Reproductive Health and its Bio-cultural Correlates among Rai and Bhutia Women of Rural Sikkim: A Micro Level Study

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This study addresses the relationship between utilization of maternal health services in terms of antenatal care, delivery care, and contraceptive use, and current prevalence of gynecological problems mediated through socioeconomic, demographic and biological correlates, in two ethnic communities of Sikkim.

Study participants included 506 parous, non-pregnant women of Rai and Bhutia communities. Information on morbidity status and utilization of maternal health care facilities were collected using appropriate pretested questionnaires. Bivariate and multivariate analyses were used. Anthropometric measurements were taken and blood tests were carried out for estimating hemoglobin concentration, and erythrocyte sedimentation rate (ESR).

Logistic regression showed significant association between participant's education, parity, husband's cooperation and maternal health care utilization on one hand and prevalence of gynecological problems, hemoglobin concentration, ESR and parity on the other.

Study results reinforce an interrelation between prevalence of gynecological problems and maternal health care utilization during pregnancy and delivery. A single effective health care program can be launched to meet the needs of these two ethnic groups. (*Ethn Dis.* 2012;22(2):140–147)

Key Words: Antenatal Care, Delivery Care, Gynecological Morbidity, Socioeconomic Status

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BACKGROUND

The 1994 International Conference on Population and Development brought the topic of women's reproductive health into the purview of mainstream research, especially in developing countries. Participants in the conference developed a consensus to ensure a wide range of reproductive health care services (including family planning) were accessible, affordable, acceptable and convenient to all users.[1] The importance of reproductive health has been globally recognized as a major component of women's health and well-being.[2] Lack of reliable information on reproductive health status, its needs and services and associated sociocultural factors, however, remain a major drawback, especially in developing countries.

Researchers in the fields of social sciences and public health attempted to develop and test various models to understand the reproductive health profile of a population in an operationally easier and methodologically sound manner.[3–7] Studies conducted in India showed that poor utilization of antenatal care (ANC) services during a previous pregnancy had serious implications on reproductive health of women including higher incidence of gynecological morbidity in the future.[8,9] Health care seeking behavior of women is essentially governed by socioeconomic status, level of awareness, prevailing social norms, a woman's own perception about ill health, access, availability and quality of maternal health care facilities.[10] Hence, the relation between pregnancy, delivery and morbidity episodes are important and should be viewed in the context of socioeconomic and demographic characteristics of the population. Studies dealing with determinants of health outcomes generally focus on individual risk factors and ignore the socioeconomic environment in which the outcome takes place.[11] We have observed a growing interest in examining community influences on health outcomes to consider health in its socioeconomic environment.[11,12] Several studies revealed effects of ethnicity on fertility behavior and maternal health care among women in India.[11,13] Observations of earlier researchers substantiate the fact that the root of disease development and its persistence lies in socioeconomic and cultural attributes.[8,14] Studies about prevalence of reproductive morbidities, treatment seeking behaviors, and utilization of maternal health care among different population subgroups in India and across the globe demonstrate similar patterns.[15,16] Mother's education and other socioeconomic conditions are noted to determine access to antenatal and delivery care.[8,17] Awareness about symptoms of reproductive morbidities and the necessity to seek prompt treatment has definite socioeconomic implication.[18] Cooperation at household level, particularly by husband and other family members, is shown to improve women's access to maternal health care services.[19,20] This is true in use of ANC and contraception by women in India.[21,22]

Studies on women's reproductive health are very limited for northeast Indian states except the large-scale multi-objective surveys like National Family Health Survey, which have pooled females of all ages and of all population groups, irrespective of their ethnic affiliation, and hence failed to identify any community specific difference in maternal health profiles. In contrast, studies do exist to show that

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community specific social norms and practices may play an important role in utilization of maternal and reproductive health care services.[22,23]

Our study aims to document socioeconomic and biological correlates of maternal health care practices and gynecological morbidity for two different ethnic groups, Rai and Bhutia, residing in similar environments and enjoying similar health care services with dissimilar cultural norms. A sample of 506 women was surveyed to determine: 1) the association between maternal health care utilization in terms of ANC, delivery care and contraceptive use, with socioeconomic and demographic factors at the time of their last childbirth; and 2) the prevalence of current gynecological morbidity and treatment seeking in the context of certain sociodemographic and biological factors as well as relationship between prevalence of gynecological morbidities and use of maternal health care during last pregnancy.

