Social Interaction and Contraceptive Change in Northern Ghana

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Abstract

The role of diffusion in reproductive change has received great attention in the literature. Underlying the various studies is the assumption that the information or behaviour of one person can have spillover effects on the motivations of another (Montgomery and Casterline, 1998). Two fundamental components of diffusion are identified: social learning and social influence. Social learning refers to the acquisition of information from others, which in the case of fertility control may include information on the types of contraceptive methods available, the health side effects of the methods and the cost of the methods. Social influence, on the other hand, refers to the power that individuals exercise over each other through authority, deference, and social conformity pressures. Using data obtained from the 1995 and 1998 demographic and health panel surveys we examine the impact of social interaction on the adoption of contraception in the Kassena-Nankana district of Northern Ghana. Three major distinct groups of respondents were defined by the social interaction variable: women whose family planning discussion partners are contraceptive users or encouragers (or both); women whose family planning conversational partners are neither users nor encouragers; women who reported never having discussed family planning with their social network partners. While the social interaction variable pertains to the time of the 1995 survey, contraceptive use is at the time of the 1998 survey. Results from this study suggest that social interaction about family planning triggers changes in contraceptive behaviour in the rural areas of Northern Ghana. For the majority of women, the decision to initiate family planning practice is facilitated by informal discussions with social network partners who encourage contraceptive adoption.

Résumé

Beaucoup a été dit et écrit sur le rôle de la diffusion dans l'évolution de la reproduction avec comme hypothèse sous-jacente que l'information à propos de ou le comportement d'une personne peut avoir des effets d'entraînement sur les motivations d'une autre personne (Montgomery and Casterline, 1998). La diffusion comporte deux composantes principales : l'apprentissage social et l'impact social. L'apprentissage social porte sur l'acquisition de l'information à partir d'autres personnes, ce qui, en matière de contrôle de la fécondité, concerne l'information sur les types de contraceptions disponibles, les effets secondaires sur la santé des méthodes ainsi que le coût des méthodes. Pour ce qui concerne l'impact social, il s'agit du pouvoir que les personnes peuvent exercer les unes sur les autres par l'autorité, le respect, les pesanteurs de la conformité sociale. En utilisant les données des Enquêtes démographiques et de santé de 1995 et 1998, nous examinons l'impact possible de l'interaction sociale sur l'adoption de la contraception dans la région Kassena-Nankana du Nord du Ghana. Pour les besoins de la variable interaction sociale, trois grands groupes de personnes ont été interrogées : les femmes dont les partenaires dans les focus group utilisent et/ou encouragent l'utilisation de la contraception ; celles dont les partenaires dans les focus group ne sont ni utilisateurs ni n'encouragent l'utilisation de la contraception ; celles ayant admis n'avoir jamais discuté de la contraception avec les réseaux sociaux de leurs partenaires. Si la variable interaction sociale porte sur l'enquête de 1995, celle sur l'utilisation de la contraception porte sur l'enquête de 1998. Les résultats obtenus montrent que l'interaction sociale en ce qui concerne le planning familial entraîne des changements dans le comportement en matière de contraception dans les zones rurales du Nord du Ghana. Pour la majeure partie des femmes, la décision de commencer le planning familial est largement facilitée par des discussions informelles avec les membres des réseaux sociaux qui encouragent l'adoption de la contraception.

Introduction

Although Sub-Saharan Africa remains the only major region of the world in which fertility rates remain fairly high among substantial segments of the population, fertility in the region as a whole is now considerably lower than it was two or three decades ago (Cohen, 1998; Feyisetan, 1999). Discussions about the obstacles to rapid fertility decline in this region have highlighted the nature of African reproductive regimes, particularly how they differ from reproductive regimes in other regions (Feyisetan and Casterline, 2000).

The main consensus on African reproductive regimes appears to be that contraception is one of the major factors underlying fertility decline in Africa. Even then, the view has been expressed that the pattern of contraceptive use in sub-Saharan Africa will be different from that of other major regions of the world. For instance, the Caldwells opined that in contrast to other major regions, the first adopters of modern contraception in Sub-Saharan Africa will not be older women seeking to terminate childbearing but rather young unmarried women using contraception for birth spacing purposes and to avert unwanted births (Caldwell et. al, 1992). Furthermore, to a greater extent than in other regions, contraception will be a means for women to exercise some control over their reproduction rather than male-female undertaking. Under this intellectual debate coupled with the need to design appropriate intervention strategies to enhance contraceptive innovation, a lot of studies have examined factors that facilitate contraceptive-use behaviour. Notable among factors that have been identified to influence contraceptive use are fertility preferences, increased participation in formal schooling, urbanization, and the diffusion of modern Western culture. Results of a recent analysis reiterate the significant role of socioeconomic factors in changes in contraceptive adoption in sub-Saharan African countries (Feyisetan and Casterline, 2000).

The role of diffusion in reproductive change has received great attention in the literature in recent years. Several studies in demography have investigated the role of diffusion in fertility transitions (Cleland and Wilson, 1987; Freedman, 1987; Casterline et. al, 1987; Rosero-Bixby and Casterline, 1993; Montgomery, 1993; Montgomery and Casterline, 1993; Kincaid, 1994; Kincaid et. al, 1996; Bongaarts and Watkins, 1996). These studies drew extensvely from the social comparison theory (Festinger, 1957) coupled with the inspiration from the 1964 family planning experiments in Taichung, Taiwan (see Lu et. al, 1967; Palmore and Freedman, 1969) and the Princeton European Fertility Project (Knodel and van de Walle, 1979; Watkins, 1987), particularly the observation that fertility decline or contraceptive use occurred earlier in some segments of the society than in others[1]. Underlying these studies is the assumption that the information or behaviour of one person can have spillover effects (positive or negative) on

[1] Stycos (1982) observed a similar pattern for Costa Rica

the motivations of another (Montgomery and Casterline, 1998). The European Fertility Project attributed part of the fertility decline to diffusion of ideas by noting that certain features of the fertility decline in Europe cannot be explained by changes in societal structure but rather by diffusion processes. Interpretations of findings from the World Fertility Surveys have also lent support to the argument that in addition to changes in socio-economic factors, diffusion of ideas and values through social interaction are responsible for the decline in fertility in the developing world.

