

# Male circumcision: an acceptable strategy for HIV prevention in Botswana

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**Background:** Male circumcision is known to reduce the risk of acquiring HIV, but few studies have been performed to assess its acceptability among either children or adults in sub-Saharan Africa.

**Methods:** We conducted a cross sectional survey in nine geographically representative locations in Botswana to determine the acceptability of male circumcision in the country, as well as the preferred age and setting for male circumcision. Interviews were conducted using standardised questionnaires both before and after an informational session outlining the risks and benefits of male circumcision.

**Results:** Among 605 people surveyed, the median age was 29 years (range 18–74 years), 52% were male, and >15 ethnicities were represented. Before the informational session, 408 (68%) responded that they would definitely or probably circumcise a male child if circumcision was offered free of charge in a hospital setting; this number increased to 542 (89%) after the informational session. Among 238 uncircumcised men, 145 (61%) stated that they would definitely or probably get circumcised themselves if it were offered free of charge in a hospital setting; this increased to 192 (81%) after the informational session. In a multivariate analysis of all participants, people with children were more likely to favour circumcision than people without children (adjusted odds ratio 1.8, 95% CI 1.0 to 3.4). Most participants (55%) felt that the ideal age for circumcision is before 6 years, and 90% of participants felt that circumcision should be performed in the hospital setting.

**Conclusions:** Male circumcision appears to be highly acceptable in Botswana. The option for safe circumcision should be made available to parents in Botswana for their male children. Circumcision might also be an acceptable option for adults and adolescents, if its efficacy as an HIV prevention strategy among sexually active people is supported by clinical trials.

Male circumcision is known to be protective against HIV acquisition. At least eight prospective studies have demonstrated threefold to eightfold protection among circumcised men,<sup>1–9</sup> and nearly 30 cross sectional studies have shown significantly lower HIV prevalence among circumcised men.<sup>2–10–11</sup> A recent meta-analysis of 27 prospective and cross sectional studies found the risk for HIV in circumcised men half that of uncircumcised men, and the association was stronger in studies adjusted for confounding factors.<sup>12</sup> The proposed mechanism for the protective effect of circumcision is that the inner mucous surface of the foreskin is rich in Langerhans cells and only minimally keratinised, making it particularly susceptible to the virus.<sup>13–15</sup>