METHODS

Study Site

The study area, Ranka, includes eight villages, located in the East district, and about 15 kilometres away from Gangtok town, the capital of the state of Sikkim. Ranka was purposively chosen as the study locale because it is a major population concentration for both communities. The two study groups, Rai and Bhutia, have dissimilar ancestral origin and distinct cultural norms and have resided in Ranka for several generations sharing similar social and physical environments.[24]

Participants

Two communities, Rai, a Nepalese caste group and Bhutia, a tribal group, constitute more than 90% of the total population of the villages studied. In general, the study population (in both groups) make use of the available public health care facilities in the locality run by the government. Traditional health care practices (like amji and Tibetan) are often discernible in these two groups. A total of 3238 adult Rai and Bhutia females participated in the present study. Of these, 506 parous and non-pregnant females (328 Rai and 178 Bhutia) who had given birth to a child within two years before the time of survey were finally selected. Age of participants ranged from 18 to 50 years with a mean age of 34.12 ± 8.38 years.

Data Collection

Data was collected through face-to-face interviews of mothers by trained female interviewers at their residences. Blood samples were collected by a phlebotomist and anthropometric measurements were taken on each participant following standard methods and techniques.[25]

The questionnaires were prepared with the help of a practicing gynecologist, and were pretested before administration. The questions were structured to elicit women's perception in terms of the symptoms associated with biomedically defined morbidity.

Measures

In the present study, utilization of antenatal and delivery care during last child birth, current use of contraceptives, and prevalence of gynecological morbidity are considered as dependent variables. Independent variables include both sociodemographic and biological indicators.

Biological Measures

Biological measures include hemoglobin level (Hb), erythrocyte sedimentation rate (ESR), and anthropometric measures [body mass index (BMI) and sum of skin-folds]. Use of biological indicators in the study would help explain both pregnancy and labor related complications, reducing the random effects for each.[6] These indicators are considered to be measures of susceptibility for maternal health risks.[3] Skin-fold thicknesses taken at six different sites (biceps, triceps, subscapular, suprailiac, abdomen and calf) represent the measures of adiposity. The occurrence of high ESR values could be the cause of inflammation and represent infection in other parts of the body. To rule out this possibility, participants were also asked about other health problems as well. Females, who had not reported any diagnosed physical ailments during the survey, were selected for ESR estimation. Hemoglobin and ESR estimations were done using cyanmet and Westergren reference methods, respectively.[26,27]

Sociodemographic Measures

Sociodemographic variables included age, ethnicity, level of education (years of formal education), occupation, possession of modern gadgets, monthly expenditure of family and parity. Participants having one child, 2–4 children and more than 4 children were categorised as primipara, multipara and grand-multipara respectively. Possession of a television set with cable connection, telephone and car indicated the higher socioeconomic status. Possession of these modern gadgets were also considered to be indicators of woman's exposure to outside world. Participants were divided into three categories in order of cooperation received from their husband regarding decision-making about maternal health care utilization and related matters (eg, ANC, delivery care, contraceptive use and treatment seeking for morbidity symptoms).

Table 1. List of the gynecological morbidity symptoms asked of the participants

List of symptoms related to reproductive health problems
  Menstrual problems like heavy/light/irregular bleeding or painful menstruation or spotting in between
  Pain or bleeding while passing stools
  Some mass/swelling coming out from vagina or leakage of urine when coughing or sneezing
  Leaking of feces constantly from vagina
  White colored discharge from vagina with bad odor with itching/irritation
  Frequently going to toilet to urinate or burning sensation while passing urine
  Lower abdominal pain or vaginal discharge with fever
  Not becoming pregnant even though desired
  Feeling excessively weak and tired or feeling of breathlessness during normal household activities
  Painless red sores on the genital area and anus

Gynecological Problems and Maternal Health Care Utilization Measures

Participants were asked about their experience of having any symptoms, during three months prior to the survey, from a list of ten symptoms related to gynecological conditions (Table 1). For each symptom they were asked whether they sought any treatment. Based on their answers on the increasing number of symptoms, the participants were grouped into nonmorbid, moderately morbid and severely morbid categories. No claim however is made in this study about the diagnostic accuracy of reported symptoms and the actual clinical conditions remain uncertain.

In our study, ANC use implies at least three antenatal visits, intake of iron/folic acid tablets and two tetanus injections during last childbirth. Delivery care generally implies institutional delivery with assisted care during last childbirth. In addition to ANC and delivery care, treatment facilities for gynecological problems are also available at primary health centres and district hospitals in Sikkim.

