Ethnic Disparities in Contraceptive Use and its Impact on Family Planning Program in Nepal

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Aims: Regardless of three decades of implementation of family planning program in Nepal, need of family planning services is largely unmet. Systematic studies, evaluating the impact of family planning program on several ethnic groups of Nepal has not been carried out in large scale. This study sheds light on the investigation of, whether the use of contraceptives varies among different ethnic groups in Nepal and what are the predictors of contraceptive variance in ethnic groups in Nepal.

Methods: The study is based on data collected from Nepal Demographic Health Survey (NDHS) 2006. Multilevel logistic regression analyses of 10793 married women of reproductive age nested within 264 clusters from the surveys were considered as the sample size. Individual, household, and program variables were set and a multilevel logistic regression model was fitted to analyze the variables, using GLLAMM command in STATA-9.

Results: Multilevel logistic regression analysis indicated that Muslims, Dalits and Terai Madheshi women were significantly less likely to use modern contraceptives compared to the Brahmins and Chhetries (Higher Castes). Women who were exposed to family planning information on radio were more likely to use modern contraceptives than women not exposed to radio information (OR=1.22, P> 0.01). An odd of using contraceptives by Newars was (OR 1.09, P>0.05), the highest among all ethnic groups. Exposure of women to family planning messages through health facilities, family planning workers and means of communication, increased the odds of using modern contraceptives. However, impact of the family planning information on contraceptive use varied among ethnicity.

Conclusions: Special attention needs to be paid, in particular to the ethnicity, while formulating family planning policies in Nepal, for better success rate of family planning intervention programs.

Keywords: Ethnic groups, family planning, modern contraceptives, odd ratio

INTRODUCTION

Family planning activities were initiated first in 1958 by Nepal Family Planning Association in Nepal. Family Planning Policy was adopted in 1965 and limited family planning services were made available in Kathmandu valley in 1968. Services were expanded all over the country only in the early 1990s.[1] Various interventions were implemented through the static and mobile services, door-to-door campaigns and mass media to increase knowledge, acceptability and use of contraceptives over the last two decades. As a result, total fertility rate (TFR) has been declined from 5.1 in 1991 to 3.1 in 2006 and the knowledge of family planning is almost universal in Nepal.[2] It is evident that the need for family planning is largely unmeet (25%).[3] Unmet need of contraceptive is considerably higher among poor than wealthier women. Regional and ethnic disparities also exist in the utilization of family planning services. A report on the further analysis of NDHS 2007 indicates that, despite impressive progress on meeting the Millennium Development Goal (MDG), *Dalit and Janjati* (low castes),

and *Terai/Madhesi*-origin groups are still facing many barriers to access the family planning services because of their illiteracy, poverty and low social status.[4]

Existing studies on contraceptive use focused more on individual and household level determinants and ignored the importance of community and health care program factors.[5,6,7] Previous studies have also shown that contraceptive use pattern vary among ethnic groups.[8,9,10]

Exposure to message broadcast through a variety of channels is currently considered as the most effective way of changing knowledge, attitudes and behaviour.[11] Conceptual framework developed by Bertrand *et al*. (1996)[12] provides the basis to evaluate the impact of family planning program. The framework recognizes that fertility and other behaviour are consequences of both the demand for and supply of family planning services. Demand for family planning services are affected by a number of political, socioeconomic, cultural and individual factors. Thus an increase in the availability of family planning services is more likely to translate into higher

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levels of use in a country where these other factors exert a positive influence on demand.

So far, systematic studies using this framework for evaluating the impact of family planning program on the utilization of contraceptive services among different ethnic groups have not been conducted in Nepal. This analysis intends to fill up this gap by examining the differences of the impact of exposure to family planning services on the modern contraceptive use among different ethnic groups.

Overall objective of this study is to examine whether observed differences in the levels of modern contraceptive use among different ethnic groups over the last ten years in Nepal is associated with the exposure to family planning information. More specifically, this study intends to examine:

a) Whether the impact of exposure to family information on contraceptive use varies among different ethnic groups controlling for individual, household and program level characteristics

b) What are the predictors of ethnic variance in contraceptive use in Nepal? and

c) To what extent, do they impact on family planning services in Nepal?