Studies on the effects of social interaction on reproductive change have continued to increase (see, for instance, Agyeman et. al, 1996; Montgomery and Chung, 1998; Stash, 1999; Entwisle et. al, 1996 ; Watkins et. al, 1997; Montgomery and Casterline, 1998; Green, 1999; Buono et. al, 2000; Boulay, 2000; Casterline et. al, 2000). These studies and others like them, have demonstrated the increasing dependence of women on informal networks for information on fertility control measures. For instance, the study in rural areas of South Nyanza, Kenya (Rutenberg and Watkins, 1997), noted that women who have been adequately briefed about contraceptive methods still rely on information from friends and other women similar to them before taking a decision on contraceptive adoption. In Nan Rong, a rural community in Thailand, family planning has become a part of the daily discussions among women in several settings (Entwisle et. al, 1996). "In contemporary rural Chitwan, Nepal, ongoing evaluations of modern methods of contraception have become part of everyday discussions among women and men" (Stash, 1999). Each separate group of women and men in Chitwan discussed children, family size, and family planning among themselves in the course of their normal activities. The situation among women in Naga, a rural community in Northern Ghana, is different from Chitwan's only in the spread of network partners. In Naga, discussion of family planning by women is most often undertaken among women in the same compound (Buono et. al, 2000).

Contributing further to the analysis of the role of social interaction (or diffusion) in reproductive change, Montgomery and Casterline (1996) drew attention to the two fundamental components of diffusion: social learning and social influence. According to them, social learning refers to the acquisition of information from others, which in the case of fertility control may include information on the types of contraceptive methods available, the health side effects of the methods and the cost of the methods. At the inter-personal level, social learning takes place when the other actors provide information that shapes an individual's subjective beliefs about prices, qualities, advantages and health risks of family planning methods. Social influence, on the other hand, refers to the power that individuals exercise over each other through authority, deference, and social conformity pressures. It is noted that individuals, faced with the need to make decisions in constantly changing environments characterized by ambiguities and uncertainties, rely on information drawn from

many sources to help resolve the ambiguities and uncertainties. Bongaarts and Watkins (1996) added a third aspect in their analysis of how social interaction can influence fertility change. This is the joint evaluation of the meaning of information and ideas exchanged in a particular context. Whether these diffusion processes facilitate or discourage the adoption of fertility control measures depends on several factors, and cognizance must be given to the fact that an individual may have several conversational partners for different purposes. In this study, emphasis is placed on inter-personal relationships that facilitate the discussion of fertility regulation issues.

The way in which information on family planning influences an individual's prospect for contraceptive adoption depends, among other things, on the content of the information. While the expectation is that discussions will highlight the positive aspects of contraception, it must not be presumed that information will always be positive. In order to facilitate a meaningful analysis of the impact of diffusion on contraceptive change, particularly for program efforts, some researchers have noted the need to document the content of conversations among conversational members (Cleland, 1998; Marsden, 1998; Valente, 1998). Discussions of the negative health consequences of family planning methods may predominate in some societies with the result that contraceptive innovation is frustrated. Studies in Senegal (Ngom, 1995), Ghana (Adibo, 1992; Adongo et. al, 1997), Egypt (DeClerque et. al, 1986) and Dominican Republic (Porter, 1984) have shown that rumors and misconceptions about contraception can frustrate innovation. In addition, reports from the Demographic and Health Surveys conducted in several less developed countries have also indicated that misconception (or misinformation) about contraception is one of the major reasons for non-adoption of contraception. Expectedly, however, information on family planning or particular contraceptive methods is not always negative. There have been reports of discussions that not only put more emphasis on the advantages of contraception but also encourage adoption. Women who receive positive information have often been reported to have greater prospects of adopting contraception (Valente, 1995; Bertrand et. al, 1986).

Contraceptive adoption can also be facilitated or frustrated by elements of social influence: the disposition of discussion partners to family planning and the experiences of discussion partners who have adopted contraception[2]. Individuals with conversational partners who approve or encourage contraceptive use are more likely to adopt contraception than individuals whose discussion partners neither approve nor encourage contraceptive use. Thus, in addition to acquiring information, individuals take decisions on the basis of the weight of the support they receive either through encouragement or the experience of other people.

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[2] The experiences are usually with respect to health risks, either as perceived by the non-adopter partner or as related by the adopter partner.

The usual practice of using cross-sectional measurements of social interaction and contraceptive use has implications for the interpretation of results. When the measures of the two variables pertain to the same time period, it becomes difficult to determine which of the two variables – social interaction and contraceptive use - influence the other. For instance, a positive association between membership of a social network and contraceptive use lends itself to several interpretations. It could be argued, for instance, that an adopter's membership of a network results from the need to associate with other individuals who share similar beliefs and values in a pro-natalist society where adopters are perceived as non-conformists. On the other hand, it could be argued that contraceptive use is facilitated by the information obtained from conversational partners and by relating to the experiences of partners who have adopted contraception. The second argument appears logical only where it could be established that membership of a network precedes contraceptive use. In order to assess adequately the impact of social interaction on contraceptive use, data must not only be available at two points in time but must afford the opportunity to examine social interaction and contraceptive-use statuses at two different points in time.

