Difficulties Conceiving and Relationship Stability in sub-Saharan Africa:

The Case of Ghana

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Abstract

Little is known about the relationship between self-identified difficulties conceiving, biomedical infertility, and union instability in sub-Saharan Africa. Previous research suggests that infertility increases the risk of psychological distress and marital conflict, encourages risky sexual behavior, and deprives infertile individuals and couples of an important source of economic and social capital. Qualitative research has suggested that there may be a link between infertility and divorce; less is known about the implications of infertility for unmarried couples. In this paper, discrete-time hazard models are applied to 8 waves of secondary panel data from Ghana collected by the Population Council of New York and the University of Cape Coast (n=1,173) between 1998 and 2004. Results show a positive relationship between perceived difficulties conceiving and relationship instability for both married women and those in nonmarital sexual unions; this relationship, however, does not hold for biomedical infertility. Future research should examine this relationship using nationally representative data in a cross-national comparison to determine whether results hold across the subcontinent.

Introduction

Recent research in sub-Saharan Africa (SSA) has begun to examine the consequences of difficulties conceiving--especially infertility, as inability to conceive is arguably particularly detrimental. This literature suggests that infertility negatively impacts and is impacted by factors such as psychological distress, marital instability, and stigmatization (Boerma & Urassa, 2001; Dyer, 2007; Fledderjohann, 2012; Leonard, 2002; Okonofua, 1999; Sundby & Jacobus, 2001). Yet much remains underexplored about the relationship between difficuties conceiving and social outcomes, including implications for romantic partnerships. Extant research on the link between infertility and relationship stability in SSA has generally been qualitative or cross-sectional; these excellent studies provide key evidence that a link may exist, but quantitative longitudinal studies are a necessary next step. The few studies examining this issue using quantitative data (for example, Boerma & Urassa, 2001) tend to focus on marriage, with scant attention paid to the effects of infertility among those in nonmarital sexual unions.

This study examines the effects of infertility on relationship stability for both married and unmarried individuals using panel data from Ghana, West Africa. Much of the literature has focused on the so-called infertility belt of Central Africa, where rates of infertility are especially high; however, high rates of infertility are not found exclusively in this region. Estimates of infertility in Ghana find that it impacts about 17-18% of the population (Larsen, 2000), providing an impetus to explore further the impact of infertility across the sub-continent. In this paper I explore the implications of infertility for relationship stability in SSA, taking Ghana as an example. It is a mistake to treat the subcontinent as a homogoneous unit; substantial economic, social, and religious differences exist between countries in SSA. However, a single-country case study contributes to the need in the literature to examine how (or whether) the link between

infertility and relationship stability varies between countries, especially outside of the infertility belt.

Relationship Formation and Disruption in sub-Saharan Africa

Marriage is a central, nearly universal institution in SSA, providing couples with adult status, economic resources, and ancestral linkages (Aryee, 1997; Oppong & Abu, 1987). A primary goal of marriage in Ghana is to produce children, but premarital childbearing and cohabitation are on the rise, as is the phenomenon of taking "outside wives" – extramarital longterm partners who do not formally enter into a marriage (Zabin & Kiragu, 1998), but who may bear the children of an unmarried partner. Women are expected to begin childbearing immediately after marriage, and motherhood earns one higher social status (Oppong & Abu, 1987). Where bridewealth is still commonplace, payments may be seen as an investment in a fertile woman who will continue the family lineage; if the couple does not produce a child, repayment may be demanded (Aryee, 1997), placing considerable pressure on the bride. Although the manifest function of the bridewealth is to tie two families together, one latent function is to facilitate divorce when a woman does not fulfill her reproductive responsibilities (Armstrong, 1997).

Although obtaining accurate estimates of divorce is difficult due to data limitations, it appears that divorce is quite common in SSA (Takyi & Broughton, 2006). Estimates range between 25% and 60% depending on the demographic group under consideration. Nearly 70% of marriages are officially monogamous, but men sometimes have sexual partners whom they do not marry (outside wives); these relationships may mirror polygynous marriage, but are not legal unions and thus are not figured into divorce statistics in the event of relationship disruption (Salm & Falola, 2002). The correlates of instability in nonmarital relationships in SSA are even

less clear; nor are the implications of various premarital partnership patterns for relationship stability apparent. The few extant studies of nonmarital unions in SSA have suggested that there are several key forms: those that progress towards marriage, those that are entered into when a (male) partner is already involved in one or more existing unions, and those that are disrupted and do not result in a marriage (Aryee, 1997; Barden-O'Fallon, 2005; Bledsoe, 2002; Desgrees du Lou, 1999; Meekers & Calvès, 1997; Meekers, 1992; Salm & Falola, 2002).

