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An incentivized HIV counseling and testing program targeting hard-to-reach unemployed men in Cape Town, South Africa

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Abstract

Background—In Southern Africa, men access HIV counseling and testing (HCT) services less than women. Innovative strategies are needed to increase uptake of testing among men. This study assessed the effectiveness of incentivized mobile HCT in reaching unemployed men in Cape Town, South Africa.

Methods—A retrospective analysis of HCT data collected between August 2008 and August 2010 from adult men accessing clinic-based stationary and non-incentivized and incentivized mobile services. Data from these three services were analyzed using descriptive statistics and log-binomial regression models.

Results—A total of 9416 first time testers were included in the analysis: 708 were clinic-based, 4985 were non-incentivized and 3723 incentivized mobile service testers. A higher HIV prevalence was observed among men accessing incentivized mobile testing 16.6% (617/3723) compared to those attending non-incentivized mobile 5.5% (277/4985) and clinic-based services 10.2% (72/708)]. Among men testing at the mobile service, greater proportions of men receiving incentives were self-reported first-time testers (60.1% vs. 42.0%) and had advanced disease (14.9% vs. 7.5%) compared to men testing at non-incentivized mobile services. Furthermore, compared to the non-incentivized mobile service, the incentivized service was associated with a 3-fold greater yield of newly diagnosed HIV infections. This strong association persisted in analyses adjusted for age and first-time versus repeat testing (RR 2.33 95% CI 2.03–2.57]; $p < 0.001$).

Conclusions—These findings suggest that incentivized mobile testing services may reach more previously untested men and significantly increase detection of HIV infection in men.

Keywords

voluntary counseling and testing; mobile services; HIV; incentives; sub-Saharan Africa

Introduction

There have been reported difficulties in reaching men for HIV counseling and testing (HCT) and prevention programs in sub-Saharan Africa.^{1–3} This may be due to an overall lack of engagement with health services by men, potentially fuelled by an under-representation of men in the health care work-force.⁴ Other reasons for the poor showing of men in HIV services include fears regarding lack of confidentiality, stigma, discrimination, job loss and norms related to masculinity such as fear of being perceived as weak or unmanly.^{1, 5, 6} Consequently, novel strategies are required to achieve higher coverage of testing, especially among those who have never previously tested.

Conventional strategies to reach men have been documented and these include interventions targeting socio-cultural norms around masculinity;⁷ provision of male friendly services separate from the normal health care services;⁴ offering work-based⁸ and mobile services^{4, 9–12} and use of interventions that encourage rapport between health-care providers (preferably male staff) and men.⁴ These methods have met with variable success in promoting health-seeking behavior including HCT among men. HCT is the gateway into all HIV prevention and care services^{13–15} and for increased representation of men in HIV services in sub-Saharan Africa, these and other methods may need to be employed.

Conditional cash transfer (CCT) programs have recently received attention as a potentially innovative and effective HIV prevention strategy.¹⁶ Studies have shown that CCTs increased the return for HIV test results^{17, 18} as well as maintenance of safe sexual practices.¹⁹ However, little is known of the impact of CCTs on HIV testing in hard-to-reach populations such as men. This study, therefore, aimed to investigate the impact of CCTs on HIV testing in men. In the present retrospective observational study, we assessed the effectiveness of an innovative intervention, combining the use of incentives and a mobile HCT clinic in reaching men. HIV testing yield and patient characteristics among incentivized and non-incentivized testers attending the mobile service were compared with those of men accessing a conventional non-mobile HIV testing service.

Methods

Study design

This was a retrospective observational study of HCT data collected from a stationary clinic and non-incentivized and incentivized mobile testing services over a two-year study period, from August 2008 to August 2010.

Settings

All three services provide point of care “rapid” HIV testing using capillary finger prick of venous blood according to national testing guidelines.

Stationary Clinic HCT service

This clinic service has previously been described in detail.^{9, 20} Briefly, the Masiphumelele clinic is located in the southern sub-district of Cape Town, South Africa. It serves a predominantly African peri-urban township population of 17,000 people. The community has high unemployment rates, most dwellings are informal and in 2008, the estimated HIV prevalence was 25% among the adult population.²¹ The community was representative of the communities where the mobile service operated.

