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Influences of Family Structure Dynamics on Sexual Debut in Africa: Implications for Research, Practice and Policies in Reproductive Health and Social Development

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Abstract

There is no research on the timing, sequencing and number of changes in family environment and their influences on sexual and reproductive health outcomes in Africa. Using a population-based survey with data on family structure at three points in the life course, this paper examines the influences of these family structure dynamics on the timing of first sex among unmarried males and females aged 12-24 years in Cameroon. The number and timing of family transitions significantly impacted the timing of sexual debut for both males and females. The median age at first sex (18.7 years) is higher among young people without family transition than among those with one transition (18.2 years) or two transitions (17.7 years). Family transitions occurring during childhood were significantly associated with premature sexual initiation for females but not for males. Reproductive health and social development interventions for young people in Africa should integrate the changing contexts and transitions in family structure (*Afr J Reprod Health 2012 (Special Edition); 16[2]: 147-172).*

Résumé

Il n'existe pas des recherches sur l'occurrence, les séquences et le nombre de modifications des structures familiales ainsi que leurs influences sur la santé sexuelle et de reproduction en Afrique. A partir des données d'une enquête basée sur la population ayant collecté des informations sur les structures familiales à trois différents moments au cours de la vie chez les célibataires des deux sexes âgés de 12 a 24 ans au Cameroun, cette étude examine les effets de la dynamique des structures familiales sur le début de l'activité sexuelle. Le nombre de transitions familiales et leur occurrence sont significativement associés à l'âge au premier rapport sexuel tant chez les filles que chez les garçons. L'âge moyen au premier rapport sexuel est plus élevé chez les répondants n'ayant vécue aucune transition familiale (18,7 ans) que ceux qui ont connu une transition (18,2 ans) ou deux transitions familiales (17,7 ans). Une transition familiale survenue durant l'enfance influence l'entrée en sexualité des familles, mais pas celles des garçons. Les activités d'intervention en santé de reproduction et développement social des jeunes en Afrique doivent intégrer les changements des contextes et transitions des structures familiales (*Afr J Reprod Health 2012 (Special Edition); 16[2]: 147-172).*

Keywords: Family structure, sexuality, reproductive health, social development, young people, Africa

Introduction

Reproductive health (RH, hereafter) activities have clearly demonstrated that individual oriented interventions are less successful than those which integrated contextual factors in their design and implementation.[1] Among contextual factors, prior research evidenced that family environment is of

paramount importance for interventions targeting adolescents and young adults.[2-4] However, research on the linkages between changing contexts and transitions in family structure and sexual behavior and reproductive health outcomes in sub-Saharan Africa (SSA) remains embryonic. The handful of studies linking family environment and adolescent sexual behavior in SSA[5-12], suggest similar results to those found in developed countries. Compared with neither- or one-parent families, living in two-parent families are associated with lower risks of first sexual intercourse.[5, 9, 13] However, these studies suffer from two main drawbacks which substantively limit their usefulness for effective RH interventions in SSA. First, the majority of previous studies in SSA have relied on cross-sectional data, and have often used current individual/familial characteristics to explain past events such as sexual initiation. While they contribute to some extent to the knowledge base on the relationship between family environment and sexual behavior, they remain limited for policy and program purposes. They cannot identify and explain the mechanisms through which prior exposure to certain family environments may be detrimental for adolescents and young adults. Second, these studies did not focus on family environment for fostering preventive or acceptable RH behaviors. For instance, Babalola adopted the ideation approach to understand the effects of peer perceived behavior on the timing of sexual initiation among youth in Rwanda.[5] Djamba utilized rational adaptation, social disorganization, and patrilineal bias framework to depict the effects of social capital on premarital sexual activity in the Democratic Republic of the Congo.[8] Although they do not deny the role of parents, these studies did not integrate the changing family environment. Consequently, previous studies often lack a family-oriented theoretical foundation and a conceptual framework which depict how family environment and child outcomes are related in the sub-Saharan African context.

The present study constitutes a continuing effort to disentangle the role of changing family environment underway in Africa -- as measured by family structure, family transitions and family processes – in shaping sexual and reproductive health outcomes in Africa.[14-16] Family structure and family changes/transitions are not mutually exclusive but they are conceptually distinct. Family structure captures parental co-residence and considers whether the child/youth resides with his/her biological parents or parent-like figures at a specific time. Family changes or transitions are dynamic measures of family structure which measure the transitions from one family structure to another over the family life cycle. In general, previous studies found that youth who resided in two-parent families, compared with youth residing in other family structures, are more likely to report positive outcomes in developed[17, 18] and developing countries.[5, 9] Theoretically, research based mainly on US data and other developed countries have identified three main perspectives to explain the relationships between family structure and child outcomes: socialization, social control, and family instability and changes. A thorough examination of these family-centered perspectives, and the possible contingencies that can be found in SSA, has been discussed elsewhere[17-20]. These perspectives may be viewed as complementary rather than competing[18]. For instance, family instability and changes emphasizes the dynamics of family structure on sexual behavior, including sexual debut; it posits that changes, disequilibrium, and psychological distress associated with family transitions are more relevant to explain the relationships between family environment and sexual and reproductive health outcomes than does family structure *per se*.

The investigation is carried out using a rich dataset from the 2002 Cameroon Family and Health Survey (2002 CFHS). To our knowledge, the quantity and quality of family living arrangements data collected in the 2002 CFHS among young people aged of 10-29 years is unmatched to date in the Sub-Saharan African contexts. Relevant information collected at three points included parental co-residence and family processes (communication about sexuality, quality of parent-child relationships, parental control), youth's involvement in religious/communities activities, material advantage or deprivation and time use.

Family structure dynamics and sexual debut: What do we know and what should we know?

An extensive literature from developed countries has documented the association between family environment and premarital intercourse among youth.[19] These studies have focused on two non-exclusive areas, including family structure and family processes, and provide a valuable knowledge base for researching the influences of family transformations on sexual debut in SSA. Although various types of family structures such as stepfamilies, reconstituted or blended families have been considered in developed countries, empirical studies are mainly grounded in the idiosyncratic dichotomy between nuclear intact families and non-intact families. The former provides a warm and appropriate environment for child socialization and supervision which is considered protective. The latter is treated as a risky environment for youth development, leading to a set of problem behaviors including early sexual initiation. In SSA, family configurations are more complex: extended family remains prevalent and polygamy is still an important component of family configurations in many countries. These dimensions need to be integrated into the measure of changes in family structure, in order to provide a more complete portrait of the relationships between family environment and sexual initiation in the sub-Saharan African context.

Socialization theory

From socialization, individuals learn how to interact in dating relationships through conscious and unconscious observations of the relationships around them during early childhood, particularly those between parents or parent-like figures.[18, 21] Youth from unmarried households witness their parents' dating or cohabitation while they are learning to deal with their own romantic relationships and may model their own patterns of sexual activity after those of parents.[22] Most empirical studies have confirmed these conjectures in developed countries[18, 21]and developing countries[9, 10, 23-25] alike. Compared with children from neither- or one-parent families, children living in two-parent families have lower risks of problem behaviors and lower rates of sexual debut. To some extent, the theoretical anchor-point of socialization in early childhood is built on attachment theory. This theory emphasizes the role of the primary caregiver and that of the family environment, ideally the nuclear two-parent families during early childhood.[26] The degree of parent-child closeness, the quality of parent-child relationships or the levels of parental involvement, provide the child with protection, security, and comfort to better adapt psychologically and emotionally, and to adhere to socially acceptable behaviors.

In sub-Sahara African countries, these assumptions are pertinent. First, although the child is closer to biological parents in nuclear two-parent families than other family configurations, the uneven gender roles among parents between men and women as they relate to family influences on child development have been documented.[27] The mother is the primary caregiver in most African contexts like in many other societies. As such, the mother is the most influential person in early childhood. Fathers tend to be less involved in day-to-day childcare and childrearing activities during early childhood; this is likely to lessen the potential influences of two-parent families in early years of life. Second, parent-child bonds in extended families in these contexts are affected by the presence of other adults in the home. The presence of grandparents or other adult relatives within the home can largely lessen the role of biological parents, especially the mother, in childrearing duties during early childhood which in turn is likely to lower the levels of parent-child closeness. Third, the socialization theory emphasizes the link between the father's absence in the home and poor outcomes in adolescent boys and girls.[28, 29] The ways in which the father's absence operates in most African contexts may substantively differ from the Western countries. The cultural traditions of a long period of postpartum abstinence following a birth often coupled with the presence of extended family members in the household as residents or regular visitors often restrict the opportunities for fathers to bond with their children. This is especially the case in polygamous families where the father has to partition his time among his wives and children

and the ensuing limited contacts result in low levels of father-child bonds which in turn reduce the effects of father's presence during childhood and early adolescence. In sum, parent-child closeness per se or the quality of parent-child relationships during early years of life in such environments may be less influential, as a result of limited paternal involvement in childrearing. Finally, parent-child interactions may be dependent upon the involvement of other adults (e.g., grandparents, aunts) within the home.