For unions that progress to marriage, there is no universal path to tread; paths vary by length, family involvement, type and number of ceremonies, cohabitation patterns, and a variety of other factors (Meekers, 1992). Relationships that do not transition to marriage may include: partnerships entered into for economic gain (Aryee, 1997; Meekers & Calvès, 1997); those that arise from migration, such as when a husband migrates for labor and forms a nonmarital union (Desgrees du Lou, 1999); partnerships to test fertility with a partner outside of the marriage (Barden-O'Fallon, 2005; Bledsoe, 2002); and those that begin with the possibility of marriage, but terminate due to incompatibility of partners (Salm & Falola, 2002).

Infertility and Relationship Stability

Childbearing is central to adult life in SSA; children provide invaluable assistance in subsistence activities, emotional fulfilment, continuation of the lineage, adult status, and economic security in old age (Caldwell, Orubuloye, & Caldwell, 1992; Sundby & Jacobus, 2001). Couples experience substantial pressure from family members to have large families, and quickly (Dyer, Abrahams, Hoffman, & Van der Spuy, 2002; Dyer, 2007; Oppong & Abu, 1987).

In light of the importance of childbearing in SSA, women who have difficulties conceiving--infertile women in particular--face stigma, social isolation, and, in some cases, divorce and loss of custody of existing children (Dyer, 2007; Fledderjohann, 2012; Okonofua,

1999; Pearce, 1999; Sundby & Jacobus, 2001). Primarily qualitative research in SSA has shown that infertility negatively impacts relationship quality and, subsequently, increases the likelihood of marital disruption (Boerma & Urassa, 2001; Leonard, 2002; Okonofua, 1999). Moreover, in much of SSA, infertility is considered legitimate grounds for divorce (Barden-O'Fallon, 2005). Not all research, however, has shown that infertility is associated with divorce: Oppong and Abu (1987) suggest that polygyny may enable subfecund women to remain married, thereby reducing the risk of infertility-related marital disruption. The impact of infertility on the stability of nonmarital unions is virtually unknown.

Contributions of the Current Study

The current study makes several unique contributions to the growing literature on a) subfecundity and infertility and b) relationship disruption in SSA. I focus not only on marital unions, but also on nonmarital sexual unions, as childbearing in Ghana does not occur exclusively within marriage. With some notable exceptions (Boerma & Urassa, 2001), studies of the association between relationship stability and infertility have predominantly been qualitative, and the few existing quantitative studies on this topic have been cross-sectional. This study uses event history analysis of panel data to answer two main research questions: (a) Is there an association between infertility and relationship disruption, and (b) Does the risk of relationship disruption differ for those who are married as compared to those who are in nonmarital sexual unions?

Materials and Methods

Data

I utilise 8 waves of pooled longitudinal data collected across six geographically varied regions of Ghana by the Population Council of New York and the University of Cape Coast between 1998 and 2004. A purposive sampling design was employed to maximise diversity of between-community economic modalities, ethnicity, and kinship systems (see Casterline, 2007 for a full description). On average, slightly less than 1 year passed between interviews. Respondents were given both (a) the main survey, relating to demographic characteristics, fertility attitudes and behaviors, contraceptive behavior, and other variables, and (b) a retrospective calendar instrument for the months between waves for a select set of indicators. Calendar data focused primarily on fertility-relevant information, such as birth control use.

The analyses were limited to the data for female respondents. The focus of the hazard models was relationship disruption. Women who were not currently either (a) married or (b) involved in a sexual union were excluded from the sample. Initially 1,219 women were interviewed. To account for attrition between Waves 1 and 2, 219 women were added, providing both data contemporary to the Wave 2 interview date and retrospective data relevant to the Wave 1 questionnaire (see Casterline, 2007). Twelve cases were dropped due to attrition, and the sample was further restricted to women who were within the demographic age of fecundability (15-49). A small number of women left their first marriage due to widowhood, which can be expected to differ substantively from other forms of relationship disruption. These women were allowed to contribute to the data set while in their relationship, but were censored (i.e. coded missing) at the point of widowhood. The final sample size was 1,173; pooled across 11 time points and accounting for censoring, the total number of records was 10,418. Additionally, there were substantially fewer records (4,827) available for models including self-assessed difficuties

conceiving due to the fact that data on these items are only available in Waves 6, 7, and 8 (see below).

Missing data for background and demographic variables were around 3% in most cases. Missing data did not exceed 20% for any of variables in the analyses; the variable measuring fertility desires had the highest amount of missing data (19.27%). Missing data were multiply imputed using the ICE procedure in Stata 11. A total of 10 imputed data sets were created with this procedure. Results shown are averaged across these data sets using the *mim* procedure, which adjusts the standard errors to account for the uncertainty introduced by imputation (Marchenko & Royston, 2009).

