The Importance of Motherhood:
A study of infertility in urban Northern Tanzania

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Abstract

This paper examines the ramifications of infertility and coping mechanisms in an African urban population with low fertility. The study was conducted in Moshi, Tanzania, a multi-ethnic community with relatively high levels of education and a well developed health services infrastructure. The methodology included a survey of 2,019 women and in-depth interviews with 25 fertile and 25 infertile women. Of the 1,549 sexually active women 2.7% had never had a child in spite of trying to conceive for at least 2 years. Out of the 1,352 women who had previously had a child an additional 6.1% were subsequently infertile. A logistic regression analysis suggested that infertile women were more likely to have been married at least twice, to be infected with trichomonas and for parous women to have experienced strong labor pains that lasted more than two days after most recent abortion or delivery. The most important finding from the qualitative analysis concerns the major difference between childlessness and subsequent infertility (or primary and secondary infertility) in terms of implications for the effected women. Childless women were stigmatized, were called names such as "gumba" and "tasa" and had little respect in the community. We also found that in this community of mixed ethnic groups, beliefs about the causes of infertility and remedy seeking were also mixed. While most women have been informed about the Western biomedical reasoning for infertility, traditional beliefs persisted in explaining the problem and both Western medical facilities and traditional healers were utilized for treatment.

Keywords: Childlessness, reproductive health, marital relations, sexual practices, social stigma, Africa.

Introduction

There is a growing body of literature that documents the devastating effects of infertility in sub-Saharan Africa, both for individuals and for community public health. (For example, Larsen, 1996; Gerrits, 1997; Kielman, 1998; Hollos, 2003; Boerma & Mgalla, 2001; Sundby & Jacobus, 2001; Okonofua, Harris, Odebiyi, Kane & Snow, 2002; Roth, 2002). This research shows that regardless of the medical causes of infertility, in most of these cultures women suffer personal grief and frustration, social stigma, ostracism and, often, serious economic deprivation. They receive the major blame for reproductive mishaps and in many places infertility is a ground for divorce, causing a woman to lose access to livelihood.

In the anthropological literature it has long been recognized that in African societies "the achievement of parenthood is regarded as a *sine qua non* for the attainment of the full development as a complete person to which all aspire" (Fortes, 1978, p. 125). In many African societies, for example among the Ewe and the Ashanti, a man or woman who has no child is not considered fully adult and after death, they will not be buried with the full adult funerary ritual (Fortes, 1978, p. 141). Among the Ekiti Yoruba of Nigeria (Ademola, 1982) and among the Aowin of Ghana (Ebin, 1982), infertile women are treated as outcasts and their bodies are buried on the outskirts of the town. A childless woman in the Ijo society of Nigeria (Hollos, 2003) and among the Tswana in Botswana (Suggs, 1993) cannot attain full adult womanhood by progressing through the stages of the life cycle which is predicated on having given birth. Furthermore, the achievement of parenthood is evidence of virility and potency for a man and of femininity and a distinctive womanhood for a woman. "A woman becomes a woman

when she becomes able to bear children and continued childbearing is irrefutable evidence of continued femininity". (Fortes, 1978, p. 141). In the Sudan (Boddy, 1989) as well as in Egypt (Early, 1993; Inhorn, 1994), children are a source of power for women vis a vis men and infertility is threatening to their power and social order.

Apart from these considerations for consequences for individuals, anthropologists stress that parenthood is also a fulfillment of fundamental kinship, religious and political obligations to the community, since the child "whose birth confers parenthood is born not only to its parents and into its family but also into a lineage, a clan, a community, to all of which its survival is of critical economic, juridical and religious interest" (Fortes, 1978, p. 126). In the cosmology of African societies, children represent a connection to the ancestors and their birth represents a continuation of the family not only in physical but in religious terms. In a subsistence economy, they are also important in providing a labor force and economic success has been shown to be correlated with family size in that "it is the rich men who have large families and not the poor", for example among the Hausa (Hill, 1972).

It is not surprising, therefore, to find that across the continent of Africa infertile women seek treatment for their problem at a number of venues, both traditional and biomedical, often with a preference for traditional healers (Green, 1994; Gerrits, 1997; Kielman, 1998; Sundby & Jacobus, 2001). In addition to remedies primarily sought by individuals alone, some communities also offer mechanisms for dealing with infertility which include voluntary associations and cults that support women with infertility problems (Skramstad, 1997; McCurdy, 2000), thereby demonstrating community interest and involvement in the problem of infertility.

Previous demographic research

What are some of the factors that previous research has found to be associated with infertility in sub-Saharan Africa? Previous research shows an association between infertility and a number of socio-economic and behavioral factors (Larsen, 1989,1995, 2003). Muslims tend to have higher infertility than Christians in Tanzania, there is no association between religion and infertility in Kenya, and in Nigeria and Cameroon the association varies by region of residence. The level of schooling does not matter significantly in Nigeria, Cameroon, Kenya and Sudan in the 1970s. In Nigeria women with secondary and higher education had higher risk of infertility in the 1980s, and in Tanzania women with primary education had higher risks of secondary infertility in the 1990s. Women married more than once had consistently higher infertility compared to women married only once. In the 1980s women in polygamous unions have higher infertility than monogamously married women in Cameroon, while the opposite pattern held in Nigeria.

The public health effects of infertility include exposure to sexually transmitted infections (STIs) including HIV, as infertile men and women in sub-Sahran Africa often seek extra-marital relationships (Favot, Ngalula, Mgalla, Klokke, Gumodoka & Boerma, 1997). Considerable research on infertility in sub-Saharan Africa has stressed the importance of STI-induced infertility including HIV/AIDS (Mayaud, 2001). Gonorrhea and chlamydia are the two main STIs documented to result in infertility of women and men. Syphilis does not affect the fallopian tubes, but it causes fetal wastage and stillbirth. HIV infection enhances the risk of fetal wastage, while it is not well

understood whether HIV infection results in reduced risk of conception. There has been less emphasis on documenting the prevalence of infertility from sepsis following child delivery or induced abortions (Dixon-Mueller & Wasserheit, 1991), despite the fact that postpartum infections contribute between 14 and 30% of maternal mortality in Africa (Meheus, 1992). Induced abortion is prevalent in Tanzania, even though it is illegal (Justesen, Kapiga & Asten 1992; Mpangile, Leshabari & Kihwele, 1993).

The current research

Previous research, both by anthropologists and demographers, has been conducted in high fertility populations, most of which are rural. In contrast, in this paper we examine the ramifications of infertility and coping mechanisms in a high density African urban population with low fertility. The question is whether the effects of the infertile condition are similarly serious in this urban, low fertility context.