Although somewhat inconsistent across studies, higher levels of parent-child communication about sexuality is another factor found to be associated with lower rates of risky behaviors in Western countries.[30] In SSA, studies on the content, time and frequency of parent-child communication about sexuality are quite limited in quality and quantity. Existing literature identifies the culture of silence as a strong barrier to parent-child communication about sexuality topics in many African societies[31] and west Cameroon in particular.[32] Indeed, biological parents in African societies generally feel uncomfortable talking to their children about sexuality topics. The role of sexuality educators is much more fulfilled by grandparents[33], and peers.[34] Strictly speaking, parent-child communication during early childhood is expected to be low, but likely higher in extended families (one or two-parent) where youth may have the opportunities to interact with other adults, compared with nuclear families. Empirical evidence showed that associations between parent-child communication and sexual activity in SSA are decidedly inconclusive. Some researchers found a weak relationship[23, 35], while others have found no effect.[36] The cross-sectional nature of data used in these studies likely limits their capacity to adequately determine the time-order of parent-child communication and sexual debut.[37]

Social control thesis

The social control thesis posits that adolescents from two-parent families have fewer opportunities to engage in sexual activity due to higher levels of parental supervision and monitoring compared with neither- and one-parent families.[38-40] During this developmental period, parents and family members are critically influential on the decisions made by adolescents and young adults over sexual matters.[41] In SSA, parents, particularly fathers, play an important role in disciplinary rules within the home.[27, 42] For instance, father-child relationships in SSA are often vertical rather than horizontal.[9] Therefore, father's absence may lead to a lesser home discipline, which in turn may result in a faster transition to sexual initiation among young people.[43, 44]

The role of social control processes in the effects of family environment on premarital sex in SSA may differ from that of Western societies in several points. First, the negative effects of one-parent families on early sexual debut in developed countries are partly explained by the family nuclearization. Parental absence (referred to as the absence of one parent) may increase the burden of childrearing for the other parent in Western context, especially when he/she is working out-of-home. In SSA, members of the extended family may shield the child against potentially deleterious effects of parental absence because other adult members in the home can supervise and monitor youth in lieu of biological parents, then decreasing the risk of premarital intercourse. Hence, the presence of viable surrogate fathers can limit the negative effects of father's absence. Indeed, adults in many African societies mean "parents". These parent-like figures have the social power to rebuke any youth's misbehaviours or report any behaviors which break social rules to biological parents who will undertake disciplinary actions to retrieve normative behaviours, thus reducing the negative effects of parental absence. The longer the child remains in the same family structure, the more knowledgeable he/she is about parental values and home discipline. Frequent changes in family structure often lead to a lower internalization of home discipline, family values, and parents' attitudes about premarital sexual activity. Such lack may negatively affect the timing of sexual debut among adolescents and youth. Empirically, higher levels of parental monitoring were also significantly and negatively associated with sexual activity among Ghanaian youth.[35]

Second, the protective role of two-parent families found in developed countries deserves

scrutiny in SSA, especially in the context of polygamy where marital relationship involves multiple wives and multiple parents. Polygamous fathers may not have enough time to equally supervise the higher number of their children, almost leaving each mother as the main parent overseeing her children. This situation is similar to neither- or one-parent households. Indeed, in African societies where polygamous wives maintain geographically separate households, fathers may be only present sporadically in youth's lives so that the burden of youth supervision falls disproportionately on the shoulders of polygamous mothers.[45] Third, higher levels of family conflict within polygamous families may explain why youth from those families exhibit poor outcomes, including early sexual debut.[46] Fourth, youth from polygamous families are more likely to report psychological adjustment problems compared with those from monogamous families.[47-50] Polygamy may negatively affect household's socioeconomic status and interpersonal relationships due to higher levels of family conflicts within the home. This may impair a child's psychological and social adjustment which is likely to increase the risk of premarital intercourse.

Finally, the effects of parental control may vary by gender. Most African societies have different expectations for males and females about sexuality, whereby premarital sexual intercourse is strictly prohibited for females whereas it is sometimes encouraged or not sanctioned for boys.[51]

Family instability and changes

The thesis is that sexual initiation among adolescents and young adults is driven by family instability and changes that occur after a divorce, remarriage, or parental death. Studies showed that youths raised in non-intact families are more likely to experience multiple family transitions and conflicts due to stressful events, which tend to hasten their sexual initiation.[21, 52] The increasing rates of divorce in developed countries led researchers to focus primarily on the negative effects of marital disruptions on sexual onset.[53, 54] In contrast, single-parent households in African settings more often result from parental deaths than divorce. Previous research indicates that parental death is a strong, traumatic and stressful event associated with negative outcomes such as school dropouts[55-57] or risky sexual behavior.[12, 58] Orphans may be particularly vulnerable to sexual initiation because they lack role models or closer supervision compared with non-orphans. Early sexual debut among orphans can be seen as an alternative to the lack of love and affection at home.[57] Empirical evidence revealed that South African orphans, both females and males, reported early sexual initiation.[12] A study among Kenyan schoolgirls mentioned that orphaned females were looking for parental love, which may explain their potential sexual relationships.[58] Finally, the distress following parental death may lead to poor decision-making on sexual matters.[59, 60] A study conducted in Zimbabwe showed that maternal and double orphans were more likely to initiate first sex at an early age, and have multiple sexual partners.[61] Besides parental death, SSA has a strong tradition of redistributing children across households within the extended families.[62] For many reasons including schooling[63] or parental death, biological parents or other adults in the extended families can send children to be reared by other relatives. Although one might argue that fostered children keep regular contacts with biological parents, child fostering has long been recognized as a risk coping mechanism used in SSA to offset economic hardship, to take advantage of the available resources through the extended kin networks, and to redistribute the costs and benefits of childrearing across the extended families.[64-66] Although the mechanisms through which fostering leads to poor outcomes remain unclear, empirical evidence showed that fostered children have lower school attendance and poor academic performance[55, 67, 68], reported an early age at sexual debut in Kenya[13], or more likely reported paid work either full-time or part-time.[66] The finding about paid work offers two possible explanations for why those youth can exhibit early sexual debut. First, paid work can lead to more autonomy even though it is also plausible that the minor-youth may have to report to the household head how the money from the job was spent. Second, paid work may lead to financial freedom that allows youth to escape

parental control through the support that could have been provided. Another important factor that needs to be considered for assessing these conjectures should be the respondent's age at fostering. Whether the respondent was fostered before or after first sex can improve our understanding of the effects of fostering on youth sexual behavior. These factors can explain early sexual debut among youth raised in neither-parent families compared with those who grew up in one- or two-biological parents.

As previous research has noted,[17, 18] these explanations often overlap and complement one another, and the specific mechanisms through which family structures affect the timing of sexual debut may be relevant to more than one theoretical perspective. For instance, demographic events like divorce or parental death are associated with family instability and changes.[12, 69, 70] These changes subsequently lead to stressful events for both parents and children, and thereafter affect parent-child interactions. In fact, frequent changes of family environments may decrease the effectiveness of social control due to the decrease in number and types of parents present in the home. A new family environment requires new adaptations emotionally, psychologically or economically, thereby hindering socialization processes. Likewise, social control and socialization processes may be linked in several ways.[18] Strong social networks among parents found to be operating in SSA may offer opportunities for collective child socialization.[32] Likewise, the quality of parent-child relationships leads to more effective control of children; when parents provide a stable and warm environment, children likely internalize familial values and attitudes about sexuality. Thus youth may choose to delay sexual debut in adherence to familial values and normative sexual attitudes. In African societies, parent-child relationships also vary depending upon parents' gender. Father-child relationships, especially for daughters, are mostly vertical ones; whereas mother-child relationships are rather horizontal and characterized by companionship, confidentiality, and flexibility with respect to the acceptance or rejection of normative behaviors.[9, 32] In this context, although mothers exercise more effective control over children, fathers likely provide more disciplinary environments which in turn are associated with lower rates of sexual initiation.

Family dynamics and sexual debut: Possible explanations and contingencies

The diverse changes in family structures over time are all important aspects that deserve consideration to augment our understanding of the effects of family influences on child outcomes. There are germane reasons to think dynamically of family environments by considering demographic events occurring within families over time including marriage, divorce, remarriage, and death. Such events do not contrive families in the same magnitude in SSA as in developed countries.

