Women's Social Context and the Care of Sick Children in Rural Bangladesh

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Abstract

This study examines the associations between women's position in the household and community (here it is village) and the care of children with acute illnesses in rural Bangladesh using data of the Matlab Health and Socioeconomic Survey conducted in 1996. Women's position is indicated by their education, domestic autonomy, social capital and household socioeconomic status, and their village-level position is indicated by percentage of ever-married women who have high autonomy, social capital and education. The results show that children are more likely to be treated by health providers over home-care if their mothers have education and high social capital in the village, controlling for illness and child's characteristics. Household socioeconomic status is the strongest predictor of use of trained providers (doctors or paramedics) over others. High village-level women's education and short distance to trained providers are associated with increased use of such providers. The results suggest that mass improvements in women's education and social capital and easy access to trained providers would improve the care of sick children rural Bangladesh.

1. Introduction

Desai and Alva (1998) analyzed the DHS data from 22 countries in Latin America and Africa and noted considerable variations in child health outcome across clusters. Control for household-level socioeconomic variables and the community of residence attenuated the educational differential in infant mortality and height-for-age in a number of countries. This attenuation underscores the importance of community characteristics, such as access to primary health care facilities, public and private health providers in the communities, etc. that should be included in the studies of child health. Sastry (1996) has shown that social and community characteristics modify the effects of the household-level variables on infant and child mortality in northeast Brazil. In Guatemala, family and community memberships are important determinants of use of health care: prenatal care, assistance at delivery and child immunization (Pebley et al 1996b). Village-level socioeconomic characteristics have effects on contraceptive use in rural Egypt (Entwisle et al 1989). The above findings all reveal that the characteristics of communities influence individuals' health behaviours.

In Bangladesh, areal variation in the use of modern contraceptives exists. The inter-district variation is partly explained by district-level religious practice and literacy (Amin et al 1996). The *bari*-level and cluster-level variations in use of modern contraception are largely explained respectively by social

characteristics and attitudes of the *bari* head and by the characteristics of family planning workers in the clusters (Kamal et al 1999). The BDHS 1996-97 has documented areal variations in infant and child mortality and immunization coverage of children. Similarly, areal variation in the care of sick children may exist, which may be the effect of differences in either provision of health facilities or the social context between areas.

What constitutes a community in this study is a village, which is roughly similar to a cluster in the rural area. Although villages may not be very cohesive communities, there are shared experiences among villagers because of their geographic closeness and exposure to the same common networks in terms of exchange of ideas (Amin 1995). People of the same village go to the same market and to the same mosque for the Friday-prayer. Views may be homogenous within villages and heterogeneous between villages. The views of individuals may reflect village-level norms, preferring particular types of health practices over others.

Table 1. Health service use for sick children and women's social position in Matlab villages

Village-level illness care and women's social position	Mean	Range
Illness care:		
Percent of sick children who were taken to health providers	55	11 – 88
Percent of sick children who were taken to doctors or paramedics	10	0 – 75
Social position:		
Percent of women who have some education	48	21 – 86
Percent of women who have high score on domestic autonomy	43	8 – 89
Percent of women who have high score on social capital	49	18 – 96
Percent of women who have high score on prestige	46	8 - 84
Number of villages	89	

Despite homogeneity in many other aspects, marked variations exist in the care of children with acute illness between Matlab villages (Table 1). The care of sick children refers to choice of treatment from a health provider outside the home as opposed to home-care or choice of a trained provider (paramedic or doctor) as opposed to all others. Similarly, women's positions, indicated by the percent of women who have some education, greater domestic autonomy (indicated by degree of women's mobility in public and ability to make purchases of family goods), higher social capital (indicated by women's economic security and sociopolitical awareness, involvement in extensive social interactions, a degree of consultation about decisions and knowledge of social institutions outside the village) or more social prestige (indicated by as strict purdah, complete gender-based division of labour and relative freedom from menial work) vary considerably between villages. When women's position in the village is high, it may be regarded as legitimate for women to act with some degree of autonomy. This may

collectively ease women's access to health and social services. Whether there is any relationship between women's position at the village-level and the care of sick children is little explored.