In addition, the difference between previous research and our work is that we distinguish between infertile women who are childless (primary infertility) and women who have had at least one child (secondary infertility). As previously documented (Larsen, 2000), it is secondary infertility, that is more prevalent throughout sub-Saharan Africa, however, the literature often does not distinguish between the women with one or the other condition. The question we address is whether in a low fertility population, both primary and secondary infertility bring about serious personal ramifications.

Another focus here is how women cope with infertility and seek solutions. Previous studies (Sundby, Mboge & Sonko, 1998; Roth, 2002) document the various attempts of infertile women in health care seeking behaviors. Others (Hollos, 2003),

show life long arrangements and adjustments that infertile women make to have a bearable life. We attempt to document both of these kinds of coping mechanism in an urban, multi-ethnic population.

The setting

The study was conducted in Moshi Urban District (Moshi) in Kilimanjaro Region. Kilimanjaro Region, located in northern Tanzania, is one of mainland Tanzania's 21 regions. It has an area of 13,000 square km and according to the 2002 census a population of 1.4 million, which is 4.0% of the country's total population (www.tanzania.go.tz/census/regions.htm). Due to its geographic location between the coast and the interior of the country, Kilimanjaro has been the scene of continuous exposure to outsiders since the middle of the 19th century when Swahili and Arab traders from the coast started penetrating into the hinterlands (Kimambo, 1991). Subsequent invaders included agents of the German Colonial Administration in the late 1800s and subsequently the British who took over the administration of Tanganyika Territory in 1918. The German presence was powerful in the Region primarily through the missionizing efforts of the Leipzig Lutheran Mission who from about 1900 established schools and hospitals. The importance of trading continued after independence, to a large extent due to Kilimanjaro's relatively easy accessibility from other parts of the country and to its location near the Kenyan border. Swahili is the *lingua franca* and official language of Tanzania, and the vast majority of people in Kilimanjaro are Swahili speakers.

The economic life of the Region is characterized by two distinct zones, the mountains (including Mt. Kilimanjaro and the Pare Mountains) and the plains. The mountains support intensive agro-forestry cropping and coffee cultivation, while the plains are characterized by nomadic livestock herding (Talle, Biswalo, Schreiner & Klepp, 1995). Explosive population growth by the middle of the 20th century resulted in increasing movement from the mountains to the plains, resulting in both long- and short-term outmigration of men. Land scarcity and economic stagnation pushed mostly young men off the mountain and pulled them to urban areas. Most of the migration was to Moshi, Arusha and Dar es Salaam, as well as to Mombassa and Nairobi in Kenya (Setel, 1999, p. 68). By the 1970's, Kilimanjaro Region had the highest migration rates among young men in Tanzania (Barnum & Sabot, 1976, p. 108). During this time urban wages increased sharply and migration, especially to Moshi, rose sharply. By mid-20th century, Moshi had become a significant center in the regional economy, first colonial and then post-colonial. The town grew and became crowded with young people from all over northern Tanzania and beyond. Between the 1957 and 1988 census, the resident population of Moshi increased more than ten times to 96,631 people; two-thirds of this increase was accounted for by the natural increase of the Moshi population and by migration from elsewhere within the region (Setel, 1999, p. 70). The town still attracts a large number of migrants, some of whom are permanent, others more transient. There is a core stable population, which has lived in the town for generations.

Today, Moshi is the capital of Kilimanjaro Region, and it is an important regional commercial and industrial center. Its population is dispersed among 15 wards. The wards in the center of Moshi have an urban character, with crowded living quarters, industries,

markets, shops, restaurants, hotels, several large markets and a central bus station. The wards around the periphery are more rural and crops are grown between the houses. Overall, the most typical occupation is some sort of trading or business, followed by skilled labor. In general, the formal sectors of the economy are dominated by the men, while women are often confined to the informal sector, selling vegetables or staples in the markets (Molland, 2002, p. 32). The population is multiethnic, with about 50% of them being Chagga, who were the original inhabitants of the town. The other main ethnic group is the Pare who makes up about 15% of the population. The rest is a mixture of a vast number of groups, including the Maasai, Samba and Meru. About one third of the inhabitants are Muslim, the rest Christian, and all of Tanzania has a similar religious distribution (1999 TRCHS, 2000, p. 22).

The town has a high concentration of schools, and a relatively well developed infrastructure. Most houses are connected to electricity and have running water. The educational level compared to the rest of the country is high, with almost the entire population, including women, having some primary or complete primary (7 years) education. In all of Tanzania, 17% of women age 20-24, 22% age 30-34 and 52% age 40-44 had no education in 1999 (1999 TRCHS, 2000, p. 13).

Moshi has primary, secondary and tertiary health care facilities. It has a private consultant hospital (Kilimanjaro Christian Medical Centre (KCMC)) (one out of a total of four in the country), a couple of private hospitals, a medical school (the second medical school is in Dar es Salaam), and a government regional hospital. In addition, there are two public health centers, six public dispensaries and numerous private dispensaries. Moshi as well as the rest of Kilimanjaro Region are well covered in terms of primary

health care. For instance, the percentage of births delivered at a health facility was 64 in the Kilimanjaro Region compared to 47 in mainland Tanzania, and the percentage of children fully vaccinated reached 94 in the Kilimanjaro Region relative to 71 in mainland Tanzania (1996 DHS, 1997, pp. 110, 116). The transition towards low fertility is further advanced in the Kilimanjaro Region where as many as 23.7% of women reported currently using a modern method of contraception compared to 11.7% in mainland Tanzania (1996 DHS, 1997, p. 48). Kilimanjaro Region had the highest total demand for family planning including 51.4% compared to 34.6% for mainland Tanzania and it provided the best services resulting in the highest percentage of satisfied demand of 73.3 versus 46.4 for mainland Tanzania (1996 DHS, 1997, p. 90). Finally, the total fertility rate is 2.9 in Moshi based on the 2002-2003 Moshi Infertility Survey (the data analyzed here). In mainland Tanzania it is 3.2 in urban areas and 6.5 in rural areas from the 1999 TRCHS (2000, p.31).

Design and methods

The design was based on a two-pronged approach, including a representative household survey in Moshi of 2,019 women aged 20-44 conducted in 2002-2003 and in-depth comprehensive interviews with a sub-sample of 25 fertile and 25 infertile women gathered in the summer of 2004. The purpose of the household survey was to determine the prevalence and risk factors of infertility and to provide a representative sample frame for selecting the cases for the in-depth interviews (for further detail, see, Larsen et al., 2004).

