Satisfaction, complaints and regrets of 1954 sterilised women compared to a control group

to be submitted (in abridged form)
ABSTRACT

Objectives To study satisfaction, complaints and regrets in women who were sterilised in comparison to a control group.

Design Cohort follow-up study of 1954 women sterilised compared to 932 women not sterilised.

Setting Obstetrics and gynaecology department of a referral hospital in Bulawayo, Zimbabwe.

Subjects Women sterilised in relation to a caesarean section, after vaginal delivery or independent of a delivery and for the control group women of similar parity who delivered abdominally or vaginally.

Methods A postal questionnaire and visits to the participants.

Main outcome measures Prevalence of physical and mental complaints, regrets and incidence of unwanted pregnancies.

Results The control group complained significantly more often of depression and loss of libido. There was no difference in abdominal pains, menstrual problems, headache, loss of appetite, obesity or other complaints in the two groups. The overall regret rate defined as wanting (the option of) more children was 2.1% for all the sterilised women, 3.4% for women with a medical indication for sterilisation and 1.7% for those without such an indication. Women of higher parity (1317) without medical indication for a sterilisation had a regret rate of 1.1% while 43.9% of similar women in the control group regretted not having been sterilised. There were no women without a contraindication for further pregnancies who were prepared to undergo a, free of charge, refertilisation operation. The failed sterilisation rate was less than 1% over a period of 5 years. Women in the control group who said they had a completed family had 41(6%) unwanted pregnancies over an average period of 28 months.

Conclusion Sterilisation should be an important ingredient of the family planning method mix available to women in Zimbabwe.
INTRODUCTION

Surgical contraception is in many developed and most developing countries, an important element in the method mix on offer in successful family planning programs. By ‘successful’ is meant that they help to shape and attain aspirations on the personal, family, national and global level. Unwanted pregnancies and unwanted infertility are seen as failures in the complex interactions between attitude, education, emancipation, motivation, provision and quality. It is important to state that unwanted pregnancies are a nearly universal problem, certainly not confined to Africa and even in the best of circumstances at least 20% of all conceptions can be so defined. In fact, unwanted pregnancies within marriage are probably largely a new development in Africa, related to the awareness and acceptance of the option of planning families and economic change.

Surgical contraception is the commonest contraceptive method used in the world with an estimated prevalence of 270 million in 2003 as compared to 99 million in 1980. Around a sixth of the sterilisations performed are vasectomies as compared to a quarter in 1990. Only in New Zealand, the Netherlands, the United Kingdom and Bhutan are there more sterilisations of males than females. In continental sub-Saharan Africa sterilisations are not frequently performed, and vasectomies are very rare (but more frequent than in France). In the non-Muslim areas and probably even in Muslim areas, the low incidence of female sterilisation seems mainly a service provision problem. Initiatives in Zaire, an area in Nigeria, Kenya, South Africa, Lesotho, Senegal and Zimbabwe have been well received by women but are often dependent on a few enthusiastic providers.

The populations of East, Central and Southern Africa have started the demographic transition as defined by the Princeton rule (10% decrease from the previous plateau in Total Fertility Rate (TFR)), to smaller families with Zimbabwe, Botswana, Lesotho and South Africa in the vanguard. Was there 15-25 years ago in sub-Saharan Africa an attempt to make family planning palatable for husbands, political, traditional and religious leaders by calling it spacing - already functioning very well because of the tradition of extended breast feeding and post partum abstinence - limiting the size of ones family is now becoming widely acceptable. In Zimbabwe, the fertility decline had already started before independence in 1980 although the indigenous nationalistic elites regarded any attempt by the colonial government to introduce family planning with deep suspicion. In the countries with gained independence at an earlier date family planning programmes were not possible before independence for the same reasons. Conversely in South Africa the transition of power 15-45 years later made the legalisation of abortion possible.
Couples in developing countries have in theory many more contraceptive tools available than couples in the European countries had during the demographic transition, but they lack the access to “new” territories without which Europe would have had twice as many inhabitants, all other things being equal.

Current use of modern contraception has increased in Zimbabwe from 26.6% of married women in 1984 to 50.4% in 1999. Sterilisation increased from 1.7 to 2.7% in married couples (0.1% male, 2.6% female), use of oral contraception from 22.6 to 35.5%, condom use from 0.7% to 1.8% and dependence on injectables (Depo-Provera®) from 0.8% to 8.1%. 49.6% was not using modern contraceptives at the time of the 1999 DHS survey. See Addendum Table 2, to compare contraceptive prevalence in different countries.

Therefore, contraceptive users in Zimbabwe depend for more than 70% on the pill. Depot medroxy progesterone acetate (DMPA) was banned, by the then minister of health in 1981, hence the limited use in 1984.

The ideal number of children in Zimbabwe according to the 5907 women interviewed for the 1999 DHS household survey is 3.9, and 4.2 for those who are married. Seventy-one percent of married women would like to have a total of four or fewer children. Median age at first birth has gone up very little over the last 20 years from 19.7 years to 20.3. To limit a family under those circumstances to four children by spacing only, would require 7-8 years between births. In the US, it is estimated that 6% of typical pill users become pregnant in the first year of use, in China 11%. It is estimated that use, misuse, or discontinuation of the pill are associated with 1.045.000 unintended pregnancies in the US each year.

Forty-eight percent of the 5907 women interviewed for the Zimbabwean DHS survey had stopped contraception in the preceding 5 years; 35.4% of those 2835 women because they wanted to become pregnant, 18.2% because of side effects or health concerns, 6.7% because of the costs or non-availability of contraceptives and 11.7% because they became pregnant, most, by far in absolute terms, while using the pill. This is an underestimation of the real failure rate because so much of pill use is by women who are protected anyway by breastfeeding. Furthermore, women who had an induced abortion after pill failure would not admit this to an unknown interviewer. See Addendum Table 3.

The average woman in Zimbabwe would have these days a completed family, with the youngest child out of the high mortality age range, at around 32 years of age and it would not be far off to estimate her chance of becoming pregnant in the remaining years of her fertile life at least 50%, if she depended on oral contraceptives with only sub-50 mcg oestrogen tablets available. Use of surgical contraception would reduce the cumula-
tive failure rate with a factor 50 - 75. Other long time methods like intra uterine contraceptive devices (IUCD), implants and injectables have their own advantages and disadvantages. For example those who stopped injectables in the above survey did this in 27% of the cases because of side effects. IUCD use and high prevalence of HIV is an insufficiently studied field\(^{16,17}\) and implants are in practice only available for the well to do (US$ 300 in the private sector in the USA and $ 23 for developing countries)\(^{18}\).

Women in Zimbabwe who are sterilised have according to the DHS survey the following characteristics: they have at the time of sterilisation a median age of 33.8 years comparable with other countries in Africa (India 25.7, Bangladesh 26.7, USA 28.8, Brazil 28.9, Thailand 29.0, Sri Lanka 30.0, Indonesia 31.8, Peru 32.0, Vietnam 32.5, Tanzania 34.8)\(^1\). Women sterilised in Zimbabwe have for more than 50% five or more children like in the rest of Africa unlike the USA and China where more than 50% have 1-2 children, and Latin America and Asia (except China and Muslim Countries) 3-4 children. Trends in number of children at the time of sterilisation show that in Asia and Latin America the numbers are going down but not in Africa, including Zimbabwe. The level of education and place of residence (rural or urban) in sterilised women is similar to women in general in Zimbabwe.

In order to make it easier for couples to succeed in planning their family and to lower the TFR further in Africa, to make it possible for governments to spend more per capita on education, nutrition and health, it seems unavoidable that surgical contraception becomes a more important element in the method mix easily available. Important factors in improving access to female sterilisation are surgical capacity and political commitment. The latter could influence the former if studies showed whether women were satisfied with this method. A follow-up study to check satisfaction of clients had never been done before in Zimbabwe and that was the rationale for the study described here.

**Methodology**

The methodology of the obstetrical arm of this study based in the United Bulawayo Hospitals (UBH) has been described elsewhere\(^{19}\). In short, women sterilised in the defined periods were followed-up by writing, rewriting, writing via a clinic and visits in order to have a questionnaire filled in. A potential control group of women not sterilised was identified with the help of the same delivery registers, matching the parity and the modes of delivery of the sterilised group. They were followed-up similarly but less fanatically. For this paper the study period was merely extended by a year to a total of 127 month, from 1 December 1990 till 1 July 2001, in which time 27.825 deliveries took place in UBH. All women who were sterilised, not only those of higher parity, during those 127 months were included.
Higher parity in this study means having at the time of sterilisation and/or after the index delivery at least 4 apparently viable children, or 3 if the woman is 30 years or older. This is the group seen by the author as containing the Likely Sterilisation Acceptors, Regret UNlikely (lisarun). If a woman has exactly the number of children mentioned above she is lisarun, she can have one child more, lisarun + 1 or one less lisarun - 1, etc. All women who are at least lisarun are referred to as ≥ lisarun.

Emergency caesarean section (CS) refers in this paper not so much to the haste in which the operation was performed, but to counselling time (potentially) utilisable to discuss the option of a tubal ligation TL. Hence, a woman delivered in the middle of the night by CS because of bleeding due to a placenta praevia after 2 weeks bed rest in our hospital had her operation defined as an elective CS, while a woman with a term pregnancy referred from a district hospital for her fourth CS and added the same day to an elective CS list to prevent her going into labour at night or in the weekend, was categorised as having had an emergency CS, if she had not been asked and made up her mind earlier about having a TL or not. Some women delivered elsewhere and were transported to us for a post partum sterilisation. They are included in some Tables and not in others, as appropriate. A cohort of women was randomly selected from the to us referring City clinics to be part of the control group for women who were sterilised in UBH after a vaginal delivery. Everything possible was done to find the women who were sterilised and nearly everything for those of the control group who delivered by CS. Women suitable for the control group who delivered vaginally (20% randomly selected from UBH records and 200 from the City clinics) and who did not return our questionnaires were only sent 2 reminders and then visited only if they lived in the City or near a TL patient who needed to be visited. The City clinic patients were only written once for logistical reasons and not visited. We had 1286 (76.8%) successful follow-ups of the delivery related sterilisations.

In addition to the above, 988 women sterilised but not in relation to a delivery over a 6-year period from 1-7-1995 until 1-7-2001, were identified in annual batches from the theatre registers and an attempt was made to find the hospital files. Because the filing department was understaffed and cramped and because the files were shared with other specialities, not all files and hence addresses could be traced. This resulted in 833 (84.3%) women who could be written to and in the end, after many reminders and personal visits, in 668 filled-in questionnaires (80.2%) and probably an under-representation of ill women because their files were elsewhere. Because obstetrical patients need a birth certificate, record keeping was meticulous in maternity and all women had at least one recorded address, thrice written down.
There was no attempt to create a control group for women who had an interval sterilisation. It could be argued with success that women who delivered vaginally without TL could form also an adequate control group for most women who had a non delivery related sterilisation, except perhaps for those who were admitted with an (incomplete) abortion. Around 10% of the ≥ Lisarun women admitted with an incomplete abortion (between 772 to 1019 annually, all parities) were sterilised. No attempt was made to contact women seen for an abortion, who were not sterilised. It was thought that some women might get seriously embarrassed if letters were sent to their addresses (often deliberately incorrect).

The results given in the next section can be somewhat confusing unless one realises that there are many sub-groups: medically indicated TLs, maternity related TLs, delivered elsewhere or not, still alive at follow-up or not, ≥ Lisarun or not, in control and TL groups and not all questions were answered by all women.

**Statistical Methods**

Statistical analysis was performed using WHO’s Epi-Info version 6.0. Continuous variables were compared using Student’s t-test for normally distributed variables and the Kruskal-Wallis test for variables not normally distributed. Categorical variables were compared using the chi-square test or Fisher’s exact test as appropriate. Stratified analysis was done with the help of Mantel-Haenszel weighted relative risk with Greenland/Robins confidence limits.

**RESULTS**

We succeeded in following up a total of 1954 women who were sterilised (1286 delivery related, 668 not) and 932 for a control group not sterilised, of whom 98 delivered vaginally in two of the city clinics which refer to us.

Most questions were answered by most respondents, even a sensitive question about libido was answered by 94.9% in the TL group and 86.6% in the non TL group (Table 8). The most sensitive question was apparently about the last pregnancy: being planned, too early, or whether the patient had hoped before the last pregnancy that she would not become pregnant anymore. It was answered by 87.1% of the TL group and 81.7% of the control group (Table 7).

There were many unavoidable differences between TL and control group, see Tables 1 and 2.

Table 2 shows the subdivisions of the TL groups and control groups and shows the subdivisions in relation to women who wanted (no) more children. If we compare the maternity related sterilised women who responded, to those who did not respond (not
shown) we found the non-responders to have a similar number of children (difference 0.06, p=0.60), to be 0.8 years younger (p=0.006) and to emanate more often from the very low-income group (40.0% versus 30.5%, p<0.001). The non-responders from the non-maternity related sterilisations (not shown) had more children (0.6 child, p<0.001), were older (1.2 years, p<0.001) and were more often very poor (65.9% versus 31.8%, p<0.001) than the responders. These responders were at sterilisation on average 36.4 years of age and had 4.9 children at follow-up. Responding women in the UBH control group who had delivered vaginally had more children (5.2 versus 4.8, p< 0.001) were older (34.5 versus 34.0 years, p=0.029) and were less often paying government patients (35.1 and 40.7%, p=0.076) than non-responders and women who were not written to. Non-responders for the control group who delivered by CS were of similar age (p=0.676), and parity (p=0.765) and response was significantly positively correlated to income.

Tables 3 and 4 show the complete data from the delivery records for higher parity women. This includes women who were not followed-up (80% of the not sterilised vaginal deliveries) or followed-up without success. They exclude women from the control group who delivered elsewhere (City clinics) and those who were referred post partum for a sterilisation. Table 5 shows data of the 802 women above 39 years of the 6045 ≥ LISRUM who delivered during the study period in our maternity unit (802/6045 = 13.3% [2.9% of total deliveries]) of whom 272/802 (33.9%) had a sterilisation.

The marital status of women is described in Table 6. The results are self explanatory, but it should be realised that divorce, widowhood and death made follow-up much less successful. Therefore, these categories are under-represented amongst the successfully followed-up women, especially in the vaginal delivery control group because they had less home visits. Seven of the women who were widows at the time they entered the study had deceased at follow-up; HIV infection seems likely.