Analytic Strategy

I applied discrete-time hazard models to the Cape Coast data to model the relationship between difficulties conceiving and relationship stability. The data were pooled across 8 waves and arranged in a person-period format, where each individual had as many listings in the data as measurement occasions (Allison, 1995; Singer & Willett, 2003). Because there were uneven intervals between several of the interview dates (i.e. 7 months may have passed between waves A and B, while 10 months passed between waves B and C), even time points were created based on a 6 month interval, resulting in a total of 11 time points (Allison, 1995; Teachman, 2011).

Time-varying variables were coded based on the most temporally proximate measurement of the variables. The first time point for each respondent was set to be the date of her first interview. For example, imagine that Respondent 1 was interviewed in wave 1 in January of 1998, wave 2 in September of 1998, and wave 3 in September of 1999. Time-varying covariates (TVC's) for time 1 would come from wave 1. TVC's at time two would come from wave 2 because 6 months from time 1 would be July of 1998, which is temporally closer to wave

2 than wave 1. The next time point, time 3, would be 6 months from July of 1998–that is, January of 1999. Since this time point is closer to the wave 2 interview date (September 1998) than to the wave 3 interview date (September 1999), time-varying covariates for time 3 would be drawn from interview 2 for this respondent. Time 4–July of 1999–is closer to the wave 3 interview date than the wave 2 date, so TVC's for this time point are drawn from wave 3. Note: the models may underestimate the effects of infertility for women who began the survey infertile or who did not become infertile over the waves of data, resulting in a more conservative estimate.

Dependent Variable

The dependent variable was relationship disruption–that is, a divorce (among married respondents) or separation (for both union types). This dichotomous variable was measured at each of the 11 time periods, with individuals who were currently in a relationship coded 0 and those who had experienced the event (a disruption) coded 1. Individuals who experienced a disruption were censored at subsequent time points. The event variable was coded missing if either a) the respondent has not yet entered a relationship or b) the relationship has already ended at a prior time point. For example, a woman who entered the data set single, reported getting married at time 2, and divorced at time 6 would contribute information for each time period at which she was observed in a relationship prior to the event (in this case, divorce) and subsequent to the start of the survey. Thus, at time 1, this respondent would be coded missing; at times 2 through 5, the event variable for this respondent would be coded 0; however, the variable would be coded 1 at time 6, and the event variable will be missing for times 7 through 11. The respondent would not contribute data for times 7 through 11. Multiple events were not

considered; respondents were coded as missing subsequent to a disruption even if additional relationships could be observed later in the data set.

Independent Variables

Three measures of difficulties conceiving were used in the analyses. First, a measure of infertility drawn from the epidemiological literature was included to capture the effects of an objectively identified sterility on relationship stability. This measure (hereafter 24-month infertility) considers a woman infertile if she was not contracepting, was engaging in regular intercourse, desired to have a child, and had not experienced a birth for 24 months subsequent to either a) the birth of a child or b) the beginning of a relationship, depending on which was most recent (Larsen, 2005). While Larsen (2005) warns that short waiting times to conception may lead to an upward bias in estimates of prevelance, a comparative analysis of several objective measures of infertility (not shown here) suggests that the most stringent objective measures (which require 5-7 years of unsuccessful trying before identification as infertile) require far too long a waiting time to to identification as infertile to align with women's personal understandings of infertility; however, these individual perceptions are presumably the most salient factor in shaping the association between infertility and social factors, of greatest interest here. The 24-month infertility measure, then, more closely matches women's own assessments of their infertility than demographic measures, while offering a more conservative estimate of infertility than the traditional 12 month measure advocated by the World Health Organization and clinicians, who wish to quickly identify and treat potential infertility. Moreover, because live births, not conception, are the focus of the survey data here, a 12 month measure may overestimate infertility in the sample. A conservative measure is crucial in SSA, where long

periods of lactational ammenorhea and labor migration are common, and a 24-month measure offers an excellent compromise between the wide variety of objective measures in the literature.

The final two measures of difficulties conceiving are self-assessed, local (personal, community) definitions of difficulties conceiving. Self-identified measures typically involve a shorter waiting time than standard objective measures (Barden-O'Fallon, 2005), suggesting that it is worthwhile to consider self-identified measures in tandem with objective measures, as self-identified measures may better match local understandings of subfecundity (Leonard, 2002). The two subjective measures used in this study differed only in their treatment of birth control use. First, I included self-assessed difficulties conceiving ignoring contraceptive use (hereafter basic self-id), which classified a woman as infertile if she answered "takes a long time," "impossible," or "don't know" to the question "When you want to become pregnant, do you become pregnant quickly, or does it take a long time?" or if she responded that she cannot get pregnant to a second question, "Would you like to have (a/another) child (with your husband/partner) or would you prefer not to have any (more) children (with him)." A second version of the self-assessment measure accounting for contraceptive use was also created (hereafter contracepting self-id). This measure used the same questions and responses as the basic self-id measure, but classified a woman as not having self-assessed difficulties conceiving if currently contracepting under the assumption that she was simply a successful contraceptor.