This government-run primary health care facility provides outpatient care including HCT free of charge. Client-initiated or self-referred HCT has been provided to all individuals

accessing the clinic since 2001. Provider-initiated HCT has been routinely provided to patients referred from TB services whose HIV status is unknown. This was extended to those referred from antenatal services in 2002 and those referred from STI services in 2007. All testing required signed consent. The HIV testing results were recorded in a HCT register. The HCT register data used in this study was restricted to men who tested on their own initiative.

Mobile services

During the study period, both the non-incentivized and incentivized mobile services described below operated from the same mobile service but on different days of the week (Monday to Friday) and the days varied from week to week. As previously described, this mobile service provided free HCT in combination with screening for chronic diseases (such as diabetes, hypertension and obesity) and sexual transmitted infections (STI).⁹ The Tutu Tester has been described in detail elsewhere⁹, but is a modified van with two testing rooms, a counseling room and a bathroom. A gazebo-style tent was pitched in front for additional counseling room and waiting areas. Both onsite CD4 testing using the PIMA point-of-care machine and off-site laboratory CD4 testing were offered. Staff included two nurses, three counselors, an educator and a driver.

Throughout the study duration, the mobile service operated mainly in under-served poor peri-urban areas in the greater Cape Town metropolitan area such as Khayelitsha and Klipfontein township populations where antenatal HIV prevalence rates were documented in 2008 as 33% and 23.4%, respectively.²² Rapid HIV testing was performed according to the Provincial Government of the Western Cape.²³ Individuals who received HIV-positive results were staged according to the WHO criteria²⁴ and underwent CD4 count testing. After completion of testing, clients newly diagnosed with HIV were referred to their local health care facility or health care provider. Those with a CD4 ≤ 200 cells/ μ L were referred for antiretroviral therapy (ART) and those with a CD4 count >200 cells/ μ L were referred for HIV care, according to the 2004 South African ART Guidelines.²⁵ The service used a biometric identification system, which utilized fingerprints to identify and log mobile clinic users.

Non-incentivized mobile HCT service

This describes HCT services and data collected on men that accessed HCT on their own initiative at the mobile service without incentivization. The mobile unit stopped at community locations such as shopping centers, taxi ranks, stations and off-road car parking areas and waited for nearby ambulatory clients to spontaneously access the service.

No formal advertisement for the service or active recruitment of clients was conducted.

Incentivized mobile HCT service

Men who participated in the incentivized program were accessed in association with a partner organization called Men at the Side of the Road (MSR) that provided technical support to unemployed or casually employed men. These men congregated on the side of roads and traffic intersection in cities in South Africa in their search for job opportunities from passing motorists. One male recruiter employed by MSR invited unemployed men registered with MSR to attend the mobile HCT service on a predetermined day and venue. The MSR recruiter explained the health benefits of HIV testing and the men were also informed of an incentive to be received, consisting of a food voucher, regardless of their HIV status. The men were registered biometrically per finger print on arrival according to normal Tutu Tester procedure and post testing, a food voucher was printed following recognition of the male clients' fingerprint from a database of biometric identities. This was

done to track voucher dissemination and to prevent participants from testing more frequently than the suggested. The vouchers were redeemable at local supermarkets for consumables other than alcohol and tobacco products and avoided the need for cash in areas where security and staff safety were a problem. The vouchers were worth R80 (equivalent to approximately USD10.30).

Study population

The study population was derived from three groups of adult men (aged 15 years) that underwent HCT at the stationary clinic, non-incentivized mobile and incentivized mobile testing services.

Study Definitions

Incentivized testers - Men who accessed the incentivized mobile HCT service after recruitment from a MSR same-sex recruiter and who received an incentive for doing so.

Non-incentivized testers - Men who voluntarily accessed the mobile HCT service and received no incentive for doing so.

First-time testers - Men who had a first test encounter at the mobile service.

Self-reported first-time testers - Men who self-reported that they never had an HIV test prior to their first encounter at the mobile service.

Self-reported repeat testers - Men who self-reported having had an HIV test in the past elsewhere at the time of their first encounter at the mobile service.