Individual women's behaviour and attitudes are likely to be influenced by the social contexts in which they exchange views and learn from each other to participate in key family decisions. Village-level institutions, for example, health centres, schools, mothers' clubs, micro-credit programmes, etc. are influential forums for the dissemination of ideas and homogeneisation of knowledge and values. They shape individuals' behaviour both directly by positively affecting women's mobility and authority and indirectly by affecting knowledge of health facilities and peer knowledge of health service use or management of illness. Presence of social institutions in the village may influence women's social position and make them more homogeneous within the village and more heterogeneous between villages in knowledge of health practices.

It can be argued that village-level measures of women's status are more appropriate as indicators of women's status than individual measures. While Balk (1994) asserts that women's status can vary within villages, status in the villages can be viewed as a social norm. The influence of the high female literacy and autonomy at the village-level might be quite different from the influence of literacy and autonomy of individual women on child health care, though these are interrelated. Aggregate levels of women's literacy and autonomy in a village may influence individual women's health-seeking behaviour in a number of ways. For example, a high level of literacy in a village may promote diffusion of knowledge of health and disease and undermine old views. Desai and Alva (1998) and Palloni (1981) argue that children of uneducated mothers can benefit if they live in well-educated clusters. Similarly, children of less empowered women may benefit if they live in villages where majority of women are empowered. If the status of women at the village-level tends to be high, this may legitimize women's rights in the household and community. It may reflect collective access to health care, thereby improving use of health care of children of women of low as well as high status, thereby reducing the importance of individual women's status in a given village. It is possible that individual-level and the village-level variables may have opposite effects on the likelihood of using health services. In summary, social context can influence access to health services. We hypothesize that women's education and position at the village-level have independent positive associations with care of sick children in rural Bangladesh.

On the other hand, the conditions surrounding a household may not influence health service use if parental ability to pay the treatment cost is the primary predictor of use of health services. This argument is corroborated by the finding that the mortality risk facing children is influenced by the

economic capability of the individual family, not by the prevailing level of national income in some developing countries (Preston 1980).

The specific objectives of this study are to examine (a) the extent to which health-related behaviours, particularly treatment of acute illness of children, are homogeneous within villages, and (b) to assess the degree to which the observed consistency in the care of sick children within villages can be accounted for by village-level and individual-level characteristics, for example, women's education, social capital, etc. A multilevel modelling is used to examine the influences of each factor operating at each of these levels. Knowledge of what explains areal variations in child health care or women's position might be important for development planning.

2. Methods and Materials

In this study, the villages are assumed to be a random sample from a large underlying population of villages. While conducting the individual-level analysis, we noticed considerable variations in childcare between villages. Similarly, women's position in the household varies between villages. The individual-level analysis has shown that the three variables: per head asset values, housing conditions and possession of a hygienic toilet are related to use of high quality treatment for sick children. Since these three variables share information between them (Table 2), since they affect childcare in the same directions, and since we need to reduce number of variables, a principal components analysis is used to identify a composite index (component) that explains maximum variations among them. One component is retained (Table 3). The variance explained is highest for per capita asset values. The component scores computed for individual women range between –2.94 and 3.12. Households scoring 3.12 are the most well-off. Finally, the score is coded into two halves; scores less than 0 are coded as '0'and higher scores are coded as '1'. This component indicates the socioeconomic status of the household.

Table 2. Correlation between household socioeconomic indicators (number of households=2643)

	Number of persons per living room	Possession of hygienic toilet
Per capita asset values	0.316	0.235
Number of person per living room		0.160

Table 3. Principal components, component loadings and cummunality values for household socioeconomic variables (number of households=2643)

Variable	Component loading (rotated)	Communality
Per capital asset values	0.77	0.60
Housing condition	0.71	0.50
Possession of hygienic toilet	0.66	0.37
Eigenvalue	1.47	

Percent of variance explained	49	

The principal components analysis reduced nine women's status indicators to three components that appear to represent women's domestic autonomy, social capital and social prestige (details in Appendix). Of the three components, only women's social capital is related to use of health services for sick children. Women's score on social capital is coded into two equal groups; low and high. The age of the child is grouped into less than 5 years coded as '1' or 5-14 years coded as '0'. Durations of illnesses are divided into those of less than 5 days and those of 5 days or more.