Given that the self-assessed measures are less well-defined in the literature (particularly for use in SSA), several concerns may arise. First, while 56% of respondents self-identify according to the basic measure, only 11% do so when the contracepting measure is used. This is due entirely to contraceptive use in the sample. Among respondents who say it takes a long time to conceive, 65% report using birth control, and 73% of those who say it is impossible to

conceive use contraceptives. One possible explanation for this high level of birth control use among those who self-identify relates to cultural notions about aging and reproductive fatigue (Bledsoe, 2002); contraceptives may be viewed as a response to difficulties conceiving. Contraceptives may be used to give the reproductive system time to recuperate, aiding in conception and ensuring healthy future pregnancies. Couples may also use contraceptives for purposes other than preventing pregnancy (for example, condoms to prevent sexually transmitted infections). Additionally, the measures of birth control use do not account for frequency of use; if a couple uses a condom once, the couple will appear to be contracepting even if they have tried to obtain a pregnancy in other sexual engagements that month. Based on prior literature, the effect of controlling for birth control use for subjective measures is not clearcut. I provide both versions of the measure as the perception of difficulties conceiving will arguably be distressing and potentially detrimental to the relationship regardless of contraceptive behavior.

Additionally, the response "takes a long time" may arguably not necessarily indicate that a woman identifies herself as having difficulties conceiving. However, Greil (1991) found that U.S. women undergoing treatment identified as "not yet pregnant" rather than "infertile". While they felt that they had difficulties conceiving, they were reluctant to embrace a self-identified label. In a context in which childbearing is expected to occur very early in a marriage, acknowledging that it takes a long time to conceive will likely capture self-identified difficulties whether or not the respondent is willing to accept a formal label. Similarly, coding women who responded "don't know" as having difficulties conceiving will capture women who suspect difficulties but are unwilling to embrace the label. Moreover, because women not currently in a sexual union were excluded, the measure will not include women who express uncertainty because they are currently abstinent.

Conceivably, because divorce in the case of difficulties conceiving is typically initiated by the male partner, the female partner's perception of difficulties may not be as salient as the male partner's perception of her fertility status. Nevertheless, women often experience pressure both from within the dyad and from in-laws (Dyer et al., 2002). Presumably a male partner's perception of difficulties conceiving will strongly influence his partner's perception, and the female respondent's report will adequately capture the role of perceived difficulties in shaping relationship disruption.

Given the strong, curvilinear relationship between age and infertility in the data (not shown), as well as the inverse relationship between age and propensity to divorce found in extant literature (Booth, Johnson, White, & Edwards, 1986), age in years was included to parse out the independent effects of age and infertility. A continuous indicator of relationship duration in months was also included to account for the potential effects of duration on relationship stability (Amato & Rogers, 1997; Booth et al., 1986), as well as to control for duration dependency (Box-Steffensmeier & Jones, 2004). Among married respondents, a dichotomous indicator of whether the respondent had any cowives (i.e. whether the relationship was polygynous) was included.

For those in a nonmarital sexual union, a dichotomous indicator was included for whether the union transitioned into a marriage, with those who did experience a transition coded 1, and those who either experienced a disruption or remained in the union without marrying coded 0. This measure may be meaningful if relationship quality is higher among those who make the transition to marriage. Alternatively, some unions may be conceived of as candidates for marriage from the start (or nearly), while others may be seen solely as nonmarital arrangements. The latter may be more susceptible to disruption. A dichotomous indicator of whether the

relationship was a marital union (coded 1) or a nonmarital sexual union (coded 0) was included to capture the qualitative differences that might exist between marital and nonmarital unions.

Parity was included as a categorical variable. Most of the women in the sample had at least one child already. As a result of censoring, it is not possible to tell whether the respondent had the child with a previous partner or with her current partner. It may be the case that difficulties conceiving subsequent to the birth of a child is substantially more distressing when all births occurred prior to the start of the current relationship than when childbearing occurred with one's current partner. The effect of having a child with the current versus a previous partner cannot be determined by the data used here.