There is an indication in Table 7 of the planning of higher parity pregnancies in our community. Around half of the last pregnancies in women who were sterilised were not wanted until they were actually there, which also can be said for a third of those in ≥ LISRUM control patients. This is no doubt an underestimation, because women who would because of age and/or parity, be most likely to have had an unplanned pregnancy, were the ones who often did not answer that particular question or they filled in that the pregnancy had come too early, which is virtually the same as unwanted in a woman of over 40 years of age.
Physical and mental complaints

Table 8 shows that there is no evidence in this study that women who were sterilised have more complaints afterwards than the control group. Having concluded that, one has to consider if the groups are comparable (see Tables 1,2,3,4). It is obvious that there are large basic differences between the two groups. To these differences has to be added the fact that women who were sterilised did not only have more often a CS with their index delivery, but they more often had repeat CSs with increasing evidence of poor scarring and adhesions. The mean number of CSs in total in women sterilised with an elective caesarean section was 3.0, and 1.7 if not sterilised; these figures were 1.8 and 1.4, and 0.1 and 0.1 for emergency CSs and for vaginal deliveries, respectively.

There might be a tendency to more menstrual problems in the TL group, which almost disappears if the control patients using hormonal contraception are excluded from the comparison. Still, the not delivery related sterilisations (Table 10) show also high rates of menstrual problems at follow-up. Many of these women already had problems, otherwise we would not have seen them in the first place, and many also stopped hormonal contraception around the time of the sterilisation, probably reverting to their natural cycle or continuing an unnatural one for up to a year if they had been using DMPA. No obvious post TL menstrual syndrome could be distilled from the results. Complaints were about longer or shorter, less or more frequent periods and more or less blood, and dysmenorrhoea.

TL patients were older than the controls at follow-up (few post menopausal) but complaints were not age related apart from the clinically irrelevant younger mean age (0.6 years, p=0.006) of women with an increase in headache at follow-up in both groups combined.

The TL and control group become much more comparable if we examine only those women who delivered vaginally and had a post partum sterilisation or not, see Table 9. No difference in menstrual complaints is obvious. However, considering the answers to the follow-up question: “if you have period complaints, did they start before or after your last delivery/operation?”, then women with a TL answered that question significantly more often with “after” than the control group, even if we focus only on those 217 women who did not deliver by CS and were not using hormonal contraceptives, 86.4% and 62.9% respectively (p< 0.0001, RR 1.37, 95% CI 1.14-1.66).

It is difficult to interpret the very significant but clinically perhaps marginally relevant lower levels of sadness and loss of libido in the sterilised groups. Probably, a large part of it is that women who are brave enough to have an operation to be sterilised are different, a priori, or feel good because they have passed a “test”, in their own eyes. They might also be the better communicators in different situations with their partners20.
Nevertheless, there are 11 women who comment spontaneously in writing on the questionnaire that they feel so relaxed while having sex, because the fear of a pregnancy has disappeared or words to that effect. There was no libido diminishing or enhancing effect of hormonal contraceptives detectable in our data. Although members of the higher income groups complain more about loss of libido and the control group contains more women from that class, stratified analyses still shows the same relation between TL or not and libido, so it seems a real difference. “Rich” women are a little less often sad in our data and therefore compensating for social class keeps the control group significantly more often sad. It should be mentioned that women complaining about less libido are also the women who have become fatter (p<0.0000005, RR 1.28, 95% CI 1.17-1.41), an enormous potential market for chocolate producers. The p value is even smaller for 2x2 tables relating headache and libido loss (RR 1.51, 95% CI 1.65-1.80), another cliché confirmed or refuted if one adopts the presumption that the headache in the stereotype is pretended. We did not find a relation (p=0.11) between sadness and becoming fatter.

Together with a hospital employee who did a Masters in laboratory science, we also followed-up 40 women above thirty-nine who were sterilised and 40 who were not. No difference could be detected in age at menopause and FSH, LH, Oestradiol, Progestagen and Testosterone blood levels. Similar results can be found in the literature21.

Regret

There were 61/1954 (3.1%) women who regretted being sterilised, see Tables 2, 8, 10, & 13 and List of Case Histories (LCH). These 61 include women who became pregnant despite the sterilisation, or stayed pregnant (LCH no 18), who blamed the sterilisation for physical or mental complaints they had afterwards, and those who did not really want another child, but whose partners did. One woman who was prepared to deceive her husband into believing that she was fertile again (LCH no 63) is not classified as having regret.

We counted 42 (2.1%) women who wanted more children or had serious doubts about being sterilised because they might want more children later. Sixteen of these 42 women had an (arbitrary) medical indication for their sterilisation like having had four or more caesarean sections with at least four living children, poor quality uterine scars, severe hypertension, eclampsia late in reproductive life, diabetes, HIV infection.

This leaves 26 with a really regrettable sterilisation, 16 of whom were ≥ LISARUN, as defined in Methods and two (LCH 36 and 42) of the 16 had lost a child after sterilisation and had become LISARUN-1 post hoc, leaving 14 women with regret, although they had 4 children alive at follow-up or 3 children if they had been at the time of sterilisation 30 years or older.
There are of course gradations in severity of regret. Only three women (LCH no 1, 6 and 48) were brave/motivated enough to opt for an, all costs paid by us, reanastomosis. All three were HIV positive when tested before operation (not known at the time of sterilisation) but one of them did not want to know the result of the test and was operated regardless in an attempt to reopen her tubes. Some women might not have had regrets when contacted but perhaps later or earlier. Similarly, women who stated to regret the sterilisation at some point might change their minds. We saw six of those.

During fourteen years in the gynaecological department of UBH, while the policy was to welcome all patients with unwanted (in)fertility and do whatever we could to assist them, we operated one other woman who regretted having been sterilised (in a hospital more than 600 km away) and advised one woman to have her operation elsewhere (LCH no 71). Over the ten-year period encompassing 1991-2000, exactly 530 tubal operations and/or removals of myomata were performed for infertility not related to earlier sterilisations. This shows the commitment to assist with infertility and the preparedness of women to be operated on if a child is wanted and the minor part surgical sterilisation played in unwanted infertility.

Figure 1  % not medically indicated TLs of women with more than four children after delivery, during CS or postpartum
In the much larger Mpilo Hospital in Bulawayo (10,000 deliveries annually) no re-
fertilisation-after-sterilisation operations were performed during the same period but they also performed far fewer non-medically indicated TLs. See Figure 1. In (qualita-
tive) discussions with private gynaecologists in Bulawayo, we were often told that in the only (Roman Catholic) private hospital, re-anastomoses of Fallopian tubes were per-
fomed. Sterilisations were allowed in that hospital only with written permission from the religious authorities and then only during CSs with a medical indication for stopping reproduction. Hence, all other private sterilisations were done in United Bulawayo Hospitals and in two private minor case surgeries (with no facilities for reconstructive tubal surgery) resulting in a total of around 200 private sterilisations in Bulawayo and surrounding provinces annually, until an acute shortage of gynaecologists due to the politico-economical situation, ensued. Medical insurance companies did not pay for re-
fertilisation and very few indigenous women would be able to pay for such an operation if carried out in the very expensive private hospital. We can conclude that there seems to be little regret of such a serious nature that (certainly non-private) indigenous women in Southern Zimbabwe are prepared to be re-operated. This while according to the 1999 national DHS survey the prevalence in Bulawayo and Matabeleland South of married women being sterilised is by far the highest (9.8% and 3.7%) in the country, in Bulawayo 4.3 times higher than in Harare.

Regret, in the narrower sense of wanting (possibly) more children, used for the 42 women mentioned above is, like in the overwhelming majority of sterilisation follow-up studies, significantly related to having a medical indication (1.7%/ 3.5%, p<0.03), being younger (35.6/31.5 years, p<0.001), having fewer surviving children (4.9/3.2, p<
0.001), losing the index or another child just before or after sterilisation (1.8%/7.0%, p<0.001), being not (still) married, both at the time of sterilisation and follow-up (1.5%/4.4%, p<0.001) and having a sterilisation together with a legal termination of pregnancy (2.0%/10.0%, 2-tailed Fischer exact p=0.025). Combining the above 6 risk factors (taking less than 4 children and younger than 30 years as cut off points) reveals that having one or more risk factors is related to 3.4% regret, having none with 0.4% (p<0.001). There is no significant relation between being poor or lower middle-class or a private patient and the frequency of regret (2.7%, 1.4%, 2.3% respectively, p=0.228).

Having only children of one gender is more common in women with regret, 38.1% as opposed to 11.3%, but since these women have also fewer children these figures have to be corrected, taking into account the sex ratio of 104 in the children of the successfully followed-up sterilised women. Women with regret have for 19.0% no boys and for 19.0% no girls. Put differently 8/135(5.9%) women who have no daughter at follow-up regret their sterilisation and 8/96 (8.3%) women who have no son do this. Women who need a CS deliver more often sons. Of the regret group of 42, slightly more than
expected have offspring of a single sex (no sons: 8, expected 6.8; no daughters: 8,
expected 7.4), however, these numbers fall well within confidence limits. Based on this
data, it cannot be determined whether there is a relation between having regret and hav-
ing no sons (or no daughters), because of the relatively small sample size.

Having a sterilisation with a CS as opposed to post partum is a risk factor for regret
(p=0.03). This significance disappears (p= 0.06) if women with a medical indication for
sterilisation are removed from the 2x2 table. The significance reappears (Fisher exact, p
< 0.02) if on top of that the comparison is restricted to ≥ LISARUN women. One should,
however, bear in mind that the regret rate in the non medical indication ≥ LISARUN post
partum TL group is very low, 1/448 (0.2%), so that it would be very difficult for women
who had a TL with a CS not to have a somewhat higher proportion of regret also because
they had fewer living children on average (6.1 and 5.0 respectively). We found no evi-
dence that post partum sterilisations more often result in regret than interval sterilisa-
tions as seen in the literature, but in our case, as opposed to the situations in the
literature23, women had on average more viable children 6.1 and 4.8 respectively, at the
time of follow-up.

Of the 1286 delivery related sterilisations 911 were not medically indicated; 820 of
those women had been ≥ LISARUN and 106/820 (2 with twins) were at risk of becoming
LISARUN - 1, if they lost one child. They were at the time of TL, LISARUN + 0. This loss
happened to 12 of the 106 women, 2/12 regretted the sterilisation (16.7%).

See also Table 13 comparing regrets about TL to regrets about not being sterilised.
Note that women with (arbitrary) medical indications for TL are excluded from this table
so are women of lower parity. This table is not corrected for the difference in the mean
number of children in TL and control group, but if it were the results would be essential-
ly the same.

If one regards Table 2, it seems that it is not a good idea to sterilise a patient
together with an operation for a legal abortion or for an ectopic pregnancy. If one
removes the medical indications for TL and women who were < LISARUN then there are
6/513 (1.2%) women with regrets in the non-obstetrical group, see Table 13. Three
(2.0%) are related to 151 women who had a sterilisation combined with evacuation of
the uterus for incomplete abortion. One other lady is described as Case History 23. Two
(0.7%) were members of the purely interval TL group of 282 women. We have also fol-
lowed-up 18 ≥ LISARUN women who were not sterilised with an operation for an ectopic
pregnancy and 14 saw this as a missed opportunity. They are not part of the control
group, because this was not a random sample.
Religion

If we look at religion and 2500 digitalised records of sterilised and not sterilised higher parity women from the maternity registers (1990-1996), we found that being a member of the Roman Catholic Church (RCC) makes a small difference. Stratified according to income class, Catholics have less (RR=0.8) sterilisations than members of other religions (p<0.05, Mantel-Haenszel RR 0.80, and Greenland/Robins confidence limits, 0.65-0.99). There is no difference in number of children in women admitted in maternity being RCC or not, but those who are sterilised have 0.4 children more at that time if they are RCC (p=0.02). This effect is even more obvious if allowances are made for economic class.

Apart from this, the effects of religions are very much economic class related and members of the other religions behave as expected with a lower income and with rural women having more children.

Failed sterilisation

There are several patients who became pregnant after sterilisation. Two delivered a term baby within 8 months after sterilisation, performed during an operation for an ectopic pregnancy. We do not consider them failed sterilisations. We saw 4 pregnant women who had been sterilised elsewhere (South Africa, Malawi and two in Zimbabwe). Four patients were seen pregnant during the last 6 years who had been sterilised (3 with a laparoscope, 1 together with the evacuation of a miscarriage) by our department, but they were not part of the planned follow-up cohort. Of the 2507 TL patients that we actively tried to follow-up, we know of 5 patients who delivered after a sterilisation. This includes one lady who delivered after two sterilisations. She had a re-sterilisation after a symphysiotomy by the author. Three years later we delivered her with an elective CS and she had again a (third) sterilisation (a salpingectomy). Five patients had pregnancies after sterilisation that ended in induced abortions. Altogether this comes to a failure rate of 10/2506 (0.4%) or better 11/2507 (0.4%) counting the woman who had three sterilisations, during a mean follow-up period of 5 years. We have no idea if some of our patients were seen elsewhere after a failed sterilisation. It seems likely to us that if these pregnancies were seriously unwanted, patients would have come to us for help. It might be that others became pregnant and delivered elsewhere without us getting any feedback.
Mortality

Child mortality

The obstetric sterilisation and control group, together involving 2218 successfully followed-up women, was associated with 220 (9.9%) deaths of at least one child. 3.2% (70) of this mortality was known or could have been expected to happen at the time of delivery (case histories 4, 29, 37, 62, 65, 69, 70) and 6.8% (150) happened more or less unexpected (case histories 5, 7, 8, 26, 30, 36, 42, 46, 54, 67). Mortality in both groups is strongly related to HIV infection. For example, because of an increase in premature delivery in the HIV infected25. In the control group, regrets about not having been sterilised decreased (RR 0.56) from 43% to 24% if a child died, and it made no difference if this death was known or expected after delivery or happened unexpectedly later.

Women who were sterilised and lost a child were, if we regard all females, medical indication or not and higher parity or not, 4.3 times as likely to regret their sterilisation (1.6% and 6.9%, Fisher exact test, p = 0.001). Again it did not make a difference if the death was known or anticipated or not at the time of sterilisation. Women with a medical indication for sterilisation did not more often lose a child during follow-up, but more often had a child who had already died or who was born so premature that it could easily die. In the non-obstetrical TL group 10/668 (1.5%), lost a child unexpectedly. One of those 10 mothers regretted her sterilisation (10.0%) and 2.0% of all those who lost no child, medical indication or not.

