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Polygyny and women's health in sub-Saharan Africa

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ABSTRACT

In this paper we review the literature on the association between polygyny and women's health in sub-Saharan Africa. We argue that polygyny is an example of "co-operative conflict" within households, with likely implications for the vulnerability of polygynous women to illness, and for their access to treatment. We begin with a review of polygyny and then examine vulnerability to sexually transmitted infections (STIs, including HIV) and differential reproductive outcomes. Polygyny is associated with an accelerated transmission of STIs, both because it permits a multiplication of sexual partners and because it correlates with low rates of condom use, poor communication between spouses, and age and power imbalances among other factors. Female fertility is affected by the interplay between marital rank, household status, and cultural norms in polygynous marriages. Finally, we present areas which have received only cursory attention: mental health and a premature, "social" menopause. Although data are scarce, polygyny seems to be associated with higher levels of anxiety and depression, particularly around stressful life events. It is our hope that the examples reviewed here will help build a framework for mixed method quality research, which in turn can inform decision makers on more appropriate, context-dependent health policies.

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Introduction

In 2001, Botswana's diamond mining giant corporation, Debswana, decided in partnership with international organizations to provide antiretroviral treatment to all mineworkers infected with the human immunodeficiency virus (HIV) *plus one spouse* (Swarns, 2001). In a society where polygyny is prevalent, this raises some difficult questions. Should the mine worker select his senior wife for treatment? Or his favorite one? Should he rotate their access to pills on a daily basis? Or should he split the pills between his wives? To our knowledge, there has been no published follow-up of this policy. However, the issues raised highlight the complexity of health-related interactions in polygynous households.

While the household has traditionally been viewed as a unit ideally making decisions for the good of all, there is evidence that individuals within a household vary substantially in their ability to access key resources and to effect decisions according to their gender, age, and social power (Haddad, Hoddinott, & Alderman, 1997). These competing interests give rise to what Sen (1990) describes as the "coexistence of extensive conflicts and pervasive cooperation in household arrangements".

Polygyny in sub-Saharan Africa represents an excellent example of such a "co-operative conflict" paradigm, because of its role in structuring women's access to resources essential for their own health and that of their children. In many African societies, polygyny is a normative marital system (Lesthaeghe, Kaufmann, & Meekers, 1989; van de Walle, 2005). Polygyny structures social relationships within the household by requiring cooperation among co-wives in productive (domestic, agricultural) and reproductive (conjugal, childrearing) arenas, all the while

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placing them under the authority of a husband for whose attention and parental investment co-wives are in direct competition (Dorjahn, 1988; Madhavan, 2002).

This article reviews evidence from various societies in sub-Saharan Africa, for the role of polygyny as a social mediator of women's vulnerability to disease and their health outcomes. Using a model of "co-operative conflict" between spouses and between co-wives, we summarize the associations between health and polygyny that have been most frequently explored: vulnerability to sexually transmitted illnesses (STIs) and fertility outcomes. We then examine how polygyny, by structuring a woman's relationship to her husband and to other household members, might also influence women's mental health and their experience of menopause and illness. Finally, we suggest areas for further research.

Quantitative research on polygyny has been hampered by a host of confounding factors, and by the fact that polygynous status often depends more on an individual's position in the life cycle (age, employment), and on a husband's income, than on any absolute differences between polygynous and monogamous individuals (Antoine & Nanitelamio, 1995; Blanc & Gage, 2000; Orobato, 1996). Because women's status is intertwined with their husband's, there are strong social pressures for women not to reveal personal feelings about their marital relationships that might undermine their commitment to the established social order (Lesthaeghe, 1989; Wittrup, 1990). Significantly, female researchers seem to obtain greater insights into the emotional nuances of co-wives' lives (Jankowiak, Sudakov, & Wilreker, 2005). Unless noted, the data presented here are derived from cohort and case-control studies with small sample sizes.

Overview of polygyny in sub-Saharan Africa

In sub-Saharan Africa, polygyny is common and continues to reinvent itself in light of broad social changes. According to all Demographic and Health Surveys of sub-Saharan African countries conducted since 2000 ($n=22$ countries – but this excludes Namibia, where 18% of the female respondents' marital status was 'unknown'), the percentage of married women aged 15–49 with at least one co-wife varies from 11.4% in Zimbabwe, to 26.5% in Ivory Coast (median value), to 53% in Guinea. For married men, the percentage with two or more wives ranges from 4.9% in Zimbabwe, to 14.1% in Mozambique (median value), to 36.7% in Guinea (www.measuredhs.com).