Data Collection

Data was collected from two sources. First, data on all client-initiated HIV tests performed during the study period were extracted from HIV testing registers at the primary health care clinic. Variables of interest were ages of individuals tested and their HIV test result.

Second, data from the mobile clinic were single entered into an access database. Variables examined included demographic characteristics, whether they had previously tested for HIV, their HIV test result and clinical characteristics. The University of Cape Town's Research Ethics Committee had approved the Tutu Tester and Masiphumelele clinic health research programs.

Statistical Analysis

Women, young men <15 years of age and known HIV-positive clients were excluded from the analysis. Descriptive statistics were used to describe HIV prevalence and characteristics at the three HCT services. This was done by restricting analysis to first-time testing encounters at the mobile services and assuming that the proportion of repeat testers attending the clinic-based service was negligible (Katharina Kranzer, Personal communication, September, 2011). Because no data were available on prior HIV testing among men accessing the self-initiated testing at the community clinic, a further analysis was conducted on HIV prevalence and characteristics limited to the first test encounter at the mobile service. Comparisons of men in the different services by study variables were done using Student's t-test and Anova to compare means, Wilcoxon rank sum and Kruskal-Wallis test to compare medians, chi-square and Fischer's exact test to compare proportions. Confidence intervals were calculated using exact binomial techniques. A log-binomial regression model was used to calculate HIV risk in men accessing incentivized and non-

incentivized testing. All data were analyzed using STATA 10 (Stata Corporation, College Station Texas, USA).

Results

Characteristics in clinic-based, non-incentivized and incentivized mobile services

During the study period, a total of 10034 HIV test encounters were documented among men attending clinic-based (n=708), non-incentivized mobile (n=5214) and incentivized mobile (n=4112) services. HIV prevalence and characteristics of men attending the three different services were explored. This was done by restricting analysis to first-time testing encounters at the mobile services and assuming that the proportion of repeat testers attending the clinic-based service was negligible (Katharina Kranzer, Personal communication, September, 2011). A total of 9416 first time testers were included in the analysis: 708 clinic-based, 4985 non-incentivized and 3723 incentivized testers (Table 1). The proportion of young men (15–24 years) was highest among clinic-based (40.9%) compared to incentivized (11.1%) and non-incentivized testers (24.5%) ($P<0.001$). The HIV prevalence was 10.2% (95% CI 7.9–12.4) for clinic-based, 5.5% (95% CI 4.9–6.2) for non-incentivized and 16.5% (95% CI 15.3–17.8) for incentivized testers ($P<0.001$).

Furthermore, HIV prevalence and characteristics among first-time testers accessing incentivized and non-incentivized mobile services only were described and compared. There was no difference in body mass index (BMI), sexual transmitted infection (STI) symptoms and age between incentivized and non-incentivized testers at their first test encounter (Table 1). The proportion of men who were self-reported first-time testers was higher among incentivized compared to non-incentivized testers. The yield of newly diagnosed HIV was three times higher in incentivized mobile (16.5% 95% CI 15.3–17.7) compared to non-incentivized mobile testers (5.5% 95% CI 4.9–6.2) ($p<0.001$). The strong association between HIV-testing yield and use of incentivized testing persisted in analyses adjusted for age and self-reported first-time testing (RR 2.33 95% CI 2.03–2.57; $p<0.001$).

Self-reported first-time and repeat testing in incentivized and non-incentivized mobile services

We next explored the HIV prevalence rates among men reporting ever testing for the first time and those reporting repeat tests and compared these rates among those accessing incentivized mobile services versus non-incentivized mobile services. We found that incentivized self-reported first-time testers had a HIV prevalence of 18.5% (95% CI 16.9–20.1) compared to a HIV prevalence of 7.0 (95% CI 5.9–8.0) in non-incentivized first-time testers ($p<0.001$). Similarly, in a sub-analysis of self-reported repeat testers, incentivized repeat testers had a HIV prevalence of 13.6% (95% CI 11.8–15.3) compared to a HIV prevalence of 4.5% (95% CI 3.7–5.3) in non-incentivized testers ($p<0.001$). Age-adjusted risk for testing HIV-positive was 2.09 (95% CI 1.75–2.50; $p<0.001$) in first-time incentivized compared to non-incentivized testers. Whereas the age-adjusted risk for testing HIV-positive was 2.69 (95% CI 2.17–3.33; $p<0.001$) in repeat incentivized testers compared to non-incentivized testers (data not shown).