Ethnicity was also included as a control in the models. Takyi and Broughton (2006) found that ethnic identification may influence divorce; within Ghana, membership in some groups may afford women more autonomy, which is associated with higher rates of divorce. Moreover, though the association between ethnicity and fertility is strongly related to other socio-demographic characteristics, there appears to be a relationship between fertility behaviors and ethnicity (Addai & Trovato, 1999). For example, some sexual and birthing practices, which vary by ethnicity, may be associated with an increased risk of reproductive tract infections which are, in turn, associated with infertility. Due to small cell counts, several categories were collapsed, and differences between ethnic groups could not be assessed. Ethnicity was measured in five categories: Adangbe, Ga or Ewe, Denkyira, Fante, and Ahanta or Other.

Where appropriate based on preliminary analyses, curvilinear terms were included for age and relationship duration; interaction terms were included for age and relationship duration. Interactions were also tested for 24-month infertility/self-id and relationship type (marriage vs. union), 24-month infertility/self-id and relationship duration, and 24-month infertility/self-id and

parity, but were not significant and were excluded from the final models. Where curvilinear or interaction terms created extremely large values (age squared, relationship duration squared, and the age by relationship duration interaction), variables were divided by 1,000. This process changes neither the strength nor the direction of the relationship, but it does provide a sufficiently large coefficient to interpret.

Results

Descriptives

[Table I about here]

Table I provides descriptive statistics for the subsample of women included in the analyses; statistics vary substantially from the full sample. Table I shows the prevalence of each measure included in the analyses. Records are pooled across the the 11 time points (except in the case of self-identified difficulties conceiving, which is pooled across 5 time points due data availability), resulting in 10,418 total records (4,827 records for self-identified infertility). Just under 15% of the sample experienced a first relationship disruption at some point during the observation period. Nearly 10% of the the sub-sample experienced 24-month infertility. Self-identified difficulty was more frequent: 56% experienced basic self-id (birth control not accounted for), while 11% experienced contracepting self-id (current contraceptors coded not having difficulties conceiving).

The average age for women in the sub-sample is 29.61 years; age ranges from 15 to 50 years. The average relationship duration is 47.47 months, though this figure ranges from 1 to 66 months. The majority are in a marital union (87%), while a substantial minority (13%) are in a nonmarital union. Among those in a union, 17% transitioned from a union into a marriage during

in the observed period. The remaining 83% either remain in a union to the end of the observation period or experience a relationship disruption. Among married respondents, about a quarter (26%) have one or more cowives, while the remaining 74% are monogamously married. Parity is presented both as an interval measure, which ranges from 0 to 14 children, with the mean at 4.23 children per woman, and as a categorical measure. Only 6% of respondents have no children, and an additional 9% have one child, while the remaining 85% have more than one child.

Nearly half of the subsample (40%) never attended school. An additional 18% attended primary school, while 7% report finishing primary school but not attending middle school. Thirty-two percent attended middle school, and a small minority (3%) attended or completed secondary school. A majority identify with the Fante ethnic group (52%), followed by Adangbe (14%), Ga or Ewe (10%), Denkyira (12%), or Ahanta or some other ethnic group (11%).

Hazard Models

[Table II about here]

Model 1 in Table II shows the non-significant, univariate relationship between 24-month infertility and relationship disruption. Model 2 provides the multivariate model with 24-month infertility, age, and the curvilinear term for age. The odds of disruption for infertile respondents remains non-significant, while age is curvilinearly associated with the odds of relationship disruption. The *Pseudo R-Squared* measure suggests that these predictors explain a small portion of the variance in relationship disruption (about 2%).

Model 3 shows the full multivariate model with all predictors. Infertility is still non-significant (OR=1.24). Relationship duration is strongly, significantly associated with relationship disruption: for every one month increase in relationship duration, there is a drop in

the odds of disruption, with the odds dropping much more quickly for duration above 24 months. Older respondents in longer relationships face lower odds of disruption (OR=1.21), while those in polygynous marriages having greater odds of disruption (OR=1.94) than those in monogamous unions. Respondents who have no children (OR=.49) or only one child (OR=.59) have substantially lower odds of disruption than those with two or more children. The remaining covariates are not significant. These variables jointly explain 33% of the variance in relationship disruption (*Pseudo R-Squared=.33*).