In each country surveyed, polygyny rates were positively associated with rural residence, older age, and low educational attainment. For example, in Mali, polygyny rates were 44.8% and 26.5% for married women and men in rural areas, respectively, vs. 26.7% and 22.1% in urban areas. Rates were 19.3% and 18.1% for married women and men, respectively, with at least a secondary education, vs. 42.2% and 26.7% for those with no education. Rates were 20% for married women aged 15–19 years vs. 55.3% for those aged 40–49 years; and 9.4% for married men aged 20–24 years, vs. 40.8% for those aged 50–59 years (CPS/MS, 2007).

Historically, polygyny has been associated with patriarchal, patrilocal, gerontocratic, pronatalist agrarian societies

that limit women's access to land, inheritance, support from natal kin, and sources of formalized power (Goody, 1973; White & Burton, 1988). This is particularly true of West Africa, where polygyny is most prevalent and predates Islam (Hayase & Liaw, 1997; Lesthaeghe et al., 1989; Murdock, 1967). For men and their lineages, women represent "wealth in people" rather than "wealth in things" (Caldwell, 1981). Plural wives multiply offspring and political alliances through in-laws (Clignet, 1970), and productivity in the fields (Jacoby, 1995). From a power balance perspective, polygyny places women largely under the authority of their husband and his lineage, particularly his mother, for access to key resources and support during childbearing and other life events (Adams & Castle, 1994).

Women's ability to negotiate social relationships within this framework and vis-à-vis their co-wives is therefore crucial to their well-being and to that of their children. First wives, in principle, enjoy social respect, agency as 'household manager,' as well as a measure of freedom from a husband who may display preferential attention to more junior co-wives (Madhavan, 2002). A review by Jankowiak et al. (2005) outlines the importance of a husband's behavior, a woman's age, rank and individual resources, and local cultural factors, in determining the extent of competition and cooperation between co-wives.

Co-wife competition is heightened whenever women depend more directly on their husband for emotional fulfillment or access to resources. Competition is most fierce around a husband's investment in the education, health and attainment of their children, particularly the sons whose birth secures the husband–wife bond and who will care for them in their old age (Bledsoe, 1993).¹ Despite a formalized "egalitarian" rotation of domestic and conjugal duties, husbands may display emotional and sexual favoritism. They may also use 'divide and conquer' strategies to prevent their wives from uniting in collective passive resistance (Clignet, 1970; Dorjahn, 1988). The result is often a socially imposed form of prisoner's dilemma, in which co-wives must choose between collaborating with one another or vying for power in their individual relationships with their husband. Competition between co-wives is amplified in the migratory context, as women vie to maximize their reproductive value and to manipulate their seniority status in countries where only one wife may obtain identity documents or receive health benefits (Sargent & Cordell, 2003).

Conversely, co-wife cooperation leads to economies of scale which may free women to pursue remunerative activities outside the household, providing for themselves and their children during periods of insecurity (Adams, Cekan, & Sauerborn, 1998; Bledsoe, 1993; Caldwell, Oruboloye, & Caldwell, 1992). However, Jankowiak and colleagues conclude that, although women may benefit from "pragmatic cooperation" with a co-wife, "(o)ur findings go against the conventional wisdom that a polygynous

¹ However, women maintain separate budgets from their husbands, in part as protection from their use of pooled resources to pursue additional wives, and this inevitably entails lower budgets available for women and their children (Caldwell, et al., 1992).

family as a marital system is as satisfying as any other" (2005:96).

Contemporary changes to the structure of polygyny have altered its costs and benefits to women. Cash cropping has eroded a key benefit of cooperation among co-wives, as the fruit of their labor is placed as cash into the hands of men, who do not necessarily recycle it back into the household (Diskin, 1994). In cities, polygyny often persists (Antoine & Nanielamio, 1995; Marcoux, 1997) despite the variable effects of education (Peterson, 1999), market forces (Solway, 1990), and cost of living (Locoh & Thiriad, 1995). Additionally, the alternative to polygyny is often informal 'outside wives', whom a legitimate wife may not know (Ezech, 1997) and who divert a man's resources from his wife and children without providing them with any of the co-operative benefits of polygyny (Karanja, 1994).