The choice of explanatory variables at the village-level is guided by previous research on the micro-level and macro-level determinants of seeking care for sick children. The village's access to health services is indicated by median of the distances (in km) of the sampled households in the village to the nearest doctor or paramedic. The village context is measured by stated opinions of the sampled ever-married women of the villages. The village social context represents the aggregate position of all women in the village. Measures of the positions of individual women in the village are aggregated to form a continuous measure of the proportion of ever-married women in the high position in different respects. It should be noted that women considered include women with or without sick children, so that the measures reflect a broader sample of women in the village than is used for the individual-level analysis. The value is calculated once for each village. Similarly, the prevalence of formal education among sampled ever-married women of the village is calculated. The overall social position of women in each village is indicated by the percentage of ever-married women belonging to the high status group and the percentage of women who have some education.

Whilst some analysts argue that independent measures of women's position at the aggregate are ideal, others argue that, given a sufficiently large number of observations, aggregated micro-level variables make ideal macro-level variables (Balk 1994, 1997). Here, the survey responses of the village women (number of women proportionally represents the village size only) are used to represent the village context. The ratio of sampled households to all households was 1 to 15. The villages are of different sizes. Village characteristics estimated from a very small sample may be less reliable than those estimated from a large sample. The villages with samples of less than 10 women are excluded from the analysis. This results in exclusion of very small villages and a reduction in the number of sick children.

2.1. Data Analysis

The sample size is reduced for two reasons: villages represented by less than 10 women are excluded from the analysis and data on women's status were not available for the 274 sick children. Women with missing data are more likely to be younger in age and educated (see Appendix). This analysis is based on a sample of 1,565 sick children living in 89 villages (46 in the comparison area and 43 in the treatment area, where ICDDR,B provides primary health care services in addition to the public and private services that serve the comparison area). The number of children with acute illness varies widely (ranging from 6 to 122) across villages and more-or-less proportionally to the size of the village. The full sample contained 1,986 sick children living in 136 villages.

The first dependent variable is choice of treatment from a provider outside the home as opposed to home-care. The second dependent variable is choice of treatment from formally trained allopaths (doctor and paramedics) as opposed to all others (including family treatment, untrained village doctors and healers of traditional medicines). Choice of health care for children's acute illness is hypothesised to be influenced by women's position and access to health services at the village-level in the presence of controls for illness and child characteristics, the household socioeconomic status and individual women's education and social capital.

Since the dependent variable has of two categories, logistic regression with a village-level random effect is used to model the effects of the individual-level and the village-level variables. The residual village-level variance is used to describe unmeasured village effects, that is the contextual effect of the village in which the child lives on his/her chance of being taken to a health care provider, after controlling for a number of variables known to affect health service use.

Risk Estimation and Statistical Methods

The relationship between individual and village attributes and use of health services is estimated using what is called a two-level logistic model: individuals (level 1) are nested within villages (level 2). Typically, dependent variables with two categories have been analyzed using standard logistic regression. Let y_{ij} be the binary choice of treatment for the ith child in the jth village, $y_{ij} = 1$ for using health services outside the home and 0 otherwise, and let $p_{ij} = \Pr(y_{ij} = 1)$. Then the two level random coefficients logistic model can be written as follows:

$$\text{logit}(p_{ij}) = \beta x_{ij} + \sigma_u u_j$$

where x_{ij} is the value of the ith child on the jth village at level one (called the fixed part) and u_j is the random effect associated with the jth characteristic of the village. β is a vector of parameters that are estimated as fixed effects. In a multilevel model, the total error not explained by the observed

covariates is split into components corresponding to each level in the hierarchy with a separate error term for each level. Variation at the village level on the logit scale is represented by $u_{j,}$ which is assumed to follow a normal distribution with zero mean and standard deviation 1. σ_u is a scaling parameter corresponding to the random effect u_j (which represents the unobserved characteristics of the village).

The strategy adopted in the multilevel logit regression analysis was first to consider illness and child's characteristics, individual household and women characteristics and the level-two random intercept, which control for homogeneity between sick children at the village-level (model I). The scaling parameter of the random intercept indicates whether there are significant unexplained variations in childcare at the village level. The second model included all the variables in model I and one village characteristic, access to health services (model I is nested in model II). The changes in the random intercept parameter may be attributed to the effect of modelling this aspect of the differences between villages. There might be some changes in the coefficients of the level-one variables as well. The third model included village-level measures of women's position in addition to the variables in the model II. The changes in the coefficients of the village-level random intercept and those of the level-one variables can be attributed to the effect of these village-level characteristics on choice of treatment. These models were fitted using the 1st order MQL procedure of MLwiN. The PQL procedure was also tried.

