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Decomposing the Socio-Economic Inequalities in Utilization of Antenatal Care in South Asian Countries: Insights from Demographic and Health Surveys

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Abstract

Even after encouraging maternal and child wellness programs at worldwide level, lower-middle income nations have not reached the goal set by the UN yet. This study attempts to fill the gap and examines the associations and inequalities between socio-economic, demographic factors and utilization of full antenatal Care in South Asian countries. It uses data from DHS of the selected countries, and Oaxaca decomposing is applied for socioeconomic inequalities in utilization of antenatal care. Findings from the multivariate analysis show that mother's age at the time of birth, birth order and interval, mother's education, mass media exposure and economic status are significant determinants of the utilization of antenatal care services in South Asian countries. In terms of specific outcomes with regard to inequality in ANC, the distance from the line of equity to the line of concentration curve is greatest in Pakistan followed by India and Nepal.

Keywords: Antenatal care, Concentration curve, Inequality, South Asian countries.

I. Introduction and review of literature

Maternal and child health is one of the important concerns of global public health issues. Thousands of girls/women die every year due to pregnancy complications and childbirth which are avoidable. Maternal deaths have significantly declined globally from 532,000 in 1990 to 303,000 in 2015 (WHO, 2015). Estimates show that they mostly occur due to the complications of maternal morbidity or during pregnancy. Haemorrhage is still a predominating cause of maternal mortality (27%).

Maternal Mortality Ratio (MMR) is one of the development indicators and being a developing country, India has managed to reduce it from 600 per 100,000 live births in 1999 to 122 per 100,000 live births in 2015-17 (SRS, 2015-17). However, its global share of MMR is still very high (20%). Maternal death can be easily prevented by proper antenatal check-ups or care. Antenatal Care (ANC) is one of the essential ways to improve maternal and child health and to reduce both maternal and infant deaths. Despite universal health coverage and extensive maternal and child health care programmes, coverage of full ANC is much lower in the country. Compared with NFHS-3 where overall at least 4 or more ANC visits constituted 37 per cent, in NFHS-4 it reached around 51 per cent (NFHS-4, 2015-16). There are a number of factors which influence the ANC ranging from socio-economic to other institutional and infrastructure related factors. A study done in Jharkhand state

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found that the lower economic status of women is one of the main hurdles in utilizing full ANC, followed by lack of mass media exposure (Gupta, Kumar and Dorcas, 2016). Another study shows that ethnic inequality and quality of care between public and private health care facilities influence the use of ANC (Victora et al., 2010). Severe inequality in household wealth and women's education lead to its disproportionate use (Obiyan & Kumar, 2015).

Many researchers suggested that underuse of maternal health care indicates both demand and supply side inefficiencies (Pathak, Singh & Subramanian, 2010; Ngomane & Mulaudzi, 2012). Demand side factors include the social or ethnic variation and health beliefs of the people, whereas supply side factors cover the accessibility and availability of health care facilities. Factors related to women are much more important to assess the use of both pre- and postnatal care (Tsawe et al., 2015). A study done in India indicates that other than socio-economic factors, there is a huge regional variation in utilizing maternal health care. Southern region in particularly has high maternal health care utilization as compared with other regions (Singh, Rai & Singh, 2012; Houweling et al., 2007; Say & Raine, 2007).

In MDG 2000, the fifth goal is to improve maternal health and the fourth goal is to reduce child mortality by 2015. SDG three also focuses on good health and well-being which includes reproductive health care and universal health care coverage.

Need for the study

In south Asia region, India and Pakistan are lower-middle income countries while Nepal is a lower income economy. There is a huge socio-economic inequality in the society and large sections of the population of these countries live in poverty. Disparity in every sphere of life of the people is visible and maternal and child health is not an exception. Still, maternal mortality rate is high in lower-middle and lower-income countries. Moreover, income of the people is one of the crucial factors to determine maternal mortality and full ANC is one of the basic measures to control the pregnancy-related complication at an early stage. It is essential to examine the factors that contribute to the unequal antenatal care utilization in these countries. Even after promoting maternal and child health at the global level, lower-middle income countries are far behind to reach the goal set by the United Nation.

Objective of the study

A number of earlier studies indicated the socio-economic and demographic differentials and inequalities in antenatal care in India (Singh & Chaturvedi, 2015; Obiyan & Kumar, 2015; Yadav, Gupta & Singh, 2016; Yadav et al., 2016). However, a few studies have assessed and decomposed the contribution of socio-economic factors in utilization of full ANC. Hence, this study attempts to fill the gap and examines the associations and inequalities between socio-economic, demographic factors and utilization of full ANC in South Asian Countries.