Polygyny and women's health issues

In the next few sections, we review the ways in which a co-operative conflict model can deepen our understanding of the association between polygyny and several health issues which have received the most attention: vulnerability to infectious diseases, fertility, and mental health.

Vulnerability to sexually transmitted infections

Perhaps the most widely recognized demographic and health consequence of polygyny is its effect on the transmission of HIV and other STIs (Adeokun & Nalwadda, 1997; Caldwell, Anarfi, & Caldwell, 1997), leading to the emergence of popular terms, such as *sidagamie* (Traore, 1998), to describe this relationship. Demographic factors partially explain the effect of polygyny on STI transmission. In stochastic simulations, concurrent, as opposed to serial, sexual relationships appear to increase the transmission of STIs (Morris & Kretzschmar, 1997; but see Lagarde et al., 2001). In addition, there is often a marked age difference between a man and his junior wives. Younger women may exchange sex for material gain or for other reasons without enjoying the social status to request condom use (Tawfik & Watkins, 2007) and are at an elevated risk of contracting STIs, which they may then introduce into a polygynous marriage. The practice of widow inheritance may increase the chance of HIV transmission to his current wives if a man whose brother died of AIDS inherits his widow (Malungo, 2001). Finally, migration is a major vector for the transmission of HIV and other STIs from areas of high prevalence (urban centers, certain countries) to areas of lower prevalence (rural communities) (Buvé, Bishikwabo-Nsarhaza, & Mutangadura, 2002; Lurie et al., 2003), especially if polygynous men keep wives in two places.

However, polygyny also shapes a man's emotional and sexual relationship to his wives so as to amplify the risk of STI transmission. First, relationships between polygynous spouses are often marked by loose emotional ties, and with lack of communication between spouses about sexual health matters – including important symptoms and treatment issues (Orubuloye, Caldwell, & Caldwell, 1997). Second, extramarital sexual activity is more common

among polygynous than monogamous men, during the period of postpartum sexual abstinence (Blanc & Gage, 2000; Lawoyin & Larsen, 2002) and during the premarital search for new wives (Gage & Meekers, 1994; Mitsunaga, Powell, Heard, & Larsen, 2005). Third, while social control over women in polygynous societies has been assumed to ensure their fidelity to their husbands, polygynous women may be less likely to be satisfied emotionally, sexually and materially, and may be more likely to have multiple sexual partners (Hattori & Dodo, 2007). Fourth, polygyny can generate marital instability, with frequent rates of divorce and remarriage (Gage-Brandon, 1992; Locoh & Thiriad, 1995). Fifth, men may perceive their wives' requests for condom use as evidence of female infidelity (Lawoyin & Larsen, 2002; Lugalla et al., 2004; Mukiza-Gapere & Ntozi, 1995). These interpersonal factors all contribute to an expansion of sexual partners and to an increased risk of STI transmission within polygynous marriages.

It could be argued that given a gradual breakdown of traditional societal control over individuals' behavior in polygynous marriages, interpersonal dynamics between spouses play a stronger role in influencing sexual behavior and the transmission of STIs. Interestingly, measures that target the practice, rather than the prevalence, of polygyny and that strengthen the traditional relationship between men and women *within* polygynous marriages have been found to mitigate the association between polygyny and HIV transmission in sub-Saharan Africa (Patten & Ward, 1993). These measures fall within more recent efforts to examine the social context of behavior (Wellings et al., 2006), and to target men as active agents within the HIV pandemic (Hawkes & Hart, 2000; Morrison, Sunkutu, Musaba, & Glover, 1997). HIV infection rates have actually been found to decrease following measures intended to strengthen relationships within polygynous unions. Such measures have included reduced rates of widow inheritance and sexual networking in Zambia (Malungo, 2001), and increased use of condoms, fidelity within the polygynous ring, and collaboration among co-wives to monitor one another's sexual behavior and that of their husbands in Tanzania (Lugalla et al., 2004) and Uganda (Mukiza-Gapere & Ntozi, 1995).