For instance, the increasing rates of cohabitation, divorce and remarriages in the mid-to-late 1980s in the United States[54] and other developed countries fuelled a growing body of research on the effects of family dynamics on RH and child outcomes in western contexts. Unsurprisingly, researchers and practitioners have adopted the marital transition approaches in those countries to explain how family changes can affect child outcomes. The prevalence of family instability is rising in African countries and is expected to have deleterious consequences on child well-being and adjustment in his life course. In SSA, the causes of family instability are diverse and somewhat different from those of developing countries. Divorce, cohabitation and remarriages have driven family instability in developed countries. Besides those factors, the increasing rates of AIDS mortality in SSA have significantly increased the proportion of children living without one or both of their biological parents.[71] Llyod and Desai showed that children in many Sub-Saharan African countries spend substantial proportions of their childhood years apart from one or both parents[72], for many reasons including parental death or fosterage practices. Empirical evidence showed that at least 10% of children aged 0-14 years lived in households without their biological parents.[73] Family instability has received limited theoretical and empirical development. The existing voluminous literature investigating the effects of orphanhood on child outcomes is mainly

motivated by the increasing adult AIDS mortality rate in SSA. Yet, parental death-oriented studies represent only one facet of family instability. Therefore, other aspects need to be integrated to broaden our understanding of the effects of family transitions on sexual behavior and reproductive health outcomes in Africa.

Mechanisms put forth for linking family instability and children's social and psychological adjustment in the developmental stage of life are articulated in the *social control* theory as discussed above and in the *stress theory*. We now present the stress theory.

The stress theory posits that changes in family configurations following divorce, remarriage or parental death may explain the relationships between family structure and children's outcomes.[53, 54] According to this theory, new family environments often require many adaptations and adjustments for both parents and children. Whether a new adult is added or subtracted from the family entity implies that there may be changes in parental roles and the quantity and quality of parent/adult-child interactions and relationships. In this context, one might expect that changes in family structure over time, often associated with stress, undermine parent-child bonds due to new adaptations and adjustments. The events that originate or perpetuate these transitions likely differ between SSA countries and developed countries. Whereas divorce, separation or remarriage are the leading causes of family changes in developed countries[54], parental death is the foremost cause of family instability in SSA.[12, 55, 71, 74] Presumably, the effects of family instability in SSA may be dependent upon the original source of stress even though parental death is also considered a traumatic event in an individual's life. In developed countries, the stress theory pointed out that economic, time, and parental resources brought up by family transitions place stress on families, and thus negatively affect child outcomes.[54, 75, 76] The main assumption about the mediating effects of economic resources relies on income inequality: two-parent families are more likely to be economically advantaged than neither- or one-parent families. In SSA, such an explanation may be less relevant for young people growing up in a homogeneous context of generalized material deprivation. Inequalities observed in developed countries between two-parent families and other types of family structure may be less pronounced to explain the stress in those families. According to time resources, previous research found that paternal presence has a protective effect on adverse RH outcomes in Kenya[9], and Rwanda[5]. Such findings are not necessarily due to time resources available from fathers. Rather, disciplinary rules due to paternal presence within home may explain such effects. In fact, resident fathers in SSA are not caring like in developed countries.[27]

Finally, parent-child relationships, parent-child communication, and parental supervision are part of family processes that need to be integrated to understand the effects of family structures on child outcomes.[18] The quality of parent-child relationships is often considered an important measure of parental warmth within the home associated with lower rates of risky behaviors, including sexual debut.[77] Likewise, parent-child communication in general, and that about sexuality is an indication of how parents and children connect each other regarding various domains of life, including the sensitive field of sexuality.[15] Youth who think that parents are aware of their whereabouts are less likely to engage in risky behaviors.

Gender differences in the effects of family influences on sexual initiation

Prior research has provided conflicting findings regarding gender differences in the age at first sex. For instance, some researchers reported earlier sexual initiation for male than female youth in SSA.[78] Ghanaian male youth experienced first sex at a median age of 18.4 years while females have a median age of 16.9 years. Likewise, males and females aged 12-25 years in a rural South African setting reported a median age at first of 19.2 years and 18.5 years, respectively.[79] In other countries like Kenya and Zambia, male youth reported lower median age at first sex compared with female youth.[80] The same trend has been observed in America and Caribbean. In Great Britain and the United States, the age at first sex was lower for males than females, with a males-female

difference in age at first sex reaching almost 2 years.

These differences may be attributable to respondents' background characteristics[81] or the dominant discourse about first sex in the settings under observation.[32] For example, females may feel uncomfortable to report exact timing of first sex, and therefore underreport their true sexual activity status. With regard to family influences, parental attitudes about youth's premarital sexuality can partly explain why male youth can experience sexual initiation at early age compared with female youth. In fact, the double standard surrounding sexual initiation suggests that premarital sexuality is sometimes encouraged for boys whereas it is strictly prohibited for females.[51] The double standard strongly influences discipline rules for females and males within homes and communities.[9] Besides the double standard, the stress associated with family transitions may be interpreted differently for boys and girls. Amato found that divorce does not appear to weaken father-son or mother-daughter bonds if it occurred during late adolescence.[54] The economic hardship following family changes may affect differently boys and girls.[82, 83]

Situating the effects of family structure dynamics on sexual debut in an African context

Following the review and theoretical frameworks above, this paper considers four hypotheses:

First, family transitions or changes lead to premature sexual debut through its deteriorating effects on the quality of parenting. Children who reside in the same family structure are more likely to report higher levels of parent-child relationships, parent-child communication about sexuality, and parental supervision, irrespective of parental co-residence. Indeed, parent-child bonds are a long-lasting process. "Stable" family structures lead to more comfort and confidence for both children and parents. Additionally, children feel more secure in a well-known environment and social interactions. Therefore, children in "stable" family structure are less likely to report sexual initiation compared with those who experienced family changes. A recent study[14] has shown that even within family structures which are often considered risky, positive parent-child bonds may buffer the negative effects associated with at-risk families such as one-parent families or neither-parent families.

Second, the number of family transitions is positively associated with a higher probability of premarital sexual debut. Children who often move in or out of certain family structures are more likely to engage in sexual initiation. We will be able to test this hypothesis because of the sequencing of exposure and outcome variables in our dataset, unlike cross-sectional data for which the relationship between family transitions and sexual debut may exist because a change in family environment is in response to an early sexual activity viewed as a problem behavior socially stigmatized. Third, the timing of family change has differential effects on sexual initiation, depending on the stage of life at which the change occurred: the effects are expected to be stronger if the change is later than earlier in the individual life course because at this stage, the parent-child bonds are still evolving.[75] In contrast, if the changes occurred during adolescence, they are expected to be strong enough; therefore, the negative effects of family changes are lower.[54] Fourth, the effects of family changes on sexual initiation differ by gender. The literature on gender-specific effects of family instability on sexual debut indicated that girls living in unstable families were more likely to be sexually experienced than those living with biological parents. For boys, those living with biological parents and other types of families were equally sexually experienced[84]. In African contexts, the generalized poverty can worsen girls' vulnerability through less parental control, poor parent-child communication, and lower quality of parent-child relationships; and therefore hastening sexual debut.

Data and Methods

This paper utilizes data from a population-based survey drawn from a random and representative sample of the Cameroon Family and Health Survey carried out 2002 (CFHS-2002), under the auspices of the Population Observatory in Socio-clinical Epidemiology (POSE) in Bandjoun, a semi-urban zone in the province of west Cameroon

among individuals aged 10 years and older in 75 localities.[85] Each locality used probability samples in which all households have a nonzero chance of inclusion. When selected, all individuals aged 10 years and above in the household were interviewed. A total of 4,950 men and women were interviewed using structured questionnaires and face-to-face technique in each selected household. The survey response rates were very high (> 90%).

The present study used a sub-sample of 1,815 adolescents and young adults of both sexes, aged 12-24 years. The CFHS gathered retrospective information on family histories at three moments: 6 years, 12 years and at time of survey. This study has been restricted to unmarried youth aged 12-24 years because family structure is no longer significant for those who were married at the time of the survey. Likewise, family structure at age 12 is not meaningful for youth aged less than 12 years. The choice of ages 6 and 12 are of particular importance in youth's life course in Cameroon. The primary school attendance usually starts at 6 years; 12 years of age represents the transition to high school, and often coincides with the beginning of puberty. Because recall biases affect retrospective data, choosing the two markers limits the shortcomings inherent in retrospective surveys. Indeed, it should be harder to reconstitute, what would be ideal, the family structures at each age before the survey. It is easier for each respondent to remember the parental co-residence when he/she started the primary school and when he/she was entering high school. Additionally, due to the sensitivity of sexuality topics, a statement about the confidentiality of the responses was read to participants, and an oral consent was obtained before each interview. To ensure the confidentiality of respondents, trained interviewers were requested to ensure that nobody in the home was overhearing the interviews. The study was approved by the University of Montreal's Ethics Committee and the National Ethics Committee of Cameroon.