In the analysis that follows, we take advantage of the availability of data at two points in time to examine the impact of social interaction (measured by reports of a personal network member with whom family planning has been discussed) on the adoption of contraception in the Kassena-Nankana district of Northen Ghana. While the social interaction variable pertains to the time of the 1995 survey, contraceptive use is at the time of the 1998 survey.

Data and Methods

Data for this study are obtained from the 1995 and 1998 demographic and health panel surveys in the Kassena-Nankana district of Ghana. The Kassena-Nankana district is located in the northeastern part of Ghana bordering Burkina Faso. The population of the district is currently estimated at about 140,000. There are two major ethnic groups in the district: the Kassenas and the Nakanas. The third group, the Builsas constitute a very small minority. The district is predominantly rural with an economy based on subsistence agriculture (for a more comprehensive description of the Kassena-Nankana district, see Binka et. al, 1995).

The panel survey, conducted annually since 1994, is a major component of the data collection system at the Navrongo Health Research Center (NHRC). In compounds that were initially selected randomly from all compounds in the district, annual surveys are carried out among eligible respondents to obtain information on reproductive issues. Being a component of the NHRC's Community Health and Family Planning Project (CHFP), the panel survey is

intended to yield adequate data for the evaluation of the CHFP on contraceptive use and other proximate determinants of fertility, reproductive preferences and covariates over time (Binka et. al, op. cit.). The CHFP is a four-cell experimental design to evaluate the impact on health services delivery program of mobilizing two types of resources – the usual Ministry of Health resources and community participation in program management. The resources are represented by the key staff at the periphery: the Community Health Officers (CHO) who are the Ministry of Health nurses relocated to village clinics, and Yezura Zenna (YZ) representing community volunteers involved in health promotion. The four cells represent the different combinations of resources that are mobilized. Cell I has the community volunteers (YZ) only; cell II has the Community Health Officers (CHO) only; cell III has both CHO and YZ; and Cell IV has none of the key staff and is thus a comparison area.

The core instrument of the panel survey was adapted from the core questionnaire of the 1993 Ghana Demographic and Health Survey. The instrument for the female respondents usually contains questions on background characteristics, reproduction, contraception (knowledge, use and intentions), pregnancy and breastfeeding and fertility preferences. Each year, special modules are attached to the core survey instrument to elicit information not routinely gathered but of interest to the programs of NHRC[3]. In 1995, a social interaction module was added to the core instrument to investigate the role of diffusion in reproductive behaviour. The social interaction module, administered only in cells III and IV[4], contains questions on respondent's perceptions of family planning approval, use and motivational roles of four groups of individuals with whom the respondent has discussed family planning. Individuals in three of the groups - the husbands, heads of compounds (where the husband is not the head), and women leaders – reside in the same compound with the respondent. The fourth group consists of individuals outside of respondent's compound[5]. There were also questions to elicit information on age, sex and lineage of discussion partners who reside outside of the compound. Respondents were asked to indicate whether they have ever discussed family planning with each of the different individuals and whether the discussion partners approve or disapprove of family planning. The

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[3] For a more exhaustive discussion of the panel surveys, particularly the modifications in design since 1994, see Trim et. al, 1999.

[4] As noted above, both the CHO and YZ are mobilized in cell III and Cell IV is the comparison area.

[5] The 1995 module does not permit a determination of the actual number of discussion partners each respondent has. Respondents were asked to mention a maximum of two personal network members outside: the person with whom she talks most often and the person with whom she talks "next most often". We refer to these individuals as discussion partners, conversational partners, or members of a personal network as from now on. As will be indicated later, husbands are excluded from this network.

conversational partners are classified as ever-users if they were reported by the respondent to have used contraception and never-users if they were reported to have never used contraception. With respect to motivational role, the key element is whether the conversational partner has ever encouraged the respondent to use a method of contraception.

In 1998, a much larger social interaction module was attached to the panel survey. The module, administered on the 1995 respondents in cells III and IV, also contains questions on family planning attitudes, use and motivational roles of discussion partners. The 1998 social interaction module covered more issues than the 1995 module. In addition to age, sex and ethnic background, the three background characteristics of partners on which information was obtained in 1995, the 1998 module elicited information on marital status, education, ethnicity, economic situation and compound of residence of network partners. The 1998 module also contains questions on certain aspects of social interaction for which information was not obtained in 1995. These include: number of network partners, interaction with community health and family planning workers and opinion leaders and membership of voluntary associations.

For this analysis, the dependent variable is contraceptive use in 1998. Contraceptive use has two categories: using at the time of the 1998 panel survey and not using. The principal explanatory variable is social interaction, measured by discussions of family planning with other individuals and the contraceptive-use motivational role of such individuals as at the time of the survey in 1995[6]. Social interaction is defined strictly in terms of discussions of family planning with individuals other than the husband. In other words, spousal communication is excluded. Preliminary analysis of data, including the application of the Latent Class Analysis, indicates that three major distinct groups of respondents could be defined by the social interaction variable: Respondents whose family planning discussion partners are contraceptive users or encouragers (or both)[7]; Respondents whose family planning conversational partners are neither users nor encouragers; Respondents who reported never

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[6] The patterns of social interaction were computed from a combination of responses to the following questions: (i) Have you ever talked about family planning with (NAME)? [YES/NO] (ii) Do you think (NAME) approves or disapproves of family planning? [APPROVES/DISAPPROVES/NOT SURE] (iii) Do you think (NAME) has ever used a method of family planning? [YES/NO/NOT SURE] (iv) Has (NAME) ever encouraged you to use a method or discouraged you from using a method? [ENCOURAGED / DISCOURAGED/NO ADVICE GIVEN]. NAME refers to the husband, head of household, influential woman within the compound, the person outside the compound the respondent most often talks to or the individual the respondent talks to next most often.