3. Results

In the sub-sample, 54.0 per cent of sick children are treated by health providers outside the home as opposed to 55.4 per cent in the full sample (Table 9.4). The percentages of children treated by formally trained providers in the sub-sample and full sample are 9.1 and 9.6 respectively. The sub-sample slightly underestimated use of health providers, but the difference is not statistically significant. Consistent with earlier bivariate results, the level-one variables; duration and severity of illness, child's age and sex and women's education and social capital, are associated with choice of treatment from a provider as opposed to home-care (data not shown). Duration of illness, child's age, women's education and household socioeconomic status are associated with choice of doctor or paramedics as opposed to all other care providers.

Sick children living in villages with a high proportion of literate women less often receive care from a health provider outside the home as opposed to home-care, running counter to expectations (p=0.07). Children living in villages with a high proportion of women scoring high on social capital are relatively likely to receive care from a health provider over home-care. Whether they live in villages where a

high proportion of women score high on domestic autonomy or social prestige does not affect their likelihood of receiving treatment from a health provider over home-care. The likelihood of receiving treatment from a provider is higher for sick children living in the treatment area than in the comparison area.

Table 4. Percentage of children with acute illness that were taken to health providers as opposed to home-care or taken to trained providers as opposed to all others by village characteristics (n=1565)

Village characteristics	Any provider over home-care	Trained provider over all others
Village-level women's characteristics (%):		
Women who have some education:		
<50[a]	56.3	7.5
50+	52.0	11.3**
Women who have high domestic autonomy:		
<50[a]	55.7	9.5
50+	51.5	8.2
Women who have high social capital:		
<50[a]	48.8	7.2
50+	60.3**	11.2**
Women who have high prestige:		
<50[a]	55.2	9.7
50+	53.7	8.6
Village-level access to health services:		
Healthcare delivery system:		
Comparison[a]	50.6	5.1
Treatment	59.0**	14.0**
Median distance to doctor or paramedic		
<2 km		10.8*
2+ km[a]		4.2

[a]refers to comparison category. *p<0.05, **p<0.01.

The higher the proportion of women who are literate or score high on social capital in villages, the higher is the chance that sick children receive treatment from trained providers (doctors or paramedics) over all others. The shorter the median distance of villages to the nearest doctor or paramedic the higher is chance of seeking treatment from trained providers. Children living in the treatment area are more likely to get treatment from trained providers than those living in the comparison area. Subsequent analysis did not include the village-level women's domestic autonomy and prestige (and severity of illness for choice of trained provider) as they are not significant in bivariate analysis.

The village-level random coefficient parameter in a model without explanatory variables is significant both for choice of treatment for sick children from a provider outside the home over home-care and choice of a trained provider over all others, conforming that there are variations in

treatment patterns between villages (Table 5). Inter-village variation is higher for choice of trained providers than for choice of any provider for treatment of illness.

Table 5. Inter-village variation[a] in proportions of sick children receiving treatment from any provider and from trained providers

	Treatment from any providers over home-care	Treatment from trained Providers over all others
Intercept	0.18 (0.07)	-2.24 (0.14)
Village-level variance σ_u^2	0.14* (0.06)	0.85** (0.24)

[a]based on model without observed covariates.

Table 6. Logistic coefficients (and standard errors) for choice of treatment from a provider as opposed to home-care.