Immunological and clinical status in the HIV-positive men

The men testing positive in the non-incentivized mobile services were compared with those testing positive in the incentivized services. Age was similar in newly diagnosed HIV-positive incentivized and non-incentivized testers (Table 2). Laboratory CD4 count data were available for 92.5% (571/227) of incentivized testers and 82.3% (227/276) of non-incentivized testers. Incentivized mobile testers had a higher prevalence of CD4 counts ≥ 200 cells/ μ L compared to non-incentivized mobile testers (14.9% vs. 7.5%) ($p=0.027$). The

proportion of individuals with WHO stage III and IV at diagnosis was higher among incentivized (21.4%) compared to non-incentivized testers (16.6%) ($p=0.101$). Similar results were observed in sub-analyses of self-reported first-time testers only and repeat testers only (Table 3).

Discussion

In this retrospective observational study, the first we believe in which incentivized testing in a mobile service has been compared to other services, we found a higher HIV test positivity rate in men accessing incentivized mobile testing compared to those accessing non-incentivized mobile and stationary clinic-based services. When considering the mobile services only, the proportion of first-time testers was higher among incentivized mobile testers compared to non-incentivized mobile testers, as was the proportion of men with more advanced HIV. The yield of newly diagnosed HIV cases was approximately 2 times higher in incentivized testers compared to the non-incentivized testers after adjustment for age and self-reported first-time testing among those having their first test encounter at the mobile service.

HCT services are important entry points for HIV care and ART for those found to be HIV-positive.^{13–15} We identified approximately 3-fold greater yield of newly diagnosed HIV-positive cases in unadjusted analyses and a higher proportion of ART eligible patients (CD4 200 cells/ μ L) through the incentivized testing strategy. A higher proportion of self-reported first-time testers were also identified, suggesting that individuals who had not previously accessed services utilized the incentivized service. This may be one explanation for the higher yield of new diagnoses and higher proportion of men with CD4 counts $\geq$ 200 cells/ μ L. However, it would appear that this was not the only reason since there was still a 2.3 fold greater risk of testing HIV positive even after adjusting for first-time tester status.

The literature on incentivized testing is scant. A study from Malawi in the general population, where the proportion of men was greater than women, showed that monetary incentives increased HIV test result uptake.¹⁷

There is literature on the use of incentives for other health and social behaviors and activities, ranging from discouraging unhealthy habits to encouraging school attendance among the poor.^{26–29} Over the past decade, incentives from CCT programs in low- and middle income countries have been shown to be effective in modifying behavior and improving the use of health and educational services.²⁶ Evidence is now emerging regarding the role of incentives to modify behavior for HIV prevention in sub-Saharan Africa.^{19, 28, 30} However, their use for HIV prevention is controversial with some studies suggesting that incentives from CCT programs are effective^{19, 28, 30}, while others suggest that they are not effective.¹⁶ In addition, uncertainties remain about the value of incentives and their effect in achieving sustained behavior change and cost effectiveness.^{17, 29, 31, 32} Moreover, incentives have raised ethical concerns such as coercion, bribery, introduction of inequity and dependency, erosion of personal motivation and autonomy as well as potentially harming doctor-patient relationships.²⁹ Thus, the design, implementation and evaluation of incentivized programs for HIV prevention in the region will need to take all these issues into consideration.²⁷

Extending HCT uptake and coverage to hard-to-reach populations that do not necessarily access existing health care service can be challenging. This study shows that relatively large numbers of men were accessed for testing in both incentivized and non-incentivized mobile services. In previously published work, the proportion of men accessing testing in the mobile service was shown to be greater than at the facility based service.⁹ A study

conducted in an urban South African township found low HCT uptake in a number of hard-to-reach populations namely, youth, students and men.¹⁵ Studies have also found low HCT uptake among men who were younger, unemployed, and whom had low educational and socio-economic status.^{15, 33, 34} In our study, a mobile service in combination with incentives might be a strategy to reach unemployed men that are less likely to have previously tested for HIV.