[7] 83% of all discussion partners who are contraceptive users were reported to have encouraged others to use contraception.

having discussed family planning with their discussion partners[8]. In addition to the social interaction variable, other explanatory variables incorporated into this analysis include age, education, type of union, religion, ethnic group, type of CHFP intervention program, husband's approval of family planning in 1998, desire for additional children, number of living children and other elements of social interaction on which information was collected only in 1998[9]. Apart from influencing contraceptive adoption, the background characteristics also determine patterns of social interaction. This analysis is focused on 1437 currently married women aged 18-49 in 1998 who had not adopted contraception by the time of the survey in 1995 and for whom valid values are available on all variables of interest. Because of low loss to follow up, this constitutes a high percentage of women interviewed in 1995.

The primary aim in this analysis is to assess the role of social interaction in contraceptive adoption. Since contraceptive use, the dependent variable, is binary, the logistic regression procedure is used to estimate the impact of social interaction. Contraceptive use is regressed on social interaction about family planning while controlling for other explanatory variables. Based on the observation that it is not the mere discussion of family planning with others but the content of discussion and the encouragement received from earlier adopters that facilitate contraceptive innovation, we posit that respondents whose discussion partners are family planning users[10] or encouragers are more likely to adopt contraception than others. User/encourager partners serve as role models and are more likely to emphasize the positive aspects of contraception.

Results

Characteristics of Respondents and patterns of social interaction

Table 1 describes the changes in the demographic and socio-economic composition of the women between 1995 and 1998[11]. While a change is not

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[8] The sample population was evenly distributed into these three groups. For ease of reference, women who reported that their discussion partners use contraception or that their partners have encouraged them to use contraception will sometimes be referred to as "the encouraged group"; those who have discussed family planning with partners who are neither users nor motivators/encouragers will be referred to as "the discusser group"; those who have never discussed family planning with network members will be referred to as "no social interaction group".

[9] Most of the explanatory variables that were included in the analysis at the multivariate level are those that were found to have significant associations with contraceptive use or social interaction variable at the bivariate level

[10] This is based on the assumption that the spillover effects are more positive than negative.

[11] The selected characteristics are those that have been found to be associated with reproductive behaviour.

expected in the ethnic composition of the population (since it is the same sample of women that is being examined at the two points in time), a substantial change is also not expected in the life time formal school attendance rate since the sample consists of women all of whom were above the primary or middle school age at the time of the first survey in 1995. The changes in the subgroups defined by age and fertility variables are expected: the population grew older, and as a result of the inter-survey births, the percentage of women reporting five or more live births (and living children) also increased. During the inter-survey period, the proportions of women in polygynous unions increased slightly and a few women changed religion. Christianity and other nontraditional religions recorded some increases while the traditional religions recorded some declines in membership. More women were pregnant at the time of the first survey and the percentage wanting no more children increased by ten percentage points from 16% in 1995 to 26% in 1998.

Table 1: Background Characteristics of Women, 1995 and 1998

Background characteristic	Years	
	1995	**1998**
All women	**1437**	**1437**
Age		
15-24	12.2	6.5
25-29	21.8	15.7
30-34	22.3	20.2
35-39	20.2	24.4
40-44	15.0	20.5
45-49	8.6	12.7
CHFP Program Cell		
CHO+YZ	51.6	51.6
Regular/comparison	48.4	48.4
Type of union		
Monogamy	57.1	55.1
Polygyny	42.9	44.9
Religion		
Traditional	75.2	66.4
Christianity	22.3	29.6
Other	2.5	4.0
Ethnicity		
Kassem	33.4	32.5
Nankam	61.8	63.2
Other	4.8	4.3

Pregnant at time of survey?		
Yes	10.6	7.9
No	89.4	92.1
Children ever born		
1	11.5	6.0
2	13.0	12.9
3	15.4	13.4
4	18.2	17.3
5 and above	41.9	50.4
Number of living children		
0- 1	15.5	8.9
2	20.1	18.7
3	23.0	23.9
4	19.7	21.6
5 and above	21.7	26.9
Desire for more children		
Want no more	16.0	26.0
Want more	84.0	74.0
Ever attended school		
Yes	21.9	21.9
No	78.1	78.1

Table 2 indicates low levels of spousal communication. The percentage of women who reported that they had discussed the desired number of children with their husbands increased slightly from a low 14% in 1995 to 16% in 1998. Information on spousal communication about family planning was obtained only in 1995 at which time about one-quarter of the women reported having discussed family planning with their husbands. Caution must be exercised in drawing conclusions about women's participation in decision-making on reproductive issues from these reports. As noted earlier (Feyisetan, 2000), women's reports of spousal communication may underestimate their actual level of participation in decision-making in several African societies (particularly in rural settings) where deference to one's husband is the norm. A woman's desire to portray that she is "well cultured" through deference to her husband may encourage her to report that she has never discussed reproductive issues with her husband since these issues are traditionally perceived to be the prerogative of the husband and his kinsmen. Table 2 also shows that the women are more likely to discuss family planning with personal network partners than with their husbands. Only 32% reported that they had never discussed family planning with a personal network partner in 1995 in contrast to the 74% who reported never having discussed family planning with their husbands. Half of the remaining 68% had discussed family planning with partners who are family planning adopters or encouragers.