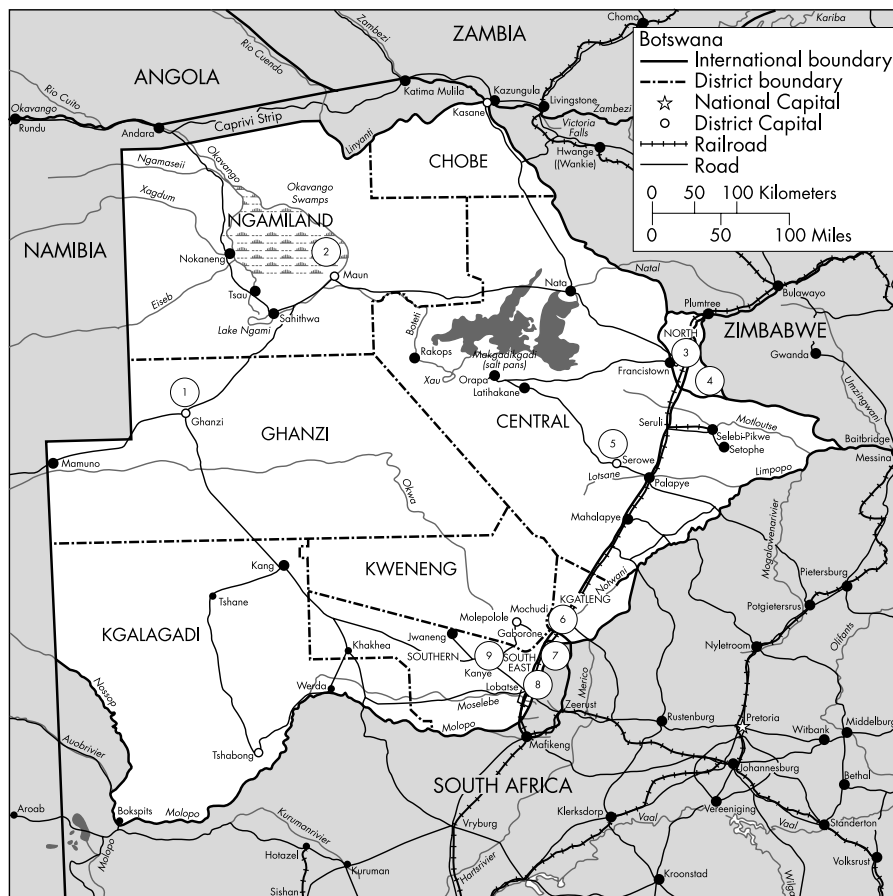
Despite the strength of the epidemiologic data, considerable debate remains about the potential role of male circumcision as a public health measure to prevent HIV infection. Although the current randomised clinical trials in Kenya<sup>16–17</sup> and elsewhere will better assess the potential benefits of circumcision intervention programmes for adolescents or adults, the acceptability of such interventions—or the acceptability of circumcision at any age—has not been studied in southern Africa. In western Kenya, Bailey *et al* have shown that male circumcision is highly acceptable among the Luo, who are a traditionally non-circumcising tribe.<sup>14</sup> Studies have also demonstrated interest in circumcision among traditionally non-circumcising groups in Uganda<sup>18</sup> and Tanzania<sup>19</sup>; in Tanzania, the incidence of male circumcision has increased in recent years among at least one traditionally non-circumcising group. Additional acceptability studies in other regions of Africa have not been reported.

We wished to determine the acceptability of male circumcision in Botswana, a country of approximately 1.7 million people in southern Africa, with an HIV prevalence of 38.5% among pregnant women in 2000.<sup>20</sup> Like most Bantu peoples,

ritual male circumcision was historically practised in Botswana, where it may have also served to protect against balanitis in the hot and sandy desert environment. Known as *Go rupa* or *Bogwera*, it was used to mark the transition from boyhood to manhood.<sup>21</sup> However, circumcision was largely abandoned during the 19th and 20th centuries through the influence of western medical missionaries. The missionaries cited appropriate concerns about unhygienic conditions, but also feared the political consequences of large male gatherings in what was at the time a British protectorate.<sup>22</sup> At present, circumcision is not routinely offered for male children born in district hospitals in Botswana.

## METHODS

Between 17 March and 17 June 2001, 605 interviews were conducted at nine locations throughout Botswana that are geographically and ethnically representative of most of the population (fig 1). Sites included two cities (Gaborone and Francistown), one town (Lobatse), and six villages (Maun, Ghansi, Serowe, Kanye, Ramotswa, and Bobonong). Approximately 100 interviews were conducted in each of the cities and in the town, and approximately 50 interviews were conducted in each of the villages. Interviews were conducted by a team of three trained bilingual health educators, and were performed in either Setswana or in English according to the wishes of participants. To maximise representation by all members of the community, interviewers travelled to each location and approached potential participants at meeting places (known as *kgotlas*) and public markets. Interviewers systematically approached every second adult who passed by, alternating between approaching males and females when possible, and asked them to participate in a health related survey. Participants were eligible if they were age 18 or older.



