Surgical efficiencies and quality in the performance of voluntary medical male circumcision (VMMC) procedures in Kenya, South Africa, Tanzania, and Zimbabwe

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Introduction

Achieving 80% VMMC coverage among men ages 15-49 years in 14 priority countries could avert up to 3.4 million new HIV infections by 2015. To reach this goal, it would be necessary to perform 20.3 million circumcisions by 2015. The systematic monitoring of the VMMC scale up (SYMMACS) measured six elements of surgical efficiency: task shifting, task sharing, pre-bundled kits with disposable instruments, rotation among multiple surgical bays, use of electrocautery, forceps guided surgical method.

This analysis explores the relationship between elements of surgical efficiency in VMMC, quality of surgical technique, and the amount of time required to conduct VMMC procedures in actual field settings. Efficiency is defined as time of the primary provider with the client (PPTC) and total elapsed operating time (TEOT).

Methods

Serial cross-sectional surveys of VMMC sites (2011-2012) in 4 countries

Trained clinicians observed quality of surgical technique and timed 9 steps in the VMMC procedure.

Bivariate and multivariate analyses tested the relationship between 5 explanatory variables (task-shifting, task-sharing [of suturing], rotation among multiple beds, use of electrocautery, and quality of surgical technique) and 2 outcomes: PPTC and TEOT.

Results

On 6 of 8 data points (4 countries x 2 years) the median TEOT was 23-25 minutes.

Multivariate results showed that in South Africa and Zimbabwe, having a secondary provider complete suturing (task-sharing) and use of electrocautery reduced PPTC.

Factors related to TEOT varied by country and year, but task-sharing of suturing and/or electrocautery were significant in at least two countries.

Quality of surgical technique was not significantly related to either PPTC or TEOT in regression analysis, except for South Africa in 2012 where quality was associated with lower TEOT.

Table 1. Median time (in minutes: seconds) per step in the VMMC procedure, primary provider time with client (PPTC), and total elapsed operating time (TEOT) by country and by year

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<thead>
<tr>
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<th>Kenya</th>
<th>South Africa</th>
<th>Tanzania</th>
<th>Zimbabwe</th>
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<tr>
<td>median time (years)</td>
<td>2013</td>
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<td>36.25</td>
<td>31.21</td>
<td>34.26</td>
<td>32.20</td>
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Conclusions

The use of medical doctors as primary provider actually increased the median TEOT in the two countries that did not authorize task shifting. Similarly, number of beds per se does not reduce TEOT, in fact, the use of multiple beds allows the primary provider – particularly important where task-shifting is not authorized – to attend to more clients in a given period of time. The time that the client spends on the operating table (TEOT) is not lower, but the time the primary provider spends with each client is reduced, increasing the overall efficiency of the program.

There was little evidence of a relationship between quality of surgical technique and either PPTC or TEOT. One possible explanation relates to the clustering of results toward the high end of the quality scale. The lack of relationship between quality and TEOT refutes the notion of VMMC critics that reducing the time of operation in high volume setting results in decreased quality of care. Whereas SYMMACS revealed a decrease in quality of services – measured on multiple dimensions with the rapid expansion of the program – this analysis demonstrated that quality did not suffer by providers trying to complete the operation too quickly. To the contrary, in the only case that was significant in the multivariate analysis, higher quality was related to lower operating time, possibly as a result of experienced providers being both better and faster.

Photo 1. (Above) Multiple bed set up at Orange Farm’s Bophelo Pele MMC Clinic

Photo 2. (Left) MMC Kit

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