Table 2: Spousal Communication and Social Interaction about Family Planning, 1995*

Indicator	%
Spousal communication	
(a) Ever discussed number of children with spouse?	
Yes	14.2
No	85.8
(b) Ever discussed FP with spouse (1995)?	
Yes	26.2
No	73.8
Social Interaction about family planning[a]	
Never discussed FP with any other person	32.3
Discussed FP with individuals who neither used FP nor encouraged use	33.4
Discussed FP with individuals who are FP users or encouragers	34.3
All women	1437

1998 values indicated in parentheses

a. Spouses are excluded from the list of network partners

Sub-group Differentials in Social interaction

When developing the conceptual framework for this analysis, we noted that social interaction, the major explanatory variable, could itself be influenced by socioeconomic variables. Thus, in addition to their direct influence, socioeconomic factors could affect contraceptive use indirectly through social interaction, implying that the net impact of social interaction will depend on the direction and the strength of its association with the socioeconomic variables. To determine whether social interaction is indeed influenced by socioeconomic variables in the study population, subgroup differentials in patterns of social interaction are examined. Table 3 shows that the percentage of women who have had no social interaction on family planning and the percentage who have been encouraged by their network partners to use family planning vary significantly by age, type of CHFP intervention program, religion, ethnicity, number of living children and school attendance. Older women, women who live in areas with only the Ministry of Health services, practitioners of traditional religions, Nankam women and women who have never attended school are more likely than others to have no social interaction about family planning. In contrast, younger women, women who reside in areas served by the combined activities of the CHOs and YZs, practitioners of nontraditional religions and women who have had some formal education are more likely than others to have interacted with partners who encourage them to adopt

contraception. The percentage of women who have not been encouraged by their family planning network partners to adopt contraception varies significantly only by place of residence and ethnicity.

Table 3: Percentage Distribution of Women Who Had Not Adopted Family Planning in 1995[a] by Patterns of Social Interaction[b] on Family Planning and Background Characteristics

Background characteristic	Never discussed FP with any other person	Discussed FP with other persons who are neither users nor encouragers	Discussed FP with other persons who are users or encouragers
All women	**32.1 (461)**	**33.6 (483)**	**34.3 (493)**
Age			
15-29	27.2	32.5	40.3
30-39	29.6	33.4	37.0
40-49	39.3**	34.1	26.6**
CHFP Program Cell			
CHO + YZ	28.7	30.8	40.5
Regular/Comparison	35.8**	36.5*	27.8**
Type of union			
Monogamy	31.0	32.7	36.3
Polygyny	33.5	34.6	31.9
Religion			
Traditional	37.5	33.6	28.9
Christianity	21.6	33.7	44.7
Other	20.3**	32.2	47.5**
Ethnicity			
Kassem	29.1	37.8	33.1
Nankam	34.7	32.2	33.2
Other	17.5*	22.2*	60.3**
Number of living children			
0-2	34.7	33.9	31.4
3-4	28.7	33.7	37.7
5 and above3	35.3*	33.0	31.7*
Desire for additional children			
Want no more	30.0	32.2	37.8
Want more	32.5	33.8	33.7
Ever attended school			
Yes	18.3	34.7	47.0
No	36.0**	33.2	30.8**

a. Refers to the time of the panel survey in 1995

b. Patterns of social interaction refer to whether FP has ever been discussed with another individual and the motivational role of that individual

** at least one of the percentages is different from the others at a level of significance of 0.01

* at least one of the percentages is different from the others at a level of significance of 0.05

Contraceptive Use Within Population Sub-Groups

Among women who were not practicing contraception in 1995, Table 4 shows the percentage that were using contraception at the time of the survey in 1998 according to subgroups defined by patterns of social interaction, and by demographic and socioeconomic variables. Contraceptive use in 1998 is found to differ significantly by patterns of social interaction in 1995. Women who at the time of the survey in 1995 had discussed family planning with partners who encouraged them to adopt a method are almost three times as likely to use family planning as women who at that time had not discussed family planning with conversational partners. Although an adequate assessment of the significance of the effects of social interaction cannot be done from a bivariate relationship, that greater proportions of women who have had social interaction about family planning adopt contraception tends to point to the significant role of diffusion in contraceptive adoption. As earlier observed for social interaction, Table 4 also shows that the percentage using contraception varies substantially among the demographic and socioeconomic subgroups except among subgroups defined by the number of living children and the desire for additional children. The patterns of contraceptive-use differentials among the socioeconomic subgroups are consistent with those of other studies. For instance, the inverted u-shaped association usually found between age and contraceptive use is observed in the study population, with women aged 40 years and above least likely to contracept. Education is also positively correlated with contraceptive use with women who have some formal education being almost twice as likely as the uneducated to adopt contraception. Furthermore, Table 4 shows that the intervention program of providing child health and family planning services through the CHOs and YZs facilitates greater demand for contraception. Women in polygynous unions, practitioners of traditional religions and Nankam women are less likely than their respective counterparts to use family planning. Although its impact appears insignificant in this study, the desire for additional children has been found to be one of the major factors that determine contraceptive use in developing countries (see for instance Feyisetan and Casterline, 2000). On the basis of the observed patterns of associations between the socioeconomic variables and social interaction on the one hand and between social interaction and contraceptive use on the other, a decline in the strength of the relationship between social interaction and contraceptive use could be expected as subsets of demographic and social factors are controlled.

Table 4: Percentage of Non-Contracepting Women in 1995 Who Were Using Contraception in 1998 by Selected Characteristics

Characteristic	percentage using contraception
All women	11.7
Social Interaction patterns (1995)	
Never discussed FP with any other person	6.9
Discussed FP with other persons who are neither users nor encouragers	10.5
Discussed FP with other persons who are users or encouragers	17.5**
Age	
15-29	12.8
30-39	14.0
40-49	8.2**
CHFP Program Cell	
CHO + YZ	16.1
Regular/Comparison	7.7**
Type of union	
Monogamy	13.8
Polygyny	9.2**
Religion	
Traditional	9.6
Christianity	16.7
Other	10.2**
Ethnicity	
Kassem	15.8
Nankam	9.1
Other	20.6**
Living Children	
0-2	9.2
3-4	13.3
5 and above	11.8
Desire for additional children (1995)	
Want no more	13.5
Want more	11.4
Ever attended school	
Yes	18.3
No	9.9**

**** at least one of the percentages is different from the others at a level of significance of 0.01**

Logistic regression estimates that document changes in the level of significance of the effects of social interaction as other sets of variables are controlled are shown in Table 5. Four models are estimated. In model 1, we include only the social interaction variable and in model 2 we examine the significance of the

effects of social interaction while controlling for the desire for additional children, noted as a major family planning demand factor. In model 3, we add spousal communication and other forms of social interaction on which information was available only in 1998. Demographic and socioeconomic variables and the CHFP intervention program, one of the family planning demand crystallizing variables (Phillips et. al, 1997) are added to the regression in model 4.