METHODS

Individual, household, and program-level data for this analysis came from Nepal Demographic and Health Surveys 2006. Altogether 10,793 married women of reproductive age nested with 264 clusters from the survey was considered as sample size. Proportionate to population size (PPS) equal weighting cluster approach was followed to determine the number of clusters. The 95% two-sided t-value with 10-1 degrees of freedom was 2.2621. A multilevel logistic regression model was fitted to analyze the use of modern contraceptives by six ethnic groups of Nepal based on individual, household and program level variable, using GLLAMM command in STATA-9.

The individual variables were chosen to represent socio-demographic factors that previous research had shown to be associated with contraceptive use: age, education and place of residence. In the absence of information on household income, a wealth index was used to represent the socioeconomic status of the household. The index included the ownership of household amenities and goods: telephone, electricity, radio, television, bicycle, floor (vinyl or Asphalt strips, carpet, tile, concrete, wood), piped water, and flush toilet. The family planning program related variables include, whether or not a woman was visited by family planning worker during last 12 months, visited health facilities during the last 12 months and heard family planning on radio.

The analysis used a cumulative approach to model building. Model 1 is a null model which was run without including any variables. Model 2 includes only the year of survey. Model 1 and 2 were not significant to this study thus they were ignored. Model 3 included individual factors. Model 4 included individual and household factors and Model 5 included individual, household and program level factors. This approach allowed the identification of the relative impact of each set of factors in explaining community variation in the contraceptive use. All models included cluster-level random effects terms.

RESULTS

Sample characteristics

In this study among married women of reproductive age, 36 % used the modern contraceptives and 55.4 % were in the 20-34 years age group. Seventy-two percent of women had no education, whereas 14% had a secondary or higher level of education. The largest ethnic groups were the upper castes *Brahmin*s and *Chhetries* (32%), *Janjatis* (30%), *Terai Madhesi* castes (15%), *Dalit*s (13%), *Newar*s (5%) and *Muslim*s (5%) (Table 1).

Table 1. Distribution of married women aged 15-49 used in the analysis by selected characteristics

Characteristics		(%)
Modern Contraceptive Use	------------	36.0
Age	Below 20	9.9
	20-34	55.4
	35 and over	34.7
Education	No	71.7
	Primary	14.1
	Secondary and above	14.2
Ethnicity	Brahmin/Chhetri	31.6
	Terai Madhesi other cast	15.4
	Dalit	13.4
	Newar	5.0
	Janjatis	30.0
	Muslim	4.6
Residence	Rural	89.2
	Urban	10.8
Household socio-economic status	Poorest	30.4
	Poorer	14.4
	Middle	17.5
	Richer	20.0
	Richest	17.7
Visited by health worker	---------	9.8
Visited health facility	--------	48.1
Heard family planning on radio	--------	57.6

Contraceptive Use

Among the 23,381 currently married women of reproductive age, 36% reported to use modern contraceptives (Table 1). Among the 36% women who were currently using contraceptive, 9.0% were below the age 20, 35 % were illiterate and 53 % were urban residences. The variation in use of modern contraceptives was seen among the ethnic groups, 39% *Bramhins/Chhetries*, 34% *Terai Madheshi*, 29 % *Dalits,* 52% *Newars*, 38 % *Janjatis* and 13% *Muslim* women used modern contraceptives (Table 2).

Table 2. Distribution of married women aged 15-49, using modern contraceptive method by selected characteristics

Charac-teristics	Ethnic groups in %						
	All	B*	T*	D*	N*	J*	M*
Age							
Below 20	9.0	9.0	4.9	5.9	20.9	13.6	6.3
20-34	44.4	36.1	31.7	26.2	49.4	38.0	12.4
35 and over	46.2	50.1	47.9	44.4	61.5	43.8	16.2
Ethnic groups using modern contra ceptives	-	38.8	34.0	28.8	52.2	38.0	13.0
Education							
No	34.5	36.8	33.4	28.3	51.8	38.7	11.1
Primary	38.1	40.7	33.0	33.3	52.7	37.4	16.6
Secondary and above	41.1	42.3	43.1	34.3	52.2	33.1	43.2
Residence							
Rural	33.8	36.1	32.5	27.4	44.7	37.2	11.0
Urban	53.7	56.1	50.8	45.7	65.7	48.5	32.2
Household socio-economic status							
Poorest	24.5	23.6	26.2	22.3	23.2	28.4	7.3
Poorer	32.3	31.7	34.1	28.0	33.8	35.7	12.0
Middle	36.8	40.8	37.6	35.1	28.0	41.0	11.2
Richer	40.4	42.7	38.1	35.6	47.1	43.8	14.7
Richest	52.9	55.6	45.1	49.3	65.7	46.4	32.3
Visited by health worker	49.1	50.0	43.4	40.2	70.8	53.3	35.3
Visited health facility	39.6	41.4	34.0	29.9	56.3	43.5	19.7
Heard family planning on radio	40.7	41.6	44.7	31.3	52.0	41.0	22.7

