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Financial Incentives for Pediatric HIV Testing in Kenya

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Abstract

The acceptability of financial incentives for pediatric HIV testing was evaluated in Kenya. Sixty HIV-infected women with children of unknown status were randomized to receive $5, $10, or $15 conditional upon HIV testing. Forty-four (73%) completed child testing; with similar rates across arms. Uptake was significantly higher than a cohort with similar procedures but no incentives (73% vs. 14%, p<0.001).

Keywords

Financial incentive; Conditional cash transfer; Index case testing; Pediatric HIV diagnosis; HIV testing

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INTRODUCTION

Antiretroviral therapy (ART) dramatically improves survival in HIV-positive children[1]. However, many children are diagnosed only after they become symptomatic, limiting benefits of ART[2,3].

There are few strategies to test older HIV-exposed children before they become symptomatic. Index case testing—testing children of HIV-positive caregivers— reveals a high HIV prevalence and is recommended by the World Health Organization (WHO)[4], however, uptake is low and it is not widely implemented in resource limited settings[5,6]. Caregivers cite fear, guilt, and financial constraints as barriers to testing children[7].

In adults and adolescents, financial incentive (FI) interventions have been shown to increase uptake of HIV testing[8,9]. However, no studies have used FI to motivate caregivers to test children, a unique population that lacks autonomy over decision-making, yet urgently requires testing.

MATERIALS AND METHODS

A randomized trial was conducted at Kisumu County Hospital in Western Kenya to evaluate uptake of pediatric HIV testing among HIV-infected women randomized to receive conditional cash incentives equivalent to $5, $10, or $15 USD. The study was designed to inform the design of a larger efficacy trial and was not powered to compare testing rates between arms or to include an un-incentivized control arm. The study was approved by Kenyatta National Hospital (KNH)/University of Nairobi (UoN) Ethics and Research Committee (ERC) and the University of Washington (UW) Institutional Review Board (IRB), and is registered (NCT02931422). Incentive amounts were calculated using pediatric HIV testing cost data collected in a previous study[6]. The $5 level reflected the 75th percentile of costs incurred for child testing visits; the $10 level reflected the 75th percentile of costs and one day of lost wages; the $15 level reflected the 75th percentile of costs and 2 days of lost wages. A statistician not involved in the study procedures conducted the randomization using block sizes of 12 using STATA version 14.2 (ralloc.ado v3.7.5). Arms were allocated in a 1:1:1 ratio. Study investigators were blinded to the incentive values of the sequence in the block. Incentive levels were assigned as pre-prepared scratch cards, ordered in the sequence of assignment, and arranged by block.

Recruitment took place in HIV care clinics. Female primary caregivers were eligible if they were HIV-positive receiving HIV care and had child(ren) ≤12 years and of unknown HIV status, defined as never tested for HIV *or* testing negative during infancy but no confirmatory test at 18 months or after cessation of breastfeeding. We obtained oral consent for recruitment and randomization, and additional optional oral consent to collect phone information for eligible mothers. Women could participate even if they declined to provide contact information. Eligible participants randomly picked one scratch card containing a randomly allocated incentive value they would receive if they tested their children within 2 months. Randomization took place in the same physical space and directly following eligibility assessment to limit the drop offs due to time and space transfers noted in a

previous study[6]. When women presented their child/ren for HIV testing, written informed consent for enrollment and HIV testing was obtained. Socio-demographic information and caregiver perceptions about children's HIV status were collected prior to performing the HIV test. HIV testing procedures followed the Kenyan national guidelines that include one rapid HIV test which if positive is followed by confirmatory rapid test for children over 18 months of age and HIV-DNA PCR testing for children under 18 months [10]. After testing, a post-test survey was conducted to determine costs incurred during the testing visit and previous health seeking behavior.

The primary study outcome was child HIV testing within 2 months of randomization. Secondary outcomes included time to testing and reported impact of HIV testing on future care-seeking behavior. Uptake of testing was compared between arms using relative risk regression (generalized linear model with a log link and binomial family). Time to testing was estimated using Kaplan Meier survival analysis and compared between arms using the log-rank test and Cox proportional hazards regression. Data were analyzed using STATA 14 (College Station, Texas, USA).

RESULTS

Recruitment began in October 2016 and enrollment completed in January 2017. Of 1,991 women screened, 72 (4%) were eligible. Of the 1,919 (96%) who were not eligible; 1,250 (63%) reported that all their children had previously been tested, although this was not verified from clinic records, 506 (25%) had children of unknown HIV status but who were >12 years, 163 (8%) had no children. Sixty (83%) of the 72 eligible were randomized into three arms of 20 each. Of the 12 (17%) who were not randomized, the participant was not the primary caregiver in 7 (58%), 2 (17%) were already scheduled for infant HIV testing at the PMTCT clinic, 2 (17%) needed time to think about child testing and never returned to the study clinic and 1 (8%) caregiver was not interested in participating.

Overall, 44 out of the 72 (61%) eligible clients and 44 of 60 (73%) randomized caregivers brought their children for testing: 75%, 70%, and 75% in the $5, $10 and $15 arms, respectively. Overall uptake was significantly higher than in a previous study by the same study team in Nairobi (73% versus 14% $p<0.001$)[6]. There was no difference in uptake between the $5 and $10 arms and the $5 and $15 arms (Relative Risk [RR] 0.93 [95% Confidence Interval [CI] 0.64–1.37, p=0.74] and RR 1.0 [95%CI 0.70–1.43 p>0.99], respectively).