II. Data and methodology

Data source and sample size

This study has used Demographic Health Surveys (DHS) from three South Asian countries - India, Nepal, and Pakistan. Specifically, this study used fifth round of the Nepal DHS (2016), third round of the Pakistan DHS (2013-14) and fourth rounds of the India DHS (2015-16). South Asian countries have multiple DHS surveys containing data on ever-married women of reproductive age which are well suited for our purposes. DHS surveys are multi-clustered surveys and nationally representative covering a broad range of fertility, morality and reproductive health data. The DHS design and schedule across the countries are homogenous. DHS used multistage stratified random sampling and used appropriate sampling weights in the estimates.

Outcome measurements

The outcome measure of the present study is Full Antenatal Care (Full ANC). Full ANC has been defined as the mothers who had minimum of four antenatal visits, at least two tetanus toxoid injections or received one TT injection during the pregnancy and at least one in three years prior to pregnancy and received iron and folic acid tablets for 100 days or more (WHO, 2016).

Defining predictor variables

Important socio-economic and demographic characteristics of the women were included as the predictor variables in this study. They included age of women at the time of child birth, women's and husbands' education and work status, birth order and interval of child, status of the child, mass media exposure, wealth quintile and place of residence.

Analytical approach

Descriptive statistics and bivariate and multivariate analysis are carried out to estimate the level and pattern of utilization of full ANC services among women by different socio-economic and demographic characteristics. Chi-square at the 0.05 level is used to check the statistical association between the outcome and predictor variables in the bivariate analysis. Binary logistic regression is used to check the adjusted effects of selected socio-economic and demographic characteristics on utilization of full ANC services. The binary logistic regression is used due to the nature of the outcome variables which are in binary form with two categories, namely, no and yes (coded as 0 and 1, respectively). The results are presented in the form of odds ratio (OR) with 95 per cent of confidence interval (CI). The OR explains the probability that a woman of an exposed group will use full ANC services relative to the probability that a woman of an unexposed group will use the same services.

Measuring inequality in full antenatal care utilization by Concentration Curve

Concentration curve is plotted to estimate the inequality in full antenatal care utilization by the economic condition of women. It plots the cumulative proportion of full antenatal care utilization against the cumulative proportion of women by their level of economic status, beginning with the poorest women. If the curve *L* coincides with the diagonal, all women, irrespective of their level of economic status, have the same maternal healthcare utilization (*Y*). On the other hand, if *L* lies below the diagonal, as in Figure 6, maternal healthcare utilization is typically higher amongst the affluent women. If *L* lies above the diagonal, mentioned healthcare utilization is more among the poor women.

Decomposing the causes of inequality in full antenatal care utilization

Turning to the decomposition analysis, it is natural to expect that inequalities in maternal healthcare utilization would reflect the inequalities in the determinants of utilization. The Oaxaca decomposition (Goli, Doshi & Arokiasamy, 2013) is applied which can explain the gap in the means of an outcome variable between two groups (e.g., between the poor and non-poor). The gap is decomposed into that part which is due to group differences in the magnitudes of the determinants of the outcome in question on the one hand and group differences in the effects of the determinants on the other hand (Pulok et al., 2016). In all the analyses, weights are used to restore the representativeness of the sample.

III. Results

Profile of respondents

Table 1. Percentage distribution of women (aged 15–49) who had given at least one birth in last five years by selected socio-economic and demographic characteristics in South Asian Countries.

Background characteristics	India		Pakistan		Nepal	
	Weighted sample	Weighted proportion	Weighted sample	Weighted proportion	Weighted sample	Weighted proportion
Mother's age at time of birth						
15-24	92,117	49.9	2,297	30.8	2,182	54.6
25-30	66,693	36.1	2,719	36.5	1,247	31.2
35-49	25,817	14.0	2,430	32.6	569	14.2
Birth order and interval						
Birth order 1	61,997	33.7	1,418	19.1	1,498	37.5
Birth order-2/3 and interval<=24	26,915	14.6	1,062	14.3	384	9.6
Birth order-2/3 and interval>24	66,813	36.3	1,629	21.9	1,442	36.1
Birth order-4+ and interval<=24	7,708	4.2	1,049	14.1	161	4.0
Birth order-4+ and interval>24	20,612	11.2	2,269	30.6	505	12.7
Status of the child						
Wanted	167,570	90.8	6,035	81.0	3,198	80.0
Unwanted	16,955	9.2	1,411	19.0	800	20.0
Women's education						
Illiterate	51,003	27.6	4,155	55.8	1,257	31.4
Literate but below primary	11,024	6.0	461	6.2	517	12.9
Primary but below middle	13,804	7.5	770	10.3	260	6.5
Middle but below high school	69,716	37.8	666	9.0	1,010	25.3
High school and above	39,080	21.2	1,395	18.7	955	23.9
Husband's education						
Illiterate	5,419	16.9	2,472	33.2	569	14.3
Literate but below primary	2,008	6.3	419	5.6	441	11.1
Primary but below middle	5,135	16.0	1,189	16.0	840	21.2
Middle but below high school	6,303	19.6	827	11.1	845	21.3
High school and above	13,265	41.3	2,540	34.1	1272	32.1
Women's occupation						
Not working	25,166	78.3	5,378	72.2	1,257	38.7
Agricultural work	3,772	11.7	869	11.7	517	46.0
Skilled/unskilled work	1,470	4.6	541	7.3	260	4.6
Professional work	1,737	5.4	658	8.8	1,010	10.7
Husband's occupation						
Not working	1,783	5.6	124	1.7	138	3.5
Agricultural work	9,226	28.7	1277	17.2	721	18.2
Skilled/unskilled work	10,681	33.2	3690	49.6	1553	39.2
Professional work	10,440	32.5	2355	31.6	1554	39.2
Mass media exposure						
No exposure	45,457	24.6	2,184	29.3	854	21.4
Any exposure	139,170	75.4	5,262	70.7	3144	78.6
Wealth quintile						
Poorest	43,133	23.4	1,698	22.8	822	20.6
Poorer	39,062	21.2	1,544	20.7	839	21.0
Middle	36,725	19.9	1,464	19.7	863	21.6
Richer	35,076	19.0	1,469	19.7	830	20.8
Richest	30,632	16.6	1,272	17.1	643	16.0
Type of residence						
Urban	54,864	29.7	2,244	30.1	2,223	55.6
Rural	129,764	70.3	5,202	69.9	1,775	44.4
Total	**184,627**	**100.0**	**7,446**	**100.0**	**3,997**	**100.0**