Measures

Dependent variable

Timing of sexual debut. The validity of respondents' self-reported age at first sexual intercourse or the waiting time to sexual debut is subject to debate. Previous studies reported that measurement of age at sexual debut is considerably problematic, especially for older youths.[86] Many studies have questioned the consistency and reliability of self-reported age at first sex in survey results from developing countries.[80, 87, 88] For instance, findings indicate that age at first sex varies by interview modes and over time.[88] Likewise, underreporting appears to be more prevalent among girls thanboys.[86] In SSA, the social context likely undermines to an unknown extent, the accuracy of self-reported age at first sex: for boys, having sex has been often reported as representing a prestige among peers while it has been reported that it is shameful for females to be sexually active in societies where virginity is rewarded.[89, 90] These shortcomings should be kept in mind when analyzing self-reported age at sexual debut as the variable of interest.

In this paper, age at sexual debut is measured by the respondents' self-reported age at first sex (recorded in years). The occurrence of sexual debut at each age is defined as a single event and the nonoccurrence of first sexual initiation is defined as censoring in the last interval (e.g., young people who are not sexually experienced at the time of interview but might experience transition to sexual initiation in the future). In practice, the probability of sexual debut in each interval of time (a year) is estimated using a binary variable taking the values 1 if the sexual debut occurred and 0 otherwise. Respondents were asked the questions "Have you ever had sexual intercourse?" and, if so, "How old were you when you had first sexual intercourse?"

Independent Variables

Family structure and family transitions. Defining and/or measuring family structure has been a subject of debate, and the resulting ambiguity in terminology has nurtured confusions about its effects on young people's sexual behaviors.[91] Due to the relative importance of polygamy in SSA, family structures were built by combining information about two main components that reflect the complexity of family situations:

parental co-residence and parental marital status. Data about parental co-residence in SSA mainly use the variable/question "relationship to the household head" collected in censuses and many surveys. This variable does not allow determining if the child is living with his/her biological parents in the same household. Aware of these limitations, the Demographic and Health Surveys Program (DHS) introduced additional questions to capture father/mother co-residence. In the 2002 CFHS, detailed information is available about household members. Family structures here emphasize the co-residence with biological parents which differ from other aspects of family structure such as family size, number of siblings or the number of generations within the household. The chief rationale is that these aspects are not easy to reconstitute due to recall biases when using respondent's self-reported information about family living arrangements when he/she was younger. Although family configurations at ages 6 and 12 may be subject of recall problems, especially for older respondents, it is worthy to note that changes in family structure are not the common patterns in Cameroonian society, especially in a semi-urban area like Bandjoun. Using these markers did not completely eliminate the recall biases but significantly limited them.

A total of 10 dichotomous questions were used to capture family structures at a given age *t* (ages 6, 12, and time of survey) about members of a typical African family: "With whom did you live at [age *t*]?" Responses included members of nuclear family (father, mother, brother/sister), extended family (cousins, uncle/aunt, grandfather/grandmother), non-relatives (friend, playmate), and other atypical situations (living in institution or alone). There were only few cases for some items (e.g., friend, playmate, in institution, and alone). Six items were retained to build five mutually exclusive categories of families: *nuclear one-parent*, *extended one-parent*, *nuclear two-parent*, *extended two-parent* and *neither-parent families*. This last category included brother/sisters, uncles/aunts, and grandparents. In theory, this category should be disentangled in sub-categories; however, models performed with these subcategories were numerically unstable due to few cases. One-parent families (mother-only and father-only) were collapsed into one category as well due to few cases, so it was done for "other relatives or neither-parent families".

Finally, it was possible to build the family trajectories using the measures of family structures at these three times. For instance, young people who resided in nuclear two-parent families have the following family trajectory: **nuclear two-parent -> nuclear two-parent -> nuclear two-parent** and they have experienced *zero* family transition over time. In contrast, those who were living in nuclear two-parent families at age 6, lived in nuclear one-parent families at age 12 and finally lived in neither-parent families at time of the survey have the following trajectory: **nuclear two-parent -> nuclear one-parent -> neither-parent,** and they experienced in total two family transitions, and so on.

Family processes and other correlates

Family processes, including the quality of parent-child relationships, parent-child communication and parental control, are complex and multidimensional concepts.[92] Together, these factors are all important components of an effective family environment but they still are poorly documented in SSA where context-specific instruments to capture these processes are lacking. For instance, parent-child relationships and parental control are measured with a single item on 1-5 scale. In contrast, parent-child communication about sex topics is measured with five yes/no items; yet Likert scales could provide a much wider variation between respondents. Family processes identified as mediators of the effects of family structure on sexual initiation are described below.

Quality of parent-child relationships at age t was captured through the question "How did you see the quality of your relationships with your parents/guardian at age *t*?" Reponses ranged from 1 = *very good* to 5 = *difficult or bad*. This variable was reversely recorded.

Parent-child communication. Five yes/no questions captured parent/guardian-communication: "Did you ever have conversations with your parents/guardians about puberty, sexual education, STIs and HIV/AIDS, pregnancies, and

alcohols or drugs at age *t*?" These items were summed; the score ranged from 0 to 5 with higher scores indicating higher levels of parent-child communication about sexuality (Cronbach α = .66; .72, and .82 at ages 6, 12, and time of survey, respectively).

Parental control. This study used direct measures of parental supervision at age *t*, which captured whether parents were aware of the youths' whereabouts through the question "Were your parents or guardians controlling your leisure at age *t*?" Responses ranged from 1 = *a lot* to 5 = *not at all*. Responses were reversed to obtain a gradient, higher scores indicating higher levels of parental control.

Economic deprivation is proxied with three variables. First, "What was the lighting type that you were using in the home at age *t*?" Responses were electricity, lamp, candle and other. This variable was coded 1 if the lighting mode was electricity and 0 otherwise. Second, the presence of radio or television at home captured by the question "Did you have a radio or a television at home at age *t*?" coded 1 = *yes* and 0 = *otherwise*. Third, the educational attainment of parents/guardians measured by the following question: "What was the education level of the person in charge of you at age *t*" Responses were recorded as follow: 0 = *none*, 1 = *primary*, 2 = *high school* or *university*. These variables represent different aspects of socioeconomic status within the household and are introduced separately in the estimations.

Other variables that have been found to be associated with sexual onset include age (in years), gender (male vs. female), educational experiences (in years), and place of residence (rural vs. urban).

The paper considers three dimensions of family changes. First, the types of family changes which track the youth's family trajectory by comparing the family structure in which he/she lived at each time (*Hypothesis 1*). Second, the number of major transitions early in life which is expected to a maximum of two because three moments are used in the survey to capture the family structures over time (*Hypothesis 2*). Third, the time of change by assuming that the change in family structure that occurred between age 6 and 12 as "early childhood" and that occurred between age 12 and the time of survey as "adolescence"; and thus estimating the effects of the time of change on sexual debut (*Hypothesis 3*). Finally, the influences of the three dimensions are estimated separately for males and females to capture the gender-specific effects of family changes (*Hypothesis 4*).

Estimation Techniques

Bivariate and multivariate analyses were performed. Kaplan-Meier life tables were used to determine the median age at sexual debut. For multivariate analyses, discrete-time hazard modeling was used because the timing of sexual debut can be viewed as an age-dependent process. Using the person-age observation as the unit of analysis, multivariate discrete-time models using logistic function were fitted to capture the effects of family structure, parental marital status and family processes during childhood and adolescence on the risk of sexual debut. The log-odds of sexual debut can be parameterized with a general formulation as follows:

$$Log\left(\frac{p_{(t)}}{1-p_{(t)}}\right) = \alpha_{(t)} + \beta * FT + \delta * X_{(t)} + \xi * Z$$

where $p(t)$ represents the probability that an individual has sexual debut at age t given that that individual has not yet experienced first sex before age t; β is a vector of the effect of family transitions (FT) or number of transitions, δ is a vector of parameters corresponding to time-varying covariates X which are referred to as potential mechanisms that mediate the effects of family configurations, referred to as family processes; ζ is a vector of parameters corresponding to time-invariant covariates Z, and α represents the specific effect of being in a given age interval. The logit coefficients represent the effects that being in the estimated variable category has on the odds of having sexual debut relative to remaining virgin. This analytic strategy is appropriate because the events occurred in discrete time intervals, and sexual debut was captured in whole years.

