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The Impact of Cell Phone Reminders on Uptake of Medical Male Circumcision in Rakai, Uganda

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Abstract

Background: Medical male circumcision (MMC) is a recommended strategy for HIV prevention, but attendance for scheduled MMC is often suboptimal. We assessed the impact of cell phone and in-person reminders on uptake of MMC.

Methods: Between October 2010 and June 2011, men participating in the Rakai Community Cohort Study (RCCS) were educated about the risks and benefits of MMC and those who wished to receive free MMC were referred to the Rakai MMC program. Cell phone reminders (calls and/or short message service (SMS)) and in-person re-notification or persons without phone contacts were used to remind clients two days before the surgical appointment date. Proportions of men coming for scheduled surgery before (control period) and after the reminders were computed and logistic regression used to estimate adjusted odds ratios (AdjOR) and 95% confidence intervals of attendance for scheduled MMC.

Results: Approximately 66.7% of men had cell phone contacts. Overall, the intervention increased attendance for scheduled MMC from 20.5% to 32.4%, AdjOR 2.01 (95%CI, 1.42, 2.83), p<0.001. Among men with no phone contacts, uptake increased from 22.2% to 31.9%, adjusted AdjOR 1.71 (95% CI, 0.97, 3.01) p=0.064, compared to an increase from 19.4% (40/206) to 32.6% (92/282), AdjOR 2.15 (95%CI, 1.39, 3.32) p=0.001 among men who had cell phone contact.

Conclusion: Cell phone and in-person reminders of surgery appointments increased MMC uptake, but cell phone reminders are cheaper than in-person re-notification.

Keywords: Medical male circumcision; HIV, MMC uptake; RCCS; Cohort; Rakai; Uganda

Introduction

Three randomized controlled trials (RCTs) in Uganda, Kenya and South Africa showed a 50-60% efficacy of medical male circumcision (MMC) for HIV prevention [1-3]. MMC has also been shown to improve genital hygiene, and reduce sexually transmitted infections (STIs) in men [4,5] and in female partners of circumcised men [4,6]. In March 2007, WHO/UNAIDS recommended that MMC be provided as part of a comprehensive package for prevention of HIV acquisition in men [7]. It is estimated that wide-scale MMC could reduce at least six million new HIV infections and three million deaths over 10 years in Sub-Saharan Africa [8,9]. A Simulation study has also shown that for MMC to independently reduce HIV incidence by 30% in 15 years, the proportion of circumcised men would need to be 96% [10]. In Uganda, it is estimated that expanding MMC to 80% of adults by 2015 could avert 428,000 new HIV infections countrywide by 2025 [11]. There is therefore a need to ensure rapid scale up of MMC, in order to achieve a population level impact on HIV prevention.

With funding from the President's Emergency Plan for AIDS Relief (PEPFAR), the Rakai Health Sciences Program (RHSP) has been offering free MMC to males aged 12 years or older in Rakai and neighboring districts since 2007. RHSP also conducts annual HIV surveillance via the Rakai Community Cohort Study (RCCS) among all consenting adults residing in 50 rural communities in Rakai District. All males participating in the RCCS are encouraged to receive MMC for HIV prevention and other related benefits. Despite the provision of free MMC services since 2007, prevalence of male circumcision among non Muslim men in the cohort communities remains modest (~32% in 2011). Between January and September 2010, MMC attendance for scheduled surgery among cohort clients was unacceptably low (20.5%).

Previous studies have used cell phone interventions to improve medication adherence [12-15]. However, currently there is scanty literature on increasing update of MMC by use of cell phone in the world. Studies have shown use of cell phone reminders to have had an effect on health services utilization. A study in Netherlands showed that SMS reminders improved adherence of type 2 diabetes patients, especially the precision with which the patients followed their prescribed regimen and that it was well accepted by the patients [16]. In a systematic review also indicated that text messaging interventions have improved patients' medication adherence rate (85%, 29.34) [17]. Another RCT in Kenya reported a statistically significant improvement in HAART adherence at 48 weeks in the group receiving weekly SMS reminders, as compared to the control group [18]. In another systematic review it was reported that a non-randomized studies, conducted in