Table 5: Logistic Regression Odds Ratio for the Effects of Social Interaction on Family Planning and Other Characteristics on Contraceptive Use, Kassena-Nankana District, 1998

Characteristic	Model 1	Model 2	Model 3	Model 4
Social Interaction patterns (1995)				
Discussed FP with other persons who are neither users nor encouragers	1.60**	1.60**	1.12	1.02
Discussed FP with other persons who are users or encouragers	2.89***	2.88***	1.77**	1.48
Want no more additional children (1995)		1.16	1.23	1.21
Discussed FP with Spouse (1995)			1.49**	1.36*
Encouraged to use FP by Health worker (1998)			4.00***	3.43***
Encouraged to use FP by opinion leader (1998)			0.91	1.14
Encouraged to use FP in voluntary Association (1998)			1.43	1.39
CHFP Program Cell (CHO + YZ)				1.72**
Age				
15-29				1.75*
30-39				1.80***
40-49				1.00
Monogamous union				1.14
Christianity				1.33
Ethnicity (Nankam)				0.85
Living Children				1.25
Ever attended school (Yes)				1.27
-2 log likelihood	508.71	508.49	473.16	458.12
Model chi-square (df)	27.36 (2)	27.80 (2)	98.47 (7)	128.54 (15)
N	1437	1437	1437	1437

*** Significant at p ≤ 0.10; ** Significant at p ≤ 0.05; ** *Significant at p ≤ 0.01**

Estimates from model 1 reveal significant differences among groups defined on the social interaction variable. Women who have been encouraged by their discussion partners to use contraception are almost three times as likely as the "no social interaction" women to adopt contraception. For every contraceptive user among women who have not discussed family planning with social

network partners, there are nearly two users among women who discussed but have not been encouraged by their network partners to use family planning. Estimates from model 2 reveal no substantial reduction in the contraceptive-use difference among the groups on controlling for the desire for additional children.

The role of spousal communication in contraceptive adoption is well documented (see for instance, Feyisetan, 2000). Women who discuss family planning with their spouses are often found to be more likely to use contraception. In 1998, the social interaction module was enlarged to collect information on other forms of interpersonal interactions that could also generate demand for family planning. Respondents were asked to indicate whether they have ever discussed family planning with health workers and opinion leaders and whether they are members of voluntary associations where family planning issues are discussed. Since discussions of family planning generate demand for contraception mainly through the motivation or encouragement the network provides to individuals, information on whether the respondent has ever been encouraged to adopt contraception by the different individuals or groups was used to create two categories of respondents for each of three new interaction variables. The first category consists of individuals or groups who reported that they had been encouraged to use contraception by these individuals and the second category consists of those who have had no interaction nor have been encouraged by these individuals or groups to adopt contraception.

Parameters of model 3 reveal a significant decline in the effects of social interaction on controlling for spousal communication and the other forms of interpersonal interactions. For instance, the difference in contraceptive use between women who reported no family planning network partners and women whose family planning network partners have not encouraged the use of contraception disappears on controlling for these additional demand crystallizing factors. The contraceptive-use difference between women who have been encouraged by their family planning discussion partners to use contraception and women with no social interaction, however, remains significant. This result tends to highlight the significance of motivation/encouragement in the effects of social interaction on contraceptive use. Model 3 also shows that spousal communication about family planning and the encouragement received from health workers and voluntary associations have significant effects on contraceptive use. Indeed, women who reported that they had been encouraged by health workers are four times as likely as women who reported no such encouragement to adopt contraception.

The last column of Table 5 shows the estimates of model 4 that controls for all explanatory variables considered in this analysis. The estimates show that the effects of social interaction on contraceptive use reduce significantly on

controlling for all the explanatory variables. By adding the demographic and socioeconomic variables to the regression model, the significant difference in contraceptive use observed in model 3 between women who have been encouraged by their network partners to use contraception and those who have no social interaction about family planning disappears. The results from models 3 and 4 suggest that the impact of social interaction on contraceptive use derives substantially from the fact that the subgroups defined by the social interaction variable are also markedly differentiated by other factors that facilitate or inhibit contraceptive adoption. That is, while the majority of women who reported that they had interacted with partners who encouraged them to use family planning possess characteristics that facilitate demand for contraception, the majority of women who have not had social interactions about family planning possess characteristics that have not been found to facilitate contraceptive adoption.

Discussion

Like several studies that have demonstrated the increasing dependence of women on informal networks for information on fertility control measures, this study has examined the role of social networks in contraceptive adoption. Defined in terms of the face-to-face discussion of family planning with kin, friends and neighbors (excluding husbands), social interaction is hypothesized to affect contraceptive adoption through the attitudes, behaviours and encouragement of others with whom non-adopters come in contact. Unlike many studies that use measurements of social interaction and contraceptive use obtained from the same survey, the design of this study offers a unique opportunity to avoid the ambivalence surrounding the interpretation of the relationship between social interaction and contraceptive use. When measures of social interaction and contraceptive use are obtained from the same survey, there are at least two plausible interpretations of the relationships observed between the two. First, it could be argued that social interaction facilitates contraceptive use through the mechanisms of social learning or social influence. Secondly, higher levels of social interaction, usually observed among contraceptive adopters, may be attributed to the need for individuals in this group, usually a small minority in many African societies, to initiate and sustain ties with individuals with whom they can share information and their family planning experiences. However, because social interaction precedes contraceptive adoption in this study (social interaction is at 1995 while contraceptive use is at 1998), the second argument is not tenable. This study thus enables us to examine the effects of social interaction prior to contraceptive adoption on consequent contraceptive use.