If women had already 1-2 children more than they originally wanted, they were less likely to regret a TL. Women who said that their last pregnancy was planned and who lost a child were 6.24 times as likely to regret their TL as women who did not lose a child (p=0.001). Women who had not wanted their last pregnancy were less likely to regret their TL if they lost a child than all women who were sterilised who did not lose a baby.

Adult mortality

Adult mortality was 40/2886 =1.4% of all the women enrolled in this study and 121 (4.2%) were or became widows. Both rates are no doubt underestimations because of the difficult follow-up in these circumstances. At least 30% of the women were HIV infected26 and one can assume that, in a “mature” epidemic without specific treatment, around 10% of the infected will die annually27-8. This would be 86 women. Most women are infected by their (prospective) husbands who by virtue of that fact and the positive correlation between age and progression of HIV infection would be expected to have a higher mortality rate29. Something around two hundred widows would be expected.
**Gender**

There is nearly no evidence in our figures that women have a preference for sons. As shown above the figures relating regret to gender are too small to draw conclusions. There is also no imbalance in male/female last baby ratio in sterilised women, unlike clearly in Nepal, India, Korea, China, Vietnam and a few other countries\(^{30-3} \). Looking at the composition of families in this study comparing TL and control group one can conclude that couples prefer children of both sexes above only children of one gender and that sterilised women compared to the controls have very marginally less often no son than no daughter if all known confounders are controlled for\(^{34-5} \).

**DISCUSSION**

It should be emphasised that this study was performed in an unusual window of opportunity for Africa. The demographic transition had started in Zimbabwe a few years before independence in 1980. Zimbabwe has the highest literacy rate in continental Africa, see Addendum Table 5, had a reliable postal service, good roads, good hospital records, well-structured health care and the powers that were had enough confidence in an expatriate to allow the study.

Much has changed. The fabric of society is coming apart at the seams because of the economy, hunger, land redistributions, internal migration, decreasing school enrolment and quality, AIDS, lack of fuel, distrust, emigration of trained (health) personnel and it is dangerous (especially for conspicuous expatriates) to move around and ask questions\(^{36-7} \). It is easy to imagine that even the production of sterilisation consent forms will become a problem and furthermore, the few remaining doctors will have little time to do TLs let alone do studies. This makes it also unlikely that recommendations resulting from this study can be carried out without outside help.

Another important consideration is that studies like this should not be done often because the study risked exposing women who had themselves sterilised without their partner’s knowledge. If we knew this, we did not send letters and only city dwellers were visited, discretely by non-uniformed student nurses with a good story in case the husband happened to be around. We also did not explicitly mention sterilisation if possible in our letters to sterilised women so that they could pretend that we studied episiotomies, ectopic pregnancies or CSs. Nevertheless, sometimes things went wrong, see case history No 1 and 63. “Clandestine use” of contraceptives in sub-Saharan Africa has been estimated to occur in between 6 and 31% of users\(^{20} \). We still thought the study important enough to do because it had not been done before in Zimbabwe and sterilisation studies with a control group are rare in any case. This previous lack of a good study made it possible for health workers, religious officials and important persons to air opin-
ions, which could only be addressed by impressions of the actual situation. Now there are facts. Perhaps future, evidenced based policies will counterbalance the distress of the poor women who were “caught” by their husbands.

Methodological problems are obvious in this study because allocations to TL and control group were not random. It is unlikely that a proper randomised study of TL compared to another contraceptive will ever been done and one could argue that this study comes nearest to such a study because so many random events were responsible for women being part of either group. Strikes of doctors or nursing staff, broken down autoclaves, no transport to the laundry, time and day of delivery, motivation and experience of doctors who happened to be on call, mood of the anaesthetists, emergency operations limiting access to theatre, oxytocine out of stock resulting in more abdominal deliveries, workshops, holidays, food and mood in post natal ward and character of the nurse in charge of theatre were some of the random factors.

Negative physical and mental consequences of female sterilisation were small or none existent in this study. To the contrary, women seem to feel better. In the literature, menstrual disturbances are often described as happening even years after a sterilisation. No anatomical explanation has ever been found and the effect can in some studies disappear if there is a proper control group or if women are used as their own controls. In a large prospective multi centre USA TL follow-up study meningual disturbances were also seen but black women reported less irregularity and spotting and fewer days of bleeding than white women. From our results, we can draw the (unhelpful) conclusion that women who were sterilised had as often menstrual complaints as the control group, but less often menstrual problems before the index pregnancy. This might indicate that women who are sterilised feel healthier to begin with and stay healthier after the TL but not in relation to their periods that bother them now as often as the control group. Alternatively, women in the control group accept menstrual problems easier as part of their lives, also because a period is welcome as it is proof of not being pregnant. Another explanation could be that more sterilised women had regular periods earlier because more were using the pill.

Black women have more and larger fibroids and at a younger age. We had the impression that women many years after a sterilisation, reported more often with leiomyomata than women of the same age group who had used hormonal contraception or had had more pregnancies. This would be explainable because pregnancies in general, pregnancies later in life, injectables, implants and probably also the combined pill, protect against fibroids although the relative importance of these factors and their interactions are not known.
Increased libido after TL is seen in several studies but not in others. There is no support in the literature of a reduced incidence of depression after TL but large studies with a control group are rare. One large study from China finds more depression after male and female sterilisation than in a control group; a study from Hong Kong using patients as their own control does not.

There were not many postoperative infections after sterilisations and none serious. This despite the high prevalence of HIV infections in our clients. This can be explained by the fact that HIV infection affects mostly the cell-mediated immunity involved in protection against viruses, fungi, mycobacteria, and protozoa. Wound infections after CSs are also not increased in other studies with HIV positive patients.

Service Delivery
Opportunity to have a TL was a much too important factor in selection of patients for TL (Table 5). Fear, lack of knowledge and money (Table 11) were other factors. Less than a quarter of the patients sterilised over the last 12 years in UBH was just seen because they wanted a sterilisation. The others came for delivery, miscarriages, abdominal pain, HIV, bleeding problems etc. Even in the group with only an interval sterilisation, there was often a chance opportunity, such as being referred for the side effects of other contraceptive methods or for removal of an IUCD or Norplant or women happened to be counselled by our family planning sister because a member of the woman’s family was admitted to hospital or the woman (or her partner) worked in the hospital or was the wife of a matron’s gardener etc.

Pure interval sterilisations were also significantly more often performed on private patients because private doctors have an incentive, clients are more assertive, and they live more often in town.

We were, time and again, surprised that we saw so few women with HIV infections for contraception. Although most of the 2.2 million (recent 2003, and probably too high estimate by the president of Zimbabwe) HIV positive people in Zimbabwe do not know their HIV status, an estimated 40,000 children die annually of AIDS (30% prevalence in pregnant women x 33% estimated vertical transmission with 19.0 months mean duration of breastfeeding x 400,000 deliveries (crude birth rate around 34.7/1000, 1997)). Nearly all of these children would have been seen at least once by a health worker and in town, often by a doctor working in a paediatric department. Very few of the mothers of these children were referred to our family planning department. Sterilisations of HIV positive women were virtually confined to women identified as HIV positive by our department or referred by the Matabeleland AIDS Council. Other health workers have apparently no time or stomach to counsel patients about their HIV status and options. This is not an academic discussion because women who already have a few children are
very willing to use proper contraception to prevent another child dying in their arms and those without living children are willing to do much to prevent vertical transmission, warranting referral to a gynaecologist. Hormonal contraceptives are problematic for HIV positive women because supply is not guaranteed, they might need transport or money, commodities frequently extra scarce in a family wrought by HIV infection. Furthermore, the pill becomes unreliable if combined with anti tuberculosis medication and to a lesser extent if combined with other antibiotics like tetracycline and penicillin and derivates. Absorption of oral contraceptives is negatively affected by the frequent attacks of gastroenteritis and the often-diagnosed AIDS dementia syndrome plays havoc with compliance. We found some but not enough evidence in the literature for us to abandon our recorded concern about the use of IUCD’s by immune deficient women and the only conceivable advantage of having HIV is not needing to be afraid of catching HIV, hence motivation to use a condom will be negligible within stable unions.

Annually an estimated 60,000 new women in Zimbabwe, not counting the known HIV infected and those with other medical indications for TL, will have in their own opinion, a completed family. Perhaps a 1000 are sterilised nowadays and there is an enormous backlog. For Kenya, 2.5 times the population of Zimbabwe, in 1984 when only 17% of married women there (40.9% in Zimbabwe in 1999) said they had a completed family, this backlog meant that 300,000 sterilisations had to be performed between 1986-1990 to meet half the demand. In the USA 700,000 sterilisations take place annually, while the population is 23 times as large. The equivalent would be 30,000 in Zimbabwe. There is no way with the number of doctors per unit of population being 1-3% of the rate in the industrialised world, that so many TLs can be organised. As a result there are more unplanned children and induced abortions straining the government budget. Without a modest incentive to the staff directly involved in sterilisations, also because every operation involves the risk of the surgeon injuring himself and catching HIV, it must be feared that even less women will have the option of a TL in the future.

At medical conferences, it is sometimes argued that sterilisation of women is in Africa not an effective family planning method from de population dynamics point of view, because women are only sterilised when they are already “old” and sub-fertile. Our TL patients were on average 35.8 years at the time of sterilisation and would have enjoyed perhaps 6 years of protection from the operation. But to be really sure, important in a country where legal pregnancy terminations are very rare (maximum 100 annually) and the non-legal dangerous, expensive or both, they should have continued with tablets or injections until age 50 or so. See at age at sterilisation Table 4 Addendum.

Furthermore, studies from other countries show that sterilisation of women of higher age and parity is often an early step in successful programmes.
Religion

Religion seems to become a declining force in family planning behaviour. Roman Catholic countries like Poland, Ireland, Italy and Spain have birth rates among the lowest in the world and Islamic Iran has reintroduced FP. Some Catholic women enrolled in this study seemed to think, without evidence, that pill use is less sinful than a sterilisation. Whilst the Church is very much against IUCD’s because it considers this to be a method that causes monthly abortions, using the pill is not declared less wicked than a sterilisation. For practical purposes a TL is much more efficient than injections or the pill because those would in theory need 3 monthly or daily confessions. Besides, the pill can fail especially if proper use is undermined by anti propaganda, resulting in temptation to have a termination of pregnancy (LCH 64). We saw two women who had decided to become Catholic who were not allowed to join the Church before their implants were removed. It is unlikely that the priest would have demanded a reversal operation. Catholics seem to have more (induced?) abortions in our figures. The same is seen in the USA55-6 but there, as in Zimbabwe, many confounding factors are obvious. Catholics for example, might be more inclined to have a planned delivery in an RCC hospital than to report with an (acute) incomplete abortion to such a hospital. Perhaps this was the reason that we saw a higher proportion of Catholics having abortions than having deliveries. The same consideration was operative in a study from Amsterdam57. Only some 20% of the women with induced (estimated 60,000)58 and spontaneous abortions (estimated 40,000) in Zimbabwe are seen in hospital59 so that conclusions about the connection between religion and abortion are difficult to draw. In the USA55-6, Roman Catholics are in general of the lower economic strata and more often “Hispanics”. In Zimbabwe, at least in Matabeleland, Catholics are more often private patients and urbanised than members of international churches like the Lutheran, Seven Day Adventist, Dutch Reformed, Presbyterian, Salvation Army, Methodist and Mennonites churches. Some of these denominations actively encourage family planning60.

HIV

The subject HIV infection and sterilisation bears some discussion. The small risk related to operating a possibly HIV infected patient is one factor explaining the low number of TLs performed in Southern Africa.

It is very unlikely that systematic antiretroviral drug treatment will be available on a large scale before South Africa has implemented a working policy61.

Therefore, for the time being, we should assume that highly active ant retroviral therapy (HAART) and even the package of vertical transmission prevention, will not be widely available in Zimbabwe26.
The rational approach would be to test every pregnant woman, or even better, every woman who considers a pregnancy or better still, every woman who is considering a sexual relationship, for HIV. This will not work in the foreseeable future, just like many people in the Netherlands with a 50% risk of Chorea of Huntington will not be tested and many women do not use folic acid before conception. There are those who advise against TL for nearly any woman who is HIV negative because of the feared “depletion of the Zimbabwean gene pool”. A little overanxious perhaps with an estimated 400,000 Zimbabweans, more than half of the complete population living 100 years ago in the territory now called Zimbabwe, being in Europe. There are those who want to test everybody and sterilise everybody who tests HIV positive to prevent another orphan or vertically infected child. The HIV epidemic in Southern Africa is so serious that it will no doubt affect the gene pool in the evolutionary sense. There must be a selection in favour of those clever enough and able to prevent infection. Perhaps a selection against a strong libido or being attractive will also been seen.

Failed sterilisation

Failed sterilisation occurred as expected in the light of a large follow-up study from the USA. Our best estimate would be a cumulative 5 years failure rate of 0.4-0.8%. Our patients were relatively old, meaning less chance of failure but on the other hand, in the USA, black women have significantly higher failure rates. The USA CREST study showed a 10 year cumulative overall 18.5/1000 failure rate with most failures in laparoscopic procedures and the least (7.5/1000) in post partum partial salpingectomies.

Regret

It is difficult to decide what our sterilisation regret rate is, because we do not know how to define regret. For example, a woman who became pregnant after a sterilisation indicated that she regretted the operation (patient 3) and is labelled as such. Four others, whose operation also failed, did not regret having had a TL. Does case history 12 indicate regret and if so, should the rules change regarding suggesting a TL to women having their fourth CS and turning out to have single sex children? If youngish patients/couples insist on a TL and the staff tries to discourage them without success, should they be included in the hospital TL regret rate? If there is a medical indication for sterilisation should regret in this case be included in the overall regret rate. Does regret in a woman, as described in case history 9 mean that she regrets the sterilisation or the indication for the sterilisation. What is a medical indication for a sterilisation: the third, fourth or fifth CS? Also in circumstances where the mortality related to CS is 1%, 3% or even 10% (LCH 72)? What if a woman with 2 previous CSs deliberately delays coming to the hospital until it is nearly too late? What will she do next time? What about a woman...
with a scar in the uterus who lives in an area where there is very likely no doctor (LCH 65 and 67) or no functioning transport system for the next few years? What is the survival rate of under-fives if the mother dies of the next CS in a country where according to the United Nations half the population is on the point of starvation and where there are already 700,000 AIDS orphans?