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South Africa, which compared SMS reminders to directly observed therapy short course (DOTS) reported similar rates of tuberculosis cure (62.35% vs. 66.4%) and treatment success (72.94% vs. 69.4%). And another study from South Africa, utilized SMS reminders when patients delayed in opening their pill bottles and reported increased tuberculosis cure (RR 2.32, 95% CI 1.60 to 3.36) and smear conversion (RR 1.62, 95% CI 1.09 to 2.42) rates compared to DOTS. In another non-randomized study, conducted in Kenya, use of SMS reminders increased rates of clinic attendance on scheduled days compared to standard care (RR 1.56, 95% CI 1.06 to 2.29) [19]. In a trial conducted in Kenya, comparing only short weekly messages to standard care, text messaging was associated with a lower risk of non-adherence at 12 months (RR 0.77, 95% CI 0.63 to 0.93) and with the non-occurrence of virologic failure at 12 months (RR 0.83, 95% CI 0.69 to 0.99) [20]. Participants who received text messages' support were more likely to maintain adherence thresholds at follow up and meet the clinical goals of lower viral load and higher CD4+ count [21] and it was also reported that SMC reminders in terms of adherence, 62% of the intervention groups participants had greater than 95% compliance, compared to 50% compliance in the control group [22]. Among 90 patients (76% male, mean age 59.2 years), Medication Event Monitoring System revealed patients who received text messages for anti-platelets had a higher percentage of correct doses taken (p=0.02), percentage number of doses taken (p=0.01), and percentage of prescribed doses taken on schedule (p=0.01), text messages response rates were higher for anti-platelets than statins (p=0.005). Self-reported adherence revealed no significant differences among groups [23]. Basing on literature from other countries, we designed a study to compare cell phone reminders against physical re-notification in the uptake of MMC. We assessed the effectiveness of using a combined strategy of cell phone reminders and physical notification to increase MMC attendance for scheduled surgery in the RCCS communities.

Methods

Between October 2010 and June 2011, participants who consented to RCCS activities were informed about the benefits and availability of free MMC services. An information sheet detailing facts on the circumcision procedure, wound care, benefits and possible complications was read and given to participants during RCCS annual surveys. Men who were willing to receive MMC were referred to the RHSP circumcision center in Kalisizo. Names, phone contact and physical addresses of clients referred for circumcision were registered in a log book on a daily basis. All participants who had a phone contact received a phone call and short message service (SMS) reminders two days prior to their surgical appointment. If for any reason the phone call was not received by the client (client out of network zone or phone unavailable), only SMS were sent. Participants with no cell phone contacts were reminded using in-person notification. To ease transportation to the Rakai circumcision center, participants were provided with free transport from a central address within their geographical location. All reminder information (phone call, SMS or in-person re-notification) indicated the date of surgery, as well as the physical address and time at which the participant would be picked up. Historical data collected in 2010 was used to determine uptake of MMC in the preceding comparison period. After the completion of the study in June 2011, the cell phone reminders were used as a service in MMC services in Rakai and other neighbouring districts.

Statistical Analysis

We defined MMC uptake as actual circumcision of a man referred for this service within the appointed dates. Demographic characteristics of men seeking circumcision in intervention and control periods were compared using chi square tests. We computed proportions of men attending scheduled male circumcision before the intervention and during the intervention period. Simple logistic regression was used to estimate unadjusted odds ratios (ORs) and 95% CIs with associated p-values to compare MMC uptake by period. We also estimated ORs of scheduled MMC uptake by demographic characteristics including age, marital status and having a mobile phone contact. Multiple logistic regressions were used to estimate adjusted odds ratios (AdjORs), controlling for age, marital status and having a mobile phone contact. We also separately computed the proportions of MMC uptake among men who were notified in-person (No phone contact) and among those using phone calls and SMS. Statistical analyses were performed using StataTM Release (Stata Corporation, 4905 Lakeway Drive, College Station, TX 77845, USA).

Results

A total of 755 men were included in this analysis, 332 in the control and 423 in the intervention periods. Table 1 shows the demographic characteristics and mobile phone ownership by control and intervention periods. Men in the control period were significantly younger, less likely to be currently married and less likely to have mobile phone contacts.

Table 2 shows a comparison of uptake of scheduled MMC between the control and intervention periods. MMC uptake was significantly higher in the intervention (32.4%) than in the control period (20.5%), adjusted odds ratio 2.01 (95%CI 1.42, 2.83), p<0.001. Compared to the control period, MMC uptake in the intervention period was significantly higher among men with a phone contact (AdjOR=2.15 (95% CI 1.39, 3.32, p=0.001), men aged <20 (AdjOR=2.43 (95% CI 1.38, 4.27, p=0.002), and both married and unmarried men (AdjOR=2.11 (95% CI 1.28, 3.52, p=0.004) and 1.84 (95% CI 1.15, 2.94, p=0.011, respectively). Table 3 shows a comparison of uptake of scheduled MMC among men who were notified in person and those who were notified by phone during the intervention period. There were no statistically significant differences in MMC uptake by notification method (31.9% vs. 32.6%, p=0.883).