**Figure 1** Map of Botswana showing the nine locations where interviews were conducted.

**Table 1** Characteristics of participants in nine sites throughout Botswana (n=605)

| Characteristic               | No (%)                       |
|------------------------------|------------------------------|
| Median age                   | 29 years (range 18–74 years) |
| Male sex                     | 316 (52)                     |
| Marital status               |                              |
| Single                       | 343 (57)                     |
| Cohabiting                   | 88 (15)                      |
| Married                      | 128 (21)                     |
| Separated, divorced, widowed | 46 (7)                       |
| Number of children           |                              |
| 0                            | 221 (36)                     |
| 1                            | 114 (19)                     |
| 2                            | 107 (18)                     |
| 3                            | 66 (11)                      |
| 4 or more                    | 97 (16)                      |
| Education completed          |                              |
| None                         | 34 (5)                       |
| Primary school               | 185 (31)                     |
| Secondary school             | 321 (53)                     |
| Tertiary/university          | 65 (11)                      |
| Occupation                   |                              |
| Salaried (government)        | 134 (22)                     |
| Salaried (private)           | 105 (17)                     |
| Domestic work/manual labour  | 64 (11)                      |
| Self employed                | 103 (17)                     |
| Student                      | 36 (6)                       |
| Unemployed                   | 163 (27)                     |
| Religion                     |                              |
| Christian                    | 404 (67)                     |
| Muslim                       | 9 (2)                        |
| No religion/other            | 192 (31)                     |

Response rates were recorded, informed consent was signed by all participants, and interviews were performed in a private setting.

The data collection instrument consisted of both closed and open ended questions about participants' views of male circumcision, and was administered in two parts. Part 1 was administered before any information about male circumcision was provided to the participant by the health educator, and part 2 was administered after the health educator read a short informational pamphlet regarding the potential risks and benefits of male circumcision to the participant. This pamphlet described benefits reported in the medical literature, such as reduction in phimosis, childhood urinary tract infections, bladder cancer, and some sexually transmitted diseases including HIV infection. The risks described included surgical risks (bleeding, infection, and pain), and the potential for community stigma related to the altered appearance of the penis.

Data were analysed using EPI-INFO version 6.02 and STATA version 6.0.<sup>23</sup> Wilcoxon signed rank tests were used to calculate differences in responses to questions asked both before and after the informational session. For multivariate analysis, we used logistic regression and calculated adjusted odds ratios (AOR) and their 95% confidence intervals. We included all factors significant at the  $p = 0.2$  level in univariate analysis, and all potential confounders, in the multivariate models.

**RESULTS**

In total, 605 people participated in the study at the nine sites, accounting for approximately 57% of those approached. Twenty nine different ethnic groups from throughout the country were represented. Characteristics of the participants are shown in table 1. Some differences were noted between