When designing this analysis, we noted that the impact of informal discussions on contraceptive use depends on the content of the discussions. While exchange of positive information and ideas could facilitate contraceptive adoption, rumors and misconceptions about fertility control measures may frustrate adoption. However, even if as suggested by several researchers there

exists qualitative data to document the content of conversations, determining whether the discussions are predominantly positive to facilitate contraceptive use or overwhelmingly negative to frustrate use may still be difficult. Network members usually discuss both the positive and negative aspects of family planning even in environments that are highly conducive to contraceptive use. A strategy usually adopted to determine the utility of social interaction is to obtain information on family planning attitudes and behaviour of network members. In addition, respondents are asked to indicate whether they have been encouraged to use family planning by their partners. Perceived attitudes and behaviours of other network members are sometimes indicative of the type of discussions that could have taken place. Reports of encouragement from network partners suggest that greater emphasis is placed on the positive aspects of family planning. In this analysis, we examine whether in the process of discussing family planning issues network partners encourage one another to contracept. Thus, rather than compare contraceptive use between women who have family planning network partners and those who do not have, attempts are further made to compare contraceptive use among two subgroups of women who have social network partners: those who have been encouraged to use contraception by their partners and those who have not been encouraged to do so. Thus, encouragement from network members is a major variable in defining the patterns of social interaction in this analysis.

Results from this study suggest that social interaction about family planning triggers changes in contraceptive behaviour in the rural areas of Northern Ghana. Consistent with recent findings in Southern Ghana (Casterline et. al, 2000), the highly statistically significant coefficients of social interaction, particularly before controlling for demographic and socioeconomic characteristics of the women, suggest that for the majority of the women, the decision to initiate family planning practice is facilitated by informal discussions with social network partners who encourage contraceptive adoption. However, the decline in the level of significance of the coefficients of social interaction after controlling for the background characteristics points to the inseparable nature of the effects of social interaction and those of the demographic and socioeconomic characteristics (Montgomery and Casterline, 1998). This result indicates that diffusion dynamics are means through which the background factors operate. As stated above, this result is not unexpected in rural areas where the ability to associate and discuss family planning with others, particularly outside the home, is influenced by background factors.

This study draws our attention to the need for programs to facilitate gatherings/social interactions that permit free exchange of ideas and experiences among community members. In addition, programs should be developed to minimize misconceptions about family planning methods. Adopters should be adequately educated on the benefits and side effects of contraceptive methods as well as the management of side effects.

References

Adibo, M. 1992. "Conceptions and Misconceptions: Community Views on Family Planning." Technical Report, Health Research Unit, Ministry of Health, Accra, Ghana.

Adongo, Philip B., James. F. Phillips, Beverly Kajihara, Cornelius Debpuur, and Fred N. Binka. 1997. "Cultural Factors Constraining the Introduction of Family Planning among the Kassena-Nankana of Northern Ghana." Social Science and Medicine 45(12):1789-1804.

Agyeman, Dominic K. et. al. 1996. "Social Structure and the Diffusion of Fertility Behaviour" Final Report submitted to the Rockefeller Foundation.

Bertrand, J.T., E.G. Landry and J.D.A. Zelayaet. 1986. "Is Female Sterilization Voluntary in El Savador?" International Family Planning Perspectives 12: 40-48.

Binka, Fred N., Alex Nazzar, and James F. Phillips. 1995. "The Navrongo Community Health and Family Planning Project." Studies in Family Planning 26(3): 121-139.

Boulay, Marc. 2000. "The Influence of Information-Seeking Strategies on Social Network Composition and Contraceptive Adoption among Women in Rural Nepal." Paper Presented at the Annual Meetings of the Population Association of America, Los Angeles, 22-25 March.

Bongaarts, John and Susan Watkins. 1996. "Social Interactions and Contemporary Fertility Transitions." Population and Development Review 22(4): 639-682.

Buono, Nicole, Alex Nazzar, Cornelius Debpuur, Bamikale Feyisetan, James F. Phillips, and Lucas Amega-Etego. 2000. "Social Interaction and Reproductive Change in a Rural Community of Northern Ghana. (Forthcoming).

Caldwell, John, I.O. Orubuloye, and Pat Caldwell. 1992. "Fertility Decline in Africa: A New Type of Transition." Population and Development Review 18(2): 211-242.

Casterline, John M, Mark Montgomery and R. Clark. 1987. "Diffusion Models of Fertility Control: Are There New Insights?" Population Studies and Training Center Working Paper 87-06, Brown University.

Casterline, John, Mark Montgomery, Steve Green, Paul Hewett, Dominic Agyeman, William Adih, Peter Aglobiste. 2000. "Contraceptive Use in Southern Ghana: The Role of Social Networks." Paper Presented at the Annual Meetings of the Population Association of America, Los Angeles, 22-25 March.

Cleland, John. 1998. "Paper and Pills: An Overview of Innovation, Diffusion Contributions to Explanation of Fertility Decline." In Social Process Underlying Fertility Change in Developing Countries. A Compilation of Papers and Communications from the National Research Council's Committee on Population Annual Meeting Held in Washington D.C.

Cleland, John and Chris Wilson. 1987. "Demand Theories of Fertility Decline: An Iconoclastic View," Population Studies 41(1): 5–30.

Cohen, Barney. 1998. "The Emerging Fertility Transition in Sub-Saharan Africa," World Development 26(8): 1431–1461.

DeClerque, J., A.O. Tsui, M.F. Abul-Ata, and D. Barcelona. 1986. "Rumor, Misinformation, and Oral Contraceptive Use in Egypt." Social Science and Medicine 23(1): 83-92.