The strengths of this study include the fact that it provides insights into possible effectiveness of incentivization together with point of contact mobile testing as a strategy to increase the uptake of HCT services among men who previously had not sought out testing. It does not enable an analysis of the incentives alone as a means to increase uptake of first-time testing in this at risk population. However, the model tested here (a voucher system, linked to a biometric identifier in a mobile unit) was shown to be effective from an operational viewpoint.

Our study had certain limitations. Since this was an observational non-randomized study, the associations observed in this study are potentially confounded by differences in the target population for each service. The mobile service under incentivized testing conditions reached men seeking employment and therefore these men may have a compromised socioeconomic status, whereas the mobile service under non-incentivized testing conditions attracted voluntary male clients, who may thus be described as the “worried well” and men accessing the primary health care clinic were presumably attending for specific health related issues or specific perceptions of HIV risk. Whilst the employment status of the men attending the incentivized service was known, that of those attending the mobile non-incentivized service and the stationary clinic was unknown although the underserved communities where the mobile service operated have high unemployment rates in general. Among those men testing at the mobile clinic, there was no difference in BMI, STI and age between incentivized and non-incentivized testers.

The study relied on self-report of previous HIV testing history, and men attending the incentivized service may have not reported previous HIV tests or not told the truth about their previous HIV test results in fear that this would jeopardize their chances of receiving the incentive. What’s more, although no data were available in this study on repeat testing among men attending the clinic-based service, it was assumed that repeat testing at this service was negligible based on 5 year testing data at the Masiphumelele clinic (Katharina Kranzer, Personal communication, September, 2011).

A further potential bias in this study is introduced by the difference in recruitment for non-incentivized and incentivized mobile services (passive self initiated versus active recruitment by a MSR peer). Lastly, the study lacks data on linkage to care in newly diagnosed HIV-positive non-incentivized and incentivised testers. However, in a previous study linkage to HIV care in the non-incentivized mobile testers has already been assessed.³⁵ This study reports that linkage to HIV care was 100% in patients with CD4 counts < 200 cells per microliter, 66.7% in those with CD4 counts 201–350 cells per microliter, and 36.4% in those with CD4 counts >350 cells per microliter. Other linkage to care studies are planned.

In summary, this study showed that a mobile service providing incentivized HIV testing was accessed by men, a high proportion of whom were first-time testers, tested HIV positive and had advanced disease. However, due to the retrospective nature of this study, we are unable to fully attribute the observed differences in this study to the incentives offered in the program. Further studies on effectiveness of incentivized programs including randomised controlled designs that avoid bias are required. In addition, as with any program that offers

incentives, sustainability is an issue and more research on cost-effectiveness and affordability of an incentivized testing program such as this are required.

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Table 1

Baseline characteristics of male clients' at their first test encounter at clinic-based, non-incentivized mobile and incentivized mobile services