Regret can be profound and ruin somebody's life. It can also be a fleeting feeling if one sees a cute toddler. Some might think it very unethical to even ask a woman in certain circumstances, see LCH 65, if she wants a sterilisation. The same doubt exists about regretting not being sterilised. What does it mean? Is it just a minor inconvenience? Is it serious stress? Will women die of an induced abortion or a ruptured uterus because they were not sterilised? Might some women die after a sterilisation because around 15-20% of the failed sterilisations (with the age structure of our patients and the operation technique we used) become ectopic pregnancies.

How does one compare regret being sterilised to regret being not sterilised? Are they comparable or is the former much worse than the latter? In our arbitrary table 13, arbitrary because we left out the lower parities (see later) and the medical indications for reliable contraception, there are 8 regretted maternity related TLs (not so serious that the patients had a reversal) and 300 regrets for not having a TL (not so serious that many came for a TL later).

We can argue that we did not have such seriously regretted TLs that a reversal operation was necessary, because the one operation we did was on an HIV positive patient. Other studies show higher regret rates for example, 3.2% in Hong Kong50 up to 12.7% (5.9% if women were over 30 years of age at the time of TL) in the USA65 or in another study from the USA66 14% of the followed-up women report having “second thoughts”. High regret rates of around 5% are seen in Brazil67 where young age and a complex network of interests and misunderstandings shape the nature of choice of female sterilisation under low-income young women during not indicated CSs. A study from Zaire4 showed 2% regret with 1% reversal operations, one from Senegal68 98% no regret, one from Kenya69 “virtually no regret” at first follow-up visit. We could have had very high rates in this study if we would have asked, for example: “do you sometimes wonder if your decision to be sterilised was correct?” This question combined with the question: “do you sometimes have complaints caused, you think, by the operation closing the tubes” would have made it probably possible to claim a “second thoughts” rate of over 25%. In reality, most of the literature50 indicates that 10% of sterilised women have some degree of regret about having undergone the procedure; 0.1-0.3% of sterilized women in developing countries (except Brazil) and 1-3% of sterilized women in developed countries ask about surgery to restore their fertility, with about one-third of the
women in developed countries who consult a doctor eventually proceeding to have
reversal surgery.

The combination of age and parity seen in the average patient sterilised in UBH
would of course be rare in TL patients outside Africa and the Middle East, and would sel-
dom be associated with regret in studies from China, USA, Korea, Brazil or Europe.

We suggest that regret should be defined as being prepared to undergo a reversal
operation or IVF if a medical aid society or the health department would bear the costs
and there would be no serious contra indications to a pregnancy and the patient is not
much older than 40 years old. Defined as above, we had no regrets that we know of over
a period of 13 years when around 3200 sterilisations were performed. With the age dis-
tribution of the sterilised women, around half of the 3200 was past the point of realisti-
cally wanting more children at the end of this study.

There is frequently in reported studies a very strong negative correlation between
age at sterilisation and regret, more than regret and the number of children is (negatively)
correlated. This is because much can still change in the marital relationship of a
young woman. The relative risk of requesting reversal for women sterilised before age 25
was in one study\textsuperscript{5} 18 times that of women sterilised after age 29. In our study (exclud-
ing those with a medical indication) that factor was in relation to regret 6.3 but there
were only 19 women in the under 25 group and 1317 in the above 29 years group. The
decision being strongly pushed by others (doctor, partner, friend, mother) is often also a
factor in regret\textsuperscript{7}. Less information about the procedure, and fewer contraceptive meth-
ods known before sterilisation seem to have a strong influence on the degree of regret\textsuperscript{74}.  
A study of reversal operations in India showed that 70\% of the women involved was Para
2 or less and more than 80\% had lost at least one child\textsuperscript{73}. This type of patients were not
sterilised in UBH, unless there was an obvious medical indication or strong pressure
exerted by the patient.

Having written all the above we believe that regret prevention should be
approached from a practical point of view. What does this study contribute in guidance
to health personal in similar circumstances? The overall regret rate was (related to
maternity or not) 61/1954= 3.1\% (incl. 30 women who died later in the denominator).
This figure does not help much because it includes failed TLs and women who did not
want more children but had complaints possibly related to the TL. These situations are
not predictable. It is difficult to blame abdominal pain on a TL if a woman also has had a
CS for example, and other contraceptive methods also give problems, but there is the (in
practice) unique irreversibility of sterilisation. Therefore we will focus on wanting more
children. Women who died do of course not regret being sterilised. Their family can, but
that is only relevant if the TL caused the mortality, none in these series, but see LCH 28,
72 & 74. Wanting another child or the option of another child is an indication of the care
taken in selection of TL patients and the stability of the patients’ opinion. This calculation results in a 2.1% (42/1954) regret rate. A medical indication for a sterilisation should strictly speaking not figure in the regret rate. A doctor looking for guidance in this paper will in general propose a TL to a patient of whom s/he thinks that she has a medical indication for sterilisation; no guidance necessary. He/she can if the situations are comparable expect a regret rate of 3.4% (16/465) in the medically indicated sterilisations.

What is left are 26 regrets relating to 1489 TLs i.e. a 1.7% regret rate. There must be women in this group who were sterilised because pressure was exerted on the hospital staff, or on the women by partners, mothers (in law), nurses or doctors. In order to compensate for that we remove women from this equation who did not meet our definition of higher parity at the time of sterilisation, 152 women of whom 10 (6.6%) regret their TL. What is left are 1337 women of whom 16 (1.2%) wanted more children. This includes 4 women who lost a child after the index delivery; two of those women became LISARUN - 1. Our figures give a good indication of the best policy for a hospital in southern Africa depending on the acceptability of different forms of regret. With a small reduction in sterilisations by, for example, adhering better to our policy of offering only non-medical indicated TLs to the group of women defined as ≥ LISARUN (or even LISARUN + 1 in maternity), the regret rate for sterilised women without a medical indication for sterilisation can be very low as opposed to situations in other countries where younger age and fewer children at the time of TL make a change in circumstances resulting in wanting another child, more likely. It goes without saying that the reduction mentioned above goes hand in hand with an increase of women who regret not being sterilised.

Young women and unmarried women and women with an unstable marriage are also at risk of regret. Widows often have an extra indication for TL but that indication should be confirmed with an HIV test. Divorced women are also in an HIV high-risk group because they often divorce because of extra marital relationships of either or both partners. A new relationship (mostly with another divorcee or widower) entails a new risk of at least 30% of HIV infection.

Care should be taken with the sterilisation of women who have just delivered a dead or pre-term child if they have not many surviving children already. “Not many” depends on the local definition and there is difference between for example Mali and Botswana. If sterilisations take place during CS, unavoidable in Southern Africa with the resources available but also quite normal in the USA and routine in Brazil, a reliable person should examine the baby properly to assess viability (case history 5). If possible, the “what if” scenario should have been discussed with the woman/couple involved. In another paper19, using data of this study satisfaction with sterilisation is plotted against being given the option of a sterilisation or not in higher parity women who need a CS.
electively or at short notice. The results of that study showed that it is much better to give higher parity women that option even if she needs an emergency CS as defined under Methods. Studies about regretted TLs normally have no non-sterilised control group showing how many regrets there can be in non-sterilised women.

CONCLUSION

This study demonstrated that mental and physical problems after sterilisations were rare and easily counterbalanced by positive effects. Most sterilised women indicated that they were very happy. Failed sterilisations were not seen in a higher than expected frequency.

Regret was rare: 2.1% overall, 1.7% for sterilisations without medical indications and 1.2% for sterilisations without medical indications in women with four or more children or three children if they were 30 years or older at the time of sterilisation. More than 40% of the latter sub-group of women in the control group were unhappy not having been sterilised.

3.4% of the women with a medical reason to stop having children regretted their sterilisation. Of some concern is the regret related to the unpredictable death of a child after sterilisation, especially if not caused by AIDS, and to a lesser extent, regret related to a new relationship, which needs cementing with a few extra children. The bereavements happen of course more with delivery related sterilisations than with interval sterilisations. The best solution to this problem would be to wait until a year or so post partum with the sterilisation in those women who just have the number of children wanted. This is a small group of women because many who are sterilised have already one or two children more than originally planned. If the resources are not there to organise a proper interval sterilisation service and/or the women involved rarely have the opportunity to return, then one has to accept some more regret or reduce the hospital TL rate by around 10% - the women with no medical indication for a delivery associated sterilisation, who have less than 6 children after delivery or are have less than 5 children if they are at least 30 years old - in hospitals with a similar case load, depending on how much importance is given to regret related to not being sterilised and the complications thereof. This study does not provide evidence that non-medically indicated TLs should not be performed in relation to deliveries in the prevailing circumstances. The situation might change if women are in the future more successful in having just the (small) number of children they want before sterilisation and at a younger age, in which case the death of a child or a divorce might more often result in a request for reversal.
There were no women in this study without a medical contra indication for a pregnancy nor any woman that we know of among women sterilised over a period of 13 years in non-private practice in Bulawayo, who regretted their TL so much that they were prepared to have an all costs paid reversal operation.

The institutional capacity to perform the sterilisations women would be very happy to have, is not available in Africa and some form of incentive for staff would be a step in the right direction.

If sterilisation is indicated anywhere in the world, then the most suitable circumstances for its success, in terms of low regret rates, and low failure rates compared to alternatives like the pill, are present in sub-Saharan Africa.

Table 1 Characteristics of sterilisation group (1286 delivery related, patients who died later included) and control group (delivery related) in successfully followed-up women.

<table>
<thead>
<tr>
<th></th>
<th>Sterilised =1286</th>
<th>Control group = 932</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age at index delivery in years</td>
<td>35.0</td>
<td>32.9</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Mean number living children at follow-up</td>
<td>5.1</td>
<td>4.5</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Delivered by caesarean section</td>
<td>58.8%</td>
<td>40.7%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Using hormonal contraceptives</td>
<td>0.3%</td>
<td>54.1%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Having an (arbitrary) medical indication for very effective contraception</td>
<td>29.0%</td>
<td>15.7%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Very poor patients</td>
<td>36.7%</td>
<td>24.8%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Private patients</td>
<td>33.3%</td>
<td>37.2%</td>
<td>0.061</td>
</tr>
<tr>
<td>Want more children</td>
<td>2.2%</td>
<td>25.1%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Use of unreliable method of contraception (not sterilisation, IUCD, implant or injectables) or none, by those women who do not want more children</td>
<td>0.0%</td>
<td>70.3%</td>
<td></td>
</tr>
<tr>
<td>Patient had died at follow-up or later</td>
<td>25</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>(2 after response)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Period of follow-up</td>
<td>27.2 months</td>
<td>28.3 months</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
Table 2 Composition of successfully followed-up sterilised women (including those who died) and women in the control groups in eight subgroups with data in relation to use of contraceptives and completeness of families and regret.

<table>
<thead>
<tr>
<th>Sub-groupings</th>
<th>TL Group</th>
<th>Control group</th>
<th>Percentage of higher parity women in subgroups sterilised</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (% of TL group)</td>
<td>n Want more children (% of previous column)</td>
<td>n Want no more children (% of previous column)</td>
</tr>
<tr>
<td>TL + legal. abortion</td>
<td>30 (1.6%)</td>
<td>3 (10.0%)</td>
<td>Estimated 85% (mostly HIV positive)</td>
</tr>
<tr>
<td>TL + ectopic pregnancy</td>
<td>41 (2.1%)</td>
<td>3 (7.3%)</td>
<td>Estimated 15%</td>
</tr>
<tr>
<td>TL + incompl. abortion</td>
<td>181 (9.3%)</td>
<td>4 (2.2%)</td>
<td>Estimated 10%</td>
</tr>
<tr>
<td>Interval TL</td>
<td>311 (15.9%)</td>
<td>2 (0.6%)</td>
<td>Estimated 1.2% of new women who want to stop reproduction annually in area covered</td>
</tr>
<tr>
<td>TL + other elective gynaecological operation</td>
<td>105 (5.4%)</td>
<td>2 (1.9%)</td>
<td>Estimated 50%</td>
</tr>
<tr>
<td>TL with an elective CS + control group</td>
<td>439 (22.4%)</td>
<td>13 (3.0%)</td>
<td>97 (10.4%)</td>
</tr>
<tr>
<td>TL with an emergency CS + control group</td>
<td>317 (16.2%)</td>
<td>9 (2.8%)</td>
<td>282 (30.3%)</td>
</tr>
<tr>
<td>Post partum TL - + control group</td>
<td>530 (27.1%)</td>
<td>6 (1.1%)</td>
<td>553 (59.3%)</td>
</tr>
<tr>
<td>Total</td>
<td>1954 (100%)</td>
<td>42 (2.1%)</td>
<td>932 (100%)</td>
</tr>
</tbody>
</table>
Table 3  Sterilised group, age and parity (living viable children at time of sterilisation) from UBH maternity (whether followed-up with success or not).

<table>
<thead>
<tr>
<th>Sub-group sterilised</th>
<th>Number of higher parity women in sub-group sterilised</th>
<th>Mean age 25, median and 75 quartiles of women sterilised</th>
<th>Mean parity 25, median and 75 quartiles of women sterilised</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaginal delivery</td>
<td>595 (12.5%)</td>
<td>36.2, 33.5-36.0-39.0</td>
<td>5.9, 5.0-6.0-7.0</td>
</tr>
<tr>
<td>n = 4774</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective CS</td>
<td>457 (75.0%)</td>
<td>33.7, 31.0-33.0-37.0</td>
<td>4.5, 4.0-4.0-5.0</td>
</tr>
<tr>
<td>n = 609</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emergency CS</td>
<td>356 (53.8%)</td>
<td>35.8, 32.0-36.0-39.0</td>
<td>5.2, 4.0-5.0-6.0</td>
</tr>
<tr>
<td>n = 662</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4  Potential (whether followed-up with success or not) control group, age and parity (living viable children after index delivery) from UBH maternity.

