV status matched the results of a rapid test.

Outcomes
- *Primary*: recent HIV testing (one-month)
- *Secondary*: recent HIV testing (four-months), HIV self-test use, correct HIV status knowledge, linkage to care among participants who reported testing HIV-positive at last test

Statistical analysis
- Intention-to-treat, complete-case analyses measured at the unit of the individual
- Risk ratios measured using mixed effects generalized linear models (Poisson distribution, log link, robust standard errors) with study arm fixed effects, peer educator random effects.
- Sub-group analysis: HIV treatment cascade measured for FSWs who tested HIV-positive with rapid test

Host Organizations

1. Department of Global Health, Harvard T.H Chan School of Public Health, Boston, USA
2. International Research Consortium (IRC), Kampala, Uganda
3. Uganda Health Marketing Group (UHMG), Kampala, Uganda
4. Ugandan Ministry of Health, Kampala, Uganda
5. Francis I. Proctor Foundation, University of California San Francisco, San Francisco, USA
6. Institute of Public Health Heidelberg University, Heidelberg, Germany
7. Africa Health Research Institute, Durban, South Africa

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Results

Table 1. Demographic characteristics of participants at baseline, by study arm, N (%)

Characteristic	Delivery, N=336	Coupon, N=296	Standard, N=328	Total, N=960
Age, median (IQR)	28 (24 to 32)	28 (25 to 32)	28 (24 to 32)	28 (24 to 32)
Have a primary partner	186 (62.8%)	193 (57.4%)	189 (57.6%)	568 (59.2%)
Can read and write	255 (86.2%)	279 (83.3%)	285 (87.7%)	819 (85.7%)
Owns a mobile phone	289 (97.6%)	311 (92.6%)	310 (94.5%)	910 (94.8%)
Years in sex works, median (IQR)	5 (3 to 8)	5 (3 to 8)	5 (3 to 8)	5 (3 to 8)
Inconsistent condom use, clients	125 (42.7%)	141 (42.3%)	122 (37.2%)	388 (40.8%)
Last HIV test, >3-6 mos prior	108 (36.7%)	119 (35.6%)	123 (37.5%)	350 (36.6%)

Table 2. Impact of HIV self-testing on study outcomes at one and four-months, by study arm

Outcome	One-month, N (%)				Four-months, N (%)			
	Direct, N=289	Coupon, N=321	Std, N=315	p-val	Direct, N=262	Coupon, N=297	Std, N=301	p-val
Primary outcome								
Recent testing, past month	275 (95.2%)	258 (80.4%)	226 (71.5%)	<0.001[1] 0.148[2] 0.001[3]	156 (59.5%)	185 (62.3%)	138 (45.9%)	0.043[1] 0.008[2] 0.718[3]
Secondary outcomes								
Recent testing, past 3 months	275 (95.2%)	261 (81.3%)	234 (74.1%)	<0.001[1] 0.224[2] 0.002[3]	242 (92.4%)	260 (87.5%)	220 (73.1%)	<0.001[1] 0.002[2] 0.188[3]
HIV self-test use	272 (94.1%)	250 (77.9%)	n/a	0.001[3]	222 (84.7%)	228 (76.8%)	n/a	0.087[3]
HIV status knowledge, correct guess	n/a	n/a	n/a	n/a	185 (88.1%)	219 (86.9%)	219 (88.0%)	0.964[1] 0.730[2] 0.723[3]
Among HIV-pos FSWs	N=39	N=54	N=39		N=34	N=66	N=44	
Linkage to care	17 (43.6%)	13 (24.1%)	25 (64.1%)	0.182[1] 0.001[2] 0.111[3]	24 (70.6%)	32 (48.5%)	33 (75.0%)	0.719[1] 0.018[2] 0.052[3]

[1]p-value for *delivery* vs. *standard-of-care* arm; [2]p-value for *coupon* vs. *standard-of-care* arm; [3]p-value for *delivery* vs. *coupon* arm
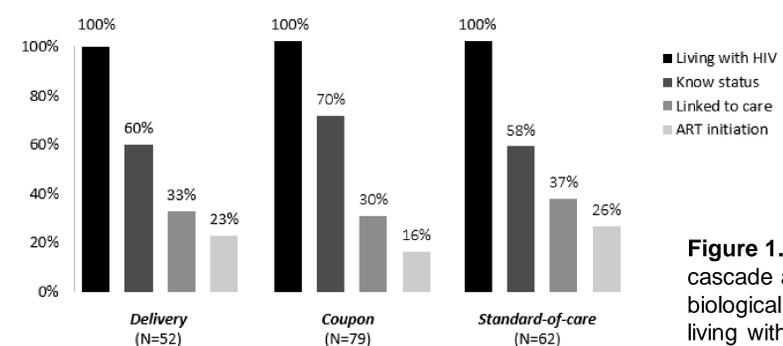

Figure 1. HIV treatment cascade at four-months among biologically confirmed FSWs living with HIV, by study am

Discussion

Peer educator facilitated delivery of HIV self-tests was effective at increasing rate of recent HIV testing compared to standard HIV testing and counseling services.
- Directly delivery of HIVST vs coupon was more effective in short term, no difference in long term (four-months) indicating that coupon could be an effective delivery strategy.

HIV self-testing did not impact correct HIV status knowledge.
- Possible that background HIV status knowledge high in this population
- May also be a consequence of HIV self-test misuse or incorrect results interpretation

Linkage to care, among those who self-reported testing HIV-positive at last test, significantly lower among FSW who received the HIV self-test coupon
- More steps involved with coupon, may have delayed linkage to care for these FSW by four-months
- Linkage to care in all arms increased between one and four-months
- No difference in linkage to care between direct and standard-of-care arm (four-months)

For HIVST to reduce gaps in HIV treatment cascade, additional efforts are needed to ensure correct interpretation of test results and linkage to care.