Ethical Consideration

Methods and measures used in the study were reviewed and approved by Institutional Review Board of the Indian Statistical Institute. Before data collection, a written consent was sought from each study participant and respective household head.

Statistical Analyses

Chi-square tests were used to examine the ethnic difference between the study groups for sociodemographic characteristics, prevalence of morbidities and reproductive health care utilization measures. Logistic regression (binary) models were fitted to assess the effect of socioeconomic and demographic variables on maternal health care utilization patterns. Logistic (multinomial) regression model was fitted to estimate the association between prevalence of morbidity and sociodemographic as well as biological factors. Before developing logistic regression models, independent variables were checked for collinearity using chi-square tests to avoid screening effects. A log-linear model was used to estimate the association and interactions among ANC, delivery care utilization and contraceptive use since logistic regression models cannot estimate interaction effects. Subsequently, the effects of interaction and association among ANC utilization, prevalence of morbidity and treatment seeking practices was estimated using another log-linear model. Analysis was done with the help of SPSS 11.0.1 package (SPSS Inc., Chicago Ill, USA).

RESULTS

Sociodemographic Characteristics of Participants

The numbers of nonliterates were higher among the Rais than Bhutias (Table 2). A majority of women in both study groups were housewives, and a majority had two to four children. Family expenditures of most women in both groups were a little more than 100 USD per month. Percentage of mothers who attended ANC during their last pregnancy was higher among the Bhutias; they also more frequently reported to have received 'a lot' of husband's cooperation in matters related to treatment seeking and other maternal health care issues, compared to the Rai women. Number of unattended deliveries was high in both the study groups. The morbidity prevalence of the study women of both groups indicated that >50% of them had not suffered from any ailments during the reference period (three months prior to survey). None of the differences in the above characteristics between the groups were statistically significant.

Maternal Health Care and Its Socioeconomic and Demographic Correlates

The results of logistic regression models determining the relationship of maternal health care utilization practices, (ie, antenatal and delivery care, contraceptive use and treatment seeking for gynecological morbidity) with socioeconomic and demographic characteristics are in Table 3. Antenatal care use during pregnancy had significant association with participant's age, level of education and possession of modern gadgets. Odds ratio in favor of attending ANC increased with increasing level of education. Mothers who had lost at least one or more offspring in infancy were more likely to go for ANC than those who had no such experiences. Likewise, mothers with higher parity were less likely to take ANC.

Association was found between delivery care utilization and these variables: parity, level of education, husband's cooperation and ANC utilization. Participants who received ANC during pregnancy were about five times more

Table 2. Sociodemographic characteristics of the study populations, n (%)

Variable	Rai (*n*=328)	Bhutia (*n*=178)	χ^2 value	P
Age group				
≤20 years	34 (10.37)	20 (11.24)	0.49	0.92
21–32 years	92 (28.05)	54 (30.34)		
33–44 years	108 (32.93)	60 (33.71)		
≥45 years	94 (28.66)	44 (24.72)		
Level of education				
Nonliterate	176 (53.66)	80 (44.94)	2.01	0.37
≤10 years	132 (40.24)	82 (46.07)		
>10 years	20 (6.10)	16 (8.99)		
Occupation				
Agriculture	50 (15.24)	22 (12.36)	0.42	0.81
Housewife	222 (67.68)	126 (70.79)		
GS and business	56 (17.07)	30 (16.85)		
Having modern gadgets[a]	188 (57.32)	104 (58.43)	0.01	0.97
Parity				
Primipara multipara	62 (18.90)	30 (16.85)	3.21	0.2
Grand-multipara	168 (51.22)	112 (62.93)		
	98 (29.88)	36 (20.22)		
Family's monthly expenditure				
≤Rs. 2000 (≤USD 44)	96 (29.27)	54 (30.34)	5.96	0.06
Rs. 2001–5000 (USD 44–111)	194 (59.15)	84 (47.19)		
>Rs. 5000 (>USD 111)	38 (11.59)	40 (22.47)		
Husband's cooperation				
No	130 (39.63)	50 (28.09)	3.62	0.16
A little	28 (8.54)	20 (11.24)		
A lot	170 (51.83)	108 (61.80)		
Taken antenatal care	138 (42.07)	94 (52.81)	2.26	0.13
Delivery type				
Unattended	222 (67.68)	122 (68.54)	0.01	.99
Attended	106 (32.32)	56 (31.46)		
Prevalence of morbidity				
Non morbid	168 (51.22)	102 (57.30)	1.4	0.49
Moderately morbid	120 (36.59)	52 (29.21)		
Severely morbid	40 (12.20)	24 (13.48)		
Treated for morbidities	35 (21.88)	17 (22.37)	0.21	0.59
Current users of contraceptives	111 (33.84)	67 (37.64)	0.26	0.36

GS, government services.