[Table III about here]

Table III provides the results of the hazard models predicting relationship disruption as a function of basic (not accounting for contraceptives) self-id, fertility variables, and socio-demographic variables. Model 1 shows the univariate association between relationship disruption and each of the self-identified measures. There is a strong, positive relationship between basic self-id and disruption (OR=5.11). Model 2 shows the association between basic self-id and relationship disruption controlling for age. The positive effect of self-identified difficulties conceiving (OR=4.09) remains strong and highly significant, and the association between age and disruption is curvilinear. Basic self-id and age account for around 2% of the variance. Model 3 shows the coefficients with all of the fertility and socio-demographic predictors added. The effect of self-identified difficulties conceiving actually increases in this model, with women who self-identify having 5.45 times the odds of relationship disruption compared to those who do not self-identify. The effect of age is now non-significant, while relationship duration is negative, significant, and slightly curvilinear: The odds of disruption decline slowly at first, then more rapidly as duration increases. Those in polygynous marriages have over 4 times the odds of disruption compared to those in monogamous unions, and married respondents face significantly

lower odds of disruption (OR=.30). Those with no children (OR=.29) or only one child (OR=.35) have lower odds of disruption than those with more than one child. The remaining predictors in the model are non-significant. The full model explains 34% of the variance in relationship disruption.

Model 4 in Table III adds 24-month infertility to the full model. Presumably, if the perception of difficulties conceiving is the salient factor, the effect of self-identification should remain largely unaffected by the inclusion of 24-month infertility; conversely, if underlying sterility is more salient than the perception of subfecundity, the effect of self-identification should be substantially diminished. Model 4 shows that the former assumption holds. Basic self-id is strongly, significantly associated with disruption, even when controlling for underlying sterility. The *Pseudo R-Squared* is unchanged between Models 3 and 4.

[Table IV about here]

Table IV shows the association between relationship disruption and contracepting self-id. The first model provides the univariate relationship between contracepting self-id and relationship disruption; those who self-identify are significantly more likely to experience relationship disruption as compared to those who do not self-identify (OR=2.02). Model 2 shows the results including contracepting self-id and age. The effect of difficuties conceiving (OR=2.22) actually increases somewhat compared to the univariate case, and is now a significant predictor of relationship disruption. Age is once again curvilinearly related to relationship disruption. Model 3 provides the full model, in which only relationship duration, polygynous marriage, relationship type, and parity are significant. The curvilinear relationship between disruption and duration remains significant. Those in polygynous marriages are more likely (OR=3.75) to experience a disruption, and married respondents significantly less (OR=.28).

Respondents with only one child have lower odds of disruption (OR=.43) than those with more children. The remaining predictors are not significant in this model. Finally, Model 4 shows the full model with 24-month infertility included. Given that the effect of contracepting self-id is non-significant in both Models 3 and 4, it is difficult to accurately assess the effect of including 24-month infertility. Self-identification and age together explain 4% of the variance in disruption, and the full models explain about 34% of the variance.

Discussion

This study sought to answer two questions: (a) what, if any, is the association between difficulties conceiving and relationship disruption for Ghanaian women and (b) does this relationship differ by union type? Results of the hazard models show a positive association between difficulties conceiving and relationship disruption. This is substantially stronger for self-identified difficulties conceiving than for 24-month infertility, suggesting the perception of infertility may be more salient for relationship stability than is underlying (in)ability to conceive. Underlying sterility is unlikely to be distressing if one is unaware of problems conceiving. Without the perception of difficulties conceiving, such difficulties cannot be cited as a justification for divorce. This study has also shown that there are substantial differences by relationship type in the hazard of experiencing a disruption: married women have significantly lower odds of experiencing a disruption than do women in a nonmarital union.

As no significant interaction was found between difficulties conceiving/infertility and relationship type, it appears this association holds for both fertile and infertile women. The effect of difficulties conceiving may differ between marital and nonmarital unions; childbearing is a central component of a marriage but is not necessarily expected in all nonmarital unions. For

unions which mirror marriages, emphasis will presumably be placed on childbearing—particularly if the union was entered into to "test" fertility. The risk of disruption may be greatest for these unions, as no legal ties bind the couple. For more casual unions, childbearing likely will not be expected, and difficulties conceiving are unlikely to impact relationship disruption. Future research should consider the impact of difficulties conceiving by relationship type with distinctions between types of nonmarital partnerships.

This study also shows that polygynous marriages face a substantially higher risk of relationship disruption than do monogamous marriages. In this case, polygyny does not appear to offer women much protection from relationship disruption when facing difficulties conceiving. It may be that women in polygynous unions may not feel adequately supported and be more inclined to leave the marriage. Conversely, polygyny may stem from existing marital troubles. Parity is also a significant predictor of disruption. Contrary to what might be expected, having one or no children actually reduces the odds of relationship disruption once difficulties conceiving and socio-demographic factors are accounted for. Low parity may increase the risk of relationship disruption for women who have difficulties conceiving, but low parity among those who are not infertile could mean that the couple has not begun trying to conceive. Further investigation of these issues is needed.