Fertility

Because a major feature of polygynous societies is pronatalism, fertility is included in this review as an important element of women's health and well-being. Pronatalism is facilitated by universal marriage, young female age at first marriage and delivery, and low rates of contraceptive use (Blanc & Gage, 2000; Ezech, 1997). Polygyny has clear reproductive benefits for men, who attract additional wives through status, bride price, and resources linked to higher fertility (Borgerhoff Mulder, 1988). However, polygyny may represent a cost to women's lifetime fertility, with some variability according to rank, with senior wives generally being found to be more fertile than junior ones (Borgerhoff Mulder, 1988; Gibson & Mace, 2006). We refer the reader to the vast literature on polygyny as a risk factor for child mortality (Amey, 2002; Borgerhoff Mulder, 1988, 1992; Hadley, 2005; Strassmann, 1997), and concentrate here on

the relationship between polygyny and female-centered aspects of fertility. To do so, we use the three categories of proximate variables outlined by [Bongaarts \(1978\)](#). We will show that, here as well, the co-operative conflict between spouses and between co-wives affects women's fertility.

Exposure factors

The proportion of unmarried women in polygynous societies is low. Although polygyny precipitates marital instability, divorce presents little opportunity cost to women's fertility because they remarry quickly ([Gage-Brandon, 1992](#); [Locoh & Thiriat, 1995](#)).

Deliberate fertility control factors

Women in presumed "natural fertility" populations have nonetheless been found to think numerically about their fertility and to use methods to space or limit their births, even when reluctant to openly discuss them ([Bledsoe, Banja, & Hill, 1998](#); [Caldwell & Caldwell, 1977](#); [Castle, 2001](#)) or to challenge the influence of a husband's lineage on their reproductive output, which was secured through payment of the bride price ([Adongo et al., 1997](#); [Bledsoe et al., 1998](#)). Yet polygynous women have been less willing than their monogamous counterparts to use contraception, despite similar rates of stated approval for birth control, in Niger ([Peterson, 1999](#)) and in Tanzania ([Hollos & Larsen, 2004](#)). No such association between polygyny and female contraceptive behavior was noted in Ethiopia ([Hogan, Berhanu, & Hailemariam, 1999](#)), perhaps due to low overall levels of contraceptive use and knowledge, or to the strong association between Islam and polygyny in the local context.

Communication between spouses around ideal family size, family planning, and contraceptive use affects utilization of family planning ([Adongo et al., 1997](#); [Kimuna & Adamchak, 2001](#)). Communication is lower in polygynous couples, due to increasing age differences between a man and each of his subsequent wives ([Blanc & Gage, 2000](#); [Marcoux, 1997](#)), aloofness between spouses ([Draper, 1989](#); [Orubuloye et al., 1997](#)), or personal characteristics such as low educational attainment. Perhaps because of the weaker conjugal bond and distance from their husbands, polygynous women in Ghana and Kenya have been found to be better able to implement lower fertility desires ([Dodoo, 2000](#)).

Competition with a co-wife for reproductive output also limits polygynous women's willingness to limit their births unless assured that co-wives will do the same, likely because reproductive output to a large extent guides subsequent male investment ([Blanc & Gage, 2000](#); [Bledsoe, 1993](#); [Madhavan, 2001](#); [Olusanya, 1971](#)). This is also true in the migratory context, where women must compete with their co-wives for reproductive output and value in settings where only one wife may obtain immigration papers and receive benefits ([Sargent & Cordell, 2003](#)).

The pregnancy and postpartum abstinence periods, which are common in sub-Saharan Africa, can last up to 18 months, and can increase the duration of interbirth intervals, and are facilitated by polygyny, introduce another opportunity for fertility-related interpersonal negotiation ([Bongaarts, 1978](#); [Caldwell & Caldwell, 1977](#); [Dorjahn, 1988](#)). During these times, women abstain from sex, but not

their husbands ([Blanc & Gage, 2000](#)). Polygyny appears to structure the husband–wife sexual relationship such that polygynous men are more likely than monogamous men to engage in extramarital sex, whether during the postpartum abstinence period ([Lawoyin & Larsen, 2002](#)) or not ([Mitsunaga et al., 2005](#)).

Natural marital fertility factors

The majority of available studies of "natural marital fertility factors" focus on sterility, postpartum amenorrhea, and coital frequency. The association between sterility and polygyny is controversial. Childless wives certainly cluster in polygynous marriages ([Gage-Brandon, 1992](#)), and sterility justifies a man's taking an additional wife ([Bledsoe, 1990](#); [Ferraro, 1991](#)), including secondary sterility induced by STIs ([Larsen, 1995](#)). But polygyny also increases the transmission of STIs, leading to secondary sterility. In Jos, Nigeria, for example, male infertility is associated with higher incidences of STIs, marital instability, and polygyny ([Imade, Towobola, Sagay, & Otubu, 1993](#)). Thus female sterility, specifically secondary sterility, might play a greater role as a confounder, or even a consequence, than as a cause of polygyny.