Note: Every 'n' is weighted. Total may not be equal due to some missing cases.

Finding suggests that a majority of women in India and Nepal were young at the time of birth. About half of women from India and 54.6 per cent Nepalese women were between age group 15-24 years at the time of child birth, while 30.8 per cent of women from Pakistan were at the same age group at the time of birth. Percentages of birth order 2/3 and interval >24 months were higher in almost all the three selected countries and lowest for the birth order 4+ and interval <=24 months. In

Nepal and Pakistan 20 and 19 per cent children were unwanted respectively, while in India only 9.2 per cent were so. On an average, among all the selected countries level of education was comparatively low. But in this study 55.8 per cent women from Pakistan were illiterate, followed by Nepal (31.4%) and India (27.6%). Further, women with middle but below high school level education were lower in Pakistan (9.0%). Since education is an important factor for better health outcome among women, India and Nepal show better middle and high school education among the studied population as compared with Pakistan. Along with the women's education, husbands' education also plays a significant role in women's health care utilization. In Pakistan 33.2 per cent husbands were not literate as compare with India (16.9 %) and Nepal (14.3%). Husbands with high school and above level of education were 41.3 per cent in India, followed by Pakistan (34.1%) and Nepal (32.1%). Despite having a smaller number of illiterate women in India, very few women were economically active.

Seventy-eight per cent of women are currently not working in India, whereas 72.2 per cent women in Pakistan and only 38.7 per cent are not working in Nepal. Moreover, only 1.7 per cent husbands in Pakistan and 3.5 per cent in Nepal are not working, while 5.6 per cent husbands are not working in India. Surprisingly, around 29 per cent Indian husbands are working in agricultural work, which is the highest among all the selected countries. Similarly, 39 per cent husbands are engaged in professional work in Nepal, followed by India (32.5%) and Pakistan (31.6%). Exposure of mass media among women is higher in Nepal (78.6%) than India (75.4%) and Pakistan (70.7%). In India, 23 per cent of women belong to the poorest quintile and 20.6 per cent of them in Nepal fall under the same quintile. Further, in all the selected countries more or less the same proportion of women (19 to 21.1%) belong to each quintile. The proportion of women residing in rural areas (70%) and urban areas (30%) is almost the same in India and Pakistan but around 55 per cent women are living in urban area in Nepal.

Utilization of antenatal care services

Table 2 shows the percentage distribution of utilization of antenatal care services by selected socio-economic characteristics in South Asian Countries. To see the significance of different independent variables with the ANC in the three selected countries, χ^2 test has been done. Mother's age at the time of child birth was significant in India and Nepal. However, ANC in Nepal was much higher among young mothers than India and Pakistan. Birth order and interval were also significant and for Nepal the first birth order and interval were highest with 60 per cent (CI=57.2, 64.1), followed by India with 26.5 per cent (CI=25.8, 27.2). The percentage of utilization of ANC was less among unwanted children as compared with wanted children in India, Pakistan and Nepal at 12.5 per cent, 7.4 per cent and 35.9 per cent respectively. As proven by many studies, women and their husbands' education along with women's education were highly significant for ANC and the result was similar in this study as well. Mass media exposure was another significant factor to determine the ANC in the three countries. Women use more ANC services when they are exposed to mass media. But in Nepal the percentage of women using ANC was comparatively higher than in India and Pakistan even among those who were not exposed to mass media. Association between ANC and wealth was positively significant and higher towards richer quintiles in the three selected countries. In Nepal, 33.0 (CI=28.6, 37.8) and 37.6 (CI=32.6, 42.9) per cent poorest and poor women were also using ANC, which was much higher than in India and Pakistan. Urban women were always in a better situation but when we compare these countries, ANC among rural women in Pakistan was much lower 5.7 (CI=4.8, 6.8) than India 16.7 per cent (CI=16.2, 17.1) and Nepal 34.8 per cent (CI=30.9, 38.8).