Entwisle, Barbara, Ronald R. Rindfuss, David K. Guilkey, Aphichat Chamratrithirong, Sara R. Curan, and Yothin Sawangdee. 1996. "Community and Contraceptive Choice in Rural Thailand: A Case Study of Nang Rong." Demography 33(1): 1-11.

Festinger, L. 1957. A Theory of Cognitive Dissonance. Palo Alto: Stanford University Press.

Feyisetan, Bamikale. 1999. "Fertility Transition in Africa." Paper Prepared for the Economic Commission for Africa, Addis Ababa.

Feyisetan, Bamikale. 2000. "Spousal Communication and Contraceptive Use among the Yoruba of Nigeria". Population Research and Policy Review 19: 29-45.

Feyisetan , Bamikale and John Casterline. 2000. "Socioeconomic Status, Fertility Preferences and Contraceptive Change in Sub-Saharan Africa." African Population Studies 15(2):1-24.

Freedman, Ronald. 1987. "The Contribution of Social Science Research to Population Policy and Family Planning Effectiveness." Studies in Family Planning 18(2): 57-82.

Green, Steven, 1999. "Normative Versus Instrumental Functions: Evidence of Social Network Differentiation among Rural Kenyan Men." Connections 22(2): 37-49.

Kincaid, L. 1994. "A Computer Simulation of the Impact of Social Influence on Contraceptive Adoption in the Communication Network of a Bangladesh village." Paper Presented at the Annual Meeting of the Population Association of America, Miami. May

Kincaid, L., S. Pathak and S. Mitra. 1996. "Communication Networks and Contraceptive Behaviour in Bangladesh." Paper Presented at the Annual Meeting of the Population Association of America, New Orleans.

Knodel, John and Etienne van de Walle. 1979. "Lessons from the Past: Policy Implications of Historical Fertility Studies." Population and Development Review 5(2): 217-245.

Lu, L., H.C. Chen, and L.P. Chow. 1967. "An Experimental Study of the Effect of Group Meetings on the Acceptance of Family Planning in Taiwan." Journal of Social Issues 23(4): 171-177.

Marsden, Peter V. 1998. "Diffusion through Social Networks." Paper Presented to the National Academy of Sciences workshop, The Social Dynamics of Fertility Change in Developing Countries. Washington, D.C.

Montgomery, Mark. 1993. "The Diffusion of Fertility Control in Taiwan: A Multi-Level Analysis." Paper Presented at the Annual Meeting of the Population Association of America, Cincinnati.

Montgomery, Mark, and John Casterline. 1993. "The Diffusion of Fertility Control in Taiwan: Evidence from Pooled Cross-Section, Time-Series Models." Population Studies 47(3): 457-479.

Montgomery, Mark, and John Casterline. 1996. "Social Influence, Social Learning and New Models of Fertility." Population and Development Review, Supplement to Volume 22: 151-175.

Montgomery, Mark & W.S. Chung. 1998. "Social Networks and Diffusion of Fertility Control in the Republic of Korea." In R. Leete (eds), The Dynamics of Values in Fertility Change. Oxford: Oxford University Press.

Ngom, Pierre. 1995. "Resistance to Family Planning in Senegal: The Role of Women's Informal Conversations." Paper Presented at the Annual Meeting of the Population Association of America.

Palmore, James and Ronald Freedman, 1969. "Perceptions of Contraceptive Practice by Others: Effects on Acceptance." In Ronald Freedman and J. Takeshita (eds), Family Planning in Taiwan: An Experiment in Social Change. Princeton: Princeton University Press.

Phillips, James, Fred N. Binka, Martin Adjuik, Alex Nazzar, and Kubaje Adazu. 1997. The Determinants of Contraceptive Innovation: A Case-Control Study of Family Planning Acceptance in a Traditional African Society." Policy Research Division Working Paper No. 93. New York: Population Council.

Porter, E.G. 1984. "Birth Control Discontinuance as a Diffusion Process." Studies in Family Planning 15(1): 20-29.

Rosero-Bixby, Luis and John Casterline. 1993. "Modelling Diffusion Effects in Fertility Transition." Population Studies 47(1): 147-167.

Rutenberg N. and Susan C. Watkins. 1997. "The Buzz Outside the Clinics: Conversations and Contraception in Nyanza Province, Kenya." Studies in Family Planning 28(4): 290-307.

Stash, Sharon. 1999. "Explanations of Unmet Need for Contraception in Chitwan, Nepal." Studies in Family Planning 20(4): 267-287.

Stycos, J. Mayone. 1982. "The Decline of Fertility in Costa Rica: Literacy, Modernization, and Family Planning." Population Studies 36: 15-30.

Trim, Shelly, Cornelius Debpuur, James Akazili, Fred Binka, and Alex Nazzar. 1999. Reproductive Health Behaviour, Fertility Preferences and Social Interaction in the Kassena-Nankana District of Northern Ghana: A Report of the 1998 Panel Study. Navrongo Health Research Center, Documentation Note Number 41.

Valente, T. W. 1995. Network Models of the Diffusion of Innovations. Cresskill, NJ: Hampton Press.

Valente, T.W. 1998. "Empirical Research on Diffusion of Innovations: Recent Developments and New Direction." In Social Process Underlying Fertility Change in Developing Countries. A Compilation of Papers and Communications from the National Research Council's Committee on Population Annual Meeting, Washington, D.C.

Watkins, Susan C. 1987. "The fertility transition: Europe and the Third World Compared." Sociological Forum 2(4): 645-673.

Watkins, Susan C., Naomi Rutenberg, and David Wilkinson. 1997. "Orderly Theories, Disorderly Women." In Jones et. al. (eds), The Continuing Demographic Transition. Oxford: Clarendon Press.