This study was approved by the Ethics Committees of Kilimanjaro Christian Medical Centre (KCMC), the Tanzania National Institute for Medical Research, and the Institutional Review Board of the Harvard School of Public Health.

The households interviewed were selected in two stages. First, in each ward enumeration units were selected proportional to the number of enumeration units in the ward. Second, within each enumeration unit 18 households were selected at random. The survey elicited information about socioeconomic characteristics, sexual practices, marriage and fertility histories, STIs symptoms and health care seeking for infertility. Simultaneously, blood and urine samples were collected for testing of HIV-1, Herpes simplex virus type 2 (HSV-2), gonorrhea, chlamydia, trichomonas and other STIs.

Blood samples were used to detect HIV-1 and HSV-2. HIV-1 was determined by enzyme-linked immunosorbent assays (ELISA) (Vironostika HIV Uni-Form II plus O, Organon, Boxtel, the Netherlands) and reactive samples were confirmed by using a second ELISA (Mures 1.2.0, Murex Biotech Ltd., England, UK). Indeterminate results were resolved using Western blot (Genetic Systems HIV-1 Western blot, Bio-Rad Laboratories, Redmond, Washington, USA). Antibodies to HSV-2 were detected using a type-specific HSV-2 ELISA according to manufacturer's instructions (HerpeSelect 2 ELISA, Focus Technologies, Cypress, California, USA). Tests of gonorrhea, chlamydia, and trichomonas were based on urine samples using the real-time multiplex PCR (M-PCR) assay.

In-depth interviews were conducted to obtain a better understanding of the consequences of infertility for the affected women's general well being, their everyday life, their coping strategies and of their attempts to make sense of their inability to

procreate. The sample for the qualitative interviews was selected on the basis of the women's status as infertile or fertile. Infertility was measured by primary and secondary infertility. We tried to ensure that approximately equal numbers of women from these two infertile categories were included in the sample, and that women were selected from each ward. In addition, we selected infertile women with different levels of education, some Christian and some Muslim and by age younger than 30 years or 30 years and above. The fertile women were selected to match the infertile women by ward of residence, level of education, religion and age.

The in-depth interviews were framed as life history interviews with a focus on sexual practices, husband-wife relations, the meaning of children, fertility and infertility. Data were collected on the social and cultural consequences of infertility and on health care seeking behavior. Beliefs and ideas about the causes of infertility and appropriate cures were also elicited.

Estimates of infertility were based on the question "How long have you tried to get pregnant?" following the World Health Organization recommendation (Rowe, Comhaire, Hargreave & Mellows, 1993). A woman was considered to be infertile, if she reported that she had tried to get pregnant for at least 24 months (two years), she wanted a child, was not pregnant, not contracepting, not sterilized, not lactating and in a regular sexual union. Age at initial exposure to childbearing was set to age at first marriage, if no first marriage or no date of initiation cohabitation, then to age at first intercourse and if no information about age at first intercourse, then to age at first birth. Estimates of infertility were divided into primary and secondary infertility, based on infertility of nulli-parous and parous women, respectively. We used birth, instead of conception, as

the endpoint for determining primary versus secondary infertility because it is the experience of having children that matters for attaining the status of motherhood and for maturing into a grown woman in a sub-Saharan African social context. In addition, there is evidence suggesting that the self-reports about miscarriage and induced abortion were underreported in the survey questionnaire. At the time of survey interview women who had not conceived for at least 12 months of trial were invited to have a medical examination and possible treatment for infertility at KCMC. A subset of these women consented to participate in the clinical work at KCMC. It became evident from these women's medical histories that miscarriage and induced abortion were underreported in the survey questionnaire.

The statistical analysis was done using Stata version 8.0 (Stata Corporation, College Station, Texas, USA). To take into account the sampling design estimates of the prevalence of infertility by background characteristics were weighted. Pearson's chi-square test was used to determine the level of statistical association between each covariate and infertility. The association between infertility and each covariate was estimated using odds ratios (ORs) and corresponding 95% confidence intervals (CIs) in unadjusted logistic regression models accounting for the sampling design. As a last step, to adjust for the effects of covariates, an adjusted logistic regression model was estimated including all the risk factors analyzed in the unadjusted models.

Marital relations were measured by the three variables: number of times married, marriage type and whether the husband/partner has children with other women; high risk sexual behaviors were measured by laboratory confirmed current infection with HIV-1,

HSV-2 and trichomonas; medical causes[1] of infertility were measured by self-reports about "had deep lower abdominal pain at the time of interview", "ever had an abortion (spontaneous or induced)" and "strong labor pains that lasted more than two days after most recent abortion or delivery" (the latter variable was only included in the models of secondary infertility); and the control variables included woman's age at survey interview, level of education, religion and tribe.

Results

Survey findings

In the sample of 2,019 women interviewed, 468 women (23.2%) were not married, cohabiting or in a regular sexual union in the last two years before survey and two women had missing information about age at survey resulting in a sample of 1,549 women for analysis of primary infertility. One hundred and ninety seven women were childless resulting in a sample of 1,352 women for analysis of secondary infertility.

Forty three childless women were classified as infertile, and the weighted prevalence of primary infertility was 2.7% (95% CI,1.9-3.5). Among parous women, 75 women were infertile, and the weighted prevalence of secondary infertility was 6.1% (95% CI, 4.6-7.6).

Table 1 shows the associations between variables measuring marital relations, laboratory confirmed STIs, medical causes, controls and primary infertility. The level of primary infertility was 6.5% for women married at least two times compared to 2.6% for

[1] Variables measuring current infection with chlamydia and gonorrhea were not included because these infections were rare. (In the sample of 1,440 women tested 2 women or 0.1% had gonorrhea and 24 women or 1.6% had chlamydia). In addition, STIs leading to infertility would have occurred in the past and it appears that most STIs are treated with antibiotics.

women married only once and 1.6% for never married women (p=.02). Women married at least twice had significantly higher odds of primary infertility relative to women married once (unadjusted OR=2.64;95% CI, 1.11-6.29 and adjusted OR=2.08;95% CI, 1.15-3.78). With respect to type of marriage the prevalence of primary infertility was 2.4% for women in a monogamous union, 4.0% for women in a polygamous union or the partner has girlfriends (as reported by the woman) and 0.6% for never married or cohabiting women (p=.06). Thus, the unadjusted association between marriage type and primary infertility was marginally significant, but it was non-significant in the adjusted model. The variable concerning whether the husband or partner has children with other women was not associated with primary infertility (p=.40).