[a] Possess television, refrigerator, telephone, motorcycle and car.

likely to utilize professional assistance during delivery.

Use of contraceptives was significantly associated with husband's cooperation (in terms of consent in using) and utilization of ANC during last pregnancy. Factors indicating higher economic status showed significant association with treatment seeking for gynecological morbidity. Association between treatment seeking behavior and ethnicity was significant though a comparatively lower odds ratio was reported for Bhutia.

Prevalence of Morbidity and Its Sociodemographic and Biological Correlates

Table 4 shows the relationship between prevalence of morbidity and sociodemographic and biological characteristics of participants. Age, level of hemoglobin, ESR, and parity show significant association with prevalence of gynecological morbidity. Hemoglobin concentration, sum of skin-fold thicknesses and BMI were inversely related to the prevalence of morbidity whereas levels of ESR were positively related to it.

Odds ratio in favor of being severely morbid was 0.15 for primary and secondary levels of education, compared to the nonliterate group. No significant difference was observed between ethnic groups for prevalence of gynecological morbidity.

Relationship between Health Care Indicators and Prevalence of Morbidities

In order to understand the associations and interaction effects, if any, among antenatal care (X), delivery care (Y) and contraceptive practices (Z) a log-linear model was fitted, that can be expressed as:

$$\ln(m_{ijk}) = \mu + \lambda_i^X + \lambda_j^Y + \lambda_k^Z + \lambda_{ij}^{XY} + \lambda_{ik}^{XZ} + \lambda_{jk}^{YZ} + \lambda_{ijk}^{XYZ}$$

Where m_{ijk} was the expected cell frequency of the cell represented by the ith level of X, j[th] level of Y and k[th] level of Z. μ was the mean effect, λ_i^X was the effect of ith level of X, λ_j^Y was the effect of the jth level of Y, λ_k^Z was the effect of kth level of Z.

The results of best-fitted model infer that the odds ratio for contraceptive use was 5.74 (*P*<.01) for ANC attended vs not attended. Similarly, odds ratio of utilization of delivery care was 7.13 for ANC attended vs not attended.

Similarly, a log-linear model was fitted to comprehend the association among utilization of antenatal care (A), prevalence of gynaecological morbidity (B) and treatment seeking for morbidity (C). The best-fitted model can be expressed as follows:

$$\ln(m_{ijk}) = \mu + \lambda_i^A + \lambda_j^B + \lambda_k^C + \lambda_{ij}^{AB}$$

The odds ratio of suffering from gynecological morbidity was 2.73 (*P*<.01) for ANC attended vs not attended. Although interaction of treatment seeking for morbidity with use of ANC was not found significant, the odds for treatment seeking for morbidity was 4.36 (*P*<.01) for the study population.

Table 3. Logistic regression models showing association between antenatal care, delivery care, contraceptive use with socioeconomic and demographic variables

