A systematic review of interventions to increase adult men's uptake of VMMC for HIV prevention in East and Southern Africa

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INTRODUCTION

14,5 million men and boys were circumcised by the end of 2016 in East and Southern Africa, representing a dramatic increase in availability and uptake of voluntary medical male circumcision (VMMC) services.
Despite this level of scale up showing the feasibility of VMMC and efforts to increase demand, progress in increasing coverage among adult males, particularly over 25 years old, has been modest relative to the 90% target for 2020.
We conducted a systematic review of studies describing interventions to increase uptake of VMMC among adult men (>18 years). Using findings emerging from the review, we make recommendations of which interventions should be considered for implementation by VMMC programmers and policy-makers.

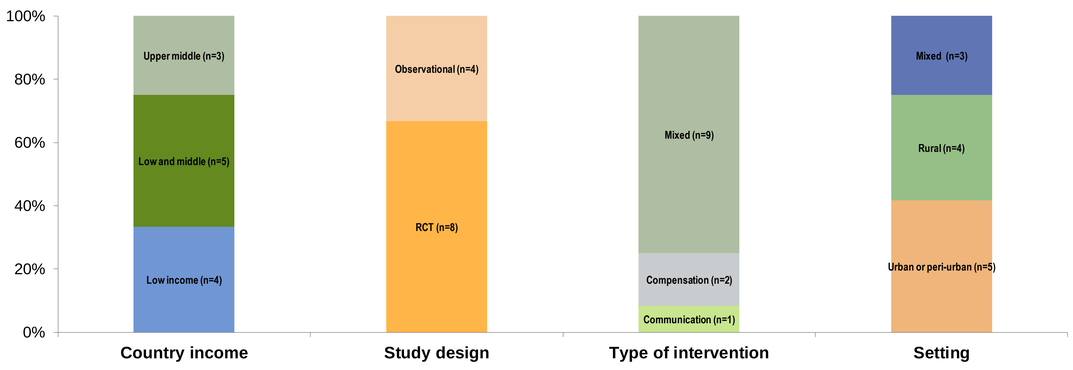
METHODOLOGY

Following PRISMA guidelines, we systematically searched three databases (EMBASE, PubMed and Global Health Library) for peer-reviewed articles for two different periods, 01 January 2005 to 22 October 2015 and 23 October 2015 to 17 January 2017. We included studies that reported on the uptake of VMMC after implementation of an intervention that aimed to increase VMMC uptake among adult men (>18 years). Interventions were categorized as communication, structural, compensation or incentive based, or mixed.
All extracted data was then analyzed by country and setting, type of intervention, time to seek circumcision and study design. Study quality was assessed using the Cochrane Collaboration risk of bias tool for randomized control trials and for non-randomized studies of interventions. Studies were not excluded from the review based on the quality assessment.

Type of interventions - definitions:

- **Communication:** interventions to address barriers that affect knowledge, behavioral and motivational factors and foster dialogue. In this review interventions included: mass-media campaigns, phone messaging, distribution of educational material, information and education provided by peers or pregnant partners of men.
- **Structural:** interventions capable of altering the structural context or operating procedures.
- **Compensation or incentive-based:** financial or non-financial rewards or compensation offered at any point aimed to effect attitudes and beliefs and actions towards the intervention. In this review, transport and food vouchers, lottery rewards, subsidized vouchers to private provider.
- **Mixed:** combined at least two of these types of interventions.

Figure 1. General characteristics of included studies (n=12)



RESULTS

- 12 studies were included. Total sample size ranged from 123 to 5326 participants.
- Most studies were performed in low income or low and middle income countries (n=9/12). Half were undertaken in urban or semi-urban areas (n=6/12).
- The uptake of VMMC among men in intervention groups ranged from 1.9% to 62%. Nine studies (75%) used mixed interventions, four combined structural and communications strategies, and five combined communication and compensation or incentive-based strategies. One study used (8%) communication strategies and the remaining two (17%) used compensation or incentive based strategies.
- In general, majority of studies used a timeframe of 2 - 3 months to outcome assessment (n=7/12)
- 35% (n=6/17) of reported interventions arms showed a positive effect; all used a mixed intervention (structural and communication or compensation and communication).