**Table 2** Attitudes about circumcision among participants in Botswana (n=605)

|   | No (%) before informational session | No (%) after informational session | p Value* |
|---|-------------------------------------|------------------------------------|----------|
| Circumcising a male child in a safe hospital setting, free of charge: |                                     |                                    |          |
| All participants (n=605):   |                                     |                                    |          |
| Would definitely/would probably circumcise                            | 408 (67)                            | 542 (90)                           | < 0.0001 |
| Would definitely not/would probably not circumcise                    | 86 (14)                             | 34 (6)                             |          |
| Unsure  | 111 (18)                            | 29 (5)                             |          |
| Uncircumcised men only (n=238):                                       |                                     |                                    |          |
| Would definitely/would probably circumcise                            | 159 (67)                            | 208 (87)                           | < 0.0001 |
| Would definitely not/would probably not circumcise                    | 38 (16)                             | 15 (6)                             |          |
| Unsure  | 41 (17)                             | 15 (6)                             |          |
| Circumcised men only (n=78):  |                                     |                                    |          |
| Would definitely/would probably circumcise                            | 73 (94)                             | 76 (97)                            | NS       |
| Would definitely not/would probably not circumcise                    | 1 (1)                               | 1 (1)                              |          |
| Unsure  | 4 (5)                               | 1 (1)                              |          |
| Women only (n=289):   |                                     |                                    |          |
| Would definitely/would probably circumcise                            | 178 (62)                            | 260 (90)                           | < 0.001  |
| Would definitely not/would probably not circumcise                    | 45 (16)                             | 17 (6)                             |          |
| Unsure  | 66 (23)                             | 12 (4)                             |          |
| Uncircumcised men only (n=238):                                       |                                     |                                    |          |
| Circumcising yourself in a safe hospital setting, free of charge:     |                                     |                                    |          |
| Would definitely/would probably circumcise                            | 145 (61)                            | 192 (81)                           | < 0.0001 |
| Would definitely not/would probably not circumcise                    | 46 (19)                             | 22 (9)                             |          |
| Unsure  | 47 (20)                             | 24 (10)                            |          |
| Women only (n=289):   |                                     |                                    |          |
| Prefer a circumcised or an uncircumcised partner:                     |                                     |                                    |          |
| Circumcised   | 146 (50)                            | 227 (79)                           | < 0.0001 |
| Uncircumcised   | 20 (7)                              | 7 (2)                              |          |
| No preference   | 61 (21)                             | 32 (11)                            |          |
| Unsure  | 63 (22)                             | 23 (8)                             |          |
| Cultural acceptability of circumcision:                               |                                     |                                    |          |
| Circumcision is culturally acceptable                                 | 298 (50)                            | –                                  |          |
| Circumcision is not culturally acceptable                             | 98 (16)                             | –                                  |          |
| Unsure  | 209 (34)                            | –                                  |          |
| Best age for male circumcision:                                       |                                     |                                    |          |
| Birth to 1 month  | –                                   | 152 (25)                           |          |
| 1 month to 1 year   | –                                   | 52 (9)                             |          |
| 2 years to 5 years  | –                                   | 129 (21)                           |          |
| 6 years to 10 years   | –                                   | 95 (16)                            |          |
| 11 years to 15 years  | –                                   | 88 (14)                            |          |
| Older than 15 years   | –                                   | 49 (8)                             |          |
| Never   | –                                   | 18 (3)                             |          |
| Unsure/other  | –                                   | 22 (4)                             |          |
| Best place for male circumcision:                                     |                                     |                                    |          |
| Hospital  | –                                   | 542 (90)                           |          |
| Traditional setting/other   | –                                   | 37 (6)                             |          |
| No place (circumcision not acceptable)                                | –                                   | 8 (1)                              |          |
| Unsure/other  | –                                   | 15 (3)                             |          |

\*p Value for the Wilcoxon signed rank test of difference in response before and after the informational session.

sites; in Lobatse, participants were younger than in all sites combined (median 26.5 years,  $p < 0.001$ ), and in Gaborone participants were older than in all sites combined (median 34.0 years,  $p < 0.001$ ).

Male circumcision was correctly described by 74% of participants, and the interviewers described circumcision to all participants who defined it incorrectly (4%) or who were unsure (22%) before proceeding with the interview. Male circumcision was preferred by most participants, both before and after being given a 5 minute informational session of its risks and benefits, as shown in table 2. Except among circumcised men, where 94% were already in favour of circumcision before the informational session, preferences for circumcision significantly increased following the informational session for questions asked twice. Circumcising a male child in a safe hospital setting, free of charge, was preferred by most participants (90%), although 51% felt that safe circumcision should be linked to traditional practices such as *Bogwera*. Only 2% felt that male circumcision would be viewed unfavourably by the community. Most participants (55%) felt that circumcision should be performed before age 6, and 25% favoured circumcision between birth and 1 month of age.

Participants were also asked to state the reasons underlying their responses. Of the 408 who initially responded that they

would definitely or probably circumcise a male child, 70% listed protection from sexually transmitted diseases or HIV among their reasons, 16% listed cultural or traditional reasons, and 12% listed hygienic reasons. The percentage citing health reasons increased to 84% following the informational session. Of the 86 participants who initially responded that they would definitely not or probably not circumcise a male child, 35% listed pain among their reasons, 26% listed safety concerns, and 22% listed religious or cultural reasons. Following the informational session, the 48 participants who changed from definitely or probably not favouring circumcision to definitely or probably favouring circumcision almost universally stated health reasons for this change.