Another important methodological issue in this paper hinges on the nature of data. Because all

individuals aged 10 years and more in the household were interviewed in the 2002 CFHS, youth within the same household are not independent observations. Instead, they are correlated and share the same household characteristics. It is, therefore, necessary to account for that correlation so as to derive unbiased estimates of standard errors and other associated values including p-value and confidence intervals. The analyses controlled for the correlation of observations on youths from the same household by using the appropriate options in STATA software.[93, 94] This yields robust standard errors obtained via the Huber-White sandwich estimator of variance. Should there exist intra-household correlation, the robust standard errors are better indicators of the sample-to-sample variability of the parameter estimates and therefore produce more accurate tests of the effects of the covariates.[93]

Descriptive Results

A total of 1,815 adolescents and youth aged of 12-24 years were analyzed. On average, they were aged of 16.6 years (SD = 3.18). Females were slightly older than males (M = 16.7; SD = 3.12 vs. M = 16.5; SD = 3.25) (see Table 1). Most participants were adolescents (79.3%: 80.2% Males vs. 78.7% Females) while youth represented almost one-fifth of the sample. The sample consisted of 55.6% of females. Participants were highly educated with an average of 8.3 years (M = 8.25; SD = 2.70). The corresponding figures for males and females were M = 8.16; SD = 2.85 and M = 8.32; SD = 2.56, respectively. In other words, respondents completed at least primary school. That was not surprising in a setting where parents have a longer tradition of child education. In fact, parents usually invest time and money for youth's education in Bandjoun (west Cameroon). Only 16.8% of participants resided in urban residence at the time of survey. Turning now to family instability measures in the sample, it is important to note a total of 85 possible family trajectories were identified for the three moments; however, most of them represented less that 1% of cases. As such, it was not statistically possible to analyze the effects of each family sequence on the risk of sexual debut. To decide which family sequences are kept, an arbitrary logic was used. First, the original types of family structures were kept because most adolescents and youth remained in the same family structure across the three moments of interest. Second, major family sequences were identified using a cut-off of 3% of cases. All other family sequences were labelled as "diverse trajectories". The reader may keep in mind that five family structures were defined: nuclear one-parent, extended one-parent, nuclear two-parent, extended two-parent, and neither-parent families.

Following this delineation, it appears that 4.2% of participants resided at all times in nuclear one-parent families; females being more likely to experience that sequence (4.4%) than males (4.0%). A marginal proportion of 1.5% lived in extended one-parent families. About one-fifth of participants (19.2%) continuously resided in nuclear two-parent families (20.2% males vs. 18.4% females). Likewise, 19.1% of them were living in extended two-parent families (17.7% males vs. 20.1% females). Almost one-tenth of respondents was living within neither-parent families at age 6 and remained in those families at age 12 and at time of survey (7.2% males vs. 10.7% females). In terms of changes, two major patterns appeared. First, a substantial proportion of participants (8.8%) resided in nuclear two-parent families at ages 6 and 12 and moved to neither-parent families (9.9% males vs. 7.9% females). Second, a similar pattern was observed for participants who resided in extended two-parent families at ages 6 and 12andwent to live in neither-parent families. They constitute 5.2% of the sample (4.6% males vs. 5.8% females). All other family transitions considered together, represent one-third of the sample (32.8%). Concerning the number of transitions, more than a half (53.2%) has not experienced family transitions. That proportion is higher for females (55.5%) than males (50.3%). Of those who experienced family transitions, most of them transitioned once from one family structure to another, whatever the time of the transition is. In fact, 43.1% of males and 37.9% of females moved from one family structure to another (a total of 40.2%). There were 6.7% of young people who experienced two family transitions. With regard to the timing of the transition, findings indicate that the family change mostly appeared at adolescence (35.6%) compared

Table 1: Description of the sample

VARIABLES	Males		Females		Total	
	N	%	N	%	N	%
PANEL 1 : FAMILY INSTABILITY VARIABLES						
Family Trajectories over time						
Nuclear One- > Nuclear One- > Nuclear One	32	3.97	44	4.36	76	4.19
Extended One- > Extended One- > Extended One	9	1.12	19	1.88	28	1.54
Nuclear Two- > Nuclear Two- > Nuclear Two	163	20.22	186	18.43	349	19.23
Nuclear Two- > Nuclear Two- > Neither-	80	9.93	80	7.93	160	8.82
Extended 2- > Extended 2 - > Extended 2	143	17.74	203	20.12	346	19.06
Extended Two- > Extended Two- > Neither-	37	4.59	58	5.75	95	5.23
Neither- > Neither- > Neither-	58	7.20	108	10.70	166	9.15
Diverse Trajectories	284	35.24	311	30.82	595	32.78
Number of Transitions						
0	405	50.25	560	55.50	965	53.17
1	347	43.05	382	37.86	729	40.17
2	54	6.70	67	6.64	121	6.67
Time of family the transition						
Childhood (% of YES)	145	17.99	175	17.34	320	17.63
Adolescence (% of YES)	310	38.46	341	33.80	651	35.87
PANEL 2 : DEMOGRAPHICS						
Age cohort						
12-19 years	646	80.15	794	78.69	1,440	79.34
20-24 years	160	19.85	215	21.31	375	20.66
Age (Mean ± SD)		(16.5 ± 3.25)		(16.7 ± 3.12)		(16.8 ± 3.18)
Education in years (Mean ± SD)		(8.16 ±2.86)		(8.33±2.56)		(8.25±2.70)
Urban Residence	134	16.63	171	16.95	305	16.80
Total	806	44.41	1,009	55.59	1,815	100.0

Source: 2002 CFHS

with childhood (17.6%). This is understandable in the context of semi-urban context. Most likely, these changes occurred in the context of passage from primary to high school whereby youth may have left their biological parents in one location to attend high school in far away location.

Research on the topic of the influences of family instability on sexual debut indicated that changes in family structures undermine family functioning. In fact, required adaptations and stress brought by residential mobility can hamper the quality of parent-child relationships, communication between parents, and parental supervision. Table 2 attempts to illustrate the issue. In fact, it can be assumed that if "stayers" do better than "movers" then it is obvious that moving from a family structure to another have brought some changes in family functioning variables. However, findings presented in Table 2 did not show a clear indication on whether staying or moving have altered parent-child interactions. Instances of that contention are that youth who resided in nuclear two-parent families scored 3.7

Table 2: Description of family transitions, and family processes over the life course

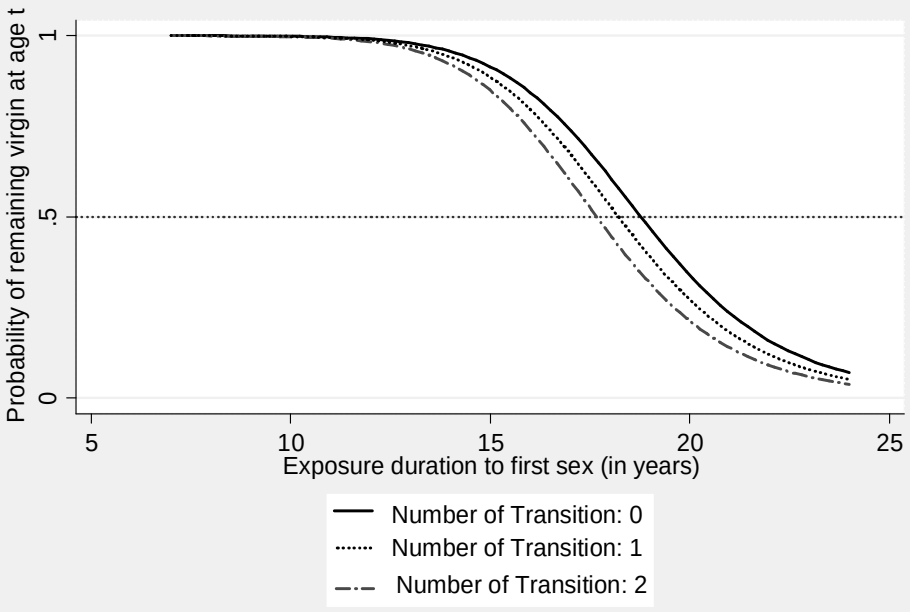
VARIABLES	Quality of Parent-Child Relationships			Parent-Child Communication about sexuality			Parental supervision		
	Age 6	Age 12	Time of survey	Age 6	Age 12	Time of survey	Age 6	Age 12	Time of survey
Family Trajectories									
Nuclear One- > Nuclear One- > Nuclear One	3.67	3.93	3.71	0.36	0.58	1.12	3.96	3.82	3.39
Extended One- > Extended One- > Extended One	3.93	3.82	3.89	0.21	0.75	1.61	3.50	3.39	2.71
Nuclear Two- > Nuclear Two- > Nuclear Two	3.91	3.86	3.66	0.21	0.41	1.31	3.70	3.69	3.32
Nuclear Two- > Nuclear Two- > Neither-	4.01	3.93	3.67	0.21	0.34	1.21	3.98	3.98	3.08
Extended 2-> Extended 2-> Extended 2	4.12	4.08	3.92	0.18	0.32	1.24	4.18	4.15	3.64
Extended Two-> Extended Two-> Neither-	4.20	4.05	3.66	0.14	0.29	1.25	4.27	4.24	3.37
Neither- > Neither- > Neither-	3.77	3.79	3.71	0.17	0.33	1.15	3.53	3.43	3.05
Diverse Trajectories	3.98	3.86	3.65	0.21	0.44	1.29	3.83	3.76	3.21
Number of Transitions									
0	3.95	3.93	3.77	0.21	0.38	1.25	3.86	3.81	3.38
1	3.99	3.90	3.64	0.20	0.37	1.23	3.91	3.84	3.21
2	4.15	3.88	3.72	0.19	0.60	1.47	3.86	3.97	3.19
Time of Transitions									
Childhood									
NO	3.96	3.93	3.74	0.21	0.38	1.26	3.88	3.83	3.30
YES	4.05	3.85	3.63	0.16	0.45	1.27	3.89	3.84	3.27
Adolescence									
NO	3.95	3.91	3.74	0.19	0.38	1.23	3.87	3.80	3.37
YES	4.02	3.92	3.68	0.22	0.42	1.30	3.90	3.88	3.17
Total	3.98	3.91	3.72	0.20	0.39	1.26	3.88	3.83	3.30