Determinants of full antenatal care utilization in South Asian countries

Table 3 shows the results of the multivariate analysis for full antenatal care services utilization. The analysis shows that mother's age at the time of birth, birth order and interval, mother's education, mass media exposure and economic status were significant determinants of the utilization of antenatal care services in South Asian countries. The full antenatal care services utilization increases

Table 2. Percentage distribution of utilization of antenatal care services by selected socio-economic characteristics in South Asian countries

Background characteristics	India		Pakistan		Nepal	
	%	95% CI	%	95% CI	%	95% CI
Mother's age at time of birth (years)	*χ2=175.106*	*P-value=0.00*	*χ2=10.696*	*P-value=0.041*	*χ2=32.793*	*P-value=0.00*
15-24	20.9	[20.4,21.5]	7.9	[06.5, 09.6]	44.4	[40.9, 48.0]
25-34	22.1	[21.4,22.7]	10.6	[09.1, 12.4]	39.4	[35.6, 43.2]
35-49	18.2	[17.2,19.2]	9.3	[07.7, 11.2]	31.6	[27.0, 36.6]
Birth order and interval	*χ2=4624.643*	*P-value=0.00*	*χ2=85.404*	*P-value=0.00*	*χ2=443.684*	*P-value=0.00*
Birth order 1	26.5	[25.8,27.2]	14.6	[12.0, 17.6]	60.7	[57.2, 64.1]
Birth order-2/3 and interval<=24	19.4	[18.5,20.4]	7.3	[05.4,0 9.8]	22.7	[17.8, 28.6]
Birth order-2/3 and interval>24	22.2	[21.6,22.9]	11.0	[09.1, 13.4]	35.6	[31.9, 39.5]
Birth order-4+ and interval<=24	6.2	[05.4,07.0]	5.2	[03.6, 07.7]	17.2	[11.6, 24.7]
Birth order-4+ and interval>24	7.6	[07.0,08.2]	7.6	[06.2, 09.4]	19.7	[16.0, 23.9]
Status of the child	χ2=839.118	*P-value=0.00*	χ2=7.916	*P-value=0.032*	*χ2=10.897*	*P-value*=0.004
Wanted	21.8	[21.3,22.4]	9.8	[08.6, 11.2]	42.3	[39.2, 45.5]
Unwanted	12.5	[11.6,13.5]	7.4	[05.7, 09.5]	35.9	[31.9, 40.1]
Women's education	*χ2=1.16E+04*	*P-value=0.00*	*χ2=541.750*	*P-value=0.00*	*χ2=400.546*	*P-value=0.00*
Illiterate	8.2	[07.8,08.7]	3.8	[03.1, 04.8]	23.1	[19.9, 26.7]
Literate but below primary	14.9	[13.8,16.1]	5.8	[03.5, 09.2]	32.1	[27.4. 37.2]
Primary but below middle	14.7	[13.7,15.7]	10.6	[08.2, 13.8]	38.5	[31.4, 46.1]
Middle but below high school	24.1	[23.4,24.8]	13.4	[10.1, 17.4]	47.2	[43.4, 51.1]
High school and above	35.9	[34.9,37.0]	24.4	[21.4, 27.6]	63.5	[59.1, 67.7]