Among men, 78 (25%) reported that they were circumcised. The median age of these men was 34 years (range 20–70 years), 15 different ethnic groups were represented, and the median age at which circumcision occurred was 13 years (range 0–30 years). Circumcision status did not differ significantly by location or ethnicity. Forty four (59%) listed culture or tradition among their reasons for being circumcised, and 30 (41%) listed disease prevention among their reasons. Sixty nine (90%) reported that they were definitely or mostly happy to be circumcised, and eight (10%) reported that it did not

**Table 3** Predictors of responses favouring the circumcision of a male child in Botswana

| Characteristic                       | Proportion (%) favouring circumcision* among those with characteristic | Proportion (%) favouring circumcision* among those without characteristic | Univariate analysis p value | Multivariate analysis adjusted odds ratio (95% CI) |
|--------------------------------------|--|---|-----------------------------|--|
| Male sex                             | 230/271 (85)   | 178/223 (80)  | 0.14                        | NS   |
| Married                              | 111/127 (87)   | 297/367 (81)  | 0.10                        | NS   |
| Has children                         | 286/331 (86)   | 122/163 (75)  | 0.001                       | 1.8 (1.0 to 3.4)                                   |
| Secondary school education or higher | 257/320 (80)   | 151/174 (87)  | 0.07                        | NS   |
| Christian religion                   | 269/321 (84)   | 139/173 (80)  | 0.33                        | –  |
| Employed                             | 310/373 (83)   | 98/121 (81)   | 0.59                        | –  |
| Ethnic group†                        | –  | –   | 0.28                        | NS   |
| Location (all sites)‡                | –  | –   | 0.0002                      | 0.03   |
| Age (median)                         |  |   | 0.002                       | NS   |
| Favour circumcision: 30 years        |  |   |                             |  |
| Do not favour circumcision: 26 years |  |   |                             |  |

\*"Favouring circumcision" defined as those responding that they would definitely or probably circumcise a male child, as compared to those who would definitely or probably not circumcise a male child.

†Univariate analysis represents  $\chi^2$  for differences among all ethnic groups, by the Kruskal-Wallis test. Four individual ethnic groups with  $p < 0.2$  were included in the multivariate model as potential confounders.

‡Univariate analysis represents  $\chi^2$  for differences among all locations, by the Kruskal-Wallis test. Location was entered into the model as a class.

matter to them. Among all men, 158 (49%) of 325 felt that circumcision made it easier to use condoms. Among 24 men who had been circumcised as adults (age  $\geq 18$ ), 16 (68%) felt that being circumcised made it easier to use condoms.

In univariate analysis, being older ( $p = 0.002$ ), a parent ( $p = 0.002$ ), or a circumcised man ( $p < 0.001$ ) was predictive of a participant whose initial response was to definitely or probably circumcise a male child, compared with those who would definitely not or probably not circumcise. Participants in Gaborone, who were significantly older than in other locations, were also more likely to favour male circumcision ( $p = 0.002$ ). Participants in Lobatse, who were significantly younger than in other locations, were less likely to favour male circumcision than participants in other locations ( $p = 0.002$ ). There were no significant differences by sex, ethnicity, religion, occupation, or education.

We created a logistic regression model to evaluate potential differences in initial responses (table 3). This model included age, sex, marital status, being a parent, education, ethnic group, and location as covariates. In this adjusted analysis, participant responses differed significantly between locations ( $p = 0.03$ ). Having a child (AOR = 1.8, 95% CI 1.0 to 3.4) was the only near significant predictor for wanting to definitely or probably circumcise a male child.

The same covariates, and circumcision status, were included in a model that included only male participants. Being circumcised was the only significant predictor for a man who would definitely or probably circumcise a male child (AOR = 14.4, 95% CI 1.9 to 109.9). Before the informational session, uncircumcised men from Lobatse (AOR = 0.2, 95% CI 0.1 to 0.6) and Serowe (AOR = 0.3, 95% CI 0.1 to 1.0) were less likely than other participants to want to become circumcised themselves, and these sites remained as the only significant predictors for this response after the informational session.

