Kinship Networks and Contraception in Rural Bangladesh

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Introduction:

Ideational change (Cleland 1985; Tsui 1985; Cleland and Wilson 1987; Freedman 1987; Kincaid 2000), social interaction (Bongaarts and Watkins 1996; Montgomery and Casterline 1993; Entwisle *et al* 1996; Kohler 1997; Entwisle and Godley 1998; Marten 2002) and social networks (Rogers and Kincaid 1981; Montgomery and Casterline 1996; Valente *et al* 1997; Kincaid 2000) are three interrelated concepts widely used in recent demographic literature. Limitations of classic demographic transition model to explain the fertility transitions in Europe, Latin America, Africa and Asian countries in the context of widely differing social, economic and cultural conditions have shifted the focus of explaining fertility transition to the theory of *ideational change* with its intrinsic relation to diffusion of innovations concepts and thus social interaction and social networks. In demographic research, rather than seeing people as adapting to changing incentives in the socioeconomic environment, these theories commonly focus on the introduction into a given environment of new attitudes regarding fertility behaviour, and of effective techniques. Social interaction through social network is a mechanism of transmitting these new attitudes.

Based on a basic proposition of social psychology, sociology and social anthropology that individual behaviour is influenced through the embedded relationship of one's own social network, the network approach of demographic literature argue that decisions about contraceptive behaviour are not made by isolated individuals or even by isolated couples, rather these decisions involve individuals, couples, families, and

peer groups. This observation might be more appropriate in rural settings of developing countries, where conformance to the social norm is more vivid than the practice of individualisation. However, the network argument of contraceptive practice encompasses two distinct perspectives of network effects: *social learning* and *social influence.* The *social learning* approach focuses on the role of social networks in encouraging the spread of new information about family planning and the adoption of new methods of contraception, whereas *social influence* approach focuses on the role of social networks in encouraging the behavioural conformity within the local community. Though both friendship and kinship ties are used in assessing the impact of networks in contraceptive decision, as Godley (2001) observed, "there is little agreement about which networks matter, how they operate and how to measure their effects". Reason of this confusion stems mainly from the nature of data, which is normally either friendship or kinship data. Also in many cases the data allow little scope to assess the type of effects these network ties have. In the present paper, an attempt has been taken to understand which networks matter and how they affect contraceptive decision. To attain these goals, first the type of relations that make up women's social networks in rural Bangladesh has been investigated and then their association with contraceptive practice have been assessed using both individual's structural positions in their networks and the attitude of other members of family planning in their networks. Other informational factors, such as government/non government health and family planning assistants and mass media influence have been incorporated while controlling for standard socioeconomic and cultural variables.

Background

The total fertility rate (TFR) in Bangladesh declined from 6.3 children per women in 1975 to 3.3 in 1994-1996 and then remained constant in 1997-1999 (The Fifth Five Year Plan (FFYP); Bangladesh Demographic and Health Survey (BDHS) 1999-2000)). This decline of 48 per cent over a 25-year period occurred without a substantial improvement in socio-economic status, health conditions and other factors thought to be essential for fertility decline. Mitra *et al* (1994) argued that the fertility transition was achieved almost exclusively through the use of birth control methods (modern and traditional). The contraceptive prevalence rate (CPR) among married women in Bangladesh increased from 8 per cent in 1975 to 54 per cent in 1999-2000 and the prevalence of modern methods increased even faster, 5 per cent in 1975 to 43 per cent in 1999-2000, more than eight fold. Though this fertility decline created interest among researchers and policy makers and demographers commented that the third stage of the fertility transition has begun (Cleland *et al* 1994; Amin *et al* 1994; Mitra *et al* 1994), the TFR remained plateau at around 3.3 for a decade (according to the UNFPA State of World Population 2004 report, this rate is 3.4 and according to BDHS 2004, this rate is 3.00), which caused concerns among policy makers. An understanding of the factors that explain why women in Bangladesh adopt contraceptives and thus to get further insight to overcome this plateau state is essential.