Husband's education	*χ2=1151.355*	*P-value=0.00*	*χ2=275.115*	*P-value=0.00*	*χ2=256.824*	*P-value=0.00*
Illiterate	10.9	[09.5,12.4]	3.7	[02.8, 05.0]	22.5	[18.2, 27.4]
Literate but below primary	19.4	[16.7,22.3]	5.9	[03.5, 10.0]	27.4	[22.5, 33.0]
Primary but below middle	19.0	[17.4,20.8]	6.4	[04.6, 08.8]	33.7	[29.5, 38.1]
Middle but below high school	20.9	[19.4,22.6]	9.5	[06.7, 13.3]	45.6	[41.5, 49.7]
High school and above	31.9	[30.4,33.5]	16.8	[14.8, 19.0]	55.9	[51.7, 60.0]
Women's occupation	*χ2=179.034*	*P-value=0.00*	*χ2=65.923*	*P-value=0.00*	*χ2=53.984*	*P-value=0.00*
Not working	23.6	[22.5,24.7]	10.6	[09.4, 12.0]	38.1	[33.9, 42.4]
Agricultural work	17.3	[15.4,19.3]	2.8	[01.5, 05.3]	39.8	[36.7, 43.0]
Skilled/unskilled work	23.4	[19.8,27.4]	5.4	[03.1, 09.4]	40.1	[31.5, 49.4]
Professional work	33.2	[29.5,37.0]	11.0	[07.9, 15.1]	57.4	[51.4, 63.1]
Husband's occupation	*χ2=399.953*	*P-value=0.00*	*χ2=99.500*	*P-value=0.00*	*χ2=70.405*	*P-value=0.00*
Not working	19.7	[16.8,23.0]	6.9	[03.5, 13.2]	45.6	[34.6, 57.1]
Agricultural work	17.8	[16.5,19.2]	4.2	[02.8, 06.4]	37.6	[32.9, 42.5]
Skilled/unskilled work	22.9	[21.5,24.5]	8.4	[06.9, 10.1]	34.5	[31.0, 38.1]
Professional work	29.4	[27.7,31.2]	13.8	[11.9, 16.0]	48.7	[44.9, 52.5]
Mass media exposure	*χ2=7681.742*	*P-value=0.00*	*χ2=144.853*	*P-value=0.00*	*χ2=164.560*	*P-value=0.00*
No exposure	6.7	[06.3,07.1]	3.1	[02.2, 04.3]	21.9	[18.4, 25.9]
Any exposure	25.6	[25.1,26.2]	12.0	[10.7, 13.4]	46.2	[43.4, 49.1]
Wealth quintile	*χ2=1.37E+04*	*P-value=0.00*	*χ2=577.653*	*P-value=0.00*	*χ2=109.842*	*P-value=0.00*
Poorest	6.7	[06.4,07.2]	1.3	[00.6, 02.5]	33.0	[28.6, 37.8]
Poorer	14.3	[13.7,14.9]	4.4	[03.2, 06.0]	37.6	[32.6, 42.9]
Middle	22.6	[21.8,23.4]	7.1	[05.5, 09.0]	37.9	[32.6, 43.4]
Richer	29.2	[28.2,30.3]	12.6	[10.6, 14.9]	42.2	[37.9, 46.7]
Richest	38.1	[36.9,39.3]	25.2	[21.8, 28.9]	58.3	[52.1, 64.3]
Type of residence	*χ2=5021.858*	*P-value=0.00*	*χ2=273.832*	*P-value=0.00*	*χ2=51.746*	*P-value=0.00*
Urban	31.1	[30.0,32.3]	17.9	[15.6, 20.3]	46.0	[42.1, 50.0]
Rural	16.7	[16.2,17.1]	5.7	[04.8, 06.8]	34.8	[30.9, 38.8]
India	**21.0**	**[20.5,21.5]**	**9.4**	**[08.3, 10.6]**	**41.0**	**[38.1, 44.0]**