Source: 2002 CFHS

on the quality of parent-child relationships whereas those who moved from nuclear two-parent to neither-parent families also scored 3.7 at time of survey. Likewise, stayers (or participants with no transition) scored only 0.05 point higher than movers on the quality of parent-child relationships at the time of the survey. In this sample, there are no clear indications that changes in family structures have impacted parent-child interactions although some marginal variations have been observed.

Timing of sexual debut among unmarried youth

The median age at first sex in this sample was 18 years. Because the effects of family changes are of paramount interest in this paper, first and foremost, it is enlightening to see how the number of transitions affects sexual initiation (Figure 1). Figure 1shows that the number of transitions is strongly associated with age at sexual debut. Indeed, the higher the number of transitions, the earlier the age at sexual debut. Participants who



Source: 2002 CFHS

Figure 1: Probability of remaining virgin at age t among 12-24 year-old in Bandjoun

experienced no family transitions had the highest median age at sexual debut (18.5 years) compared with those who moved once (17.7 years) or twice (17.2 years).

Multivariate results

This paper considers three research questions and four hypotheses. First, it addresses whether moving into or out of certain family structures affected entry in sexual activity. Model 1 displays unadjusted odds ratio whereas Model 2 includes family functioning variables (e,g., quality of parent-child relationships, parent-child communication about sexuality, and parental supervision), and control variables (age cohort, gender, place of residence, parental education, and household assets --radio/TV at home and electricity at home as the lighting mode).

Living within two-parent families all the time, either nuclear or extended, is strongly associated with lower rates of sexual debut in the entire sample (Models 1-2 from Table 3). Living in nuclear two- or extended two-parent families over time decreased the risks of sexual debut by 37% and 28%, respectively. Even when family functioning variables are included in the models, the associations remained of the same magnitude and statistical significance. An increase of one-point in the levels of parent-child communication about sexuality and parental supervision decreased somewhat the risks of sexual debut by 8% and 6%, respectively. The pattern was similar for both males and females although the levels of statistical significance differed slightly. Models 1-2 from Table 4 and 5 showed that the risks of sexual debut was somewhat lower for male and female participants who resided all the time in nuclear two-, and extended two-parent families. For males, parental supervision operated in the expected direction in lowering the risks of sexual debut. In contrast, any family functioning variables reached statistical significance among females.

The second research question pertained to the "cumulative" effects of family transitions: do frequent changes in family structure impact the entry in sexual debut? In this case, instead of family trajectories, the number of transitions is of great interest. Descriptive results showed that the number of moves was strongly associated with sexual debut. Multivariate results clearly indicated that moving into or out of family structures of origin at any time were associated with higher risks of sexual debut. For instance, the risks of

sexual initiation increased by 32% and 66% for adolescents and youth who experienced one and two family transitions in the entire sample, respectively (Models 3-4 from Table 3). The effects remained significant after controlling for family processes and other variables. For males, the increase in the risks of sexual debut was almost 62% (Models 3-4 from Table 4). Although the number of transitions was also associated with higher risks of first sex, only two family transitions drastically increased these risks, increasing by 88% for females who reported two family transitions.

Finally, does the timing of family change matter? Our study distinguished changes that occurred in childhood from those occurring during adolescence. Findings indicated a strong and statistically significant effect of the timing of family change on sexual debut for the entire sample. When the sample was divided by gender, the effects of the timing of family changes were marginally significant. The risks of sexual debut increased by almost 25% and 40% when family changes occurred during childhood (Models 5-6 from Table 3) or adolescence (Models 7-8 from Table 3). For males, the effects of family change that occurred during childhood were not statistically significant (Models 5-6 from Table 4). In contrast, the risks of sexual debut increased by almost 60% when the changes in family structures occurred during adolescence (Models 7-8 from Table 4). For females, both family changes occurring during childhood (Models 5-6 from Table 5) or adolescence (Models 7-8 from Table 5) were marginally significant. For instance, the risks of first sex increased by 32% (Model 6 from Table 5) when changes occurred during childhood. Likewise, the risks of first sex marginally increased by 27% (Model 8 from Table 5) when the changes in family structures occurred during adolescence.

Discussion

This paper set out to document the effects of family structure dynamics on premarital sexual debut among unmarried adolescents and youth in a semi-urban area in Bandjoun (west Cameroon). First, the study assessed whether moving into or out of certain family structures impacted sexual initiation. Findings indicated that family structures of origin and destination has marginal effects on sexual debut. However, living all the time with biological parents either in nuclear or extended two-parent families was significantly associated with lower rates of first sex, after controlling for family functioning variables (e.g., quality of parent-child relationships, parent-child communication, and parental supervision). These results corroborate previous findings with US data or other developed countries.[18, 52] Similar protective effects of two-parent families had also been found in developing countries with cross-sectional data in Kenya[9], Rwanda[5], or Cameroon.[95]

Adolescents and youth who resided in the same family structures over time are most likely well connected with parents or parent-like figures.[77] The longer the period shared with adult figures, the higher the connectedness with those adult figures: better quality of parent-child relationships, higher levels of parent-child communication, and better internalization of familial values that result with a good acceptance of parental supervision. All these family functioning variables are inextricably linked with lower rates of sexual initiation. Nevertheless, descriptive results conducted at the three moments of the life course showed that there are no clear indications of the effects of family changes on *(i)* the quality of parent-child relationships, *(ii)* the levels of parent-child communication about sexuality, and *(iii)* parental supervision. In a context where sexual initiation is strongly prohibited, it is possible that other factors not included in these analyses (e.g., attitudes about premarital sexual activity, sexual permissiveness) are more important than family functioning variables. Instances of the caveats about parent-child communication about sexuallity include the discomfort for both parents and youth to engage a dialogue about sexuality, even in developed countries, where findings remain incon-clusive.[96]
Second, the paper was interested in the effects of the number of transitions on sexual debut. Some scholars have posited that rather than family structure *per se*, the number of transitions may be more salient.[18] Besides the economic resources dilution brought on by family changes, family

Table 3: Entire Sample: Discrete-time hazards coefficients and standard errors (in parentheses) of the effects of family environment on sexual debut in Cameroon