Several communication factors have been credited for this increased use of contraception, which can be divided into two trends. The first trend captures mainly the empirical research bounded factors, which addressed the role of government/non-government change agents on contraceptive practice (Janowitz *et al* 1999; Kamal and Sloggett 1996; Rob and Cerenda 1992; Saha 1994). The second trend emphasises

ideational change, social interaction and social network approach (Kincaid *et al* 1993; Kincaid 2000; Marten 2002; Gayen 2004; Gayen and Raeside 2004). But so far is known, the type of relational ties that the village women of Bangladesh are embedded in and the type of influence these relational ties have in their contraceptive practice is rarely reported. Therefore, the aim of this paper is threefold. First, to explore the type of relations the village women are embedded in; second, to assess whether these network ties have influence on individual's contraceptive use; and third, to measure which type of influence (if there is any) these relational ties have on contraceptive decision. We hypothesise that in the *purdah* fettered rural setting of Bangladesh, where village women are rarely allowed to travel unaccompanied and rarely engaged in any outside home activities, women's social networks are mainly comprised of kinship relations and these kinship relations' approval of family planning is the main determining factor of contraceptive decision.

Data and Methods

Sampling Design

Data were collected by interviewing women (N=724) from seven villages and a small town *mahallah* of Bangladesh with structured questionnaires from July 2002 to January 2003. A currently married woman who had at least one child was interviewed from each household (*khana*) in each of the chosen villages. This particular type of sampling ensured the inclusion of at least one representative of the set criterion from each household in the data set. This gave the opportunity to test network properties, limiting the manageability problem of all the married women of the village, and also to an extent solved the problem of leaving isolate members out of the analysis.

Villages were taken as the sample areas, and one village was selected from each of the six administrative divisions of Bangladesh. These administrative divisions are different geographically, economically, socially and culturally and the villages were chosen to reflect this diversity. Another village was chosen where the majority of the inhabitants were Hindu in order to make the comparison that would allow determination of the influence of religion. Also one sample was taken from a non-metropolitan small town. The pilot survey was made in a small town *mahallah.* The response from the pilot survey correlated positively with the rural villages and it was decided to include the pilot data in the data set.

The survey instrument was a face-to-face interview with a structured questionnaire. The structure of the questionnaire comprised five domains: demographic, socio-economic-cultural, reproductive, family planning and sociometric questions. Altogether 77 questions were asked.

43 people, mainly comprising university students of the respective areas, took part in collecting data in different areas with the direct participation and guidance of the researcher at different phases.

Methods of Analysis

Three distinctive analysis approaches have been involved in this article. First, through descriptive analysis an understanding of the network ties that the women were embedded in and the general characteristics of the interviewed women were assessed. Second, social network models were produced using UCINET-6 to assess the association of women's network properties, both of network structure and content (in this case network members' attitude about family planning), in explaining their contraceptive behaviour. Third, both types of network properties were then used in a

logistic regression model to measure the relative effects of social network variables in contraceptive behaviour while controlling for other socioeconomic and cultural variables.

Measurement

Measuring Types of Relations

The interviewed women were asked to name up to five women in the village with whom they shared their feelings and emotions most regularly and felt their opinions and various behavioural practices important in their lives. The communication ties were recorded in "multiple-category nominal measure of relations", more specifically for this research in five categories (friend, colleague, relative, opinion leader, FP worker). This allowed measuring the types of relation with whom women shared most their emotions and turned for advice and information for their day-to-day problems. As the target audience of this research was only the women of reproductive age who were currently married with at least one child, ties mentioned to husbands were not recorded and the relations with other elderly women who did not match the set criterion (i.e. over 45 years, widowed, had not any child…etc) were excluded in the analysis.

Forming Data Matrices

According to the communication network literature, strong ties are important means of influence and control over the individual's behaviour (Rogers and Kincaid 1981; Epstein 1961; Horwitz 1977). These strength-ties allow examination of the quality of relationships (Brass 1992) and the positions of actors within the networks (Wellman and Gulia 1999).