In addition to a prolonged postpartum taboo, polygyny has been associated with reduced coital frequency, and prolonged breastfeeding ([Lesthaeghe, 1989](#); [Murdock, 1967](#)). These all effectively increase the duration of interbirth intervals ([Bongaarts, 1978](#)), as in Ghana where they are prolonged among polygynous women, due either to a longer postpartum taboo or to decreased coital frequency ([Amankwaa, 1996](#)). While the prolongation of interbirth intervals is negatively associated with total fertility rates, it can contribute to the survivorship of both newborns and weanlings and thus to the number of surviving children ([Alam, 1995](#)).

Therefore, it is important to determine whether for individual women, prolonged interbirth intervals enhance or limit their number of surviving children, and are perceived as beneficial or restrictive. In the Central African Republic, for example, senior wives have lower coital frequency relative to younger ones ([Stewart, Morrison, & White, 2002](#)). Some older Bamana women in Mali voluntarily give up their assigned nights with their husbands, allowing their husbands to sleep with junior co-wives ([Madhavan, 2002](#)), which points to a measure of female agency. Qualitative research is needed to determine whether on balance senior wives enjoy more power to reject their husband's sexual advances, or whether their husbands display sexual favoritism towards junior wives.

This last issue raises the possibility of a premature form of social and sexual abandonment in polygynous households. In polygynous societies, the young age of women at first marriage increases their fertile period. However, this may be limited in later years by a premature, "social" menopause. Polygynous women aged 35 and above have been noted to prolong postpartum abstinence among the Yoruba ([van de Walle & van de Walle, 1988](#)) and among the Kipsigis ([Borgerhoff Mulder, 1989](#)). There may certainly be an element of female agency in this. Later in their reproductive careers, African women enjoy a measure of autonomy allowing them to resist their husband's sexual

advances (Lesthaeghe et al., 1989), an autonomy which is increased when a co-wife is available to share conjugal duties. Older Gambian women adopt western contraception to 'rest' from reproduction altogether (Bledsoe et al., 1998). Reasons for 'resting' include cultural notions of depletion of physical resources, grand-maternal restrictions on childbearing once daughters and daughters-in-law begin to bear children, satisfaction with family size achieved and support received from children and grandchildren, and weariness of a husband who was not necessarily chosen.

However, given the reproductive competition between co-wives noted earlier, postpartum abstinence and early 'menopause' in polygynous marriages might reflect not women's choices, but sexual and emotional neglect on the part of polygynous husbands. Among the Kipsigis, the husbands of polygynous women who stopped childbearing early continued to have children with their other wives, reducing the likelihood that early 'menopause' was due either to completed family size or to male secondary sterility (Borgerhoff Mulder, 1989). Further research is needed to disentangle sexual abstinence or neglect from premature ovarian failure, secondary sterility, and the other biological and socioeconomic factors affecting age at menopause (see Obermeyer, 2000, for a review). While the overall contribution of a possible 'premature meno-pausation' may not be significant in demographic terms, it could represent an emotional and, because sexual attention is linked to male investment, socioeconomic burden for a number of polygynous women.

Clearly, while a majority of studies have suggested that polygynous women have lower lifetime fertility, the relative importance of each proximate determinant to the overall outcome varies according to particular settings. Among women in rural Ethiopia, for example, marital rank seems to be the main factor explaining variation in women's fertility. First wives, after controlling for age, wealth and exposure effect, had significantly larger families than monogamous or lower ranked women (Gibson & Mace, 2006). Therefore, we believe that further research on fertility in polygynous societies would be more fruitful if it were designed with the interplay of these variables in mind.

Mental health

The mental health of African women has, in general, received less attention than their reproductive health. Mental and neurological disorders accounted for approximately 10.5 percent of the global burden of disease in 1990 and are expected to increase to 15% in the year 2020. However, their impact in the developing world remains understudied and under-appreciated (Murray & Lopez, 1996).