	MODELS							
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Family trajectories								
Nuclear One- > Nuclear One- > Nuclear One	0.927	1.049						
	(0.214)	(0.242)						
Extended One- > Extended One- > Extended One	0.663	0.833						
	(0.286)	(0.349)						
Nuclear Two- > Nuclear Two- > Nuclear Two		0.588***						
	0.629***							
	(0.0850)	(0.0816)						
Nuclear Two- > Nuclear Two- > Neither-	1.049	0.986						
	(0.156)	(0.149)						
Extended 2-> Extended 2-> Extended 2	0.720**	0.662***						
	(0.0967)	(0.0914)						
Extended Two-> Extended Two-> Neither-	1.046	1.002						
	(0.207)	(0.209)						
Neither- > Neither- > Neither-	0.975	1.011						
	(0.169)	(0.178)						
Communication about sexuality		0.915*		0.921*		0.927*		0.927
		(0.0430)		(0.0421)		(0.0422)		(0.0428)
Quality of Parent-Child Relationships		1.051		1.054		1.051		1.050
		(0.0413)		(0.0413)		(0.0407)		(0.0408)
Parental supervision		0.937*		0.934*		0.937*		0.936*
		(0.0336)		(0.0331)		(0.0331)		(0.0333)
1 Transition			1.323***	1.339***				
			(0.125)	(0.129)				
2 Transitions			1.661***	1.767***				
			(0.243)	(0.268)				
Family change at childhood					1.206*	1.245**		
					(0.132)	(0.138)		
Family change at adolescence							1.387***	1.406***
							(0.124)	(0.128)
Observations (person-years)	17,623	17,623	17,623	17,623	17,623	17,623	17,623	17,623
Log likelihood	-1,853	-1,840	-1,856	-1,844	-1,862	-1,850	-1,856	-1,845
Degrees of Freedom	13	22	8	17	7	16	7	16
Chi2	778.3	842.5	764.0	822.3	763.5	822.3	763.7	822.4

Robust standard errors. *** p<0.01, ** p<0.05, * p<0.1

Control variables in Models 2, 4, 6, and 8 include: Age cohort, Gender, Place of residence, parental education, household assets (Radio/TV at home, Electricity at home). Parental education and household assets are used as time-varying covariates

Table 4: Males: Discrete-time hazards coefficients and standard errors (in parentheses) of the effects of family environment on sexual debut in Cameroon

	MODELS							
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Family trajectories								
Nuclear One- > Nuclear One- > Nuclear One	0.533	0.595						
	(0.252)	(0.281)						
Extended One- > Extended One- > Extended One	0.188*	0.266						
	(0.162)	(0.242)						
Nuclear Two- > Nuclear Two- > Nuclear Two	0.668*	0.668*						
	(0.140)	(0.144)						
Nuclear Two- > Nuclear Two- > Neither-	1.133	1.096						
	(0.253)	(0.246)						
Extended 2-> Extended 2-> Extended 2	0.657*	0.611**						
	(0.144)	(0.139)						
Extended Two-> Extended Two-> Neither-	1.428	1.477						
	(0.347)	(0.379)						
Neither- > Neither- > Neither-	0.830	0.845						
	(0.233)	(0.251)						
Communication about sexuality		0.956		0.950		0.946		0.951
		(0.0671)		(0.0676)		(0.0656)		(0.0658)
Quality of Parent-Child Relationships		1.062		1.066		1.070		1.068
		(0.0647)		(0.0645)		(0.0640)		(0.0642)
Parental supervision		0.877**		0.870**		0.871**		0.869**
		(0.0497)		(0.0485)		(0.0486)		(0.0479)
1 Transition			1.616***	1.625***				
			(0.237)	(0.243)				
2 Transitions			1.611**	1.568*				
			(0.384)	(0.401)				
Family change at childhood					1.129	1.108		
					(0.190)	(0.193)		
Family change at adolescence							1.594***	1.595***
							(0.217)	(0.221)
Observations (person-years)	7,690	7,690	7,690	7,690	7,690	7,690	7,690	7,690
Log likelihood	-811.8	-803.4	-814.4	-805.5	-819.9	-811.0	-814.5	-805.6
Degrees of Freedom	13	21	8	16	7	15	7	15
Chi2	333.8	371.9	322.2	362.4	322.9	363.2	319.9	362.1

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Control variables in Models 2, 4, 6, and 8 include: Age cohort, Place of residence, parental education, household assets (Radio/TV at home, Electricity at home). Parental education and household assets are used as time-varying covariates.

Table 5: Females: Discrete-time hazards coefficients and standard errors (in parentheses) of the effects of family environment on sexual debut in Cameroon

	MODELS							
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Family Trajectories								
Nuclear One- > Nuclear One- > Nuclear One	1.294	1.458						
	(0.322)	(0.368)						
Extended One- > Extended One- > Extended One	1.226	1.601						
	(0.652)	(0.775)						
Nuclear Two- > Nuclear Two- > Nuclear Two	0.596***	0.539***						
	(0.108)	(0.100)						
Nuclear Two- > Nuclear Two- > Neither-	0.979	0.891						
	(0.187)	(0.177)						
Extended 2-> Extended 2-> Extended 2	0.763	0.696**						
	(0.133)	(0.124)						
Extended Two-> Extended Two-> Neither-	0.776	0.707						
	(0.240)	(0.226)						
Neither- > Neither- > Neither-	1.085	1.149						
	(0.247)	(0.267)						
Communication about sexuality		0.906		0.924		0.929		0.928
		(0.0594)		(0.0575)		(0.0579)		(0.0586)
Quality of Parent-Child Relationships		1.042		1.058		1.049		1.046
		(0.0544)		(0.0553)		(0.0539)		(0.0535)
Parental supervision		0.991		0.984		0.991		0.992
		(0.0480)		(0.0466)		(0.0467)		(0.0470)
1 Transition			1.135	1.155				
			(0.144)	(0.148)				
2 Transitions			1.721***	1.880***				
			(0.318)	(0.351)				
Family change at childhood					1.267*	1.324**		
					(0.182)	(0.189)		
Family change at adolescence							1.247*	1.271*
							(0.150)	(0.158)
Observations (person-year)	9,914	9,914	9,914	9,914	9,914	9,914	9,914	9,914
Log likelihood	-1,022	-1,013	-1,026	-1,020	-1,028	-1,022	-1,027	-1,022
Degrees of Freedom	12	20	7	15	6	14	6	14
Chi2	440.2	456.5	432.3	447.6	424.6	438.2	427.5	442.6

Robust standard errors
*** p<0.01, ** p<0.05, * p<0.1
Control variables in Models 2, 4, 6, and 8 include: Age cohort, Place of residence, parental education, household assets (Radio/TV at home, Electricity at home). Parental education and household assets are used as time-varying covariates.

changes have been associated with residential mobility which thereafter influences the timing of sexual debut due to lower levels of connectedness with adult figures within homes and communities in the new environments. Findings indicated that higher number of family transitions is strongly associated with sexual debut. This is in line with previous research from developed countries.[17, 18] In developing countries, only one study to our knowledge has established that changes in family structures was significantly associated with higher rates of premarital sexual intercourse.[16]

Our third target of investigation was the timing of family changes. It has been suggested that early family changes as a result of separation or divorce in developed countries may undermine the development of solid attachment to adult figures. Hence, adolescents and youth may disengage from families in search of affection which is missing within home which in turn leads to non-normative behaviors, such as early sexual debut.[97] To our knowledge, our study is the first to provide empirical evidence in SSA about the effects of the timing of family changes on RH outcomes. As aforementioned, the causes may be different (e.g., divorce and separation in developed countries vs. parental death in SSA). But the outcomes may be similar; for instance, it is often reported that orphans have early sexual onset compared with non-orphans. However, previous research has not addressed the timing of family changes. Our paper expands our understanding of this dimension of family changes on sexual debut. Findings showed that changes that occurred during childhood and adolescence have negative effects on the timing of sexual debut. Indeed, those family changes were associated significantly with higher risks of first sex in the entire sample. Finally, although findings went in the expected directions for both males and females, only changes occurring at adolescence had a strong negative effect on sexual debut for males, whereas both changes were marginally significant for females. Further research is needed to examine in the African context the gender differences when changes in family structure occurred during the life course.