For each village, a digraph matrix depicting the tie-strength among the linked actors was formed. This tie-strength was measured through a factor analysis of three network components:

i. "meeting frequency (in an ordinal scale, daily=4, weekly=3, monthly=2, others=1)";
ii. "frequency of seeking advice for mundane problems (never =1, seldom=2, often=3 and always = 4)"; and
iii. "the perceived influence in personal decision making (also in an ordinal scale, never=1, seldom=2, often=3 and always=4)".

The factor score computed in SPSS was entered into UCINET employing an arbitrary transformation to obtain a non-negative score to depict the strength of ties.

Measures of Network Properties

According to Kincaid (2000), "individuals who are highly interconnected and centrally located within local social networks are more likely to hear about innovations earlier and to have more opportunity for social comparison and influence". So, women's centrality positions in their networks were examined to measure the role of social network as *social learning*. Both *in-degree* and *out-degree* centrality were used. The number of ties one actor receives from their fellow network members are their *in- degree centrality***,** whereas *out-degree* centrality is the ties they nominate to other members of their networks. Also examined was the perceived attitude of the network members to assess the effect of *social influence*. The network structure for each village was also mapped using NetDraw visualization program to see the overall relational pattern. Also the approval of social network members were counted for.

Other Communication Factors

To obtain measures of *social interaction* on the decision to adopt contraception, answers to the question, "Who or what factors influenced you most in your family planning decision?" were recorded on a 0 to 10 scale that depicts the degree to which 16 communication factors influenced this decision. Husband and FWA were found to be the most important influencing factors. The other 14 influencing factors were reduced to three new variables through factor analysis. These are: influencing factor 1 - display comprising poster, pamphlet, public lecture, movie, mobile van, village theatre and magazine; influencing factor 2 - interpersonal comprising opinion leader, parents, friends, in-laws and relatives; and influencing factor 3 - mass media comprising TV advertisements and radio FP program. These accounted for 37 per cent, 14.3 per cent and 10.8 per cent of the original variation respectively.

Women's general information score was measured by computing the mean of the responses to the intensity of seven information sources, i.e. radio, television (TV), newspaper/magazine, bill boards, posters, relatives and friends (each was dichotomized as yes/no first) per study area. The means of all these sources were added to create the variable "information score". These communication variables were used for controlling purpose.

Measurement of Other Control Variables

Education score was derived through factor analysis of four variables: school attendance, school level, husband's education and language competence. This variable accounted for 82.64 per cent of the original variation. *Housing score* was created using factor analysis from the variables house type, and roof, wall and floor materials-

this accounted for 51.9 per cent of the original variation. Among the 11 modern household possessions listed to construct the e*quipment score*, 5 were found to be negligible. Recorded ownership of the equipment possessed, i.e. furniture, watch, electricity, radio, bicycle and TV, were added together to create the new variable *equipment score.* 'Status of travelling unaccompanied' and 'decision making power in household matters'- these two variables were combined using factor analysis to create the new variable *female autonomy score*, which accounted for 79.1 per cent of the original variation. Three new dummy variables were created from the delivery assistance: delivery assistant- health professional (qualified doctor, nurse/midwife, family welfare visitors (FWV)), delivery assistant-friends and relatives (parents, in-laws, brothers and sisters) and delivery assistants-unqualified professionals (traditional birth assistants (TTBA), untrained TTBA, unqualified doctors and *dai*)). Numbers of family members living abroad, frequency of contact and frequency of receiving financial help from these members-these three variables were reduced using factor analysis to one variable *family members live abroad score*. This new variable accounted for 82.64 per cent of the original variation. *Women's job* was dichotomized as housewife = 0 vs. other than housewife = 1, *place of giving birth* was dichotomized as home = 1 and otherwise = 0, *income source* was dichotomized as agriculture and agriculture-related income = 1 and otherwise = 0, *micro-credit organization affiliation* was coded as yes = 1 and no = 0, finally land property was dichotomized as cultivable land = 1 and no land = 0. All these variables were used in a stepwise binary logistic regression analysis and measures of concordance and discordance were used to assess the explanatory power of the model.