In sub-Saharan Africa, polygynous women do appear to report less life satisfaction than monogamous ones (Jan-kowiak et al., 2005). This varies according to age and interpersonal factors such as support received from sons, degree of acceptance of marital status, and marital rank. For example, in Cameroon senior wives were less satisfied than junior ones (Gwanfogbe, Schumm, Smith, & Furrow, 1997).

Women's distress might be exacerbated by the latent hostility and aggression between co-wives described by anthropologists, which includes use of terms denoting anxiety and jealousy and of snide remarks and threats; covert competitive strategies, secretly indulging a husband against whom they had collectively decided to "strike"; and accusations of witchcraft and poisoning (Bledsoe, 1993; Dorjahn, 1988; Fainzang & Journet, 1988; Solway, 1990; Strassmann, 1997; Wittrup, 1990). While accusations of witchcraft may be unfounded, they do betray the competition, mistrust and unease that women experience in polygynous households. This sentiment is reflected in "anguished pleas" recorded of women presenting at a psychiatric clinic in Dakar, Senegal (Mbassa Menick & Sylla, 1996).

Husbands' behavior also appears to affect polygynous women's emotional (and physical) well-being. Polygyny is associated with higher rates of domestic physical and sexual abuse in South Africa (Jewkes, Levin, & Penn-Kekana, 2002), and in Uganda where women whose husband had another sexual partner had an odds ratio of 2.4 of experiencing intimate partner violence, in a household survey of women with infants (Karamagi, Tumwine, Tylleskar, & Heggenhougen, 2006). It is not known whether more violent husband–wife relationships in polygynous households arise from husbands' individual characteristics, such as education, or from interpersonal characteristics such as emotional distance between spouses, differential valuation by a husband of his wives, or escalation of more defiant behavior on the part of polygynously married women.

The effects of interpersonal relationships and distress on psychopathology have been well studied among Arab Muslim women. Relative to monogamous women, polygynous Arab women both in the Middle East and the United States report greater degrees of emotional distress (Maziak, Asfar, Mzayek, Fouad, & Kilzieh, 2002); higher levels of verbal, emotional, physical and sexual abuse from husbands or co-wives (Hassouneh-Phillips, 2001); and a greater prevalence of low self-esteem and loneliness (Al-Krenawi, 2001). While the economic and sociocultural logic of polygyny varies between sub-Saharan Africa and the Arab world, the household and interpersonal characteristics of "well-functioning" polygynous families (Slonim-Nevo & Al-Krenawi, 2006) and influences on women's mental health are similar (Douki, Ben Zineb, Nacef, & Halbreich, 2007).

The only community-based study of the mental health of sub-Saharan African women available to our knowledge, conducted in rural Tanzania, showed no association between polygyny and symptoms of either anxiety or depression (Patil & Hadley, 2008). This is a most interesting finding, considering previous studies in other polygynous societies. However, it bears noting that this study included only women with a child under 3 years of age. Because women's social and familial values are tied to women's reproductive status, this cohort would be expected to be most satisfied with their life circumstances.

Coping with infertility, in particular, appears to be more difficult for polygynous women. In a study of 37 infertile women referred to a gynecological clinic in Nigeria, polygynous marriage was associated with increased

psychopathology (Aghanwa, Dare, & Ogunniyi, 1999). Similarly, polygyny was associated with higher rates of infertility-related stress in a survey of Ghanaian women seeking treatment in infertility clinics (Donkor & Sandall, 2007). These findings suggest that the presence of a co-wife, presumably competing for reproductive output, exacerbates the distress that women feel at their infertility. Interestingly, polygynous women who do come to accept their infertility (i.e., no longer seeking treatment) may no longer experience competition, but rather strive to form close bonds, with a co-wife and her children, presumably to avoid being divorced (Jankowiak et al., 2005). One study, however, found no excess of domestic violence among polygynous women relative to monogamous Nigerian women attending infertility clinics (Amech et al., 2007).

Polygyny may also be associated with rates of depression in the peripartum, a period of hormonal changes and emotional instability for many women. Polygyny was associated with depressive symptoms after birth in a group of Nigerian women, an effect which had dissipated by six weeks (Fatoye, Oladimeji, & Adeyemi, 2006). This led the authors to postulate that women may adjust quickly to trying life events. Similarly, among Nigerian women in late pregnancy, polygyny was associated with an odds ratio of developing a depressive disorder of 3.92 in one study (Adewuya, Ola, Aloba, Dada, & Fasoto, 2006), and with significantly greater risk of depression and anxiety in another (Fatoye, Adeyemi, & Oladimeji, 2004). These findings might be explained by the presence of pregnancy and postpartum sexual taboos, during which a woman might feel sexually and emotionally abandoned by her husband for her co-wife. Alternatively, conflict with co-wives and lack of support from them might be more distressing during periods of physical and emotional stress.