Discussion

We found that reminding men of their appointment day for surgery using in-person and phone notification significantly increases uptake of scheduled MMC. This is consistent with findings from previous studies that have shown improvement in medication adherence when phone reminders were used [12-15]. These results are in line with

	Intervention period		Control period		P-Values
	n	%	n	%	
Total	***423***	***100***	***332***	***100***	
Age group					
<20	111	26.2	125	37.7	0.007
20-<30	166	39.2	109	32.8	
30-<40	105	24.8	76	22.9	
40+	41	9.7	22	6.6	
Marital Status					
Married	213	50.4	135	40.7	0.008
Not married	210	49.6	197	59.3	
Phone Contact					
Yes	282	66.7	198	59.6	0.046
No	141	33.3	134	40.4	

Table 1: Demographic characteristics by period.

Characteristic	Control period (Ref) n/N (%)	Intervention period n/N (%)	Adjusted Odds Ratios (95%CI)	p-values
Overall	68/332 (20.5)	137/423 (32.4)	2.01 (1.42,2.83)	<0.001
Phone contact				
No Phone	28/126 (22.2)	45/141 (31.9)	1.71 (0.97,3.01)	0.064
Had a Phone	40/206 (19.4)	92/282 (32.6)	2.15 (1.39,3.32)	0.001
Age Group				
<20	28/74 (22.4)	46/111 (41.4)	2.43 (1.38,4.27)	0.002
20 - <30	19/56 (17.4)	37/166 (22.3)	1.33 (0.72,2.47)	0.367
30 - <40	18/57 (23.7)	39/105 (37.1)	1.90 (0.96,3.69)	0.059
40+	3/22 (13.6)	15/41 (36.6)	3.99 (0.97,16.42)	0.055
Marital Status				
Not married	40/197 (20.3)	62/210 (29.5)	1.84 (1.15,2.94)	0.011
Married	28/135 (20.7)	75/213 (35.2)	2.11 (1.28,3.52)	0.004

Table 2: Attendance for scheduled circumcision by client characteristic and intervention period.

Characteristic	In-person Physical notification No. circumcised/ No referred (%)	Phone notification No. circumcised/ No referred (%)	Adjusted Odds Ratios (95%CI)	p-values
Overall	45/141 (31.9)	92/282 (32.6)	1.15 (0.73,1.82)	0.537
Age group				
<20	22/51 (43.1)	24/60 (40.0)	0.88 (0.41,1.87)	0.738
20 - <30	7/41 (17.1)	30/125 (24.0	1.45 (0.57,3.64)	0.433
30 - <40	9/29 (31.0)	30/76 (39.5)	1.40 (0.56,3.50)	0.476
40+	7/20 (35.0)	8/21 (38.1)	1.14 (0.31,4.23)	0.847
Marital Status				
Married	21/59 (35.6)	54/154 (35.1)	1.06 (0.56,2.04)	0.847
Not married	24/82 (29.3)	38/128 (29.7)	1.26 (0.66,2.40)	0.482

Table 3: Uptake of MC for referred clients by notification method among men in the intervention period.

recent systematic reviews that have demonstrated evidence based on the use of text message reminders to improve medication adherence in diabetes and hypertension patients [23]. Studies also have showed that mobile phone text-messaging is effective in promoting adherence to medications among different patient populations; these results are in accordance with previous systematic reviews, highlighting that interventions were efficacious in improving medication adherence in particular subjects [19-21].

There was no significant difference in MMC uptake by intervention type (in-person or phone), suggesting the reminder alone affected adherence to scheduled visits, irrespective of method used. However, given the high costs of physical re-notification which involves transport costs, staff time, and the risk of not finding the client at home, use of phones may be a more cost-effective intervention to increase MMC uptake. However, the proportion of men with phone contacts (66.7%) is still relatively low, underscoring the need for in-person reminders. Some telephone numbers were not available when contacted; therefore several calls were made to the participants. Some clients gave out wrong phone contacts and other clients gave phone contacts that belong to their friends or parents especially students. There is therefore need for prior collection of correct phone contacts. Some clients promise to call back to confirm their coming but they did not do so thus miss them on the day of surgery. This might have affected MMC uptake during the study.

Providers should be encouraged to collect contact phone number and physical addresses of clients on first contact in order to improve attendance for scheduled surgical appointments.

Conclusion

A combined intervention of cell phone and physical re-notification to remind clients of their MMC appointment dates increases MMC uptake, however the increase in uptake was significant higher among clients who had cell phone contact, suggesting that using cell phone reminders, a cheaper strategy compared to physical re-notification, can result in better MMC uptake.

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