Results

Women of Bangladesh Have No Friends

Examining types of relations, it was found that the social networks of village women in rural Bangladesh were mainly built of relatives, more specifically the wives of brother-in-laws. This type of relation accounted for 76 per cent of mentioned ties. Hardly had they mentioned about friends. From observation also found was the importance of *Bari* (house) factor. In villages, if Mr X has four sons when they grow up and get married their households (*khana*) get separated but they live in the same home boundary and all the households together is known as X-*bari* and the wives of these house holds can only speak to each other regularly as village women are not normally allowed travel unaccompanied. Now we examine whether centrality positions have any association with contraceptive practice.

Central Actors Practice Family Planning

From the full network in a village of Barisal division, Figure 1, it is clear that central

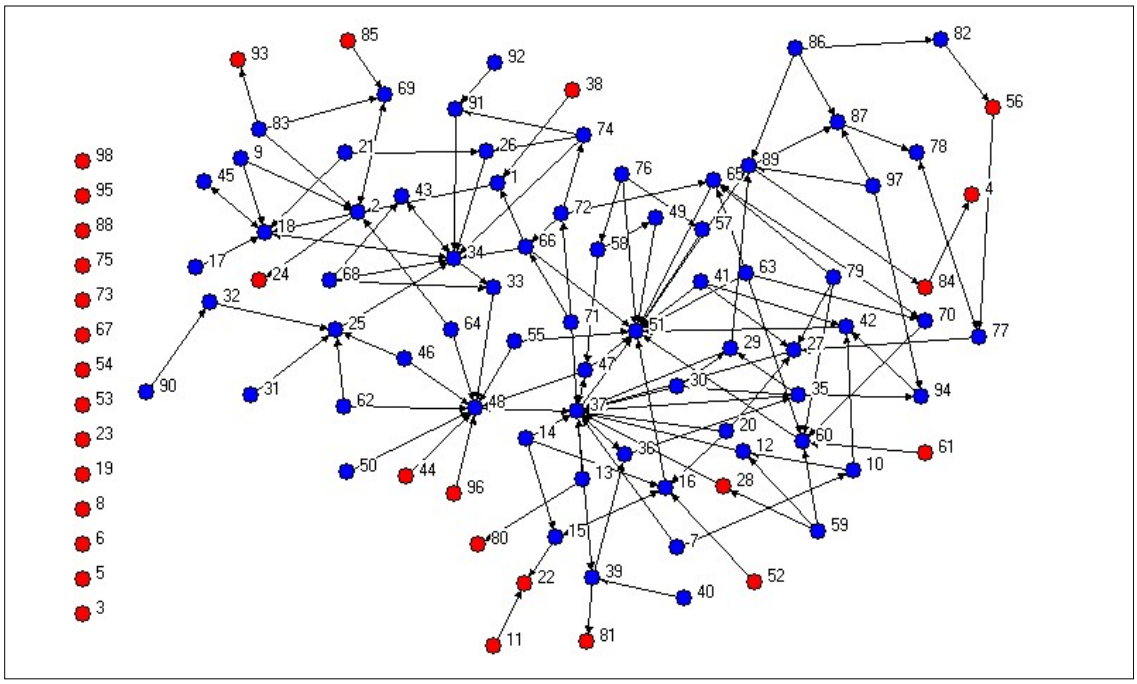

Figure 1: Network Structure of Village in Barisal Division -None of the Isolates Practice Family Planning (blue =practising, red= non-practising). Source: Gayen (2004)

actors practise family planning more than those who are isolates (who do not have any connection) or pendants (those who have only one contact). Analysing the clique structure it was found that members of any clique practiced family planning more than those who were not in any clique and members of multiple cliques practiced family planning more than those who were members of one clique. For an example, see figure 2. Actors identified in green are the women who practice family planning and actors identified in red are non-practicing. Thus the importance of centrality positions is demonstrated.