Variables	Model I	Model II	Model III
Intercept	0.08 (0.15)	-0.03 (0.15)	-0.20(0.33)
Fixed effects:			
Individual characteristics:			
Duration of illness (in days):			
<5	-0.65** (0.11)	-0.66** (0.11)	-0.66** (0.11)
5+	0	0	0
ADL interrupted by illness:			
No	0	0	0
Yes	0.52** (0.11)	0.51** (0.11)	0.51** (0.11)
Child's age (in years):			
<5	0.50** (0.11)	0.49** (0.11)	0.49* (0.12)
5-14	0	0	0
Sex of child:			
Male	0	0	0
Female	-0.18 (0.11)	-0.19 (0.11)	-0.19 (0.11)
Mothers' education:			
None	0	0	0
Some	0.20 (0.11)	0.20 (0.11)	0.22* (0.11)
Mothers' social capital:			
Low	0	0	0
High	0.23* (0.11)	0.22* (0.11)	0.17 (0.11)
Household socioeconomic status:			
Low	0	0	0
High	-0.12 (0.12)	-0.14 (0.12)	-0.12 (0.11)
Village-level characteristics:			
Health delivery system:			
Comparison		0	0
Treatment		0.31** (0.13)	0.31** (0.13)
Proportion of women who are literate			-0.65 (0.54)
Proportion of women who have high social capital			1.02 (0.52)
Random effects:			
Village-level variance σ_u^2	0.12* (0.06)	0.10* (0.05)	0.07 (0.05)

*p<0.05, **p<0.01

Table 6 shows that addition of a number of individual-level variables to the model reduced the size of the random effect, but it remained large enough to be significant (Model I). This inter-village variation may be due to variables that have not been observed or that, in some cases, cannot be observed. The effects of the individual-level variables remained as significant as in the standard logistic models presented. Model II shows that control for the health service delivery system attenuated slightly the village-level variance in seeking treatment from outside the home, but left the variance parameter still significant. The coefficients of the individual level variables did not change substantially.

Table 7. Logistic coefficients (and standard errors) for choice of a trained provider as opposed to all others.

Variables	Model I	Model II	Model III
Intercept	-2.65 (0.25)	-2.84 (0.30)	-3.91 (0.58)
Fixed effects:			
Individual characteristics:			
Duration of illness (in days):			
5+	-0.40* (0.18)	-0.42* (0.19)	-0.44* (0.19)
<5	0	0	0
Child's age (in years):			
<5	0.85** (0.18)	0.85** (0.19)	0.86** (0.19)
5-14	0	0	0
Sex of child:			
Male	0	0	0
Female	-0.30 (0.18)	-0.34 (0.18)	-0.33 (0.19)
Mothers' education:			
None	0	0	0
Some	0.14 (0.19)	0.16 (0.19)	0.07 (0.20)
Mothers' social capital:			
Low	0	0	0
High	0.19 (0.19)	0.17 (0.19)	-0.17 (0.20)
Household socioeconomic status:			
Low	0	0	0
High	0.44* (0.19)	0.39* (0.20)	0.33 (0.20)
Village-level characteristics:			
Health delivery system:			
Comparison		0	0
Treatment		1.08** (0.23)	0.99** (0.22)
Distance to trained provider (km)		-0.37** (0.13)	-0.35** (0.12)
Proportion of women who are literate			2.31** (0.87)
Proportion of women who have high social capital			0.04 (0.82)
Random effects:			
Village-level variance σ_u^2	0.69** (0.22)	0.25 (0.14)	0.15 (0.12)

*p<0.05, **p<0.01

Addition of the village-level measures of women's characteristics to the model left the village-level intercept in choice of treatment outside the home insignificant (Model III). Inter-village variation in choice of treatment outside the home over home-care is due to differences between villages in women's

social capital. While the effect of individual women's social capital on how they treat their sick children attenuates and becomes insignificant, living in a village where women's social capital tends to be higher is positively associated with choice of treatment from a provider outside the home (p=0.06).

There is a significant variation in choice of trained provider between villages, even after controlling for duration of illness and child's age and sex, household socioeconomic status, women's education and social capital (Model I in Table 7). Addition of the village-level indices of access to health services; median distance of the village to a paramedic or doctor and health service delivery system shrank the variation in choice of trained provider between villages into insignificance (Model II). The shorter the median distance of the village to the nearest doctor or paramedic the higher is probability of using trained providers over all others. Village-level women's education is positively associated with choice of a trained provider, while individual women's education is not. Women's social capital at both the individual and village levels is not related to choice of trained health provider.