In sum, this study provides empirical evidence that perceived difficulties conceiving may contribute to an increased risk of relationship disruption, both for married and unmarried couples. Furthermore, it appears that married couples are less likely to experience a disruption. It could be the case, however, that some women experience declines in relationship quality and, unsure of what other factors may account for this decline, attribute their marital difficulties as arising from an inadequate pace of childbearing. Nevertheless, given the link between infertility

and divorce established in qualitative research (Leonard, 2002), it is reasonable to expect that perceived difficulties conceiving may, in fact, influence the risk of relationship disruption.

There are several important limitations. First, the measure of self-identified difficulties conceiving used in the study may not precisely match with women's self-assessments of their fertility; while prior research (Leonard, 2002) has suggested that self-identified measures may be far more salient for social outcomes than objective, externally defined measures, there is a serious dearth of data in SSA—particularly longitudinal data—which includes measures of self-identified measures. The findings in this study are suggestive of the importance of difficulties conceiving in shaping relationship outcomes, but longitudinal data with alternative measures of difficulties conceiving, including direct measures of self-idenfitied infertility, are needed to further address the question. The National Survey of Fertility Barriers (Johnson & White, n.d.) in the U.S., for example, asks respondents: "Do you think you have/have had/might have trouble getting pregnant" and "Do you think you have/have had a fertility problem." Given the importance of infertility for relationship dissolution suggested by this and other studies (Boerma & Urassa, 2001; Dyer, Abrahams, Mokoena, & Van der Spuy, 2004), it is imperative that future studies of family and fertility in the region include measures not only of fertility, but also of infertility.

Second, due to the purposive nature of the sampling frame, the sample is not representative of the Ghanaian population. Third, as a result of low cell counts, I was unable to distinguish between primary and secondary infertility; infertility subsequent to a birth is likely to be qualitatively different than childlessness, and could have an attenuated effect on relationship stability. I do control for whether the respondent has had no children, one child, or more than one

child; however, these measures also include women who are not infertile and, may actually downplay the importance of parity if women who are not infertile are also not distressed.

Moreover, for relationships that began prior to the first interview date, it is not possible to tell whether any existing children were born in the current relationship or a previous relationship. Childbearing prior to the current relationship but not within the current relationship may differ very little from childlessness in terms of relationship stability. Similarly, there is no way to know how many women have had at least one marriage that ended prior to the start of the survey; it may be that the first marriage is qualitatively different from subsequent marriages–especially if the new husband knows that the wife has had previous difficulties conceiving. These issues should be explored using longitudinal data with full marital histories available.

The data also do not contain adequate information about cowives, who appear to play an important role in shaping the risk of disruption. Data on order and fertility of cowives would be particularly informative. I did not examine multiple events due to data limitations, but it may be that the disparities between fertile and infertile women are even greater when multiple disruptions are considered. Bridewealth may serve as a disincentive to divorce (Takyi & Broughton, 2006), but no measure is available. It would be of interest to know whether the relationships found in this study hold when controlling for socioeconomic status of the natal family and the cost of the bridewealth–particularly because it is conceptualised as the purchase of reproductive capacity (Armstrong, 1997). Finally, there is a need to examine if the effects found here also apply to men.

A broader theoretical critique of studies of marriage in SSA may also apply. The process of entering a marriage may take up to several years; parsing out timing of entry into sexual unions, cohabitation, traditional and formal ceremonies, and other substantively significant

milestones is likely to be important for understanding how relationship dynamics and entry into marriage may influence fertility and family planning behavior (Meekers, 1992). Future studies should examine this issue cross-nationally using richer, more detailed relationship data.

Author's roles

The author was responsible for the study design and execution, the analyses, manuscript drafting and critical discussion.

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Table I

Descriptive Statistics for Cape Coast Data Across 11 Time Points (N=1173; Records=10,418)

Variables	M	SD	Range
Relationship Disruption	0.14	0.35	0-1
24-Month Infertility	0.08	0.27	0-1
Basic Self-ID	0.56	0.50	0-1
Contracepting Self-ID	0.11	0.31	0-1
Age in Years	29.61	8.60	15-50
Relationship Duration	47.47	19.55	1-66
Marital Union	0.87	0.34	0-1
Union Transitioned to Marriage	0.17	0.38	0-1
Cowives	0.26	0.44	0-1
Parity	4.23	2.80	0-14
No Children	0.06	0.23	0-1
Only One Child	0.09	0.28	0-1
More Than One Child	0.85	0.39	0-1
Education Level			
No Education	0.40	0.49	0-1
Some Primary School	0.18	0.39	0-1
Finished Primary School	0.07	0.25	0-1
Attended Middle School	0.32	0.47	0-1
Attended Secondary School	0.03	0.17	0-1
Ethnicity			
Adangbe	0.14	0.35	0-1
Ga or Ewe	0.10	0.30	0-1
Denkyira	0.12	0.33	0-1
Fante	0.52	0.50	0-1
Ahanta or Other	0.11	0.31	0-1