Table 1 about here

Each of the STIs variables, HIV-1, HSV-2 and trichomonas, was marginally associated with primary infertility in unadjusted models and infected women had relatively higher levels of primary infertility compared to uninfected women, while not tested women (they did not consent to testing) had the lower levels of primary infertility. However, in the adjusted model only the variable about trichomonas was significant and infected women had higher odds of primary infertility compared to uninfected women (OR=2.46;95% CI, 1.33-4.54).

With respect to variables approximating medical causes of infertility it was found that women reporting that they suffered from a deep lower abdominal pain at the time of interview had a prevalence of primary infertility of 7.6% versus 1.9% for women

reporting no deep lower abdominal pain (p=.0001). This association was significant in unadjusted (OR=4.19;95% CI, 2.17-8.07) and adjusted models (OR=1.98;95% CI, 1.15-3.42). In contrast, primary infertility was not associated with self-reports about ever having had an induced abortion.

The prevalence of primary infertility did not vary significantly by the woman's age at survey, level of education or religion in either the unadjusted or adjusted models. The prevalence of primary infertility varied somewhat across ethnic groups (p=.12). The percentage of primary infertility was 4.8, 2.2 and 2.7 for women from the Pare, Chagga and Other ethnic groups. In the adjusted models, Pare women had significantly higher odds of primary infertility relative to the Chaggas (OR=1.87;95% CI, 1.00-3.52).

The pattern of differentials of secondary infertility was very similar to the pattern of primary infertility. More specifically, women married twice or more had higher odds of secondary infertility compared to women married once (OR=3.52;95% CI, 1.72-7.23 in unadjusted and OR=2.26;95% CI, 1.10-4.67 in adjusted model) (Table 2). In addition, women infected with HIV-1, HSV-2 or trichomonas had significantly higher prevalence of secondary infertility compared to uninfected women, although in the adjusted model only the association between trichomonas and secondary infertility was significant (OR=2.94;95% CI, 1.41-6.13). Women reporting deep lower abdominal pain at survey had 11.2% secondary infertility compared to 5.4% for other women (p=.01), women reporting they had had an abortion (spontaneous or induced) had a prevalence of secondary infertility of 10.5% versus 5.3% for other women (p=.01) and women with labor pains that lasted more than two days at last delivery or abortion had 10.2% secondary infertility compared to 5.4% for other women (p=.07). These associations

were attenuated in the multivariate model and only the association for the variable about strong labor pains that lasted more than two days after most recent abortion or delivery was significant (OR=1.97;95% CI, 1.08-3.57). The variables about age, education, religion and tribe were not significant in the adjusted model. However, the Pare had higher prevalence of secondary infertility compared to the Chaggas (10.6% versus 5.5%, p=.04) and in the adjusted model the relationship was marginally significant (OR=1.91;95% CI, 0.92-3.96).

Table 2 about here

The representative survey analysis showed that secondary infertility was more prevalent than primary infertility in this urban population (6.1% vs. 2.7%). It also documented that the risk of both primary and secondary infertility was higher for woman with specific characteristics, such as having been married two or more times and being infected with trichomonas at survey date. However, the quantitative analysis did not provide any insight into how individual women experienced their own infertility, how infertility affected women's life course and their social networks with kin and non-kin. It also did not reveal anything about the meaning attached to motherhood, the social stigma associated with infertility, and in particular with childlessness, nor did it offer the explanations women had about the cause for infertility, whether their own or of other women in the community.

In-depth interviews

Consequences of infertility

The most important finding regarding the consequences of infertility that emerged from the in-depth interviews concerns the major difference in its implications for women with primary and secondary infertility. In the survey, the implications of primary and secondary infertility appear to be similar in terms of marital relations and current STIs. The in-depth interviews, however, go beyond what was possible to find out from the surveys regarding the consequences of infertility as a lived-in experience for these women. The interviews clearly differentiate between the everyday experience of infertile women who have had at least one child and those who have never had a live birth. It is this latter group that suffers from the stigma of being "useless women", demonstrating that it is the fact of motherhood that matters in this low fertility population and not necessarily the number of children.

The most disturbing consequence of childlessness for childless women is the lack of respect in the community, where they are stigmatized and being called *mgumba* or *tasa*. The latter term, considered worse than the former, means "completely barren", whereas the former implies that the woman may yet conceive. This stigmatization and disrespect is shown in the experience of Zainabu Abdullah, for example, who reports that "other women who call me *mgumba* tell me that I cannot talk to their children because I don't know anything about children", in spite of the fact that she has raised three children who were members of her extended family. Julianna Stevens said that her "co-wife who has eight children refuses to greet her which shows great disrespect". Silvia Athanas says that not only is she called *tasa* by the neighbors, which is a "terrible and painful word" but that her husband tells her that "she is staying with him for nothing" in spite of the fact

that she earns at least as much as he does from her trading activities. Umi Rajabu, a young woman who has only been married for two years, reports that the people in her compound recently started talking badly about her and refer to her husband as "the one who is married to the *tasa*".

Women with at least one child say that while they would prefer to have at least one more, they are not stigmatized by the community the same way as the childless women. Eva James, who after two years of trying finally conceived, said that "she expects to get more respect and love from the husband now and more respect from the community", adding that "people don't respect women who have no child. These women separate away from women with children – they have a different life." Asha Alawi, a woman who has an eight year old daughter, said that while her husband would like her to have at least one more child, there is basically no problem between them. However, she is afraid that his relatives may pressure him to marry another woman. The community on the other hand thinks that it was her decision to have only one child and "because she is a mother she does get respect but not quite as much as women who have many children and take good care of them". Swalha Mbaraka, mother of a five year old son, said that "the community respects her because she does have a child. It is only childless women who get no respect". Maria Juma, who had one live child and one who was stillborn, agreed and said that "*mgumba*, which is a derogatory term, is not used for women who have at least one child".

As these statements show, women with one child are better off than women with no child at all, but they are not respected as much as multiparous women. While there

does not seem to be a preference for bearing sons in this community, the lack of respect is particularly true for women who only have a daughter.

Apart from being disrespected and stigmatized, the life circumstances of many of the childless women seem to be considerably worse than of the women with at least one child. This difference is not necessarily in terms of workload, which in other studies of infertility in Africa has been found to be a major problem for infertile women who are deprived of the help that the children usually provide (Hollos, 2003). In this urban population where most women have no land and where water and firewood do not have to be carried in, the help of children around the house is not essential. Furthermore, the patrilineal extended family in this urban setting is not as strong as in the rural areas and the problem of the continuation of the lineage is not a major issue that is discussed by these women. This may be due to the fact that there is a great deal of intermarriage among ethnic groups in this urban setting, which has lessened the importance of the lineage and diminished the role of the ancestors.