Other health effects

Outside the reproductive arena, even less is known about the broader ways in which polygyny structures women's health, despite growing evidence of the impact of social power and social networks on women's access to treatment-related resources (Adams & Castle, 1994; Adams, Madhavan, & Simon, 2002).

It is tempting to speculate on the household dynamics that would affect women's experience of physical injury and illness. During illness as during menstruation, the postpartum taboo, and other episodes during which a woman cannot perform her wifely duties, co-wives are usually expected to take over domestic, conjugal and childrearing responsibilities (Madhavan, 2002; Wittrup, 1990). Yet the mere contrast between one's illness and a co-wife's good health might induce anxiety and distress in a polygynous woman who is sick. Co-wives may also affect the care that women receive, either through support offered (e.g., by the 'social security' junior wife, Jankowiak et al., 2005) or withheld, or by interfering with the patient's relationship with her husband. Husbands may also seek differential care for their wives, according to their valuation of each woman's productive, reproductive, and emotional worth. The evidence for this remains anecdotal or suggestive. In one study of polygynous men in Rakai, Uganda, men

appear to invest differentially away from the children of women infected with HIV; it would follow that they might also divert resources away from the infected wives themselves (Brahmbhatt et al., 2002).

To return to the example of the polygynous Bostwana miners, in light of this paper, custom would require them to rotate antiretroviral medications among their wives or, because this constitutes an inappropriate regimen, to select their senior wife. However, given differential investment noted, for example, by Brahmbhatt et al. (2002), we might speculate that faced with a culturally dissonant treatment dilemma, polygynous men might be tempted to favor the wife whom they value as more fertile, or with whom they enjoy more intimate, honest conversations about sexuality and health matters.

Overall, detailed studies are required to gain information about the ways in which polygyny shapes women's access to health. Event-centered questionnaires might yield more nuanced information than interviews directly addressing opinions about polygyny itself. The resort to various forms of treatment would be traced, as well as costs and outcomes. Special attention would be given to prenatal and postnatal care for pregnant women. Demographic and Health Survey datasets, for example, could provide high-quality preliminary information. Sources of social and financial support for women during illness would also be identified. Finally, richer measures of a woman's rank and social support would include their autonomy from their mother-in-law and co-wives, opportunities for collaboration with co-wives, perceived support from their husband, number of sons and daughters-in-law, proximity to kin, and opportunity for additional employment. Altogether, such studies might help us to understand whether polygynous women are differentially vulnerable to morbidity or mortality, and how to address the ways in which this effect is mediated to improve public health.

Conclusion

In this paper we have outlined a growing body of evidence showing that polygyny mediates social relationships linked with women's health in African settings. The tensions inherent in polygynous families are based, in part, on a need to occasionally cooperate and in part on the recognition that every woman is an independent agent keen on not being undermined by the interests of her co-wives.

Although we have made broad claims, the relative importance of each of the variables outlined in shaping polygynous women's fertility and vulnerability to STIs varies with local influences on the degree of competition and cooperation between co-wives, and on male behavior. It also varies based on gender norms and a woman's position in the life cycle and social power. Thus, it is clear that any efforts to target female health-related behaviors cannot target women alone, but must encourage and support men to protect their wives from STIs and to regulate household family planning (Castle, Konate, Ulin, & Martin, 1999; Hollis & Larsen, 2004; Ratcliffe, 2002).

This paper has also highlighted the influence of polygyny on aspects of women's health other than their

reproductive and sexual output: their vulnerability to domestic violence, anxiety, and depression. Despite evidence for co-operative conflict in polygynous households, virtually nothing is known of the ways in which it regulates women's experiences during injury and physical illness.

Polygyny is a social phenomenon that has existed for millennia and continues to transform itself in sub-Saharan Africa in light of migration, urbanization, female education, and other demographic and epidemiological changes. Only by recognizing its importance and multiplying research into its local manifestations and implications will we be able to derive meaningful solutions to problems such as the one faced not only by the diamond miners in Botswana and their wives, but also by women in many regions of sub-Saharan Africa.

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