## DISCUSSION

Male circumcision appears to be highly acceptable in Botswana. Although the majority of males in Botswana are not circumcised, 68% of participants in our study responded that they would definitely or probably circumcise a male child if this service were offered for free in the hospital. The majority of these people cited the prevention of sexually transmitted diseases, including HIV, for favouring circumcision. These results are consistent with the study by Bailey *et al* among the Luo in Kenya.<sup>14</sup>

Following an informational session about male circumcision, an even larger proportion of participants stated that they

would definitely or probably circumcise a male child, and a greater number of women stated that they would prefer to have a circumcised partner. These increases suggest that educational efforts regarding the health benefits and risks of male circumcision may further improve the favourability of circumcision within Botswana. Although our brief informational session cannot be considered an adequate educational effort, these findings do suggest that participants were uninformed of the risks and benefits of male circumcision, and that further educational programmes are needed in Botswana.

Both before and after the informational session, the majority of uncircumcised men reported that they would definitely or probably get circumcised if it were offered free at the hospital. This response is consistent with trends toward increasing demand for circumcision services in Botswana's private medical sector (personal communication, W Mwamole, 2001), and with published reports from other African countries.<sup>19</sup> Surprisingly, circumcision status did not differ by location or ethnicity, despite the fact that some villages in Botswana (for example, Mochudi, Ramotswa) revived the practice of circumcising adolescent boys during the 1970s and 1980s.<sup>22</sup> Our findings that the reason for circumcision was often disease prevention, and that nearly a third of circumcised men underwent the procedure as adults, may explain this lack of geographic and ethnic specificity.

Although circumcision was favoured by the majority of participants among both sexes, among all ethnicities, and at all sites, being a circumcised male and being a parent were the strongest predictors for favouring circumcision. Although significant differences were noted between sites, the acceptability of circumcision was high overall; initial responses ranged from 59% to 81% by site for definitely or probably favouring circumcision. Men in both Lobatse and Serowe were least willing to be circumcised themselves, both before and after the informational session. Although residual confounding from age or ethnicity may have accounted for some of the difference, this finding may also reflect local differences in customs in Botswana.

Most participants reported that the ideal time to circumcise a child is before age 6, and virtually all respondents felt that circumcision should be performed in the hospital setting. These responses are helpful for guiding the development of appropriate and acceptable male circumcision services in Botswana. Although circumcision can be safely performed at any age, the procedure is simpler and has fewer potential complications if performed near the time of birth.<sup>24</sup> In addition, unlike circumcision of an adolescent or an adult who might mistakenly believe he will become fully protected from HIV



and STDs, childhood circumcision poses little risk of altering eventual sexual behaviours.

The strength of this study was its sampling of many areas of Botswana, including a multitude of ethnic groups. We believe that our interviews were unbiased, and that our use of just three trained health educators to perform all interviews reduced potential bias. Limitations included potential bias from the low response rate, which was secondary to our sampling methodology of finding participants in public markets and meeting places. Individuals declining to participate primarily did so because of time constraints, and we believe that this did not introduce significant bias into our sample. We do not believe that individuals declined to participate based on the topic itself, or based on other factors that might have introduced bias. In support of this belief, the demographic indicators presented in table 1 demonstrate that our study participants were likely to be representative of the underlying population. An unavoidable limitation of this research is that the predictive value of participants' responses for actual future decisions is unknown.