* B= Brahmin/Chhetri, *T= Terai madhesi other cast, *D= Dalit, *N= Newar, *J= Janjatis, *M= Muslim

Multilevel Analysis

Multilevel logistic regression modeling was employed to determine the impact of the program variables on contraceptive use and to examine ethnic differences in their use. Individual and household variables were also included in the model as confounders. Three variables on exposure to family planning information from health workers and mass media sources were used as program variables. Three groups of variables were entered into the model in sequence. Table 3 and Table 4 showed the result of the multilevel modeling of the contraceptive use.

Model 1 is a null model which was run without including any variable. Model 2 includes only the year of survey. Model 1 and 2 were not significant to explain the cluster level variance so they were excluded from the Table. Individual socio-demographic factors included in Model 3 explained 17% of the cluster-level variation of modern contraceptive use remained unexplained in Model 2. Similarly, household wealth index added in Model 4 explained 19% of the cluster-level variation of contraceptive use as seen in Model 3. Cluster-level variables obtained by aggregating individual characteristics within the cluster were added in Model 4, which were able to explain 11% of the cluster-level variation of contraceptive use remained unexplained in Model 5. Finally, the program variables were added in the Model 5. The program variables, exposure of family planning message from health workers and media sources added in Model 5 were able to explain that 5% of the cluster-level variance on contraceptive use remained unexplained in Model 4. Even after controlling for individual, household, cluster and year of survey in Model 5, significant cluster-level variance in contraceptive use remained unexplained.

Controlling for individual, household and cluster-level factors, all program variables were significantly associated with the modern contraceptive use (Table 3). Currently married women of reproductive age who visited health facilities or who were visited by health worker during the last 12 month were more likely to use modern contraceptive use (OR=1.23 and 1.60 respectively P >0.05) than women who were not in contact with health workers or health facilities. Likewise, women who were exposed to family planning information in radio in the last few months were more likely to use modern contraceptive use than women not exposed to family planning in these media (OR=1.22, P> 0.01).

With household (Model 3), cluster (Model 4) and program variables (Model 5) sequentially added, place of residence and ethnicity (*Newar and Terai Madhesi*) emerged as non-significant predictors of contraceptive use. Model 5 further showed that, all ethnic groups except *Newar*s were significantly less likely to use modern contraceptive than the *Brahmin and Chhetries* (OR1.09, P> 0.05).

Table 3. Odd ratios (and 95% confidence intervals) from multilevel models examining the odds of using modern contraceptive methods by selected characteristics

Characteristics		Model 3 (OR)	Model 4(OR)	Model 5(OR)
Age	Below 20 (ref)	1	1	1
	20-34	5.02 (4.31-5.85)	4.94 (4.24-5.76)	4.88 (4.18-5.68)
	35 and over	8.73 (7.45-10.24)	8.37 (7.14-9.81)	8.18(6.98-9.59)
Education	No (ref)	1	1	1
	Primary	1.07 (0.97-1.17)	0.99 (0.90-1.10)	0.9 (0.90-1.07)
	Secondary and above	1.00 (0.90-1.11)	0.86 (0.77-0.96)	0.85 (0.76-0.94)
Ethnicity	Brahmin/Chhetri (ref)	1	1	1
	Terai Madhesi	0.85 (0.74-0.97)	0.90 (0.79-1.03)	0.85(0.74-0.98)
	Dalit	0.72 (0.64-0.80)	0.81 (0.72-0.91)	0.79 (0.71-0.89)
	Newar	1.21 (1.03-1.43)	1.18 (1.00-1.39)	1.09* (0.92-1.29)
	Janjatis	0.86 (0.78-0.94)	0.88 (0.81-0.97)	0.86 (0.78-0.94)
	Muslim	0.27 (0.20-0.35)	0.28 (0.21-0.37)	0.25 (0.19-0.33)
Residence	Rural (ref)	1	1	1
	Urban	2.02* (1.71-2.39)	1.53 *(1.30-1.80)	0.95 *(0.79-1.15)
Household socio-economic status	Poorest (ref)		1	1
	Poorer		1.26 (1.14-1.40)	1.25 (1.13-1.39)
	Middle		1.66 (1.50-1.84)	1.60 (1.45-1.77)
	Richer		1.78 (1.61-1.97)	1.67 (1.50-1.84)
	Richest		2.50 (2.21-2.84)	2.08 (1.82-2.38)
Visited by health worker	No (ref)			1
	Yes			1.6* (1.44-1.76)
Visited health facility	No (ref)			1
	Yes			1.23* (1.15-1.32)
Heard family planning on radio	No (ref)			1
	Yes			1.22** (1.12-1.32)