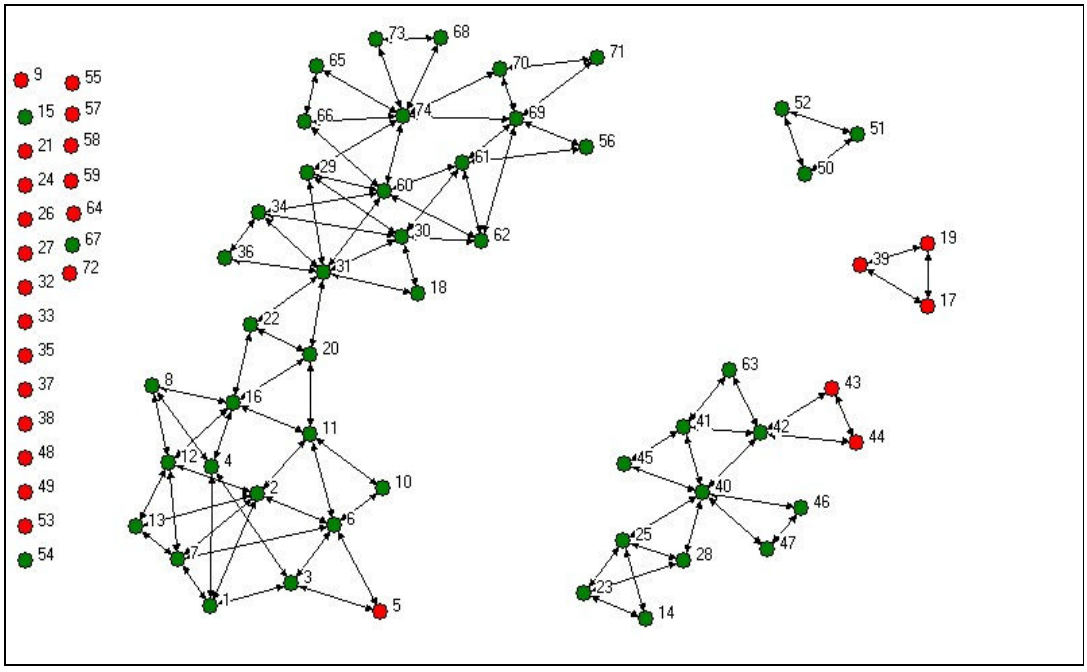

Figure 2: Clique Structure and Contraception in a Village in Sylhet Division.
Source: Gayen (2004)

From descriptive statistics it was found that 76 per cent of these referred ties were family relations, mainly *ja*-s (wives of husbands' brothers). Created variables from the centrality measures, i.e. in-degree centrality and out-degree centrality, as well as approval of network members were then included to the logistic regression model of

family planning practice. But before that correlation between network variables and contraception practice were conducted in SPSS.

Correlation between Social Network Variables and Contraceptive Use

Displayed in Table 1 is the correlation between actor's centrality positions, approval of network members of family planning and contraceptive use in rural Bangladesh. All the social network variables are positively significant with contraceptive practice at 1 per cent level.

Table 1: Correlations of Network Variables and Contraception Use

	FP practice	*indegree centrality*	*out-degree centrality*	*betweenness centrality*	*Approval score*
FP practice	1.000				
in-degree centrality	0.277	1.000			
out-degree centrality	0.539	0.314	1.000		
Approval score	0.706	0.297	0.570	0.246	1.000

Now these variables are added in the logistic regression model while controlling for other socio-economic and cultural variables.

Logistic Regression Model

The dependent variable in this analysis is a dichotomous measure of contraceptive practice (yes/no) at the time the survey was conducted. Since the dependent variable is dichotomous (practising/not-practising), a binary logistic regression was used in SPSS applying Wald's forward selection strategy, (Krzanowaski 1998), to model the decision to use contraception. In this strategy variables which are strongly correlated with those entered in the model are precluded from entry. In constructing the model 32 variables (see appendix 1) were used of which 8 were demographic variables, 4 were health variables, 11 were socio-economic-cultural variables, 6 were

communication variables and 3 were social network variables. Displayed in Table 2 is the logistic regression model for contraceptive use of women in rural Bangladesh.