This relative lack of extended family and lineage connections does not entirely negate the importance of the influence of the husband's immediate kin. Women with primary and secondary infertility share the problem of being ostracized by the husband's family, usually by his mother and his sisters. These relatives often cause a rift in the marriage, sometimes demanding that the man should at least marry a second wife. For example, the mother-in-law of Flora James who has one live daughter and one who died in infancy, is particularly unhappy because her husband is an only son and without a son his patriline will die out. The mother-in-law of Lucy Shayo, the mother of an 8 year old girl, wants her son to divorce her and the mother-in-law of Aisha Msalama, a Muslim

woman, told her son to marry a second wife. While the husbands of these women who have had at least one child have so far withstood these pressures, men whose partners have no children are more likely to be influenced by relatives. Anna Charles, for example, who has no child is in constant fear of her husband's sister who lives with them. This woman has had one child who died but because she has given birth, she considers herself to be in a superior position to Anna and consistently undermines her position in the household, telling the brother that he is married to a "useless woman".

Overall, however, the suffering of the childless women is due to being unappreciated and marginalized in the community and thus it has emotional roots. For example, we found Nazihira Mshana, a childless woman in a beautifully appointed, clean, cement house, painted inside and out. She recounted that her "husband" moved her into this house while his mother was dying, to be a caretaker for her. After the mother died in 2002 and it turned out that she was unable to conceive, the man told her to leave so that he could move in another woman who has had a child for him. When her relatives intervened, he relented but refuses to give her money and she doesn't even have bus fare to look for employment. He doesn't talk to her and comes and goes as he pleases, while she cleans the house and cooks for him and claims that she feels like a prisoner who has no way out of the situation. In another case, Adeline Godson, a woman with four children, told us about her co-wife, a woman who is over 40 years of age, has never had a child and whom her husband recently married. The reason for this marriage from the husband's point of view was to acquire an additional worker in the family business and the woman agreed to the arrangement because nobody else would take her in. Thus, she ended up as an unpaid laborer and caretaker of another woman's children, without the

benefit of respect. We never found out her name. Mary Fadhili, a woman in her forties, lives in Pasua, an outlying ward of Moshi. She supports herself as a trader since her husband doesn't give her money, either. She said that they moved here from Moshi town because the community there gave her a very hard time about her childlessness. In this area they erected a tall fence around the property for this purpose and this enabled her to come and go without having to interact with anybody.

The interviews with the fertile women echo these findings. These women feel superior to the infertile women and seem to show little sympathy for their plight. It is these women with children who denigrate the others and call them names, thereby highlighting the importance of motherhood. These women say that the point of marriage is to have children, without children a woman is not complete, and that motherhood is the most important goal in the life of a woman. In this community, where women are not called by their own first names but are addressed as the "mother of their oldest child" (as in Mama Flora, for the mother of a child called Flora), these women are fulfilling the normative goals of a woman's life cycle and are consciously aware of this, even though the desired number of children in this population is only two or three.

In a related point, we found that while from the survey it was difficult to decide what the definition of marriage was, what distinguished a married woman from a cohabiting or unmarried one and what the significance of the difference might have been, the in-depth interviews clearly revealed that the completed marriage process was considered to be most prestigious. While it was clear from the survey responses that women with both primary and secondary infertility had more frequent changes of partners than fertile women, an important additional finding that emerged from the in-

depth interviews was that there was a difference between cohabitation and the official sanctioning of marriage that differentiated childless women from women who have had at least one child. These interviews showed that male fears of infertility were related to the steps in the marriage process, resulting in the linkage of infertility to differences between cohabitation, the payment of the bride wealth and the performance of religious marriage ceremonies. To begin with, while doing the in-depth interviews, we found that almost all women called their male partners their "husband" and readily gave the date of marriage as the date when they commenced cohabiting. However, as the interview progressed and we asked for details about their marital arrangements, it turned out that the vast majority of childless women were simply cohabiting and almost none of them had their *mahari* (bridewealth) paid, nor did they have an official wedding ceremony. In the case of the women with at least one child and of the fertile women, the men waited with the payment of the *mahar*i until the woman conceived and performed the religious (whether Muslim or Christian) ceremony after at least one child was born. For example, Frimina Nathani, a mother of two children said that she and her husband were "married" in 1999, meaning that this is when they started living together. In 2000 she gave birth to a child, at which point the man paid the *mahari.* She conceived her second child in 2003 and now they are planning a religious wedding ceremony. Eva James, who was pregnant with her first child after several years of trying, said that she moved in with her "husband" in 2001 but he has not paid the *mahari* until June of 2004, after she became pregnant. They are now planning a wedding for October of the same year, after the birth of the child. Of the childless women, Tina Alex, Saumu Msabilla, Mary Msofe, Anna Charles, Joyce Mwenda, Umi Rajabu, and several others, are cohabiting with a man whom they call their

"husbands". They all say that because of their inability to conceive the man refuses to either pay the *mahari* or to participate in a wedding ceremony, although in some cases partial *mahar*i was paid. Eva James summed up the current situation in her ethnic group by saying that "among the Chagga you don't marry until you have a baby for the man".

The practice of frequently switching partners, and of having extra marital sexual relations, whether it is instigated by the man or the woman, has serious implications in a community where the prevalence of HIV is about 10%. As demonstrated by the survey data, the level of STIs is significantly higher among infertile women. What neither the survey data, nor the in-depth interviews captured, however, is whether our informants had outside partners and if so, how many. The women in the in-depth interview sample indicated that they suspected that their partners had girlfriends and a number of these partners did have children from other unions which were concurrent with their relationship to our informants. Very few of the women themselves admitted to having had outside relationships, even though they suspected that their infertility may have been caused by their partners. One of the stated reasons for this was their fear of HIV and STIs but we suspect that we are not being told the entire truth. Nevertheless, at least in one case an infertile woman was found to have syphilis while her husband was free from the disease.

Beliefs about causes and remedy seeking

In this community of mixed ethnic groups, beliefs about the causes of infertility were also found to be mixed. On the one hand, most women have attended some health care facility and have been informed about the Western biomedical reasoning for

infertility. On the other hand, traditional beliefs persist in explaining the problem. Many women utilize a combination of the traditional and Western medical models in their explanation of their affliction and in their remedy seeking, others rely on one or the other model. In addition, many of them claim that their problem is due to God's will and hope that prayers would help in becoming pregnant.