<table>
<thead>
<tr>
<th>Sub-group not sterilised</th>
<th>Number of higher parity women in sub-group not sterilised</th>
<th>Mean age 25, median and 75 quartiles of women not sterilised</th>
<th>Mean parity 25, median and 75 quartiles of women not sterilised</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaginal delivery</td>
<td>4179 (87.5%)</td>
<td>34.1, 31.0-34.0-37.0</td>
<td>4.9, 4.0-5.0-6.0</td>
</tr>
<tr>
<td>n = 4774</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective CS</td>
<td>152 (25.0%)</td>
<td>32.9, 30.0-33.0-35.0</td>
<td>4.0, 3.0-4.0-4.0</td>
</tr>
<tr>
<td>n = 609</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emergency CS</td>
<td>306 (46.2%)</td>
<td>33.7, 31.0-34.0-36.0</td>
<td>4.5, 3.0-4.0-5.0</td>
</tr>
<tr>
<td>n = 662</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 5  Mode of delivery of those 802 women who were older than 39 years in the 6045 ≥ LISARUN women.

<table>
<thead>
<tr>
<th>Mode of delivery of those above 39 years</th>
<th>Fraction sterilised</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaginal delivery n=644</td>
<td>139/644 = 21.6%</td>
</tr>
<tr>
<td>Emergency CS n=101</td>
<td>82/101 = 81.2%</td>
</tr>
<tr>
<td>Elective CS n=57</td>
<td>51/ 57= 89.5%</td>
</tr>
</tbody>
</table>

Table 6  Marital status and loss of a child after sterilisation or after or around index delivery of sterilised patients and control group.

<table>
<thead>
<tr>
<th>All followed-up sterilised women (n=1954)</th>
<th>Control group (n=932)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Died</td>
<td>32(1.6%)</td>
</tr>
<tr>
<td>Divorced during follow-up time</td>
<td>22(1.1%)</td>
</tr>
<tr>
<td>Already divorced at index visit</td>
<td>37(1.9%)</td>
</tr>
<tr>
<td>Became widow during follow-up time</td>
<td>28(1.4%)</td>
</tr>
<tr>
<td>Already widow at index visit</td>
<td>49(2.5%)</td>
</tr>
<tr>
<td>Married both at follow-up and before</td>
<td>1549(79.3%)</td>
</tr>
<tr>
<td>Single, boyfriend, remarried</td>
<td>249 (12.7%)</td>
</tr>
<tr>
<td>Lost child after TL or around or after</td>
<td>150</td>
</tr>
</tbody>
</table>

Table 7  Whether last pregnancy was planned.

<table>
<thead>
<tr>
<th>Group sterilised and alive (n=1926)</th>
<th>Higher parity control group (≥ LISARUN) (n=821)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question not answered</td>
<td>12.9%</td>
</tr>
<tr>
<td>Last pregnancy timely</td>
<td>29.3%</td>
</tr>
<tr>
<td>Last pregnancy too early</td>
<td>11.6%</td>
</tr>
<tr>
<td>Had hoped before last pregnancy not</td>
<td>46.2%</td>
</tr>
<tr>
<td>to become pregnant anymore</td>
<td></td>
</tr>
</tbody>
</table>
Table 8  Situation at follow-up after sterilisation related to delivery (n=1263) compared to control group (n=924).

<table>
<thead>
<tr>
<th>Complaint</th>
<th>Sterilised</th>
<th>Control group</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complaints about periods at follow-up</td>
<td>31.9%</td>
<td>27.8%</td>
<td>0.047</td>
</tr>
<tr>
<td>Complaints about periods women</td>
<td>31.9%</td>
<td>30.8%</td>
<td>0.717</td>
</tr>
<tr>
<td>using hormonal contraceptives excluded</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less appetite at follow-up</td>
<td>15.5%</td>
<td>15.7%</td>
<td>0.902</td>
</tr>
<tr>
<td>Abdominal pains at follow-up</td>
<td>42.9%</td>
<td>39.7%</td>
<td>0.152</td>
</tr>
<tr>
<td>Becoming fat at follow-up (not necessarily a complaint especially these days)</td>
<td>30.6%</td>
<td>34.5%</td>
<td>0.068</td>
</tr>
<tr>
<td>Sad at follow-up</td>
<td>25.8%</td>
<td>31.4%</td>
<td>0.007</td>
</tr>
<tr>
<td>Less desire in sex at follow-up</td>
<td>41.8%</td>
<td>48.5%</td>
<td>0.003</td>
</tr>
<tr>
<td>Headaches at follow-up</td>
<td>35.3%</td>
<td>36.8%</td>
<td>0.480</td>
</tr>
<tr>
<td>Physical problems just after delivery or sterilisation other than mentioned above</td>
<td>27.1%</td>
<td>23.2%</td>
<td>0.040</td>
</tr>
<tr>
<td>Regret being sterilised (n=1263)/ not sterilised(n=924)</td>
<td>42 (3.3%)</td>
<td>404 (43.7%)</td>
<td></td>
</tr>
<tr>
<td>Regret because wants more children or at least have that option (n=1263)/ wants more children (n=924)</td>
<td>28 (2.1%)</td>
<td>234 (25.3%)</td>
<td></td>
</tr>
<tr>
<td>Wants more children and having no medical indication for sterilisation (n=902)/same for no TL (n=766)</td>
<td>15 (1.7%)</td>
<td>206 (26.9%)</td>
<td></td>
</tr>
<tr>
<td>Wants more children and have no medical indication for sterilisation and are of higher parity (n=804)/ same for no TL (n=672)</td>
<td>8 (1.0%)</td>
<td>161 (24.0%)</td>
<td></td>
</tr>
<tr>
<td>Wants no more children</td>
<td>1235</td>
<td>690</td>
<td></td>
</tr>
<tr>
<td>Re-anastomosis operation/ unwanted pregnancies within on average 28.3 months of follow-up</td>
<td>0</td>
<td>41/690 (5.9%)</td>
<td></td>
</tr>
</tbody>
</table>
Table 9  Complaints present at follow-up after sterilisation post partum (n=520) compared to controls who also delivered vaginally (n=548).

<table>
<thead>
<tr>
<th>Complaints</th>
<th>Sterilised</th>
<th>Control group</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complaints about periods at follow-up</td>
<td>30.6%</td>
<td>29.0%</td>
<td>0.573</td>
</tr>
<tr>
<td>Complaints about periods excluding women using hormonal contraceptives</td>
<td>30.0%</td>
<td>33.1%</td>
<td>0.443</td>
</tr>
<tr>
<td>Less appetite at follow-up</td>
<td>15.6%</td>
<td>15.2%</td>
<td>0.863</td>
</tr>
<tr>
<td>Abdominal pains at follow-up</td>
<td>38.3%</td>
<td>39.9%</td>
<td>0.610</td>
</tr>
<tr>
<td>Becoming fat at follow-up (not necessarily a complaint, especially these days)</td>
<td>29.3%</td>
<td>35.3%</td>
<td>0.049</td>
</tr>
<tr>
<td>Sad at follow-up</td>
<td>21.8%</td>
<td>33.0%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Less desire in sex at follow-up</td>
<td>37.4%</td>
<td>48.7%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Headaches at follow-up</td>
<td>32.4%</td>
<td>35.2%</td>
<td>0.363</td>
</tr>
<tr>
<td>Physical problems just after sterilisation and/or delivery other than mentioned above</td>
<td>21.4%</td>
<td>21.4%</td>
<td>0.996</td>
</tr>
</tbody>
</table>

Table 10  Complaints present at follow-up after sterilisation not related to delivery (n=661).

<table>
<thead>
<tr>
<th>Complaints</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Complaints about periods at follow-up</td>
<td>37.6%</td>
</tr>
<tr>
<td>Less appetite at follow-up</td>
<td>12.5%</td>
</tr>
<tr>
<td>Abdominal pains at follow-up</td>
<td>40.0%</td>
</tr>
<tr>
<td>Becoming fat at follow-up (not necessarily a complaint, especially these days)</td>
<td>32.6%</td>
</tr>
<tr>
<td>Sad at follow-up</td>
<td>23.5%</td>
</tr>
<tr>
<td>Less desire in sex at follow-up</td>
<td>31.8%</td>
</tr>
<tr>
<td>Headaches at follow-up</td>
<td>29.7%</td>
</tr>
<tr>
<td>Physical problems just after sterilisation and/or delivery other than mentioned above</td>
<td>19.9%</td>
</tr>
<tr>
<td>Regret overall</td>
<td>19(2.9%)</td>
</tr>
<tr>
<td>Regret because wants more children or at least have that option</td>
<td>14(2.1%)</td>
</tr>
<tr>
<td>Regrets sterilisation and there was no medical indication for sterilisation (n=576)</td>
<td>7(1.2%)</td>
</tr>
<tr>
<td>Regret sterilisation and there was no medical indication for sterilisation and being of higher parity at follow-up (n=513)</td>
<td>6(1.2%)</td>
</tr>
<tr>
<td>Re-anastomosis operation (39 years, 5 children, divorced, HIV +) Case 48</td>
<td>1(0.2%)</td>
</tr>
</tbody>
</table>
Table 11  Reasons for not having a sterilisation in 672 surviving members of the control group who did not want any more children after index delivery; unplanned pregnancies.

<table>
<thead>
<tr>
<th>Reason</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wanted to use an other contraceptive method</td>
<td>158 (22.9%)</td>
</tr>
<tr>
<td>Thought herself to be too old to become pregnant again</td>
<td>77 (11.2%) of whom 44 (after lactation) younger than 38 years and 15 above 40 years</td>
</tr>
<tr>
<td>Not discussed with partner, partner could get angry if she would decide without him, knew or suspected he was against sterilisation</td>
<td>110 (16.0%)</td>
</tr>
<tr>
<td>Afraid of operation or side-effects later</td>
<td>132 (19.2%)</td>
</tr>
<tr>
<td>Thought religion is against sterilisation as a form of contraception</td>
<td>36 (5.2%)</td>
</tr>
<tr>
<td>Operation not offered or blames herself for not asking (11)</td>
<td>196 (28.4%)</td>
</tr>
<tr>
<td>What happened in hospital (doctors or nurses strike, great hurry, stress)</td>
<td>47 (6.8%)</td>
</tr>
<tr>
<td>No time to wait in hospital keen to go home to run household</td>
<td>76 (11.3%)</td>
</tr>
<tr>
<td>Doctor or midwife refused a request for sterilisation</td>
<td>9 (1.3%)</td>
</tr>
<tr>
<td>Doctor forgot the sterilisation during caesarean section including in one woman who was pregnant because of a failed sterilisation</td>
<td>8 (1.2%)</td>
</tr>
<tr>
<td>(Fear of) extra payment needed for longer stay in hospital only 3 as only reason</td>
<td>81 (11.7%)</td>
</tr>
<tr>
<td>The new relation (probably) wanted another child, woman not really</td>
<td>11 (1.6%)</td>
</tr>
<tr>
<td>Had had an (induced?) miscarriage at follow-up including one ectopic pregnancy</td>
<td>8 (1.2%)</td>
</tr>
<tr>
<td>Was pregnant or had delivered an unplanned pregnancy at follow-up</td>
<td>33 (4.8%)</td>
</tr>
</tbody>
</table>
Table 12  Reasons why some of the 234 women in the control group of 932 who wanted more children wanted more children after the index delivery

- Too few girls, or too few boys 14 (6.0%), 12(5.1%)
- Started new relationship 32 (13.7%)
- Wants more children because partner wants more children 17 (7.3%)
- Because religion does not allow people to limit their fertility 30 (12.8%)

Table 13  Higher parity at time of follow-up (≥ LISARUN) women stratified according to mode of delivery plus interval TL. Regret TL (wants more children) and regret no TL (missed opportunity, unwanted pregnancy or problems with other contraceptives). Excluding women with a medical indication for a TL and women who died

<table>
<thead>
<tr>
<th>Mode of Delivery</th>
<th>Regret TL</th>
<th>Regret no TL</th>
<th>RR with 95% CI, p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Emergency&quot; CS n= 377</td>
<td>3/196 (1.5%)</td>
<td>90/181 (49.7%)</td>
<td>1 0 - 32 - 100, &lt;0.001</td>
</tr>
<tr>
<td>&quot;Elective&quot; CS n= 221</td>
<td>4/160 (2.5%)</td>
<td>27/61 (44.3%)</td>
<td>6 - 18 - 49, &lt;0.001</td>
</tr>
<tr>
<td>Vaginal Del. n= 890</td>
<td>1/448 (0.2%)</td>
<td>183/442 (41.4%)</td>
<td>26-185-1318, &lt;0.001</td>
</tr>
<tr>
<td>Interval TL n= 955</td>
<td>6/513 (1.2%)</td>
<td>183/442 (41.4%)</td>
<td>16- 35 - 80, &lt;0.001</td>
</tr>
</tbody>
</table>

+ Vaginal Del. as Control
LIST OF CASE HISTORIES

1 Patient was 33 years at the time of sterilisation performed during an emergency caesarean section at 3 am after transport by ambulance over 420 km for impending eclampsia. The daughter of 1725 gram at 32 weeks survived. The patient was then the mother of 2 sons and 4 daughters. We saw her again 5 years later with her daughter of 22 requesting reversal of sterilisation claiming to have had 3 daughters only. It turned out that one of her daughters and her 2 sons were from an earlier relationship. Her husband (2 daughters elsewhere) saw our questionnaire and found out that she had been sterilised. He was not happy. Her blood pressure was 170/110 and she was at the time 38 years. She insisted on an operation but allowed an HIV test first. She was prepared to abandon her quest when the test turned out to be positive.

2 Patient was 33 years at the time of sterilisation and had 2 sons and 1 daughter. She is the only female patient found in the theatre records sterilised by a (junior) surgeon. The sterilisation was performed while her incisional hernia, after 3 previous caesarean sections, was (unsuccessfully) repaired. She does not want more children and has developed breast cancer since but thinks her scar is so ugly because of the sterilisation.

3 Patient was 30 years at the time of the interval sterilisation and had 3 sons and 2 daughters. She is not happy with the sterilisation because she became pregnant and has now 3 daughters.

4 She, 30 years, poor, unmarried, mother of one son, pushed the doctors into sterilising her after the delivery at 28 weeks of an unplanned stillborn foetus at 28 weeks. She has at follow-up second thoughts, no stable partner but if she had one, she would like to be able to have a baby.