Table 1. Included studies on intervention impact on voluntary medical male circumcision uptake: proportion (%) of circumcised men (n=12)

First author, pub year	Uptake of VMMC services in programme/intervention (%, n/N) (IC95%)	Measure of effect (OR/RR/DID, 95%CI)	Adjusted measure of effect (ORa/RRa/DIDa, 95%CI)	Effect
Leiby et al, 2016	Control arm: 10.4% (n/a) Tailored SMS: 12.6% (n/a) Conventional SMS: 11.6% (n/a)	Reference Tailored SMS: OR 1.24 (0.85 to 1.81) Tailored SMS verified: OR 0.77 (0.26 to 2.24) Conventional SMS: OR 1.13 (0.78 to 1.65) Conventional SMS verified: OR 1.21 (0.47 to 3.09)	Reference Tailored SMS: OR 1.24 (0.84 to 1.81) Tailored SMS verified: OR 0.67 (0.20 to 2.23) Conventional SMS: OR 1.17 (0.80 to 1.72) Conventional SMS verified: OR 1.34 (0.45 to 4.02)	No
Bazant et al, 2016	Control arm 1 yr prior to study vs study period: 8% (257 clients vs 278 clients) Iringa region Control arm 1 yr prior to study vs study period: 75% (75 clients vs 131 clients) Raffle 1 yr prior to study vs study period: 47% (264 clients vs 388 clients) Iringa region raffle 1 yr prior to study vs study period: 116% (58 clients vs 125 clients)	n/a	Control arm: DID 1.08 (0.48 to 2.44) Iringa region control arm: DID 1.63 (1.18 to 2.26) Raffle: DID 1.47 (0.87 to 2.48) Iringa region raffle: DID 3.36 (1.14 to 9.90)	No Only in Iringa region
Thornton and Godlonron, 2016	Zero priced voucher: 3% (12/378) Voucher >0: 2.5% (30/1190)	n/a	n/a	No
Auvert et al, 2013	Baseline: 12% (CI 0.1 - 0.14) Follow up 46.7% (1848/3338) (95%CI: 44.3-49.0)	Pre and post MC prevalence	n/a	No
Barnabas et al, 2016	Control: 28% (62/224) Text reminder: 48.0% (137/284) Lay counsellor: 47.0% (106/226)	n/a	Reference Text reminder: RR 1.72 (1.36 to 2.17) Lay counsellor: RR 1.67 (1.29 to 2.14)	Yes
Tumwebaze et al, 2012	22%(123/560) HIV neg men were high-risk High risk men circumcised: 62% (75/123)	n/a (no comparator)	n/a (no comparator)	Yes
Weiss et al, 2015	40.3% (161/400)	n/a	OR 2.45 (95% CI: 1.24-4.90)	Yes
Semeere et al, 2016	Control (historical) phase: 1.4% (4/296) Intervention phase: 2.3% (7/305)	Reference IMB: OR 1.5 (0.4 to 5.2)	Reference IMB: OR 1.4 (0.3 to 6.0)	No
Thirumurthy et al, 2016	Fixed compensation: 8.4% (26/308) Lottery-based reward: 3.3% (10/302)	Fixed compensation: OR 6.8 (2.3 to 19.7) Lottery-based reward: OR 2.5 (0.8 to 8.1)	Fixed compensation: OR 7.1 (2.4 to 20.8) Lottery-based reward: OR 2.5 (0.8 to 8.1)	No
Thirumurthy et al, 2014[b]	Control arm: 1.6% (6/370) (95%CI, 0.6%-3.5%) US $15: 9.0% (34/377) (95% CI: 6.3-12.4) US $8.75: 6.6% (25/381) (95% CI: 4.3-9.5) US $2.5: 1.9% (7/374) (95% CI: 0.8-3.8)	Reference US $15: OR 6.0 (2.5 to 14.5) US $8.75: OR 4.3 (1.7 to 10.5) US $2.5: OR 1.2 (0.4 to 3.5)	Reference US $15: OR 6.2 (2.6-15.0) US $8.75: OR 4.3 (1.7-10.7) US $2.5: OR 1.1 (0.4-3.3)	 Yes Yes No
Zanolini et al, 2016	55% (385/699)	Model 2: DID 10.21 (-18.19 to 33.94)	n/a	No
Wilson et al, 2016	n/a	Compensation: OR 5.30 (2.20 to 12.76) Information: OR 1.67 (0.61 to 4.62) Challenge: OR 2.69 (1.05 to 6.91)	n/a	Yes No No

n/a: non available; OR: odds ratio; RR: relative risk; DID: difference in differences; MC: male circumcision; a. Uptake post-programme phase was estimated by excluding the proportion of men that were not circumcised by the project. Including men circumcised during the male circumcisions RCT, MC prevalence was 12% at baseline; IMB: information, motivation, and behavioral skill model; b OR adjusted for age, education, wealth and marital status; c OR adjusted for a priori considered confounders: age, education level, baseline stage of readiness for VMMC

Communication Compensation or incentive-based Mixed

LIMITATIONS

- Abstracts were not included in our search
- Categorization of types of interventions was the decision of the authors based on other literature
- Communication component of interventions was inconsistently reported

CONCLUSIONS

No intervention had a striking effect on adult men's uptake of VMMC, although mixed interventions with service delivery, communications and possibly cost compensation showed promise. The design of approaches needs to reflect on the evidence from studied interventions, context and engaging community. Implementation should occur with systematic monitoring to permit adjustments and improvements.