A woman usually expects to conceive soon after she starts stable relations with a man. From the in-depth sample it appears that it is extremely unusual for a young woman who has never been pregnant to use any form of birth control since women feel that fertility needs to be proven in order for the relationship to endure. When conception does not occur within the first year, the woman starts searching for an explanation and it is at this point that she first of all turns to her relatives, her neighbors or to other women in her network, such as trading partners. Depending on the explanation given by these others, she then develops her own ideas about her condition and usually embarks on a path seeking a remedy for the problem. Her choice of practitioner depends on her ideas about her condition but various practitioners also influence these ideas by giving her their own views on the matter.

About half of the infertile women in the indepth interview sample began their remedy seeking by going to a traditional healer. There are a large number and a variety of types of traditional healers in the Moshi area who fall into three general categories: herbal healers, spiritual healers and paramedics, with many of them using a combination of methods for treatment. The difference between these practitioners is not limited to the specific remedies they use; they also offer different explanations or combinations of explanations for the affliction.

Herbal healers usually diagnose a physical affliction and give the woman a tea brewed from a particular root which is designed to cure their condition. Most frequently they diagnose a condition which is known as *mchango*. *Mchango* is an affliction which, according to Aisha Msalama, "resembles contractions, on and off. " Zainabu Abdullah said that " *mchango* is like a kidney problem, it consists of low back pain". According to one of the herbalists we interviewed, "*mchango* is something inside the stomach that makes rumbling noises. It is a pain which is different in kind. It is not a tumor nor a snake". Another healer said that the condition often causes herniation inside. When she was diagnosed with this condition, Zainabu was given herbs by the healer who she took for almost two years. It gave her relief from the pain but did not help her conceive. Joyce Mwenda was also diagnosed with *mchango* and was given an herbal remedy which was "extremely bitter and which she took for about a year" but she did not conceive either.

Spiritual healers usually diagnose the root of infertility to lie not in physical causes but in some sort of spiritual or social disruption, such as bewitching by a jealous other. For example, one of the healers said that "Infertility may be caused by jealousy or envy. The child of a woman like this would die in the uterus even if the woman could get pregnant." These healers may also give an herbal remedy for the problem but mostly they attempt to counteract the sorcery by prayers or by prescribing specific curing acts which the patient must perform to neutralize the effects of the sorcery. Julianna Stevens is one of the women who were diagnosed by a healer to have been bewitched by her partner's first wife. The curer said that the sorcery "made something wrong inside her and the way this was achieved was by her ingesting a particular vegetable which the jealous wife bewitched". The healer gave her an herb to counteract this effect. Another healer said

that “the trick with curing bewitching is to figure out the method through which the person was bewitched. The way it works is that a jealous person steals something from you (urine, blood from menses, clothing) and takes it to the witch doctor. The witches administer a substance to the item which closes the uterus. Healing will counteract this”. Nazihira Mshana was also told that her heavy monthly bleeding was caused by being bewitched. They gave her medicines which helped the heavy bleeding but did not help her conceive.

Paramedics are similar to herbalists in that they also attribute reproductive problems to physical causes. Most of these practitioners have some training in Western biomedicine, with many of them being former nurses or medical officers who after retirement went into practice as healers. They attempt to cure infertility by a combination of prayers and the administration of patented medicines in a somewhat unorthodox manner. One of these healers told us that the cause of infertility is most frequently blocked tubes which result from pelvic infections. In order to unblock the tubes, he administers a combination of streptomycin, hydrocortisone and PPF (a combined antibiotics) which he injects into the uterus with a syringe. This he does “twice in two days, for the two tubes”. Other paramedics work in close cooperation with the medical centers and rely on their diagnosis but administer their own remedies. One older woman healer, for example, likes to have the diagnosis come from KCMC and depending on whether the woman has blocked tubes, sores in the uterus or fibroids, she will administer different herbs. She said that the function of these herbs is to clean out the uterus and to dissolve the fibroids. She claims that she can also cure cancer, which is often the cause of infertility.

If the traditional remedies do not succeed, the infertile women invariably continue their search for a cure by making use of the services of local clinics, hospitals and eventually KCMC. About half of the women in the indepth interviews sample started out with traditional healers and then switched to these medical services; the other half did not seek out healers but went straight to the clinics. Some women in the latter group stopped after being given medicines, others continued to higher and higher levels of treatment and finally underwent surgery for blocked tubes. Their relentless quest for a child often resulted in high expenditures and false hopes. The women who never went to traditional healers had very different explanations for their affliction from those who did. Their explanations inevitably centered around pelvic adhesions, blocked tubes and fibroids. They thought that these problems were due to previous STIs or to birth control pills or injections which somehow ruined their insides. While these explanations appear to be informed by a knowledge derived from Western biomedicine, it is not clear that the women understand what "blocked tubes" or even "tubes" refer to and that they know what the connection is between these factors and infertility might be, or how the reproductive mechanism functions.

The most interesting finding regarding beliefs about the causes of infertility and the consequent remedy seeking in this urban, well educated population is the persistence of traditional beliefs and the continuing proliferation of a variety of healers. What this demonstrates is the incredible importance of finding a solution to a problem to which biomedicine in this African setting has offered little hope.

Discussion

The pattern of consequences for infertile women found in this study seems to echo findings from other areas of sub-Saharan Africa. These include the women being blamed for the condition, often being abandoned and stigmatized, and eventually resorting to an extended quest for conception by various means. This quest often leads to both the woman and her partner engaging in multiple sexual relations, putting both partners into jeopardy for contracting STIs, including HIV. This pattern was found among others in the rural Mwanza and Shinyanga Regions of Tanzania (Mgalla & Boerma, 2001; Roth, 2001), in rural Nigeria (Hollos, 2003), in Mozambique (Gerrits, 1997) and in Cameroon (Larsen, 1995). The current study in an urban, highly educated, low fertility population with strikingly similar implications completes this picture and reinforces the findings. Perhaps the most important finding is the absolute necessity for a woman to have a child, even in this context. Motherhood continues to be a defining factor in an individual's treatment by others in the community, in her self-respect and in her understanding of what it means to be a woman. What emerges is that it is not the number of children that a woman has that matters; of foremost importance is to become a mother and secondarily to be able to bear further children if they so desire.