Note: Every 'n' is weighted. Total may not be equal due to some missing cases.

with the women' age. Women with higher age group (35-49 years) were more likely to utilize the full antenatal care than their younger counterparts (15-24 years). The likelihood of full ante--natal care services utilization was less likely among women who had more than one child in all selected countries than women who experienced their first childbirth. The full antenatal care services utilization increases if women's education increases. Likewise the odds of receiving full antenatal care among women who had middle and above education were high compared with uneducated women in India, Pakistan and Nepal. Women who were doing agricultural work, skilled/unskilled work and professional work were more likely to use full antenatal care than women who were not working or were housewives in India and it is statistically significant. But in Pakistan and Nepal, the

Table 3. Binary logistic regression showing adjusted effects of selected characteristics on utilization of antenatal care services in South Asian Countries.

Background characteristics	India		Pakistan		Nepal	
	Odds ratio	95% CI	Odds ratio	95% CI	Odds ratio	95% CI
Mother's age at time of birth						
15-24®	1.00		1.00		1.00	
25-34	1.086*	[0.987-1.196]	1.228	[0.926-1.628]	1.217*	[0.962-1.541]
35-49	1.353***	[1.172-1.563]	1.455**	[1.028-2.061]	1.455**	[1.062-1.992]
Birth order and interval						
Birth order 1®	1.00		1.00		1.00	
Birth order-2/3 and interval<=24	0.903	[0.786-1.038]	0.481***	[0.324-0.715]	0.253***	[0.184-0.348]
Birth order-2/3 and interval>24	0.855***	[0.766-0.954]	0.721**	[0.529-0.983]	0.386***	[0.314-0.476]
Birth order-4+ and interval<=24	0.358***	[0.263-0.487]	0.595**	[0.355-0.999]	0.228***	[0.140-0.371]
Birth order-4+ and interval>24	0.421***	[0.343-0.516]	0.700**	[0.488-1.004]	0.222***	[0.152-0.324]
Status of the child						
Wanted®	1.00		1.00		1.00	
Unwanted	0.613***	[0.507-0.742]	0.727**	[0.530-0.997]	0.919	[0.766-1.102]
Women's education						
Illiterate®	1.00		1.00		1.00	
Literate but below primary	1.251**	[1.004-1.560]	1.024	[0.547-1.915]	1.208	[0.917-1.590]
Primary but below middle	1.400***	[1.146-1.710]	1.597***	[1.079-2.364]	1.255	[0.860-1.832]
Middle but below high school	1.836***	[1.583-2.129]	1.746***	[1.164-2.621]	1.375***	[1.062-1.781]
High school and above	2.203***	[1.855-2.618]	2.460***	[1.717-3.522]	1.979***	[1.448-2.705]
Husband's education						
Illiterate®	1.00		1.00		1.00	
Literate but below primary	1.289**	[1.012-1.642]	0.832	[0.409-1.689]	0.991	[0.700-1.401]
Primary but below middle	1.004	[0.828-1.216]	1.046	[0.654-1.675]	1.138	[0.829-1.563]
Middle but below high school	0.933	[0.774-1.125]	1.054	[0.690-1.611]	1.398***	[1.009-1.936]
High school and above	1.004	[0.837-1.203]	1.367	[0.925-2.019]	1.525***	[1.065-2.183]
Women's occupation						
Not working®	1.00		1.00		1.00	
Agricultural work	1.327***	[1.144-1.540]	1.048	[0.477-2.304]	1.370	[1.133-1.658]
Skilled/unskilled work	1.274**	[0.996-1.630]	1.049	[0.544-2.025]	1.304	[0.880-1.933]
Professional work	1.193*	[0.989-1.438]	0.944	[0.652-1.368]	1.305	[0.982-1.735]
Husband's occupation						
Not working®	1.00		1.00		1.00	
Agricultural work	1.185	[0.946-1.484]	1.057	[0.441-2.532]	1.169	[0.690-1.980]
Skilled/unskilled work	1.249**	[0.999-1.560]	1.457	[0.721-2.944]	0.941	[0.569-1.555]
Professional work	1.099	[0.883-1.369]	1.476	[0.750-2.908]	1.073	[0.648-1.775]
Mass media exposure						
No exposure®	1.00		1.00		1.00	
Any exposure	1.728***	[1.467-2.036]	1.427	[0.916-2.223]	1.666***	[1.320-2.103]
Wealth quintile						
Poorest®	1.00		1.00		1.00	
Poorer	1.435***	[1.192-1.728]	2.537***	[1.207-5.330]	1.019	[0.776-1.338]
Middle	2.095***	[1.731-2.534]	2.931***	[1.439-5.972]	1.102	[0.820-1.482]
Richer	2.715***	[2.202-3.347]	4.098***	[2.025-8.290]	1.056	[0.781-1.426]
Richest	3.220***	[2.554-4.059]	5.868***	[2.811-12.249]	1.218	[0.848-1.748]
Type of residence						
Urban®	1.00		1.00		1.00	
Rural	0.813***	[0.713-0.926]	0.764**	[0.580-1.008]	0.883	[0.716-1.087]

® Reference; ***=p<0.10; **=p<0.05; *=p<0.10

occupations were not associated with utilization of full antenatal care. The mass media exposure was positively significant with utilization of ANC for India and Nepal, while for Pakistan it was not. The economic status of the household showed a significant positive effect on the full antenatal care utilization in India and Pakistan but results were not the same for Nepal. Women who belong to rich economic status were more likely to use full antenatal care than those belonging to poor households. Surprisingly, in Nepal the economic status of women was not showing any significant effect on utilization of full antenatal care. Further, the utilization of full antenatal care was significantly associated with the place of residence (urban and rural) in India and Pakistan but result was not statistically significant for Nepal though the direction was the same. Women residing in rural areas were less likely to use full ANC than their urban counterparts in India and Pakistan. But the

association of place of residence and use of full antenatal care are not statistically significant for Nepal.

In the three countries the plotted CI curves diverged from the line of equity for utilization of ANC services, indicating that the ANC was heavily concentrated among relatively poor women (Figure 1). In terms of specific outcomes with regard to inequality in ANC, the distance from the line of equity to the line of concentration curve was greatest in Pakistan, followed by India and Nepal.

Figure 1. Concentration curve for full antenatal care utilization by economic status of women in India, Pakistan and Nepal