5 Patient was 37 years at the time of sterilisation performed during a planned caesarean section, her third operation and fourth baby. The baby had an Apgar score of 10 after 5 minutes but died after a few days because of a congenital heart problem. For both partners in the marriage it is the second marriage. Her husband has two sons from an earlier marriage and so has she. They have 1 surviving son together. Her comment was that a man says, “yes one day no another” and that she “will go for a test tube baby”. She was invited for a re-anastomosis but declined because she cannot face the prospect of 2 more operations.
6 Patient was 28 years at the time of the sterilisation during an emergency caesarean section for hypertension and two previous caesarean sections. She had 3 sons and 2 daughters. She then started a new relationship and wanted to seal the bond with a child. She was booked for re-anastomosis but a preoperative HIV test turned out to be positive.

7 Patient was 26 years, a married domestic worker at the time of sterilisation performed during her fourth, planned, caesarean section. The operation was very difficult because of enormous keloid formations at the lower abdomen. There was also a large hole in the lower anterior wall of the uterus covered by peritoneum. We saw her again a few months later when she came for help after her baby had died. We deduced from the baby’s hospital outpatient card that she died of HIV. The mother claimed not to know that. She very much wants a re-anastomosis but we refused. She has one son and one daughter.

8 She had her 4th vaginal delivery at age 35, a breech. The child died a few months later. At follow-up she regretted the post partum sterilisation. We invited her for an all costs paid visit, but she never turned up. We checked again and were informed that she had died, probably from AIDS.

9 Patient was 27 years at the time of the sterilisation during a caesarean section performed earlier than planned because she went into labour at 37 weeks. This time it was her third operation and third boy. The lower segment of the uterus is very thin on the point of rupturing and the consultant decides that there is a medical indication for sterilisation. A few days later she develops a “platzbauch” and needs re-operation. She indicates on the questionnaire that she is unhappy with her sterilisation but does not follow this up with action.

10 Patient was a 25 years old married student at the time of the sterilisation performed during a planned caesarean section, her third, performed by a private doctor. She had lost a child earlier. At follow-up she had a boy and a girl and wanted one or two more children but undertook no action after our offer of an all costs paid re-anastomosis. She wrote “will regret” behind the question if she would recommend a sterilisation to her friends.
11 Patient was 32 years poor and married at the time of the sterilisation performed during her sixth, planned, caesarean section. She has 5 sons and 1 daughter (the youngest). No action from our side was undertaken after she indicated that she wanted more children.

12 She was 30 years, married to a mineworker while she had her fourth caesarean section combined with a sterilisation, and has then 4 sons. She wrote: “would like a daughter but this is best”.

13 The private patient was 32 years at the time of the interval sterilisation and had 3 sons and 2 daughters. Thirty-four months later she indicates on our questionnaire that her husband is unhappy because he lost a son he had with another woman. The husband has only one son with our index case.

14 The private patient was 25 years at the time of the sterilisation combined with a legal abortion. She had then atrium fibrillation and cardiac failure caused by rheumatic heart disease. She had 1 son and 1 daughter. At the time of follow-up she had received a heart valve implant, was no longer married but had a boyfriend and worked in the sales department of a large supermarket. She indicated that she regretted the sterilisation. She was then contacted by telephone and said she had no time for another operation.

15 The private patient was 37 years at the time of the sterilisation combined with a legal abortion for an abnormal baby. She had at follow-up two boys and saw the sterilisation as a “hasty decision”. She was not disappointed enough to contemplate a re-anastomosis.

16 The patient was 28 years, Roman Catholic and married at the time of the sterilisation, which was combined with a legal abortion for her HIV infection. She had at follow-up only one daughter after she lost a child after the sterilisation. She wrote that everything had not been explained well and that she would like four children.

17 The private patient was a 30 years old teacher at the time of the sterilisation during an emergency operation for an ectopic pregnancy. The sterilisation was discussed before the operation at her initiative. At follow-up 34 months later she is the single mother of one boy and regrets her decision but not so seriously that she wants to be operated on.
18 The patient was a 36 years old wife of a gardener admitted for an ectopic pregnancy. She wanted a sterilisation when offered and we contacted him via his employer's telephone. He was, we were told, keen not to have children anymore. At the operation she had 1 litre of blood auto-transfused. At follow-up the employer told us she lived in the rural areas and was rather disappointed because she had lost faith in us. She had delivered, 32 weeks after the sterilisation, a daughter of 3100 gram and was afraid that she was still fertile. The gardener and his employer were much happier after the explanation.

19 The patient was a 37 years old wife of a mineworker admitted with an incomplete abortion. The evacuation of the uterus was combined with a sterilisation. At follow-up she wanted one more child having 2 boys and 3 girls, but not enough to have an operation.

20 The patient was a 32 years old divorcee mother of a boy and a girl, admitted with an incomplete abortion. The evacuation of the uterus was combined with a sterilisation, completely at her initiative being fed up with pregnancies after three deliveries an ectopic and now an (clandestine) induced abortion. At follow-up, now married she wanted to be fertile again but turned out to be HIV positive.

21 The patient was a 29 years old girlfriend of a mineworker admitted with an incomplete abortion. The evacuation of the uterus by a private gynaecologist was combined with a sterilisation. At follow-up she wanted one more child having 2 boys and 2 girls. She felt guilty because her partner did not know about her sterilisation and he had expressed surprise repeatedly about her failure to become pregnant. She blames herself.

22 The patient was a 35 years old wife of a policeman admitted with an incomplete abortion. She became pregnant while using DMPA but not every 3 months. The evacuation of the uterus was combined with a sterilisation; the husband does not know this. At follow-up she wanted one more child having a boy and three girls.

23 The married private patient was 35 years at the time of the sterilisation performed during the removal of an ovarian cyst. She had at follow-up 7 years later two boys and four girls and felt around that time a sudden urge to have another baby.
The patient was a 37 years old single unemployed woman with two sons admitted for an ectopic pregnancy. She wanted a sterilisation but at follow-up 4 years later she wanted another child.

The patient was a 36 years old wife of a prison warden admitted with an incomplete abortion. She had four sons and four daughters. She shared the husband with another woman, she being his second wife. The evacuation of the uterus was combined with a sterilisation. Since the operation, at follow-up nearly 4 years ago, she suffers pain when having sex. She does not want more children and complains that there was lack of hygienic tissues in the hospital.

She, 34 years and a private patient, develops Herpes Zoster in her fourth pregnancy. A test confirms that she is HIV infected. Zidovudine is given to try to prevent vertical transmission. After the delivery of her daughter with a good Apgar score she is sterilised. At follow-up 2 years later that daughter has died she is losing weight and still has two sons and a daughter. Her comment is that she regrets the sterilisation because if a miracle drug was invented and she was cured then she would not be able to become pregnant.

She had, as a teenager, a serious handicapping car accident and still suffers from the consequent epilepsy. After two pregnancies resulting in a daughter and a son her parents who are financially responsible for her talk her and a private gynaecologist into a sterilisation. She is then 21 years old. She writes that she has a new boyfriend and if he turns out to be okay, she will come for reversal.

She is 31 years and it is clinically obvious during her second pregnancy that she is HIV positive bordering on AIDS. The laboratory confirms this suspicion and she had, after the delivery of her son, a sterilisation. She was not a candidate for Zidovudine. A repeat follow-up questionnaire is filled in by the husband who informs us that she has died and that his in-laws blame him for her death because he allowed the sterilisation. They demand 5 cows in compensation. No information about the son is available.

She was 40 years old, a domestic worker, the single mother of a boy and a girl when her pregnancy complicated by serious hypertension resulted in the intra uterine death of a male foetus. She had a post partum sterilisation. Fate decided that her “madam” delivered around the same time and she spends much of her time with the son who is now just over 3 years old. That hurts her. She still has an erratically treated hypertension.
30 She is 28 years unmarried and referred from Plumtree District Hospital, at that time without a doctor. She had 3 previous caesarean sections, but only one son has survived. Her fourth operation is combined with a sterilisation. This is what the patient wanted. It is not clear why her other children died, she refused an HIV test, but at follow-up two years later she regerts her sterilisation because her daughter died. We planned to visit her but that never happened.

31 Patient was 34 years, poor and married at the time of the sterilisation performed during her fourth, planned, caesarean section. She has 3 sons and 1 daughter. She was very ill postoperatively, discharged and readmitted with a serious wound infection. At follow-up 9 months later, she is fine and blames her complications on the sterilisation because the previous operations were uncomplicated.

32 Patient was a 32 years old, unmarried, teacher at the time of the sterilisation performed during her third, planned, caesarean section. She has 1 son and 2 daughters. At follow-up 40 months later, she is ambivalent about the wisdom of performing the sterilisation. There are developments in her love life.

33 Patient was referred from a district hospital, no income, married, and was 30 years at the time of the sterilisation during an emergency caesarean section at 5 am after three previous caesarean sections in labour. After the operation she had 2 sons and 1 daughter. At follow-up 1 year later she regrets her sterilisation and expresses her satisfaction with the excellent services rendered.

34 Patient was 38 years at the time of the sterilisation during an emergency caesarean section for a failed induction indicated by hypertension, she had already 1 son. The girl is 1745 gram and has a good Apgar score. The woman is a state registered nurse and midwife employed 100 km from Bulawayo, her husband is in the police force. At follow-up nearly 3 years later, the girl is 13 kg and doing very well. She has not told the husband about the sterilisation and because of that, she is rather ambivalent about it. She was then 41 years old and the ambivalence might very well be academic.

35 Patient, 30 years old and married mother of 2 daughters is referred for severe pregnancy induced hypertension. After 11 days in hospital we decide that it is not longer safe for mother and child to continue the pregnancy. This decision was pending for at least a week and we had discussed the option of a sterilisation during a likely caesarean section. She is sterilised the new daughter weighed 1375 gram and had an Apgar score of
9-10 and survived. At follow-up 39 months later patient wants to “loosen the tubes for a boy”.

36 Patient 31 years old, is referred from a district hospital in labour for her third caesarean section. She has a signed “TL form”, dated a week earlier, with her. She is unmarried, and has no income and 2 daughters. With the help of a caesarean section a son of 2575 gram is delivered with in the delivery records the Apgar score recorded as “7-3-8-6/10”. The baby dies a few days later. At follow-up 41 months later she is very unhappy and invited for an all costs paid re-anastomosis. She never reacts.

37 She was 37 years, married and her husband worked in South Africa and she was admitted from a district hospital with vaginal bleeding. On arrival, the foetus had died and she was not bleeding much. Induction of labour was attempted, but failed and she was then delivered abdominally from a dead male baby and sterilised. At follow-up 14 months later and the mother of 2 sons and 3 daughters, she regretted her sterilisation. When we contacted her again six months later she indicated that she had now reconciled herself with her situation.

38 She was 24 and had her third, elective, caesarean resulting for her third son combined with a sterilisation. She is employed as a daily worker and her boyfriend shares only the last child with her. She indicates on the questionnaire 28 months later that she regrets the sterilisation but on visiting her, it becomes clear that she does not want more children but her informal husband does and he does not know about the TL.

39 The patient is 22 years, single and referred from a district hospital for her third caesarean section. She has a signed “TL form”. She has 2 daughters. She delivers her third child abdominally and is sterilised. Twenty-six months later she indicates to be unhappy for her new boyfriend who wants a child.

40 She signs at 25 years a TL form in early labour 160 km away in a hospital without a doctor and is then put in an ambulance. At arrival her fourth caesarean plus sterilisation is performed promptly. In the notes is recorded that the uterus was on the verge of a rupture. She is then the mother of three boys and one daughter. When she does not answer our questionnaire 20 months later we sent a reminder. A few days later the first questionnaire is returned: she is happy. Three months later the reminder comes back, she wants two more children.
41 Patient was 35 years old, married and had no monetary income to speak of at the time of the sterilisation performed during her third, planned, caesarean section. She has then 2 sons and 1 daughter. At follow-up 21 months later she indicates that she is wants more children and is happy with the operation without further comment. Subsequent inquiries are not answered. She could have ticked the wrong box.

42 Patient was a 33 years old single and had very little income at the time of the sterilisation performed during her fourth, planned, caesarean section. Her first caesarean was for very prolonged labour and the baby died soon after. She had after the fourth operation 1 son and 2 daughters. The son, born with a good Apgar score, died six days later for unknown reasons. We discussed a re-anastomosis one month after delivery and agreed that we would see her again in 6 months and would then operate her provided she had a negative HIV test. We had not seen her nearly 2 years after delivery.

43 This married, private patient was 35 years at the time of sterilisation performed during a planned caesarean section, her second operation and seventh baby. She has 5 daughters and lost one son of 2 years and one at age 3. Her husband used to beat her a lot she writes 44 months later, not lately though, they have no sex anymore but he wants a boy. She suspects he is HIV positive. She wants to be tested but her husband should go for a test first.

44 Patient was 33 years old married and had no monetary income to speak of at the time of the sterilisation performed during her second, planned, caesarean section. She has then 3 sons and 1 daughter. At follow-up 18 months later, she has become a widow and indicates that she is not sure if she wants more children but does not follow it up.

45 As we perform her third caesarean plus sterilisation in the middle of the night when she turns up in labour, she is 36, the mother of 2 boys and 1 daughter. Three months later she indicates on the questionnaire that she was happy with the service but that she would like another child. She does not follow that up although invited to do so.

46 She delivered in another government hospital and had then 4 children and was 35 years old and divorced and had a job as a secretary. She had pregnancy-induced hypertension and the baby of 2.2 kg died soon after delivery. Thirteen days after delivery she is admitted in United Bulawayo Hospitals by a private gynaecologist for sterilisation. At follow-up 39 months later she has a new partner her blood pressure is fine. She wants to come for tubal surgery but seems not to be able to make it.
47 She had her first caesarean plus sterilisation for pregnancy-induced hypertension by a private gynaecologist. She is then 30, a teacher and married to a teacher and the mother of 2 boys and 1 daughter. Later the youngest, a daughter, dies it turns out at follow-up 2 years later, and she regrets her sterilisation. No further details available.

48 She is now 39 years and had a laparoscopic sterilisation 11 years ago, her youngest is 13 years and she has divorced her husband, a soldier. She has 4 daughters and 1 son. She claims to have no partner but wants to be “ready” when one turns up. The laparoscopy scar is a large keloid tumour and she is informed about the likelihood of a large keloid after a laparotomy. She refuses an HIV test but later allows a test as long as she is not told the result. The test is positive and she has her re-anastomosis. She was not part of the planned follow-up cohort but is included anyway because members of the cohort might come long after the study is finished with regret.