In summary, safe circumcision services in Botswana and elsewhere could provide an effective, available, permanent, and affordable means to reduce the incidence of HIV in the next generation of children. Our study demonstrates that circumcision services for the children of Botswana would be highly acceptable, and we believe that parents in Botswana—as in most developed countries worldwide—should be offered the option of hospital based circumcision for their male children to protect them from the acquisition of HIV. The majority of births in Botswana occur at the district hospitals, and a circumcision programme could be practically implemented with existing resources by training physicians and nurses at these locations. Although infant circumcision would take approximately 15 years to have an effect on the HIV epidemic, it is a logical starting point to begin the introduction of circumcision services in Botswana in a controlled and safe manner that has no impact upon behaviour change; once established, such services may also be expanded to older children and adults. If randomised, clinical trials support the effectiveness and safety of circumcision among adolescents or adults without adversely affecting sexual behaviours, our study also indicates a high level of acceptability for such programmes throughout the country as well.

Male circumcision could become an important component of Botswana's long term HIV prevention programme, but to do so, circumcision must bridge the cultural and the medical realms. The return of male circumcision to Botswana in the 21st century, in a safe medical setting, could represent an effective response to the devastation of HIV in the region.

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## CONTRIBUTORS

PK worked on the study design, supervised the implementation of the study, and worked on data analysis and writing of the manuscript; SL worked on study design, implementation, analysis, and writing; SM worked on the study design and implementation; RM helped with study design and implementation; IT helped with study implementation and with the writing; ME helped with study design, implementation, and writing; RS oversaw the study design and implementation, performed the data analysis, and worked on the writing of the manuscript.

## Key messages

- (1) Both infant and adult circumcision were highly acceptable in Botswana; this has not been previously studied or reported, and has implications for the acceptability of circumcision programs in Botswana (and potentially elsewhere in southern Africa)
- (2) Male circumcision has been largely ignored as a potential strategy to prevent HIV infections, despite more than a decade of strong evidence showing its protective effect. Our study indicates that the barriers to implementing circumcision programmes do not appear to be at the local level
- (3) Given some remaining concerns about adult circumcision programmes (such as the potential for sexual behaviour change, which is being addressed through clinical trials), we present the idea of beginning an infant circumcision programme in Botswana; such a programme is similar to routine medical services offered in the developed world, has little potential to influence sexual behaviours, is the safest way to introduce circumcision services to the country, and can eventually be expanded to include services for older children and adults
- (4) Our study shows that in Botswana circumcision should be approached as a health issue as well as a cultural issue, as health concerns were listed as the major reason participants favoured circumcision of a male child or themselves, and the vast majority favoured circumcision in the hospital setting. Shifting the discussion of circumcision to the medical realm will best serve those people who would like to have circumcision services available for either themselves or their children

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## ECHO

### Heart disease is the next hurdle for HIV positive Africans surviving concurrent infections



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A study in Cameroon has shown that people infected with HIV must be tested for heart disease to stand a better chance of survival that improved treatment of opportunistic infections can bring. Doctors must be especially alert because the heart conditions are often silent.

The cross sectional study showed that left ventricular dilatation and HIV infection progressed together, with 23% AIDS patients, 4% HIV positive non-AIDS patients, and no HIV negative patients affected. Disease of the pericardium, with separation, effusion, or thickening were more common in AIDS and HIV positive patients, but not significantly so. Left ventricular dilatation was significantly more common when the CD4 cell count was  $\leq 100/\text{mm}^3$ . Only one patient (with AIDS) had classic symptoms of congestive heart failure. Among the 75 study patients 30 (40%) had AIDS, 24 (32%) were HIV positive but non-AIDS patients, and 21 (28%) were HIV negative.

The researchers recruited consecutive patients attending one hospital for HIV testing during July–September 1996. After clinical examinations and tests to establish HIV status the patients were examined with two dimensional and M-mode echocardiography. These results were interpreted by a researcher blinded to the patients' HIV status.

HIV infection and the toxicity of antiretroviral drugs to the heart can bring about cardiovascular disease. In Africa HIV infection is booming—in Cameroon it rose nearly three times to 11% in six years—but the link with heart disease is not well known. Improved survival of opportunistic infections means more cardiac disease, and the onus will be on doctors to investigate this actively.

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