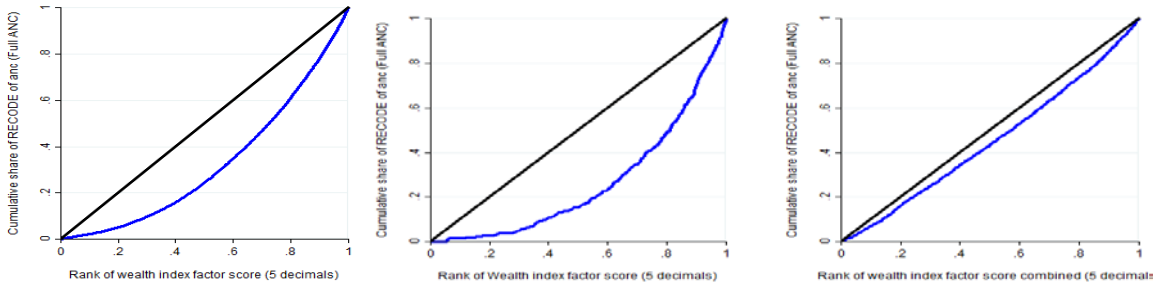

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Table 4(a), (b) and (c) presents results for decomposing the concentration index for ANC inequality in India, Pakistan and Nepal. It shows that the estimated value of the relative contribution to the concentration index was negative in selected socio-economic factors such as mother's age at 25-34 years (CI= -0.003), birth order 2/3 and interval <=24 (CI= -0.036), illiterates and below primary education (CI= -0.015), not working women and husband not working (CI= -0.002 and -0.001 respectively) in India (Table 4a). In Pakistan CI was also negative in mother's age 25-34 years (CI= -006), birth order and interval were most prominent factors. The CI for unwanted child (CI= -004), women and husband having education up to secondary levels (CI= -0.037 and -0.023 respectively) and women who engaged in skilled/unskilled work (CI= -0.001) shows the negative contribution to the CI (Table 4b). In Nepal, mother's age at birth 25-34 (CI= -0.003), birth order and interval Birth order-2/3 and interval <=24 (CI= -0.006), women's lower education, Illiterate and below primary level (CI= -0.018) and Up to secondary level (CI= -0.003) and husband's with higher secondary and above education (CI= -0.004) have negative contribution to the CI. Therefore, it reflects that fragile socio-economic groups in South Asian countries were more prejudiced in assessing full ANC services.

IV. Discussion

In these countries there are various maternal and child health programmes which are improving the average level of health care utilization and narrowing the socio-economic gap by assuring equitable and quality of health services, particularly among deprived women and children. The present study, therefore, tries to analyse the associations and inequalities between socio-economic, demographic factors and utilization of full Antenatal Care in selected South Asian countries.

Its findings indicate that in India the utilization of antenatal care is higher among women aged 35-49 years. Its pattern remains consistent across the selected socio-economic and demographic characteristics such as birth order and interval, mother's education, mass media exposure and economic status, which are significant determinants of the utilization of antenatal care services in South Asian countries. These findings are similar to those of the previous studies that socio-economic status is strongly associated with the utilization of antenatal care (Goli, Doshi & Arokiasamy, 2013; Pulok et al., 2016). In India and Nepal, as the exposure to mass media increases, the chances of availing ANC services also increases. The variables, women who had exposure to mass media and the autonomy in healthcare decision-making, are significant predictors of using health care services

Table 4(a). Decomposition analysis of the concentration index of full antenatal care by selected socio-economic characteristics in India.

Background characteristics	Elasticity	Concentration index	Contribution to concentration index	Contribution to concentration index (%)
Mother's age at time of birth (yrs.)				
15-24	-0.109	-0.026	0.003	0.008
25-34	-0.037	0.080	-0.003	-0.008
35-49	0.000	-0.099	0.000	0.000
Birth order and interval				
Birth order 1	-0.291	-0.588	0.171	0.462
Birth order-2/3 and interval<=24	-0.126	0.287	-0.036	-0.097
Birth order-2/3 and interval>24	0.000	0.672	0.000	0.000
Birth order-4+ and interval<=24	-0.002	-0.370	0.001	0.002
Birth order-4+ and interval>24	0.009	0.017	0.000	0.000
Status of the child				
Unwanted	0.005	0.410	0.002	0.006
Women's education				
Illiterate and below primary	-0.204	0.076	-0.015	-0.042
Up to secondary	-0.028	-0.325	0.009	0.024
Higher secondary and above	-0.011	-0.095	0.001	0.003
Husband's education				
Illiterate and below primary	-0.013	0.276	-0.004	-0.010
Up to secondary	0.013	-0.025	0.000	-0.001
Higher secondary and above	0.073	-0.236	-0.017	-0.047
Women's occupation				
Not working	0.089	-0.020	-0.002	-0.005
Agricultural work	0.084	0.314	0.027	0.071
Skilled/unskilled work	0.009	0.204	0.002	0.005
Professional work	-0.011	-0.036	0.000	0.001
Husband's occupation				
Not working	-0.021	0.057	-0.001	-0.003
Agricultural work	-0.030	-0.387	0.011	0.031
Skilled/unskilled work	-0.066	-0.398	0.026	0.071
Professional work	-0.031	-0.121	0.004	0.010
Mass media exposure				
Any exposure	0.521	0.697	0.363	0.979
Type of residence				
Rural	-0.203	-0.625	0.127	0.343

* Based on predicted percentages obtained from multinomial logit regression.

(Zera et al., 2010). According to Pandey & Karki (2014), women with better education were more likely to utilize ANC services, perhaps because educated women are more likely to realize the benefits of using maternal healthcare services.