Variable	Antenatal Care Use[a] % (n=232)	OR (95% CI)	Delivery Care Use[a] % (n=162)	OR (95% CI)	Contraceptive Use[a] % (n=178)	OR (95% CI)	Treated for Morbidities[a] % (n=52)	OR (95% CI)
Age group								
≤20 years[b]	15.17	1	14.94	1	12.9	1	16.58	1
21–32 years	45.17	1.46 (.64–4.94)	38.15	1.21 (.24–6.11)	47.97	4.78 (.68–3.86)	24.36	1.03 (.39–3.21)
33–44 years	26.72	.37 (.16–.50)[c]	33.33	1.44 (.25–4.34)	34.78	4.20 (.51–4.31)	36.54	1.45 (.76–4.18)
≥45 years	12.93	.26 (.14–.87)[c]	13.58	.83 (.13–5.37)	4.35	.71 (.46–2.92)	22.52	.79 (.24–3.08)
Ethnicity								
Rai[b]	59.48	1	65.43	1	62.32	1	73.08	1
Bhutia	40.52	1.03 (.52–2.04)	34.57	.55 (.27–1.10)	37.68	.82 (.39–1.71)	26.92	.76 (.12–2.24)
Level of education								
Nonliterate[b]	24.14	1	29.63	1	26.09	1	38.46	1
≤10 years	56.03	2.83 (1.35–5.96)[c]	46.91	1.05 (.47–2.35)	59.42	2.12 (.90–5.02)	50	2.18 (1.46–4.69)[c]
>10 years	19.83	6.23 (1.44–8.86)[c]	23.46	3.61 (.95–6.81)	14.49	1.65 (.39–6.82)	11.54	1.53 (.05–3.71)
Occupation								
Agriculture[b]	14.31	1	8.64	1	5.8	1	17.69	1
Housewife	59.83	2.87 (.88–5.42)	64.2	1.63 (.21–1.83)	78.26	1.91(.51–5.19)	59.23	1.35 (.22–4.34)
GS and business	25.86	3.24 (.76–6.83)	27.16	1.96 (.17–2.56)	15.94	.90 (.18–4.60)	23.08	2.24 (.24–5.85)
Have modern gadgets								
No[b]	40.52	1	40.74	1	50.72	1	30.77	1
Yes	59.48	1.99 (1.24–4.24)[c]	59.26	1.14 (.54–2.39)	49.28	1.19 (.51–2.75)	69.23	4.70 (1.47–6.08)[c]
Parity								
Primipara[b]	24.14	1	27.16	1	24.64	1	23.08	1
Multipara	68.1	1.39 (.53–3.64)	64.2	.49 (.19–1.21)	63.77	.58 (.21–1.58)	50	1.09 (.23–4.56)
Grand multipara	7.76	.49 (.13–1.82)	8.64	.21 (.14–.79)[c]	11.59	.96 (.22–4.23)	26.92	1.39 (.26–3.76)
Monthly expenditure[d]								
≤ Rs. 2000 (≤USD 44)[b]	33.62	1	29.63	1	43.48	1	26.92	1
2001–5000 (USD 44–111)	46.55	.64 (.29–1.41)	50.62	1.38 (.64–2.97)	39.13	.44 (.19–.92)[c]	23.08	1.23 (.15–2.99)
>5000 (>USD 111)	19.83	.32 (.15–.78)[c]	19.75	1.31 (.42–4.11)	17.39	.69 (.22–2.20)	50	2.53 (1.34–5.05)[c]
Husband's cooperation								
No[b]	25.86	1	24.69	1	14.49	1	26.92	1
A little	4.31	.98 (.22–4.34)	4.94	1.85 (.44–5.84)	8.7	6.11 (1.33–7.98)[c]	3.85	.73 (.15–3.32)
A lot	69.83	1.77 (.84–3.73)	70.37	2.11 (1.27–4.57)[c]	76.81	2.86 (1.16–7.07)[c]	69.23	1.31 (.36–5.16)
Taken antenatal care								
No[b]		NI	23.46	1	24.64	1		1
Yes			76.54	4.79 (2.27–6.12)[c]	75.36	2.96 (1.25–6.99)[c]		2.74 (. 68–4.86)
Taken delivery care								
No[b]		NI		NI	50.72	1		NI
Yes					49.28	1.48 (.69–3.18)		

[a] Dependent variable.
[b] Reference category for independent variable.
[c] Significant at .05 level.
[d] Monthly expenditure of the family.
NI, not included; GS, government service.

DISCUSSION

The two population groups, having dissimilar genetic ancestry and ethno-history, but residing in a similar environmental niche in a mountainous State of India have been compared for important aspects of maternal health; that is utilization of maternal health care facilities as well as prevalence of gynecological problems and associated factors.

The findings of the study demonstrated a strong statistical relationship between socioeconomic characteristics and maternal health care utilization between Rai and Bhutia women during their last pregnancy. This relationship is observed to be direct and statistically significant with level of educational status, parity and husband's cooperation

Table 4. Results of multinomial logistic regression showing association of physiological, anthropometric and sociodemographic variables with prevalence of reproductive morbidity