4. Discussion

The village-level variance for seeking in treatment from a health provider as opposed to home-care for sick children is quite small, but significant. This is to be expected because the study villages are adjacent to each other, hence populations across villages are likely to be fairly homogeneous in terms of health belief and practice. Even after controlling for the set of the individual-level variables and access to health services, significant variation exists in use of health providers over home-care between villages in Matlab. Parents in some villages, seek health care more often for their sick children than others, suggesting that village populations differ in other respects. Control for women's social capital at village-level explains this inter-village variation in seeking treatment from a provider outside the home over home-care, suggesting the importance of social context in child health care. This finding is consistent with the suggestion made by Caldwell (1986) that changes in social norms affecting the position of women in the household and society are important for both fertility and mortality changes in developing countries.

The effect of individual women's social capital on choice of treatment from a provider as opposed to home-care attenuated, but little when the village-level women's social capital is added to the multilevel model. Such attenuation suggests that the individual women's ability to use their social capital slightly depend on social contextual level in which she lives. A high-level social capital of women at the village-level may represent favourable attitudes of the villagers towards women's rights and their collective access to healthcare providers. Tolerant attitudes toward women's legitimate rights may ease access to health care of all women at the locality, thereby raising use of health services of sick children

of women of high as well as low social capital. The rise in use of health care for all sick children weakens the impact to an extent that the social capital of individual women might have on whether they seek treatment from a provider over home-care. The dependence on contextual social capital may suggest the importance of social learning.

The village-level variance in use of trained health providers (doctor or paramedic) over all others highlights the importance of variation in village characteristics. Two village characteristics: availability of trained health providers and provision of high quality health services are consistently related to use of well-trained providers and they account for the village-level variation in use of trained health providers. This finding is consistent with the micro-level finding that distance and poor quality of care are barriers to use of well-trained health providers for sick children.

One of the important findings is that the village's education profile has a positive impact on use of well-trained health providers (doctors or paramedics) as opposed to all others. While individual women's education is not related to use of well-trained providers, the average-level women's education in the village shows a positive relationship. This result is seemingly contradictory to expectations, but easy to envision. Parents are more likely to consult well-trained providers in villages where the majority of women have been to school for several reasons. High level of female literacy may reflect the village norms, shaped by education level. It reduces social barriers to women's access health and social services and undermines old values. Mothers living in relatively high literacy villages may have better knowledge of health facilities and more modern views about health and disease above and beyond what they would be expected from knowledge of their individual characteristics than if they live elsewhere. Some may simply tend to imitate the use of well-trained health providers for sick children by educated mothers. Other women's education may be of importance also to those who have some education, although for slightly different reasons. A diffusion of factual knowledge of health service use may occur if there are more women to share these experiences.

Parents in the literate villages can somehow manage to take sick children to trained providers, while parents in the illiterate villages cannot. In Ghana and Botswana, high female literacy at the state-level helped women to realize the benefits of education for health service use for sick children (Fosu 1994). The positive effect of village-level education is a confirmation of what Caldwell (1980) has termed the influence of `mass education' on mortality – even at the low level of education in Bangladesh. His hypothesis is that an increase in the proportion of literate, from a very low level, is the most crucial change. Mass education makes everyone more conscious about the need to educate their children and individuals' rights.

While mass literacy and mass improvement in social capital may result in greater use of health services, what causes such differences between villages is beyond the scope of this study, but demands for more in-depth study in future. Village-based formal or informal institutions may be behind these inter-village differences in women's education and empowerment, which may raise use of health services.

Unobserved Variations in the Care of Sick Children

Even after controlling for a number of variables, a large amount of variation in the care of sick children from well-trained providers remained unexplained. This unobserved heterogeneity is at the episode level as opposed to the village level. This large amount of unexplained variation reveals that unobserved factors operating at the episode level have an important impact on use of doctors or paramedics. Unobserved episode-level factors which trigger health actions may include parents' perception of illness, past experience with similar illness and access to health provider. Another plausible explanation, as Das Gupta (1990) suggested, is that some families, faced with the same resource constraints, are more effective than others in seeking care of their children because of differences in ability to use available resources, in beliefs about efficacy of treatment, or in parental priorities. Obviously, people vary in their level of persistence, organising capacity, energy, advice seeking, and ability to mobilize social and other resources. These factors are not readily captured by standard social and economic indicators, but play a role in determining whether sick children receive high quality health care. In the pluralistic health care environment in which Bangladeshi families live, the best form of health care in their own views vary considerably for a particular illness.