We have found that in our setting, too, it is the woman who is being blamed by the community, the family and the husband. Not only are women called names and are ostracized by their community but strong pressure also comes from their in-laws. In all phases of this study, we also attempted to include the men, in order to understand their point of view and to get a couple perspective. We found that many husbands claimed that they had children outside the marriage in order to prove their own fertility. However, the survey showed that there was no difference in the number of children the men of fertile

and infertile women may have had with other women. In addition, many men refused to participate in the study, including the surveys, the in-depth interviews and the clinic work with infertile couples. The refusal rate for the in-depth interviews was so high that the men we did interview could not be included in the study as reflecting the male dimension. This refusal may have different origins. On the one hand, it might reflect that the men do not consider the problem to pertain to them; infertility being a woman's concern. On the other hand, it is possible that the men's self-perception as virile, masculine beings was in jeopardy and that as in other parts of the world (Ali, 1996, 2000; Lindisfarne, 1994), these men also conflate men's sexual problems with male infertility.

Turning to the coping mechanisms of our population of women, these are also similar to what was found in other sub-Saharan African contexts. One of these is the search for pregnancy with another man. This finding is corroborated in other studies, however, none of these statements are confirmed by laboratory tests of STIs, as it is in ours. While in our study, including the surveys and the in-depth interviews, very few of the subject women admitted to having engaged in extra-marital sexual relationships, the biomarkers measuring current infections with STIs showed that infertile women had a higher rate of infections, particularly with trichomonas. It is possible that these infections originated with the partners, but in that case it shows that these partners are more likely to engage in extramarital sex.

Our women also seek care from multiple sources, including traditional healers and Western medicine. In spite of the fact that Moshi is an urban center with a well developed health services infrastructure and a well educated population, traditional beliefs regarding the causes of infertility as well as cures are still prevalent. Women will resort to

consulting both types of services, some of them doggedly pursuing the quest for a child. However, in many cases hopelessness and despair take over. We found little if any signs of coping mechanisms which women could have used to improve their lives. For example, in a Southern Nigerian rural population (Hollos 2003), women were found to be extremely resourceful in seeking out alternative life paths by either becoming traders or furthering their education and by moving to urban areas. Another option, adoption, is similarly not resorted to in Moshi. This is somewhat striking in light of the increasing number and problem of orphans from the AIDS epidemic.

In closing, as evidenced by this body of research and reaffirmed by our findings, childbearing and the achievement of motherhood represents a milestone for women in sub-Saharan Africa which confers on them an adult identity and represents the normative fulfillment of what is considered female destiny. Whether in rural or urban settings, or in high or low fertility populations, whether the woman is educated or not, it is the physical fact of having born at least one child which seems to be essential for a satisfactory female life course. It is possible that with social and economic change which may increasingly allow for alternative roles for women, this overarching need for a child will diminish. In the meanwhile, however, women in sub-Saharan Africa continue their quest for conception by any means and at any cost, including dying from infection with HIV.

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Table 1. The associations between marital relations, self-reported sexually transmitted infections (STIs) symptoms, laboratory confirmed STIs, medical causes, control variables and primary infertility in Moshi (N= 1,549)

Predictor	N (%)*	% Primary infertility**	p-value***	Unadjusted OR (95% CI)****	Adjusted OR (95% CI)****
Times married			.02		
Once	1238 (79.9)	2.6		1.00	1.00
Twice or more	100 (6.5)	6.5		2.64 (1.11-6.29)	2.08 (1.15-3.78)
Never	211 (13.6)	1.6		0.61 (0.21-1.74)	0.59 (0.30-1.19)
Marriage type			.06		
Monogamous	1058 (68.3)	2.4		1.00	1.00
Polygamous, partner has girlfriends	390 (25.2)	4.0		1.71 (0.91-3.22)	1.07 (0.67-1.70)
Never married, cohabited	101 (6.5)	0.6		0.25 (0.03-1.89)	0.60 (0.18-2.02)
Husband/partner has children with other women			.40		
Yes	594 (38.4)	3.3		1.00	1.00
No	755 (48.7)	2.5		0.74 (0.37-1.48)	1.10 (0.64-1.90)
Do not know	99 (6.4)	2.8		0.84 (0.23-3.00)	0.75 (0.28-2.06)
Never married, cohabited	101 (6.5)	0.6		0.18 (0.02-1.37)	
HIV-1 test			.18		
Negative	968 (62.5)	3.0		1.00	1.00
Positive	125 (8.1)	4.6		1.55 (0.50-4.73)	1.41 (0.78-2.56)
Not tested	456 (29.4)	1.4		0.47 (0.18-1.24)	0.95 (0.42-2.11)
HSV-2 antibodies			.09		
Negative	588 (38.0)	2.5		1.00	1.00
Positive	505 (32.6)	4.0		1.58 (0.77-3.22)	1.36 (0.79-2.35)
Not tested	456 (29.4)	1.4		0.56 (0.20-1.55)	
Trichomonas			.09		
Negative	1008 (65.1)	2.7		1.00	1.00
Positive	114 (7.4)	5.9		2.25 (0.88-5.78)	2.46 (1.33-4.54)
Not tested	427 (27.6)	1.8		0.65 (0.26-1.61)	0.68 (0.32-1.46)

Table 1 continued

Predictor	N (%)*	% Primary infertility**	p-value***	Unadjusted OR (95% CI)****	Adjusted OR (95% CI)****
Had deep lower abdominal pain at the time of interview			.0001		
No	1348 (87.0)	1.9		1.00	1.00
Yes	201 (13.0)	7.6		4.19 (2.17-8.07)	1.98 (1.15-3.42)
Ever had an abortion (spontaneous or induced)			.40		
Yes	250 (16.1)	3.5		1.40 (0.63-3.12)	1.50 (0.89-2.53)
No	1299 (83.9)	2.5		1.00	1.00
Age (years)			.13		
20 - 24	398 (25.7)	3.6		1.00	1.00
25 - 29	407 (26.3)	3.1		0.85 (0.36-1.98)	1.06 (0.57-2.00)
30 - 34	332 (21.4)	3.4		0.93 (0.43-2.02)	1.36 (0.71-2.58)
35 - 39	232 (14.9)	0.8		0.22 (0.05-0.99)	0.99 (0.47-2.08)
40 - 44	180 (11.6)	1.0		0.28 (0.07-1.07)	0.95 (0.45-2.03)
p-value, test for linear trend				0.008	0.92
Level of education			.38		
0 - 6 years	139 (9.0)	4.6		2.08 (0.65-6.70)	1.73 (0.81-3.72)
7 - 8 years	1014 (65.5)	2.6		1.15 (0.47-2.78)	0.98 (0.55-1.73)
$\geq$ 9 years	396 (25.6)	2.3		1.00	1.00
p-value, test for linear trend				0.31	0.26
Religion			.60		
Moslem	540 (34.9)	3.2		1.47 (0.63-3.43)	1.28 (0.64-2.56)
Catholic	576 (37.2)	2.6		1.18 (0.58-2.41)	1.28 (0.75-2.20)
Other Christian	433 (28.0)	2.2		1.00	1.00