Variables	Moderately Morbid vs Non Morbid OR (95% CI)	Severely Morbid vs Non Morbid OR (95% CI)
Hemoglobin	.78 (.53–1.15)	.32 (.14–.72)[a]
ESR	1.07 (1.00–1.15)	1.10 (1.01–1.42)[a]
BMI	1.01 (.81–1.25)	.84 (.61–1.16)
Sum of skin folds	.99 (.97–1.01)	.99 (.96–1.02)
Age	.92 (.67–.98)[a]	.87 (.78–.96)
Ethnicity		
Bhutia	.84 (.49–3.38)	.96 (.23–2.86)
Rai[b]	1.00	1.00
Level of education		
Nonliterate	.73 (.68–3.87)	.65 (.02–8.12)
≤10 years	.24 (.13–.94)[a]	.15 (.07–.57)[a]
>10 years	1.00	1.00
Occupation		
Agriculture	5.37 (2.60–7.69)[a]	5.29 (2.47–7.34)[a]
Housewife	1.85 (.36–3.43)	2.92 (.70–4.85)
GS & business[b]	1.00	1.00
Having modern gadgets		
Yes	.97 (.33–2.90)	.53 (.10–.91)[a]
No[b]	1.00	1.00
Parity		
Primipara	.28 (.04–1.88)	.20 (.01–3.96)
Multipara	.11 (.06–.48)[a]	.13 (.05–.22)[a]
Grand-multipara[b]	1.00	1.00

ESR, erythrocyte sedimentation rate; BMI, body mass index; GS, government service.
[a] Significant at .05 level.
[b] Reference category.

The findings of the study demonstrated a strong statistical relationship between socioeconomic characteristics and maternal health care utilization between Rai and Bhutia women, during their last pregnancy.

in reproductive health care utilization, whereas, an inverse relationship was observed with prevalence of reproductive health problems.

A consistent decline in utilization of ANC and delivery care was noticed, during last pregnancy, with increasing age. This could either be due to the confidence gained out of previous pregnancies and delivery experiences or due to dissatisfaction related to the services received during similar earlier episodes. These findings corroborate results of studies done earlier in India and its neighboring country Nepal.[10,28]

A distinct curvilinear relationship has also been observed between use of contraception and age, indicating desirability for children among mothers below twenty years and categorized as primipara;[29] it could otherwise be the

outcome of poor decision making capability on childbearing among the young couples, a situation common in the developing countries.[30] In traditional societies like India, young couples generally face pressure from family elders to have a child soon after the marriage. Socioeconomic factors in association with familial support and low ANC utilization can be an important cause of poor rate of institutional deliveries and insufficient delivery care taken at later stage of pregnancy.

The study participants at all age cohorts reported varying degrees of symptoms related to gynecological morbidities at the time of survey. Mothers at the youngest age group reported more problems, which is consistent with the results of studies done in other developing countries[31] point-

ing at early marriage, physical immaturity and early childbearing to be responsible.

A significant relationship has been observed between ESR and likelihood of being severely morbid. Overall, the study results indicate an association between maternal health care attributes, (ie, utilization of ANC, delivery care and socioeconomic factors) during last childbirth on one hand and between the susceptibility measures (eg, Hb, ESR, and BMI) and current gynecological morbidity status on the other. Hemoglobin concentration and the selected anthropometric indicators were considered as measures of overall nutritional status of a person. The ESR is a nonspecific measure of inflammation. An elevated ESR can be considered as a positive indicator of sexually transmitted infections such as Chlamydia, gonorrhoea, and infections causing pelvic inflammatory diseases.[31,32]

Significant interaction between prevalence of gynecological problems and utilization of ANC services during last pregnancy is another important finding of the present study, which asserts that use of maternal health service during pregnancy improves the birth outcomes as well as the future reproductive life of the women. Other studies among Indian women have also reported similar findings.[10]

Strengths and Limitations of the Study

The strength of the present study is that it is based on a population that had hardly been studied. The additional strength remains in the inclusion of anthropometric and hematological indicators together as indirect measures of susceptibility and prevalence of gynecological morbidity. Despite these merits, the study has certain limitations. The relationship between self-reported symptoms and clinically verifiable conditions remains unresolved. Data about ANC and delivery care use is based on a retrospective approach; therefore, the possibility of recall bias can not be ruled out. Use of ESR as an indirect measure of gynecological infection is limited. Hence, more research is needed to validate this relationship.

Unlike other studies[22,23] ethnicity was not a significant factor. It did not affect maternal health care utilization during last childbirth or prevalence of current gynecological morbidities, after controlling for socioeconomic variables. Therefore, establishment of general maternal health care services can be equally effective for both communities. Awareness about maternal health care utilization needs to be increased both during pregnancy and delivery and beyond, particularly among nonliterate and less educated women since education emerged as an important correlate of it. Service of the traditional birth attendants should be revamped by providing them with regular training and with essential delivery kits. Interaction of health professionals with the communities also needs to be increased, so that women may become more comfortable with them through regular exposure during pregnancy. All these may factors could contribute to an increased utilization of existing maternal health care services, thereby ensuring safe motherhood and a healthy reproductive life.

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