49 The patient was a 35 years old married teacher with two sons admitted for an ectopic pregnancy. She wanted a sterilisation but at follow-up 1 year later after she had been written to 3 times, she wanted another child. The two boys she has are 5-year-old twins.

50 The patient was a 33 years old single domestic worker with 3 daughters each with a different father. She came with an incomplete induced abortion (her second) and she had a sterilisation with the evacuation of the uterus. Ten months later, she indicates on the questionnaire that she has a new boyfriend and wants a child.

51 She was a 39 years old, married mother of 2 daughters after her last pregnancy which was complicated by severe hypertension (210/140). She had a post partum sterilisation by a private gynaecologist complicated by a wound in the bladder noticed in time, and a postoperative wound infection. Three years later at follow-up she is unhappy and wants another child.

52 She is 28 and the wife of a civil servant when she is sterilised with her third caesarean section having then a boy and two daughters. Two years later, she becomes pregnant. Her private gynaecologist in the government hospital terminates her pregnancy, although this situation does certainly not give her an indication for a legal abortion within Zimbabwean law. Her husband subsequently has a vasectomy.
53 She has her second elective caesarean section for her 6th child when she is 41 years old. She is unhappy with the simultaneous sterilisation because of the backaches and stomach cramps she develops later. She did not want to have more children she says at follow-up, 11 years after the operation when she is still married with the same railway man.

54 Had her first caesarean section for her tenth delivery for bleeding when she was 33. At follow-up more than 10 years later she has lost 2 boys one at 9 and one at 20 years of age both of “headache”. The girl of 11 is doing well. Being a grandmother and having 4 sons and 4 daughters is not enough, she is bored and wants another child.

55 The patient suffered from rheumatic heart disease with mi/ms and she had a post partum sterilisation under local anaesthesia when she had 2 sons at age 29. We sent her a questionnaire 4 months after delivery, she filled it in but died soon after. Her husband found it 5 months after that and sent it to us.

56 Patient was 33 years and married to a civil servant at the time of sterilisation performed during her fourth, planned, caesarean section. She had then 1 son and 2 daughters having lost a child earlier. At follow-up 15 months later she wanted more children but did not visit us.

57 Patient was 33 years and married at the time of sterilisation performed during her third, planned, caesarean section. She had then 1 son and 2 daughters. At follow-up 6 months later she wanted more children but did not visit us.

58 She is 38 years old and severely handicapped because of a previous poliomyelitis infection. It is so serious that one cannot imagine how this woman became pregnant without medical assistance. She had the second elective caesarean for a severely deformed pelvis combined with a sterilisation. She has now 2 sons. Her comment is that she regrets the necessity of the sterilisation but that she is happy not to become pregnant anymore.

59 Delivered for the eighth time and had a post partum sterilisation in June 1990. She had and has 4 sons and 4 daughters. Eleven years later, now 55, she blames many of her numerous complaints on the sterilisation.
This patient had at age 33 a post partum sterilisation under local anaesthesia and a stable marriage. She had at that time 5 sons and 4 daughters. At follow-up 14 months later, she indicates that she really would like to have had 12 children. She probably meant that she regrets the 3 miscarriages she had during her reproductive life.

She was 36 when after the delivery of her second set of twins, the proud mother of 4 daughters, she was sterilised. She answered to the question 7 months later if she would recommend this operation to her friends, “If they have both sexes”. She does not say outright that she wants more children and further discussion is not feasible because she starts working in the UK. She seems in two minds.

With her 4th caesarean for an intrauterine death she is sterilised. She is then only 24 years old, married and both partners are unemployed. This mother of 1 boy and 2 girls is at least ambivalent about her inability to have more children. She does not visit us after our invitation to do so.

Mother of five had written to us that she regretted her sterilisation, (interval under local anaesthesia) but had not answered when we requested more information. She came 7 months later to the hospital “under guard” of her husband’s brother who was instructed by the husband to have her sterilisation untied. The husband had found out about the sterilisation when he had seen the questionnaire, we had not known this was “a secret TL”. She was adamant that she did not want any more children. After discussing her options (the brother in law not present), we took her to the Walk-In-Clinic and made an incision under local anaesthesia in the old scar and closed it again with non-resorbable sutures to be removed in her local clinic.

A 29-year-old RC, poor, married woman delivered a twin, a boy and a girl, and had after that event 2 boys and 3 girls. She refused a TL on religious grounds but added a separate letter to our questionnaire at follow-up for the control group asking us for an illegal termination of pregnancy because she was pregnant again.

A woman 35 years, mother of 3 boys and 2 girls, in her ninth pregnancy tries to deliver in a mission hospital and fails during the second stage. No doctor has worked in that particular hospital for years. There used to be Dutch doctors working there. The clinical officer tries a vacuum extraction and fails. She is then transported to the provincial hospital for a CS. The nurse anaesthetist fails to intubate the patient and she nearly dies. After resuscitation, the patient is put again in an ambulance and transported over 130 kilometres to our hospital where the doctor on call is not comfortable with a sym-
physiotomy, and a CS plus TL is performed. The son dies a few hours later. At follow-up 40 months later she is happy to have been sterilised.

66 Patient 32, Para 3 presented with a term life extra-uterine gravidity (EUG) and was successfully delivered thereof (6 of these patients in 13 years). During the operation the R adnex had to be removed with the placenta. The left adnex was covered with adhesions, as was the rest of the abdomen. A ligation of the L tube was performed without prior consent. The patient was quite happy with this approach when counselled afterwards. Her husband died 1 year or so later of AIDS the patient followed a few months later. The four children were taken over by her sister, who had 4 children of her own. The husband of the sister died a few months later of AIDS. The sister was often seen with the “EUG” organising financial support and food. The child seems not infected.

67 A married woman of 32 years whose husband worked in South Africa was supposed to have an emergency CS in a district hospital. They failed to intubate and she aspirated and nearly died on the spot. Was then transported over 80 km to UBH were a senior anaesthetists succeeded. The woman had indicated earlier that she wanted a TL, which was duly performed, but her son died leaving her with a son and a daughter. She spent a week in our ICU with pneumonitis but survived. On follow-up see said she never wanted to get pregnant again because she did not want that fear of death again, besides the other children needed her.

68 A patient’s (white) husband had had a vasectomy. After that she became pregnant and delivered a daughter. A few years later she was referred to us by a private general practitioner, with proof of a negative pregnancy test, for sterilisation. At mini-laparotomy 2 days later it was very obvious that she was pregnant but the sterilisation took place anyway. The subsequent developments ended with her having a miscarriage and with a doctor very nearly being thrown in prison where a relative of the patient’s husband threatened that she would make sure his throat was cut.

69 She is 35 years, married and has 2 boys and 2 girls. She is using Depo-Provera and wonders if she will ever get her periods back. In order to find out, she stops the injections and becomes pregnant before she has her period. The pregnancy ends in an intrauterine death, is induced and the placenta stays behind. With the evacuation of the uterus a TL is done. At follow-up she is happy with that decision.
70 Mother of a son and a daughter, 33 years old, and diagnosed as having a baby with a very large hydrocephalus at 27 weeks of pregnancy. Induction of labour is successful with Misoprostol and the foetus does not survive the delivery. She has had three miscarriages in the past and does not want to try again. Her husband works in South Africa and she takes it upon herself to decide for a sterilisation. At follow-up she is fine. No regrets, and answers the question about recommending a TL to her friends or not with: It is my secret.

71 European professional woman, 33 years of age, with no living children now married to an indigenous Zimbabwean and keen to become pregnant. Had had on a holiday in Southern France 10 years ago, long before she knew her present husband, an abruptio placentae with a dead foetus. She was so depressed and was so sure that she never wanted to live through something similar again that she asked to be sterilised post partum in the private hospital. In a country where the legal status of sterilisation was uncertain, this was done. Since a change of law in France, in 2001, female sterilisation for contraceptive reasons is legal after a waiting period of four months. We advised her, if she could afford it at all, to have her reversal operation in a specialised centre abroad.

72 Mother of three came for her fourth CS in labour to the hospital where an inexperienced doctor too proud to ask for help operated on her including a TL. The nursing sisters called the consultant a few hours later because the patient was bleeding a lot in the postnatal ward. The consultant was just in time to express an estimated 1 litre of partly clotted blood from the uterus and to order group O blood before the patient died. A post mortem revealed a not well-sutured lateral part of the uterine incision. Sutures of the TL were OK.

73 On a Tuesday morning in 1998 a patient with a newborn was “dumped” by ambulance at UBH from a district hospital for a TL. During the operation in our new Women-Walk-In-Clinic under local anaesthesia she told her story. She had now nine living children. She planned to have 4 or 5. In 1989, she was referred from her district with an ectopic pregnancy she had then 5 children. She was operated and although she said she had a completed family, her husband’s signature was still needed at that time to have a TL. The theatre sisters then would have refused to assist the author if he had tried without the husband’s signature. So he removed one tube. In 1990 she was admitted from the same place for an emergency CS. Still, a completed family but no signature from the husband, CS no TL. Three days later the husband came. Signed the form but we could not reopen the wound so early. She went back to her district tried
the pill developed high blood pressure. Went on Depo-Provera developed continues bleeding. Vaginal delivery in 1993 no TL offered. Vaginal delivery in 1995 no TL on offer. Vaginal delivery April 1998 followed by TL. The signature of the husband is not needed any more in Zimbabwe but many hospitals would still not do a TL during an ectopic operation or emergency CS. Signatures of the husband are needed in many African countries.

74 Para 7, referred from a remote hospital where a somewhat inexperienced doctor had performed a post partum TL. During the procedure the tissues in the neighbourhood of the left tube were torn and the doctor could not stop the bleeding, although she had placed numerous small stitches and enlarged the abdominal wall incision substantially. The patient was transported over 500 km to Bulawayo were one large suture encompassing the whole bleeding area solved the problem.
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26 Verkuyl DAA. Practising obstetrics and gynaecology in areas with a high prevalence of HIV infection. Lancet 1995; 346: 293-6
30 Arnold F. Gender preferences for children. Demographic and Health Surveys comparative studies 1997; No 23. Calverton, Maryland, USA: Macro International Inc.
34 Verkuyl DAA. In preparation. Gender preference in Zimbabwe.
35 Lunter GA calculations Results:
Expectation and variance in the number of women without sons (or without daughters), under the null-hypothesis of no preference for boys (resp. girls), i.e. no dependence on either opting for sterilisation or regret afterwards, was computed by determining the sex ratio in the group, then stratifying according to family size. The expectation and variance of the relevant binomial distribution per stratum were then summed over all strata. P values were computed using a one-sided test assuming the measured numbers in the respective groups were normally distributed with expectation and variance as determined, which is legitimate in view of the large sample size.
Under the hypothesis of no gender preference, expectations for the various sub-groups, measured values and P-values are as follows:

<table>
<thead>
<tr>
<th>Group:</th>
<th>No regret</th>
<th>Regret</th>
<th>All</th>
<th>Group:</th>
<th>No regret</th>
<th>Regret</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>No sons</td>
<td>116.7</td>
<td>6.8</td>
<td>123.5</td>
<td>No daughters</td>
<td>132.5</td>
<td>7.4</td>
<td>139.8</td>
</tr>
<tr>
<td>expected found</td>
<td>88</td>
<td>8</td>
<td>96</td>
<td>127</td>
<td>8</td>
<td>135</td>
<td>found</td>
</tr>
<tr>
<td>p=</td>
<td>0.002</td>
<td>0.29</td>
<td>0.004</td>
<td>p=</td>
<td>0.30</td>
<td>0.40</td>
<td>0.33</td>
</tr>
</tbody>
</table>

Either no sons or no daughters
| 249.0 | 14.2 | 263.3 expected |
| 215 | 16 | 231 found |
| p= | 0.005 | 0.24 | 0.008 |

CHAPTER 8 185
In the group without regret after sterilisation, which is by far the largest subgroup, there are significantly fewer families without sons than expected in the absence of a gender preference (88, expected 116.7, p=0.002). The number of families without daughters is also lower than expected (127, expected 132.5), but not significantly so (p=0.30).

Discussion: there is clearly a correlation between being sterilised and having at least one son. A reasonable hypothesis that would explain this data is that women tend to postpone sterilisation until they have one or more sons. Of the regret group of 42, slightly more than expected have offspring of a single sex (no sons: 8, expected 6.8; no daughters: 8, expected 7.4), however these numbers fall well within confidence limits. Based on this data, it cannot be determined whether there is a relation between having regret and having no sons (or no daughters), because of the relatively small sample size.

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Dear Madam,

You had a delivery by operation in Central Hospital on 24-06-99.
Can I ask some questions to improve the services to our patients?
Please fill in this form and return inside enclosed stamped envelop. Your answers are of course completely confidential.

1. How many children do you have now? [ ]
   How many boys? [ ] How many girls? [ ]

2. Would you like to deliver more children? [ ] Yes [ ] No

3. Did you lose any child after that delivery? [ ] Yes [ ] No

4. Are you: [ ] Married, [ ] have a boyfriend, [ ] single, [ ] divorced, [ ] widowed. (since when [ ])

5. Did you get any problems after your last delivery? [ ] No [ ] Yes
   If yes, what problems did you get?

6. Do you have any of the following problems these days?
   [ ] Headache [ ] No [ ] Yes
   [ ] Less of appetite [ ] No [ ] Yes
   [ ] Pain in the abdomen [ ] No [ ] Yes
   [ ] Getting fuller [ ] No [ ] Yes
   [ ] Feelings of sadness [ ] No [ ] Yes
   [ ] Less desire in sex [ ] No [ ] Yes

7. Do you think you were able to take a proper decision (although you were under pressure) about stopping to have children? [ ] Yes [ ] No

8. Do you regret the decision to stop having babies? [ ] Yes [ ] No

9. This last pregnancy was it: Planned [ ] Yes [ ] No
   Too early [ ] Yes [ ] No
   You hoped that you would not become pregnant any more? [ ] Yes [ ] No

10. Do you have any complaints about your periods? [ ] Yes [ ] No
   What complaints? [ ]
11. If you have period complaints, did they start:
   before last delivery [ ]
   or after last delivery [ ]
   No / Yes

12. Do you regret having your tubes tied during the time of your last delivery? Yes / No

13. Before the doctor asked you if you wanted your tubes tied, had you ever heard about this operation to make you stop having babies? Yes / No

14. Before the doctor asked you if you wanted your tubes tied, had you ever considered having this operation yourself? Yes / No

15. Do you have any other comments on the treatment and care you received while in hospital? Please feel free to comment on anything.