Table 1 continued

Predictor	N (%)*	% Primary infertility**	p-value***	Unadjusted OR (95% CI)****	Adjusted OR (95% CI)****
Tribe			.12		
Chagga	741 (47.8)	2.2		1.00	1.00
Pare	209 (13.5)	4.8		2.25 (0.99-5.13)	1.87 (1.00-3.52)
Others	599 (38.7)	2.7		1.22 (0.63-2.36)	0.91 (0.57-1.47)
Total	1,549 (100)	2.7			

* Unweighted numbers and percentages. For some variables, the numbers do not add up to the total because of missing values.
** Infertility prevalence weighted by the survey sampling design.
*** Pearson chi-square test.
**** Odds ratios (OR) and 95% confidence intervals (CI) weighted by the survey sampling design.

Table 2. The associations between marital relations, self-reported sexually transmitted infections (STIs) symptoms, laboratory confirmed STIs, medical causes, control variables and secondary infertility in Moshi (N= 1,352)

Predictor	N (%)*	% Secondary infertility**	p-value***	Unadjusted OR (95% CI)****	Adjusted OR (95% CI)****
Times married			.001		
Once	1165 (86.2)	5.3		1.00	1.00
Twice or more	89 (6.6)	16.6		3.52 (1.72-7.23)	2.26 (1.10-4.67)
Never	98 (7.3)	4.8		0.89 (0.36-2.18)	1.10 (0.40-3.05)
Marriage type			.61		
Monogamous	951 (70.3)	5.9		1.00	1.00
Polygamous, partner has girlfriends	338 (25.0)	7.0		1.20 (0.73-1.97)	0.91 (0.51-1.60)
Never married, cohabited	63 (4.7)	4.2		0.69 (0.20-2.41)	0.66 (0.15-3.01)
Husband/partner has children with other women			.63		
Yes	544 (40.2)	6.7		1.00	1.00
No	659 (48.7)	6.1		0.91 (0.55-1.49)	1.30 (0.71-2.40)
Do not know	86 (6.4)	3.5		0.50 (0.14-1.78)	0.54 (0.13-2.25)
Never married, cohabited	63 (4.7)	4.2		0.61 (0.17-2.22)	
HIV-1 test			.01		
Negative	844 (62.4)	6.7		1.00	1.00
Positive	109 (8.1)	11.3		1.79 (0.89-3.61)	1.45 (0.66-3.21)
Not tested	399 (29.5)	3.5		0.51 (0.26-.99)	1.29 (0.46-3.63)
HSV-2 antibodies			.02		
Negative	489 (36.2)	5.5		1.00	1.00
Positive	464 (34.3)	8.9		1.70 (0.87-3.33)	1.20 (0.59-2.41)
Not tested	399 (29.5)	3.5		0.63 (0.31-1.28)	
Trichomonas			.001		
Negative	883 (65.3)	6.2		1.00	1.00
Positive	103 (7.6)	17.4		3.21 (1.63-6.30)	2.94 (1.41-6.13)
Not tested	366 (27.1)	2.7		0.42 (0.20-0.85)	0.45 (0.16-1.30)

Table 2 continued

Predictor	N (%)*	% Secondary infertility**	p-value***	Unadjusted OR (95% CI)****	Adjusted OR (95% CI)****
Had deep lower abdominal pain at the time of interview			.01		
No	1192 (88.2)	5.4		1.00	1.00
Yes	160 (11.8)	11.2		2.21 (1.28-3.81)	1.40 (0.74-2.66)
Ever had an abortion (spontaneous or induced)			.01		
Yes	220 (16.3)	10.5		2.10 (1.17-3.77)	1.62 (0.84-3.12)
No	1132 (83.7)	5.3		1.00	1.00
Strong labor pains that lasted more than two days after most recent abortion or delivery			.07		
Yes	225 (16.6)	10.2		2.01 (1.12-3.60)	1.97 (1.08-3.57)
No	1114 (82.4)	5.4		1.00	1.00
Age (years)			.22		
20 - 24	281 (20.8)	3.7		1.00	1.00
25 - 29	350 (25.9)	5.5		1.54 (0.65-3.63)	1.54 (0.62-3.79)
30 - 34	315 (23.3)	6.5		1.82 (0.77-4.30)	1.85 (0.73-4.72)
35 - 39	228 (16.9)	7.1		2.01 (0.82-4.94)	2.09 (0.82-5.35)
40 - 44	178 (13.2)	9.1		2.61 (1.05-6.47)	1.94 (0.69-5.41)
p-value, test for linear trend				0.02	0.14
Level of education			.04		
0 - 6 years	128(9.5)	11.0		2.57 (1.20-5.50)	1.81 (0.78-4.21)
7 - 8 years	905 (66.9)	5.9		1.31 (0.68-2.51)	1.10 (0.57-2.13)
$\geq$ 9 years	319 (23.6)	4.6		1.00	1.00
p-value, test for linear trend				0.03	0.22
Religion			.71		
Moslem	490 (36.2)	6.8		1.33 (0.62-2.83)	1.27 (0.58-2.81)
Catholic	485 (35.9)	6.1		1.19 (0.65-2.21)	1.21 (0.61-2.38)
Other Christian	377 (27.9)	5.2		1.00	1.00

Table 2 continued

Predictor	N (%)*	% Secondary infertility**	p-value***	Unadjusted OR (95% CI)****	Adjusted OR (95% CI)****
Tribe			.04		
Chagga	638 (47.2)	5.5		1.00	1.00
Pare	181 (13.4)	10.6		2.04 (1.00-4.15)	1.91 (0.92-3.96)
Others	532 (39.4)	5.3		0.97 (0.59-1.57)	0.81 (0.45-1.46)
Total	1,352 (100.0)	6.1			

* Unweighted numbers and percentages. For some variables, the numbers do not add up to the total because of missing values.

** Infertility prevalence weighted by the survey sampling design.

*** Pearson chi-square test.

**** Odds ratios (OR) and 95% confidence intervals (CI) weighted by the survey sampling design.