*Significant at 0.05   ** significant at 0.01

B#= Brahmin/Chhetri, T#= Terai madhesi other cast, D#= Dalit, N#= Newar, J#= Janjatis, M#= Muslim   *Significant at 0.05 ** significant at 0.01

Place of residence, which was significant predictor of modern contraceptive use in Model 3 also emerged as non-significant when cluster and program factors were added in Model 4 and Model 5. The odd ratio for urban area has decreased in Model 4 and 5 as the cluster and program variables added to model (OR of Urban area in model 3, 4, and 5 is 2.02, 1.23, and 0.95 respectively with P> 0.05).

Table 4 showed the results of the multilevel logistic regression models of the modern contraceptive use among the 6 ethnic groups separately. None of the program variables proved to be significantly associated with the contraceptive use in all 6 ethnic groups. The health worker's visit showed a significant association with contraceptive use in all ethnic groups except in Newars. Women belonging to Brahmin and Chhetries, Newars, Janjatis and Muslims, who visited health facilities during the last 12 months, were more likely to receive modern contraceptive use than the women who did not visit health facilities

during the same period. Relative to women who did not heard family planning information from radio, all women (except Newars, Janjatis and Muslims) who heard family planning message from radio were more likely to use contraceptive.

There was also ethnic variation in the association of place of residence, *Janjati and Muslim* women living in urban sectors were more likely to use modern contraception (OR 1.11 and 1.24 respectively with P > 0.05) than their rural counterpart. Level of education did not fit significantly to modern contraception use among *Dalit* women, women with primary education had better odd ratio than women with secondary or above education(OR 0.95 and 0.82 respectively with p> 0.5 and 0.01).

There was also ethnic variation in the association of household wealth with the contraceptive use; household wealth was not associated with contraceptive use in Muslims. The visit by health workers was found very high among Muslims (OR 4.0 with P > 0.05) and very low among Terai Madheshi women (OR 1.47 with P> 0.05). Similarly, Ethnic groups except Newars were found significantly associated with information on family planning through radio.

Table 4. Odd ratios (and 95% confidence intervals) from multilevel models examining the odds of using modern contraceptive methods by ethnic groups and selected variables, 2006