   Your care and treatment was very good. Thank you very much.
   God bless you.

If you still want to have some advice or service, please visit the walk-in-clinic at UH in front of the building where you delivered.

Thank you very much for your time and attention,
Dr D.A.A. Verkuyl FRCOG, Tel 67650 Residence
SUMMARY
To identify bottlenecks in the delivery of comprehensive reproductive health care in Bulawayo, Zimbabwe’s second city, a study was performed utilising volunteers pretending to be in need of emergency contraception (EC). A total of 55 private, Zimbabwe National Family Planning Council (ZNFPC), municipal and government health facilities were visited. These consultations resulted in 9 (16%) correct, 1 possibly correct and 15 wrong prescriptions for the morning after pill (MAP) and in no treatment in 30 instances. Public sector health personnel was very judgemental in its attitude to sexually active teenagers. Although the Essential Drug List of Zimbabwe (EDLIZ) is quite clear about the MAP many health providers are not aware of this, others do not even have/use this book.

INTRODUCTION
The MAP has been called the best-kept contraceptive secret. The public does not know about it and many pharmacists, nurses and doctors have forgotten what it is exactly and which reference book to check. Rape is reported to be on the increase and the use of condoms (which can tear and slip) should be. We see patients who refuse any other contraceptive than the condom, because they fear that concurrent use of, for example, the pill might undermine their resolve, to use the former if exclusively for HIV prevention. These women need EC if they have an accident with this barrier method. Knowledge and accessibility of EC to especially teenagers who often have unplanned sexual intercourse could substantially reduce the numbers of (clandestine) abortions and/or ruined lives. The contact with the health services for EC should then be used as an opportunity for discussion of more structural use of contraception and of protection against sexually transmitted infections (STI).

This study was performed in Bulawayo in December 1995 to assess the attitudes and practices with regards to EC in order to plan appropriate educational interventions.

Some health workers might have felt betrayed by the methods used in this study, but a feedback meeting for all of them held in April 1996 was conducted in a very friendly atmosphere and nobody was angry. Shock effects tend to improve memory.

METHODS
Six ladies, ages ranging from 16 to 26, were trained with the help of role plays to present themselves convincingly with a fake problem to pharmacies, general practitioners (GP) surgeries and clinics (Municipality, Central Hospitals, ZNFPC and one private Mother
and Child Health (MCH) clinic). 22 of the 23 pharmacies, one doctor of most surgeries, 6 of 17 municipal clinics and the outpatient departments of both government hospitals were visited as well as the three ZNFPC clinics including the Youth Advisory Service. The study was terminated when no new insights emerged for some time and detection of the "fraud" through health networks seemed imminent. The two youngest fake clients made nearly all their visits together for moral support.

The ladies would pretend to have been involved in an accident with a condom the previous night. They would stress that they were not keen to be pregnant. They would reveal, if asked, that their last period was a fortnight ago and that they had a cycle of four weeks. If no solution was offered they would say that they had heard about “the morning after pill”. After their visits they were debriefed using a checklist.

RESULTS

Attitudes
As Table I shows the ladies were treated politely and with enough privacy in most private surgeries. Some receptionists were very keen to know the reason for the visit. One proved to be an insurmountable barrier. One doctor was so nice that she gave her home telephone number to use, even at night, for instant support. In one surgery they had to wait so long before the doctor could escape from his government duties that they gave up.

Most pharmacists were nice and supportive, but some would communicate loudly to a colleague so that other clients could hear: “this girl comes for the morning after pill”. In the municipal clinics the young teenagers were lectured extensively by the sis-

<table>
<thead>
<tr>
<th>Attitude</th>
<th>GP's n=21</th>
<th>Pharmacies n=22</th>
<th>Staff in clinics &amp; hospitals n=12</th>
</tr>
</thead>
<tbody>
<tr>
<td>concerned/friendly/helpful</td>
<td>16</td>
<td>13</td>
<td>3</td>
</tr>
<tr>
<td>(very) nice/serious</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>in a hurry/not interested</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>amused/shocked/nervous</td>
<td>1</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>condescending/condemning/angry</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>too much lecturing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>asked advice others/unsure what to do</td>
<td>3</td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>
ters, sometimes in a room without much privacy. In one clinic the other patients laughed loudly when the, this time unaccompanied, girl of 16 left the building, without drugs but after a loud angry lecture. She was crying when she entered the car collecting her.

The eighteen-year-old girl was told in the municipal clinics that she was old enough and that it was about time she had a baby anyway. ZNFPC clinic staff showed no concern and was not helpful.

Table II shows the feelings of the clients during consultations.

### Table II  Feelings of the clients during the consultation

<table>
<thead>
<tr>
<th>Feelings of the client</th>
<th>in the GP's rooms n=21</th>
<th>in the Pharmacies n=22</th>
<th>in the clinics &amp; hospitals n=12</th>
</tr>
</thead>
<tbody>
<tr>
<td>at ease/comfortable/</td>
<td>17</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>not bad</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>not at ease/</td>
<td>4</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>not taken seriously</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>bad to horrible</td>
<td>-</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

### Table III  Questions asked by the providers

<table>
<thead>
<tr>
<th>Questions asked</th>
<th>GPs n=21</th>
<th>Pharmacy staff n=22</th>
<th>Staff in clinics/ hospitals n=12</th>
</tr>
</thead>
<tbody>
<tr>
<td>- age?</td>
<td>8</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>- do parents know about visit?</td>
<td>4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>- last menstrual period?</td>
<td>19</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>- regularity of period?</td>
<td>14</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>- ever used contraceptives?</td>
<td>8</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>- could you be pregnant now?</td>
<td>7</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>- any chance you have an STI?</td>
<td>3</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>- offered pregnancy test</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>
Management of the problem

Table III shows questions asked by the different groups of health workers. No doctor requested to do a vaginal examination. Some palpated the abdomen and some wanted to do a pregnancy test.

Eleven of the 22 pharmacists gave drugs, only in six cases the correct ones. The corresponding figures for doctors were fourteen of twenty-one, correct three (see Table IV). Some remarks from health providers were peculiar. They are summarised in Table V.

Just one doctor tried to look in the Essential Drug List of Zimbabwe (EDLIZ) but could only find the old 1989 edition. Not the 1994 one which has a description of the MAP. Of the eleven doctors who wrote an incorrect prescription a few had it nearly right. One of the doctors prescribed: MAP 2 stat PO. The client would have had 27% chance to visit a pharmacy with the right information.

One ZNFPC clinic sister told our client that the MAP meant just that and since it was now afternoon she could not be helped. In the municipal clinics the girls were advised to marry before the “stomach showed” or, that they were not only pregnant but must have acquired AIDS also. Municipal clinics had the right EDLIZ and used it but sisters, often discussing the problem among themselves in the presence of the fake patient,

Table IV  Overview of the different prescriptions

<table>
<thead>
<tr>
<th>Type of prescription, correct dosage ( )</th>
<th>21 GPs</th>
<th>22 Pharmacies</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Lo-femenal</td>
<td>8 (3)</td>
<td>5 (4)</td>
</tr>
<tr>
<td>- Nordette</td>
<td>3 (1)</td>
<td></td>
</tr>
<tr>
<td>- Demulen</td>
<td>1 (1)</td>
<td></td>
</tr>
<tr>
<td>- “MAP”</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>- “injection to make the lining of the uterus loose” (Z$200)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>- Ovrette</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>- Provera</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>- Norethisterone</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>- Trinovum</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>- Obeocalp</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>- Premarin</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>14 (3)</td>
<td>11 (6)</td>
</tr>
</tbody>
</table>
felt not authorised to dispense EC. A government hospital OPD referred to the ZNFPC clinic on its grounds and vice versa.

Side-effects
Few prescribers explained about possible side-effects and what to do. Some prescribed anti-emetics. Few explained that the MAP could either cause early or late periods.

Future contraception
Even without the MAP the chance of becoming pregnant after one act of unprotected intercourse around ovulation is only 20-30%, reduced to 5-7% with the MAP. Few clients were counselled about future contraceptive options, although private doctors might have intended to initiate this discussion at a suggested follow-up visit. Municipal

Table V Reasons for not providing the MAP/general comments given

<table>
<thead>
<tr>
<th>Reasons given for not providing the MAP</th>
<th>number of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>- not yet available in the country/Bulawayo/still to go through parliament</td>
<td>4</td>
</tr>
<tr>
<td>- illegal in Zimbabwe/we are not allowed to prescribe</td>
<td>3</td>
</tr>
<tr>
<td>- should have come in the MORNING/within 8 hours, it is now too late</td>
<td>2</td>
</tr>
<tr>
<td>- very expensive</td>
<td>1</td>
</tr>
<tr>
<td>- very dangerous</td>
<td>1</td>
</tr>
<tr>
<td>- this pill is for nausea in pregnancy</td>
<td>1</td>
</tr>
<tr>
<td>- the pill you take when you forget your regular FP tabs</td>
<td>1</td>
</tr>
<tr>
<td>- not efficient</td>
<td>1</td>
</tr>
<tr>
<td>- MAP is still in experimental phase</td>
<td>1</td>
</tr>
</tbody>
</table>

General comments
- have the baby/get married                                                  | 4                   |
- don't worry, this is not your fertile period                                | 2                   |
- sex is a crime at your age                                                  | 1                   |
- he not only gave you a baby, but also AIDS                                  | 1                   |
- you should always shower after sex                                          | 1                   |
- buy spermicide to kill the remaining sperms                                 | 1                   |
- go to the UK for an abortion                                                | 1                   |
- only a hysterectomy can help you now                                       | 1                   |
and even ZNFPC Clinics did not raise this subject. The mother and child health clinic sister wanted, but did finally not, prescribe the pill because our client refused vaginal examination.

Sexually Transmitted Infections
Only three doctors asked if it could be possible that STI treatment was necessary after the condom mishap. Another doctor wanted to give a series of penicillin injections regardless. HIV screening of both partners was never suggested.

DISCUSSION
Probably few members of the public know about EC, but apparently the medical, nursing and pharmaceutical professionals are not at all ready for requests for the MAP.

An article about condoms in The Chronicle of Bulawayo of 1-11-1995 and in the Matabeleland AIDS Council Newsletter of January 1996 specifically mentioned the MAP in relation to ruptured condoms. This should have induced some research by health workers in the city. With 30% of the ANC patients HIV positive in Bulawayo one would expect increased use of condoms and hence more demand for the MAP in the future. Any random (un) wanted pregnancy has a 12% chance of ending in a vertical HIV-infected child and 18% of resulting in an orphan to be. So it seems quite reasonable to prevent unwanted pregnancies.

Nobody offered to insert an Intra Uterine Contraceptive Device (IUCD), which is more effective and longer after the mishap than the MAP. Combined with antibiotics this would be the best option in countries where access to safe, affordable abortions is restricted and RU 486 used as EC unavailable.

The legal situation worried some personnel, but because the mechanism of action (delaying ovulation, interfering with the corpus luteum and preventing nidation) is at worst similar to the action of a (legal) IUCD this should be of no concern. Even The Vatican has recently agreed with the use of the MAP in the case of rape. One pharmacist, worried about the law, prescribed tablets recognisable as Trinovum in the wrong dose and labelled them Obecalp, which can be understood if read backwards.

It was disappointing to see that the EDLIZ, a product of the best medical and pharmaceutical minds in Zimbabwe, was used so little by everybody apart from the municipal nursing sisters. Among local doctors this book has the image to be just for sisters.
CONCLUSION AND RECOMMENDATIONS
This study found that most health providers know little about EC but municipal nursing sisters can find the information. Staff in the public sector tends to be very unfriendly to sexually active girls even when specially recruited to advise the youth. Private doctors were found to be friendly and understanding but should consider perusing EDLIZ or the relevant equivalent.

All opportunities should be used to educate health providers and the public about the MAP. Posters and discussions in health facilities and schools and inserts in, or better, print on the combined oral contraceptive packet itself (together with instructions about what to do when pills are forgotten) should spread the word about the MAP. It could even be argued that condom manufacturers should legally be obliged to suggest the MAP in case of failure of their product. The MAP should be available without prescription as suggested for the UK so that clinic sisters feel confident to dispense it. Police personnel should be informed about the EC option after rape and should be urged to present the victim in time to a health facility. Readers should please check if EC is available, even after hours and in the weekends, in their facility for, for example, a case of rape.

IUCDs have lost some ground in Zimbabwe since the (re) introduction of injectables and Norplant and since the advent of HIV, but they still have a place in emergency situations particularly as long as menstruation regulation and induced abortion are illegal and mifepristone unobtainable.

Discussions at the World Health Assembly in May 1995 indicate that the message on preventing teenage pregnancy is at long last getting across. The education in and provision of EC should be an integral part of that effort. Thousands of unwanted pregnancies ending in ruined lives happen everyday because so few teenagers in this part of the world protect themselves with their first sexual intercourse. EC can give them a second chance.

ACKNOWLEDGEMENTS
Thanks to Kelly, Nelly, Thembi, Natalie, Varda and Nienke who were so brave.
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   Guidelines for doctors. Undated, Available 27 Sussex Place, Regent's Park, London NW1 4RG.
4 Verkuyl DAA. Practising obstetrics and gynaecology in areas with a high prevalence of HIV infection. Lancet 1995;
   346:293-6.
I have all the reasons to attach this long comment. I had been planned to have my tubes tied after the last child who is five years now. The interesting part is that when I had finally made my decision and agreed with my husband, I was given a date and I was admitted in the ward ready for a minor of that was in 1996. Surprisingly enough, when I got to theatre, I was explained that theatre was very busy. The doctor was dealing with an emergency. Well I understood and I was taken back to the ward. Again, I was given another date, which was the following week and I went back home. I went back the following week as per an appointment. I was taken to theatre again. I was listening when the nurse who had taken me to theatre was told to explain to me that the doctor was sorry about the cancellation of my tying of the tube. The doctor who was supposed to operate on me was called for yet another emergency at Maimonides Hospital. I could not believe my ears. I was given another date. I never gave up because I really wanted to stop getting unwed.