Variable	Clinic-based service (N=708)		Non-incentivized mobile HCT service (N=4985)		Incentivized mobile HCT service (N=3723)		Total N=3723	P-value*
	Total N=708	Age (yrs), median, IQR	Self-reported first-time tester N=2099	Self-reported repeat tester N=2886	Total N=4985	Self-reported first-time tester N=2244	Self-reported repeat tester N=1479	
Age (yrs), median, IQR	26 (22–33)		31 (23–44)	32 (26–42)	32 (25–43)	35 (28–43)	36 (30–44)	0.0001
Age (yrs), n (%)								
<24	289 (40.9)		645 (30.7)	576 (19.9)	1221 (24.5)	299 (13.3)	114 (7.7)	413 [(11.1)
25–30	184 (26.1)		395 (17.6)	736 (25.5)	1114 (22.3)	483 (21.5)	293 (19.8)	776 (20.8)
31–35	108 (15.3)		223 (10.6)	468 (16.2)	691 (13.9)	395 (17.6)	303 (20.5)	698 (18.8)
36–40	56 (7.9)		207 (9.9)	332 (11.5)	539 (10.8)	336 (15.0)	244 (16.5)	580 (15.6)
41–50	50 (7.1)		292 (13.9)	479 (16.0)	771 (15.5)	507 (22.6)	385 (26.1)	892 (24.0)
>50	19 (2.7)		355 (16.9)	294 (10.2)	649 (13.0)	225 (10.0)	138 (9.3)	363 (9.8)
BMI, median, IQR	-		22.9 (20.9–25.9)	23.4 (21–26.9)	23.1 (21–26.4)	22 (20.6–23.7)	21.9 (20.5–23.6)	22 (20.5–23.6)
STI symptoms								
Yes	-		24 (1.3)	39 (1.6)	63 (1.5)	38 (1.8)	16 (1.1)	54 (1.5)
No	-		1779 (98.1)	2439 (98.2)	4226 (98.1)	2065 (96.9)	1381 (98.0)	3452 (97.3)
Not asked	-		11 (0.6)	9 (0.4)	20 (0.5)	28 (1.3)	12 (0.9)	41 (1.2)
Ever tested†								
<=12 months ago	-		-	-	1259 (25.2)	-	-	771 (20.7)
> 1 year ago	-		-	-	1379 (27.6)	-	-	596 (15.8)
Never/No	-		-	-	2099 (42.0)	-	-	2244 (60.1)
Yes – unknown period	-		-	-	248 (5.0)	-	-	112 (3.0)
Newly diagnosed HIV	72 (10.2; 7.9–12.4)		146 (7.0; 5.9–8.0)	130 (4.5; 3.7–5.3)	277 (5.5; 4.9–6.2)	416 (18.5; 16.9–20.1)	201 (13.6; 11.8–15.3)	617 (16.5; 15.3–17.8)
Positive, n(%; 95% CI)								<0.001

N, number; %, percentage; CI, confidence interval

BMI, body mass index; STI, sexually transmitted infections

* p-value for comparison between non-incentivized and incentivized mobile service

Table 2
Immunological and clinical status of HIV positive clients from non-incentivized mobile versus incentivized mobile services

Variable	Non-incentivized mobile HCT service			Incentivized mobile HCT service		
	Self-reported first-time tester N=146	Self-reported repeat tester N=130	Total N=276	Self-reported first-time tester N=416	Self-reported repeat tester N=201	Total N=617
Age (yrs), median, IQR	35 (28–40)	35 (28–41)	35 (28–40)	36 (31–42)	36 (31–41)	36 (31–42)
Age (yrs), n (%)						
<24	20 (13.7)	6 (4.6)	26 (9.4)	19 (4.6)	6 (3.0)	25 (4.1)
25–30	30 (20.6)	41 (31.5)	71 (25.6)	81 (19.5)	40 (19.9)	121 (19.6)
31–35	25 (17.2)	25 (19.2)	50 (18.1)	97 (23.3)	51 (25.4)	149 (24.1)
36–40	37 (25.3)	23 (17.7)	60 (22.0)	94 (22.6)	48 (23.8)	142 (23.0)
41–50	27 (18.5)	23 (17.7)	50 (18.1)	100 (24.0)	47 (23.4)	147 (23.8)
>50	7 (4.8)	12 (9.2)	19 (6.9)	25 (6.0)	9 (4.5)	34 (5.5)
CD4 cell count (cells/ μ L), median, IQR	403 (266–549)	480 (335–657)	431.5 (290.5–601.5)	381 (269–542)	385.5 (250–556)	382 (265–542)
CD4 cell count (cells/ μ L)						
200	11 (9.5)	6 (5.4)	17 (7.5)	53 (13.8)	32 (17.2)	85 (14.9)
201–350	36 (31.0)	26 (21.6)	61 (26.8)	104 (27.1)	46 (24.7)	150 (26.3)
351–500	30 (25.9)	33 (29.7)	63 (27.6)	111 (28.9)	44 (23.7)	155 (27.2)
>500	39 (33.2)	48 (43.2)	87 (38.2)	116 (30.2)	64 (34.4)	180 (31.6)
WHO stage						
I and II	115 (82.1)	105 (84.7)	221 (83.4)	326 (80.9)	143 (73.7)	469 (78.6)
III and IV	25 (17.9)	19 (15.3)	44 (16.6)	77 (19.1)	15 (26.2)	128 (21.4)

N, number; %, percentage