Among the 44 women who brought children for testing, a total of 53 children were tested for HIV (mean: 1.2 children tested per adult, range 1–3). One child, who was 11 years old tested HIV positive and was successfully linked to HIV care (HIV prevalence 1.8% [95%CI 0.05–9.7%]). The number of children tested per adult was comparable between arms. Median age of children tested was 9 years (IQR 5, 11), and was similar between arms. Median time to testing was 6 days from randomization (IQR 1, 20) and did not differ by arm ($5 versus $10: HR 1.09 [95%CI 0.53–2.27 p=0.81] and $5 versus $15 [HR: 1.03, 95%CI 0.5–2.1 p=0.94]) (Table 1). Before child testing, 30% of women believed their children were HIV-positive, 43% thought they were negative, and 27% could not predict. When asked if they had

previously avoiding seeking health care for minor illnesses for their children for fear of an HIV test, 41% of all enrolled women answered “yes”. When asked if they were more likely to seek care for their children in the future, now that they knew their child’s status 61% responded “yes”. Median direct and indirect cost incurred for the testing visit was $2.82 (IQR $1.62, $4.52).

DISCUSSION

The FI intervention resulted in high uptake of pediatric HIV testing in women with children of unknown HIV status aged 0–12 years. However, a large number of caregivers reported they had adolescents of unknown HIV status aged over 12 who were beyond the scope of this study. Most women reported that knowing the child’s status would make them more likely to access care when children had minor illnesses. Together, these data suggest that FI for pediatric testing is feasible and acceptable, and that determination of a child’s HIV status may additionally increase uptake of routine pediatric care.

Notably, a quarter of screened women were ineligible because their children were older than 12 years. While the study initially sought to test children <18 years, ethical issues of caregiver/child consent, disclosure, and potentially discordant caregiver/child wishes limited ability to include adolescents[11]. However, it is clear that innovative strategies such as assisted disclosure or incentives to access adolescents are urgently needed[9].

Our study results show potential for increased uptake of testing with FI. Overall uptake in our study was significantly and substantially higher than in un-incentivized testing reported in a previous study by the same study team in Nairobi (14%)[6]. We used similar recruitment strategies and staff as the previous study without incentives in the same site (unpublished), then included randomization at recruitment with an offer for FI at recruitment one year later and found similar low uptake of testing (12%) without incentives. Because of the study design, we were unable to compare characteristics of the population at recruitment, however uptake of testing was dramatically different; indeed, the testing rate observed (73%) is the highest reported among index-case child testing studies of caregiver/child dyads in routine clinical settings. A systematic review of uptake and yield of pediatric HIV testing strategies with a wide range of index-case child testing interventions including provider-initiated testing (PITC), family, home, outreach and school linked testing estimated uptake of index case child testing at 52%, with the highest uptake and yield in PITC settings[5]. However, PITC testing selects for symptomatic children and strategies for earlier testing may be beneficial. Our study suggests FI could hold promise for increasing uptake of index case testing, particularly beyond the PMTCT period where challenges in diagnosis have previously been reported [11]. Other strategies to improve testing in this population include optimizing PITC in outpatient departments, screening at immunization clinics and community based testing approaches[11,12].

An important novel finding of this study that warrants exploration is that 41% of women reported previously avoiding health care for their children for fear of HIV testing, suggesting that parental anticipation of HIV testing may act as deterrent to care seeking, and targeted counseling could be beneficial. Indeed, 61% of caregivers noted they would be more likely

to bring their children for other medical services after knowing their child's status, suggesting HIV testing may increase uptake of routine care.

Prevalence of HIV in this population (1.8%) was lower than reported in other studies utilizing index case child testing in sub-Saharan Africa (3.8% to 8.4%)[5,6,13] with only 1 child testing positive for HIV. However, this results match low overall HIV positivity in Kenyan children reported at 0.8% in 2016[14]. Notably, this study was conducted in a clinic where the study team had recently completed index-case child testing with no financial intervention[6], and additionally had undergone recent national family-based HIV testing campaigns.

A major strength of this study was that randomization and incentive allocation occurred at first contact, prior to large drop offs in the study population associated with traditional RCTs and other HIV testing studies[6]. This approach allowed estimation of testing uptake using a large denominator of eligible caregivers in routine clinical care. The study had some limitations; with the small sample size we are unable to make inferences to the population. We were unable to report cost data in this study. However, the trial phase of the study will evaluate cost-effectiveness of the intervention. Child testing history at recruitment was self reported and we were unable to verify testing from medical records. Although testing uptake was estimated among all eligible women, the absence of data among those randomized but who did not complete testing prevents direct comparison of characteristics between testers and non-testers.

CONCLUSION

In conclusion, FI may increase uptake of pediatric HIV testing. Our study identified gaps in adolescent HIV testing that need to be considered in future studies. The study findings were used to inform the design of a larger RCT which began in January 2017 which compares a wider range of FI values ($1.25, $2.5, $5, $10) to a control arm to estimate efficacy.

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Table 1

Testing uptake, age and number of children, and days to testing by randomization arm

	All	$5 arm (N=20)	$10 arm (N=20)	$15 arm (N=20)
Number of randomized clients who presented children for testing (%)	44 (73%)	15 (75%)	14 (70%)	15 (75%)
95%CI	60–84%	51–91%	46–88%	51–91%
Number of children tested[a]	53	18	17	18
Children tested per primary caregiver[a] (median, range)	1 (1, 3)	1 (1, 2)	1 (1, 2)	1 (1, 3)
Age of children tested (median, IQR)[b]	9 (5, 11)	8.5 (4, 10)	8 (6, 10)	10.5 (6, 11)
Days to testing (median, IQR)	6 (1, 20)	17 (1, 28)	3 (1, 6)	7 (2, 22)

[a] N=44

[b] N=54