Characteristics	Final Multilevel Model by Ethnicity					
	B#	T#	D#	N#	J#	M#
Age						
Below 20 (ref)	1	1	1	1	1	1
20-34	4.83	10.46	5.60	2.79	3.98	2.14
	(3.66-6.38)	(5.88-18.61)	(3.65-8.57)	(1.49-5.25)	(3.05-5.19)	(0.84-5.41)
35 and over	9.11	21.07	14.2	4.63	5.88	2.89
	(6.83-12.15)	(11.70-37.95)	(9.14-22.18)	(2.38-9.01)	(4.45-7.78)	(1.10-7.61)
Education						
No (ref)	1	1	1	1	1	1
Primary	0.90	0.84	0.95 *	0.70	0.93	1.13
	(0.77-1.05)	(0.61-1.17)	(0.70-1.29)	(0.48-1.01)	(0.78-1.11)	(0.42-3.04)
Secondary and above	0.73	0.90	0.82**	0.45	0.73	1.22
	(0.61-0.87)	(0.59-1.36)	(0.49-1.35)	(0.29-0.69)	(0.57-0.93)	(0.44-3.38)
Residence						
Rural (ref)	1	1	1	1	1	1
Urban	0.86	0.76	0.88	0.78	1.11*	1.24 *
	(0.67-1.12)	(0.43-1.31)	(0.60-1.30)	(0.49-1.27)	(0.80-1.53)	(0.39-3.95)
Household socio-economic status						
Poorest (ref)	1	1	1	1	1	1
Poorer	1.27	1.26	1.30	1.45	0.93	1.34
	(1.07-1.51)	(0.88-1.78)	(0.98-1.71)	(0.72-2.93)	(0.77-1.12)	(0.45-3.96)
Middle	1.66	1.87	1.74	1.41	1.23	1.20
	(1.37-2.00)	(1.45-2.41)	(1.32-2.29)	(0.74-2.69)	(1.02-1.48)	(0.61-2.38)
Richer	1.59	1.48	1.61	2.51	1.39	1.33
	(1.32-1.91)	(1.12-1.97)	(1.19-2.20)	(1.37-4.60)	(1.15-1.67)	(0.65-2.70)
Richest	2.03	1.83	1.88	3.28	1.47	2.48
	(1.60-2.58)	(1.21-2.76)	(1.17-3.01)	(1.64-6.58)	(1.15-1.88)	(0.97-6.36)
Visited by health worker						
No (ref)	1	1	1	1	1	1
Yes	1.59	1.47*	1.82	1.58	1.58	4.00*
	(1.34-1.89)	(1.10-1.97)	(1.35-2.47)	(0.91-2.72)	(1.33-1.89)	(2.07-7.75)
Visited health facility						
No (ref)	1	1	1	1	1	1
Yes	1.13	0.86	0.99	1.64	1.57	2.18
				(1.23-2.17)		
	(1.01-1.26)	(0.71-1.04)	(0.81-1.20)		(1.39-1.77)	(1.33-3.59)
Heard family planning on radio						
No (ref)	1	1	1	1	1	1
Yes	1.29	1.53	1.06	0.86	1.23	1.29
	(1.12-1.48)	(1.20-1.95)	(0.85-1.31)	(0.61-1.22)	(1.07-1.42)	(0.73-2.29)

DISCUSSION

Findings from this analysis indicated that age and ethnicity were the important individual-level factors contributing to the contraceptive use. All the program variables used in the analyses were associated with increased contraceptive use. Exposure to family planning information on radio and contact of women with the health workers were the important program variables contributing to contraceptive adoption.

Impact of the program variables on contraceptive use differed by ethnicity. For example, health worker's visit was not associated with contraceptive use among Newars. Similarly there was no association between health facility visit and contraceptive use among Dalits and Terai Medhesi ethnic groups. While, exposure to family planning information through radio was not associated with contraceptive use among Newars, Janjatis and Muslims.

This analysis also indicated that the household economic status was strong predictor of contraceptive use behavior, though its impact of on contraceptive use varies by the ethnicity. Large scale studies conducted in Sweden, Turkey, Poland and Iran showed strong association between ethnicity and poor self reported health which was mediated by socioeconomic status, cultural change, and discrimination.[13,14] It is also found that large percentages of Muslim women failed to use modern contraceptive and the trend was not so encouraging in the last decade. The question why so large proportion of Muslims are not using contraceptive should be the issue of further exploration. However, we can speculate that this may be due to the language, cultural barrier and their feeling of discrimination, which need to be addressed by family planning program.

It is also evident that despite geographical and cultural difficulties, ethnic minority groups can be open to adopt family planning when services are accessible and provided in a culturally acceptable manner.[12] Therefore, future family planning program intervention in Nepal should be planned to make it context specific so as to make it acceptable in different cultures. Different approaches should be applied to expand the family planning program in Mountain, Hill and Terai regions and among different ethnic groups. It is also speculated that the ethnic variation in contraceptive use is due to the cultural or knowledge barriers affecting women's access to health care in Nepal. Therefore, ethnic minorities should be made more aware with the importance of the family planning programs. Special program attention should be made to the Muslim, Dalit and Madhesi women.

Finally, the interventions to be designed in the future in Nepal to attain millennium development goal (MDG) should be based on socio-cultural conditions of different ethnic groups. The community health workers including female community health volunteers (FCHV) should be encouraged to disseminate health information in local language. They should also be motivated to serve Dalits, Muslims and other ethnic minorities without violating the local cultural norms. Members of the local ethnic groups should be integrated in the working team to deliver the family planning message among Muslim, Terai Madhesi and Dalits.

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