Limitations

The results of the multilevel analysis have a number of limitations. Villages vary in size, as such, some villages have few sick children. The probability of choosing a health provider as opposed to home-care varies between villages from 0.11 to 0.88 (Table 1). For a few villages, it is close to 0 and 1 and this causes violation of the normality assumption. However, the consistency of the results of the multilevel models with those of the bivariate analysis and the typical logistic regression models suggest that error in the results could be limited. This claim is reinforced by the fact that the same analysis was conducted by selecting villages having at least 12 sick children, so that the probability of choosing a health provider over home-care at the village-level is approximately normally distributed. The results were similar in the direction and often the magnitudes of the effects (data not shown).

A simulation study reveals that the multilevel estimates of the fixed effects are the same as those obtained by using standard logit models that ignores the hierarchical structure of the data (Rodriguez

and Goldman 1995). The estimates of the fixed effects and variance components are biased if the random effects are sufficiently large or the number of observations within a given level of cluster (e.g., family size) is small (Rodriguez and Goldman 1995). In this study, the scale parameter for seeking treatment from a provider over home-care is quite small, hence, the bias, if there is any, can be trivial. Pebley et al (1996) concluded that in spite of the biases in estimation of the coefficient and standard error, broad conclusions regarding the statistical significance of the effects based on an ordinary logit model are generally consistent with inferences based on the multilevel model, because the coefficients and standard error are biased in the same direction.

On the other hand, the estimates of the fixed effects and the variance components for choice of trained providers over all others may include some bias, as the probability of choosing a trained provider at the village-level varies between 0 and 0.75, with average of 0.10. Therefore, the coefficients that are marginally significant might not always be significant if bias could be controlled. Our conclusions are based on the results of both the multilevel model and the ordinary logistic regression model.

Appendix

The MHSS asked ever-married women detailed questions about their social interactions, decision-making power, sociopolitical awareness and rights violations to assess their position in the household. Their responses are scored and combined into nine distinct indicators; give advice to others, seek opinions of others, social visits, mobility in public places, ability to purchase very small and small items for family members, economic security, sociopolitical awareness and relative freedom from domination (details in Appendix A). The correlations between these indicators of women's status were found often weak and not always in the same direction (data not shown), suggesting that a few independent combinations of these indicators may represent women's status better than the individual indicators do alone. The principal components analysis extracted three distinct components, which explained 48 percent of the total variance (Table 1). Component 1 has an eigenvalue 2.14 and explains 24 percent of the variance. This component strongly correlates with women's mobility in public and ability to make purchases of family goods, and appears to represent the concept of women's 'domestic autonomy'.

Table 1. Principal components, component loadings and communality values for women's status indicators included in sorted, rotated component matrix, by indicator

Indicators of women's status	Component 1	Component 2	Component 3	Communality h^2
Give advice to others	0.03	0.68	-0.26	0.52
Seek opinions of others	-0.25	0.36	-0.22	0.24
Social visits	0.17	0.13	-0.72	0.57
Mobility in public	0.68	0.02	-0.20	0.51
Purchase small items	0.80	0.06	0.05	0.65
Purchase big items	0.80	0.13	-0.03	0.65
Economic security	0.27	0.45	0.50	0.53
Free from domination	0.10	0.14	-0.36	0.16
Social awareness	0.21	0.62	0.15	0.46
Eigenvalues	2.14	1.12	1.02	
Variance explained (%)	24	12	11	

The second component explains 12 percent of the variance and correlates highly with advice giving to others about important matters, sociopolitical awareness and economic security and fairly highly with opinion seeking from household members, friends and relatives, whose assistances are needed on a regular basis. Women's access to material (economic security) and non-material resources (sociopolitical awareness), involvement in extensive social interactions, a degree of consultation about decisions and knowledge of social institutions outside the village add up to a fair description of the concept of women's `social capital' (Putman 1993; Coleman 1988). The third component

correlates with less social visit outside the *bari*, less freedom from domination, but better access to economic assets represents the concept of women's prestige in the *purdah*-observing households. Prestige is acquired by such behaviour of women as strict purdah, complete gender-based division of labour and relative freedom from menial work (Abdullah and Zeidenstein 1979). Principal components scores were estimated for each woman, and ranked women with respect to these components, which the analysis had uncovered, and were used in further analysis.