Table II

Hazard of Relationship Disruption Accounting for 24-Month Infertility (N=1,173; Records=10,418)

	Model 1		Model 2		Model 3	
Variable	OR	95% CI	OR	95% CI	OR	95% CI
24-Month Infertility	1.55	.86, 2.80	1.35	.73, 2.49	1.24	.41, 2.21
Age			0.78***	.70, .87	0.97	.91, 1.17
Age Squared			1.42***	--	0.94	--
Relationship Duration					0.98	1.00, 1.08
Duration Squared					0.13***	--
Age*Relationship Duration					1.21**	1.02, 3.52
Cowives					1.94*	.62, 1.44
Union to Marriage					1.00	.47, 1.09
Married					0.74	.50, 5.80
Parity						
No Children					.49*	.36, 1.07
Only One Child					.59*	.37, 1.06
Ethnicity						
Adangbe					1.21	.56, 2.93
Ga or Ewe					1.35	.58, 3.43
Denkyira					1.76	.87, 4.40
Fante					1.30	.65, 3.02
Ahanta or Other (ref)						
Psuedo R-Squared				0.02		0.33

*p<.05 **p<.01 ***p<.001

Table III

Hazard of Relationship Disruption Accounting for Basic Self-Identified Infertility (N=1,173; Records=4,827)

	Model 1		Model 2		Model 3		Model 4	
Variable	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Basic Self-ID	5.11***	2.77, 9.42	4.90***	2.65, 9.06	5.45***	2.78, 10.67	5.23***	2.65, 10.33
24-Month Infertility							1.54	.68, 3.47
Age			.86*	.73, 1.00	1.06	.88, 1.28	1.04	.86, 1.26
Age Squared			1.30*	1.01, 1.68	0.96	--	0.98	--
Relationship Duration					1.01	.93, 1.10	1.00	.92, 1.09
Duration Squared					.30*	--	.32*	--
Age*Relationship Duration					0.96	.78, 1.17	0.97	.79, 1.18
Cowives					4.08**	1.66, 10.03	4.15**	1.67, 10.29
Union to Marriage					1.32	.70, 2.47	1.34	.71, 2.54
Married					.30***	.17, .54	.31***	.17, .55
Parity								
No Children					.29*	.10, .83	.26*	.09, .77
Only One Child					.35*	.15, .84	.35*	.15, .84
Ethnicity								
Adangbe					1.19	.28, 5.1	1.14	.27, 4.96
Ga or Ewe					2.25	.51, 9.86	2.24	.51, 9.91
Denkyira					3.01	.73, 12.50	3.12	.74, 13.27
Fante					2.00	.52, 7.66	2.02	.53, 7.79
Ahanta or Other (ref)								
Psuedo R-Squared				0.05		0.34		0.34

*p<.05 **p<.01 ***p<.001

Table IV

Hazard of Relationship Disruption Accounting for Contracepting Self-Identified Infertility (N=1,173; Records=4,827)

	Model 1		Model 2		Model 3		Model 4	
Variable	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Contracepting Self-ID	2.02*	1.03, 3.94	2.22*	1.11, 4.49	1.63	.80, 3.34	1.13	.45, 2.85
24-Month Infertility							1.81	.68, 4.87
Age			.84*	.72, .98	1.03	.86, 1.23	1.01	.84, 1.22
Age Squared			1.39**	--	1.02	--	1.03	--
Relationship Duration					1.00	.92, 1.08	0.99	.92, 1.08
Duration Squared					.32*	--	.32*	--
Age*Relationship Duration					0.99	.81, 1.21	1.00	.82, 1.23
Cowives					3.76**	1.53, 9.24	3.74**	1.51, 9.25
Union to Marriage					1.51	.79, 2.90	1.53	.80, 2.95
Married					.28***	.16, .50	.28***	.16, .50
Parity								
No Children					0.45	.17, 1.24	0.41	.14, 1.14
Only One Child					.43*	.18, 1.02	.42*	.18, .98
Ethnicity								
Adangbe					1.15	.28, 4.79	1.12	.27, 4.71
Ga or Ewe					2.09	.48, 9.03	2.12	.49, 9.22
Denkyira					2.86	.70, 11.6	3.01	.73, 12.31
Fante					2.11	.56, 7.96	2.15	.57, 8.07
Ahanta or Other (ref)								
Psuedo R-Squared				0.02		0.31		0.31

*p<.05 **p<.01 ***p<.001