Table 2: Logistic Regression Model of Likelihood of a Woman's Contraceptive Decision

Explanatory Variables and Category	B	S.E.	Significance	Exp (B)
Demographic Variables				
Sex of First Child Born	-0.124	0.063	0.048	0.883
Health Variables:				
Delivery Assistance-Relatives	-1.832	0.741	0.013	0.160
Socio-economic-cultural Variables:				
Family Members Live Abroad Score	-0.680	0.168	0.000	0.507
Equipment Score	0.304	0.108	0.005	1.355
Communication Variables:				
INFLF2_interpersonal	0.648	0.227	0.004	1.912
INFLF3-mass media	0.486	0.213	0.023	1.626
Husband	0.145	0.045	0.001	1.156
FWA	0.180	0.046	0.000	1.197
Sociometric Variables:				
Approval Score	2.372	0.270	0.000	10.714
Outdc_strength	0.038	0.007	0.000	1.039
Constant	**-4.83**	**0.62**	**0.000**	**0.007**

Both types of network variables (structural and attitudinal) were found to be significant. Within two structural variables, *out-degree* centrality appeared to be significant and *in-degree* centrality was dropped. But most significantly associated was approval score, see the Exp (B) for approval score in Table 2. Other significant variables that explained the contraceptive behaviour of women in rural Bangladesh were mainly communication variables: FWA, husband, interpersonal and mass communication. This model correctly predicted 93.4 per cent of the outcomes, with over 95 per cent of the contraceptive users correctly predicted and 89.9 per cent of the non-users correctly predicted.

Discussion: From descriptive statistics, it was clearly evident that the social networks of women in rural Bangladesh are mainly comprised of relatives, more specifically on average 76 per cent of the network ties were mentioned as *ja*-s (husband's brother's wife). Again from logistic regression model, the positive association of out-degree centrality in explaining contraceptive practice posits that the women who had more connection with these kinship networks were practising contraceptive, which indicates the social learning effects of these networks in relation to contraception. Again very strong association of these kinship networks' approval about family planning practice further provides insight that if these kinship networks have positive attitude about family planning practice, women practice contraception. Thus the effects of kinship networks as both *social learning* and *social influence* are evident. In the logistic regression model, strong association of FWAs, husbands' approval and interpersonal communication with increased contraceptive practice proved the importance of interpersonal communication over mass media and economic factors.

While collecting data it was found that almost all the interviewees first mentioned their husband's name as the best friend and tried to convince that other than their husband they did not confide their problems or share their emotions with any one else. Next to husbands they frequently mentioned their mother-in-law(s) and other elderly ladies of the household as their first friend amongst women. This was fairly common among young women. The reason for this may be that normally village women are not permitted to travel freely and unaccompanied, also they are rarely involved in work outside their homes. For cultural reasons they cannot discuss about family planning with the elderly women like mother-in-laws. Other than husbands and elderly relatives of the household, most of the women mentioned the names of other wives of the *Bari*. Some households of the same family members construct *Bari*. For example, 5 sons of Mr X may live in the adjacent households separately with their wives and children and all those households are called together the "X *Bari*". Most of the wives of this *Bari* are then *Ja* (husband's brother's wife) to each other. Mostly women mentioned the names of these *ja-s* whom they interacted with about family planning in addition to family welfare assistants (FWAs).

Policy Recommendation

To ensure that family planning continues to be adopted one can observe that the stability of family networks are important and will allow the diffusion of contraceptive knowledge and spread the idea of benefits arising from small families. The importance of these networks needs to be recognised and their use advocated as a conduit for spreading knowledge of contraception. Policy makers should consider utilising the central actors in these family networks as intervention points to disseminate ideas on family planning and also to promote a positive image of daughters to overcome the desire for male children.

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