Implications for theory and practice

An abundant literature has focused on RH outcomes among adolescents and youth in SSA. The first gene-ration of HIV/AIDS interventions was individually-based and sought to explain individuals' knowledge and behaviors by personal characteristics. These interventions produced sensational findings concerning the increase of RH knowledge about AIDS facts. In contrast, they failed to boost individual's protective sexual behaviors. Subsequently, campaigns of sensitization were carried out locally or nationally to increase the awareness of the entire populations about the danger that represents the AIDS pandemic to over-come the limitations of individually-centered AIDS studies. Today, people's awareness of AIDS has significantly increased at national and community levels in many SSA countries. In SSA countries, at least 90% of people interviewed in many surveys have heard of AIDS. However, there is still no robust evidence of changes in sexual behaviours among youth in SSA. A recent study showed that only 41% of youth in the sample were fully knowledgeable of the six items about HIV transmission routes; this proportion felt to 7% when measuring their knowledge about eight HIV prevention strategies.[15]

Until recently, the family environment was ignored. Recent efforts have been directed at family-based interventions to complement the micro-level and macro-level ones.[3, 4] However, family-centered studies in the field of RH in SSA remain scanty. Although there has been a universal recognition of what would be the genesis of the family, namely two biological parents, there are many specific traits of African families which remain understudied to date. These include polygamy, extended families, and the specificities of neither-parent families in SSA. Polygamous families have been found to be detrimental for youth development and adjust-ment.[47, 48, 98] However, the mechanisms through which polygamous families affect the higher likelihood of non-normative behaviors are unknown in SSA. An effort of linking polygamous families to adverse RH outcomes was done in this paper on a conceptual view. However, why and how youth from polygamous families tend to report negative RH outcomes remains unclear. A plausible explanation is that family processes differ across

family structures; polygamous families fare worse compared with monogamous families.[48]

The vast literature on the linkages between family structures and child outcomes suggests that a thorough analysis must include family processes as the intervening variables that explain at least partly the observed effects.[18] In fact, prior research suggested that the effects of family structures are often reduced or eliminated when family processes are included in the estimation equations. In a study designed to tease out some of the strengths and weaknesses with each type of family it was found that the quality of parent-child relationships were negatively associated with risky behavior among youth.[14] Back to the theoretical need to conceptualizing family processes --defined as parent-child interactions-- their mechanisms of operation to affect adolescent RH are poorly understood in SSA.[25, 99] Family processes often include connectedness, communication, parental control or supervision. What do these constructs mean for parents and youth in SSA? Finally, the literature reports that the lower the parental supervision, the greater the risks of engaging in non-normative behaviors. That is true, but parental super-vision may carry a slightly different meaning in SSA compared with Western countries. In a context of collective child socialization like in most African societies, the presence of kin in the homes and communities (aunts, uncles, grandparents) may mitigate the negative effects of the parental absence.

In sum, efforts should be directed at family-based interventions in sub-Saharan African countries where only limited effectiveness were found in terms of accurate knowledge about RH issues, and effective changes of sexual behavior among youth. One limitation of previous interventions is the limited emphasis placed on family environment in RH programs and interventions targeted at youth.[3, 4] Our study substantiates that parents' involvement in the design and implementation of RH interventions in SSA is one of the most promising venues for combating RH problems and HIV/AIDS in Africa.

Policy implications and recommendations

The question of chief importance arising from this study and previous research is whether parents or broadly family environment is tremendously relevant for RH interventions. The response to this question unfortunately shouldn't provide new insights. Indeed, the research community and policymakers around the world agree that family environment must be an import-ant part of the design and implementation of RH interventions targeting adolescents and youth.[1, 3, 4] Our study substantiates that despite enormous diversity among families, families are the most central and enduring influence in children's lives. We find that family structure dynamics is varied and changing in Africa and is one factor that can explain the vulnerability that exposes adolescents to higher risks of adverse sexual and reproductive health outcomes. In particular, our study establishes that family transition occurring during childhood is significantly associated with premature sexual initiation, especially in females. What are policy recommendations that emerge from this study? What interventions might be proposed at country levels to address this problem? Are there countries already undertaking similar interventions that can provide lessons to guide the development of such interventions? These are important questions emerging from this paper, and their answers are of great policy relevance in Africa.

It is unrealistic to assume that involving parents or parent-like figures in RH interventions aimed at improving their effectiveness is an easy task. In our experience over the last two decades or so especially in the sub-Saharan African contexts,[32] only recent efforts have been made to get a better understanding of the roles of parents at fostering positive RH outcomes. From our fieldwork experiences in Africa, at least three issues of interest in this area are poorly documented in SSA and therefore inadequately integrated in policies and programs for adolescent and youth reproductive health. First, what are the attributes of a truly protective family environment? Second, what does it take to have an effective involvement of parents? Third, are parents knowledgeable enough about RH matters to act as sexuality educators for adolescents and youth in the changing socio-cultural environments embedded in their social development? Answering these three questions poses another avenue of

investigation: are sub-Saharan countries equipped to understand the content of families, their formation and functioning? Most sub-Saharan African countries do not have family-oriented research capacities and social support institutions devoted to deeply understand the relevance of families, notwithstanding the claim that family is the essence of each society. Cross-culturally, three parental roles -- connectedness between parents and youth, parental supervision, and provision of needed resources -- have been found to significantly impact RH outcomes. Clearly, communication between parents and youth are ineluctable to enhance family functioning, and to equip families with skills to manage RH matters. However, cultural barriers (e.g., sexuality is taboo) and the extent to which caregiving is mainly a mother's task may impinge father's involvement in RH interventions. Likewise, the increasing access to Information and Communication Technologies (ICT) for youth who are highly educated compared to their parents may put them in a weak position to think that they cannot assist their youth.

Programmatically, a first step towards effective integration of family environment in a very promising way in RH interventions should consist of gathering evidence about the content of family structures and family functioning within their local contexts, and developing functional supporting institutions at the regional and national levels that are aligned with other resources and institutions mandated to promoting the well-being of families and children nationwide. For instance, it has been shown that highly connected youth either within families or communities are less likely to report problem behaviors, including early sexual initiation. Constructs such as "connectedness", "parent-child communication", "parental control/supervision", "parental modeling" need to be disentangled within the national and supra-national contexts to build more comprehensive RH content. Such constructs can then be translated correctly into policies directed at families and are more likely to increase the effectiveness of RH interventions in SSA. A second step should be the design and implementation of evidence-based interventions using information gathered in step one. Literature distinguishes between parent-based interventions and family-based interventions. Parent-based interventions are designed for parents only, whereas family-based interventions include both parents and youth. Although geographically imbalanced and the results are still stammering, these approaches have been used in African countries. This has been the case mostly in Eastern (Tanzania, Kenya, and Uganda), Western (Burkina Faso, Senegal, and Sierra Leone) and Southern (Malawi and South Africa) Africa. In Central Africa, we have been using these approaches since 1995, by carrying out a series of documentation and quasi-experimental intervention research activities within a multilevel framework in Cameroon, which are simultaneously individual-oriented, family-centered, school-based and community-based.[32, 85] Such activities have successfully addressed a number of issues required for successful transitions to adulthood of adolescent and young people in the changing contexts typical of most African societies. Given the present state of knowledge in social science and biomedical research, we have been conducting such activities in two ethnically and culturally diverse regions of Cameroon, with 75 localities forming the treatment site and 66 localities constituting the control/comparison site. We argue that employing such experimental control is generally superior to relying on substantive knowledge, because it is usually more difficult to specify an appropriate causal model of the post-test as it has been the case in most previous/existing intervention research on reproductive health in developing countries. Our research design specifies an appropriate analysis for the selection cohort design which has been carefully controlled to make the cohorts as alike as possible both in the treatment and comparison sites.

We have learned in the course of our RH research and intervention activities in a richly diverse country like Cameroon for over 15 years that when including family environment in RH interventions, it is important to distinguish between family factors which can be improved with RH interventions, and those which are beyond the family control. One of these factors is the *structural family poverty* in many African

countries. Due to poverty, parents are often unable to meet youth's needs (e.g., school fees, food, clothes, participation in social skills development activities). Hence, the family environment may be "at-risk" even though it should theoretically be protective, regardless of whether parents or other family members are physically present. In fact, the health and well-being of children and their families are inextricably tied to parents' physical, emotional and social health, social circumstances, child-rearing practices, and disposable resources or those made available to them for child health and social development. Several previous studies have explored the links between poverty and risky sexual behaviors in SSA.[10, 100] However, those studies did not seek to disentangle whether the effects of poverty were detrimental depending upon family structures. Poverty must be in that case an important factor hampering parental authority within the household. The best way to support families is to have a political commitment to alleviate conditions such as poverty and inadequate access to education at the elementary level and sustain high school completion and career-oriented training for young people which form the sustainable demographic dividend of Africa. It is our view that the long-term fortunes of the modern economy rise and fall with the family. Therefore, population and health policies in Africa must focus on the key roles that marriage and family stability play in sustaining long-term economic growth, the viability of the welfare state, the size and quality of the workforce, and the profitability of large sectors of the modern economy made possible by the window of economic and social development opportunities that can be provided by young people if they make a successful transition to adulthood. As Bronfenbrenner stated, "most families are doing the best they can under difficult circumstances; what we should try to do is to change the circumstances, not the families".[101] Poverty is one of these difficult circumstances facing families and young people in SSA. While waiting for these structural changes, policies should be tailored to programs that must use the limited resources available to foster relevant family functioning variables within each type of family environment,[14] because these needs obviously differ for each specific type of family. African countries should strive to provide some form of welfare support to indigent families and needy children as they develop socially as well as social support/protection mechanisms to relevant institutions nationwide, so as to significantly reduce rampant social and health inequalities.

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