Considering the relative contribution of socio-economic factors to utilization of ANC services, the major contributing factors were found to vary by country. Inequities in the utilization of antenatal care in accordance with studies from India and Malawi noted that many women were poor and uneducated, receiving less of them (Goli & Arokiasamy, 2013; Pulko et al., 2016; Pandey & Karki, 2014; Yaya, Bishwajit & Shah, 2016). In contrast, no inequity in their utilization has been reported in Myanmar, Thailand and Namibia (Limwattananon, Tangcharoensathien & Prakongsai, 2010; Zera et al., 2010; Myint et al., 2018). These findings imply that richer and urban women were more capable and willing to pay for services from the increasingly widespread private health care, than poorer and rural women as they did not afford them.

V. Conclusion and policy implications

While several governmental efforts increased access to maternal and child health care services among the privileged groups, the use of antenatal care remains disproportionately lower among rural, poor, young and uneducated mothers in south Asian countries. Most of the well-conceived policies and programmes do not function well due to improper monitoring. Adolescent pregnant women should be the target group to reduce inequity in utilization of ANC. In addition, policy initiatives must consider factors such as economic status, educational level and regional disadvantages to reduce the burden of maternal mortality in low-middle income countries. In view of the poor household economic status leading to lower use of maternal health care inequalities, it is proposed that these countries should receive ample public investments, especially by local governments.

Table 4(b). Decomposition analysis of the concentration index of full antenatal care by selected socio-economic characteristics in Pakistan

Background characteristics	Elasticity	Concentration index	Contribution to concentration index	Contribution to concentration index (%)
Mother's age at time of birth (yrs.)				
15-24	-0.098	-0.061	0.006	0.012
25-34	-0.050	0.119	-0.006	-0.012
35-49	0.000	-0.066	0.000	0.000
Birth order and interval				
Birth order 1	-0.027	0.150	-0.004	-0.008
Birth order-2/3 and interval<=24	-0.101	0.096	-0.010	-0.019
Birth order-2/3 and interval>24	-0.083	0.115	-0.010	-0.019
Birth order-4+ and interval<=24	-0.082	-0.194	0.016	0.032
Birth order-4+ and interval>24	-0.138	-0.150	0.021	0.041
Status of the child				
Unwanted	-0.043	0.088	-0.004	-0.008
Women's education				
Illiterate and below primary	-0.653	-0.719	0.470	0.936
Up to secondary	-0.066	0.557	-0.037	-0.073
Higher secondary and above	0.000	0.722	0.000	0.000
Husband's education				
Illiterate and below primary	-0.355	-0.504	0.179	0.356
Up to secondary	-0.102	0.222	-0.023	-0.045
Higher secondary and above	-0.020	0.543	-0.011	-0.022
Women's occupation				
Not working	0.092	0.366	0.034	0.067
Agricultural work	-0.011	-0.548	0.006	0.012
Skilled/unskilled work	0.002	-0.351	-0.001	-0.001
Professional work	0.000	0.084	0.000	0.000
Husband's occupation				
Not working	-0.006	-0.076	0.000	0.001
Agricultural work	-0.058	-0.360	0.021	0.042
Skilled/unskilled work	-0.011	-0.147	0.002	0.003
Professional work	0.000	0.412	0.000	0.000
Mass media exposure				
Any exposure	0.387	0.592	0.229	0.457
Type of residence				
Rural	-0.336	-0.727	0.244	0.486

* Based on predicted percentages obtained from multinomial logit regression.

Table 4(c). Decomposition analysis of the concentration index of full antenatal care by selected socioeconomic characteristics in Nepal.

Background characteristics	Elasticity	Concentration index	Contribution to concentration index	Contribution to concentration index (%)
Mother's age at time of birth (yrs.)				
15-24	-0.111	-0.034	0.004	0.024
25-34	-0.028	0.098	-0.003	-0.017
35-49	0.000	-0.105	0.000	0.000
Birth order and interval				
Birth order 1	-0.142	-0.360	0.051	0.328
Birth order-2/3 and interval<=24	-0.050	0.116	-0.006	-0.037
Birth order-2/3 and interval>24	0.000	0.490	0.000	0.000
Birth order-4+ and interval<=24	-0.050	-0.380	0.019	0.122
Birth order-4+ and interval>24	0.005	0.062	0.000	0.002
Status of the child				
Unwanted	0.032	0.427	0.014	0.087
Women's education				
Illiterate and below primary	-0.054	0.343	-0.018	-0.118
Up to secondary	0.005	-0.533	-0.003	-0.016
Higher secondary and above	-0.002	0.141	0.000	-0.002
Husband's education				
Illiterate and below primary	0.000	0.470	0.000	0.000
Up to secondary	-0.003	0.129	0.000	-0.002
Higher secondary and above	0.011	-0.356	-0.004	-0.024
Women's occupation				
Not working	-0.020	-0.179	0.004	0.023
Agricultural work	0.007	0.386	0.003	0.017
Skilled/unskilled work	0.167	0.146	0.024	0.156
Professional work	-0.021	-0.048	0.001	0.007
Husband's occupation				
Not working	-0.007	0.060	0.000	-0.003
Agricultural work	-0.013	-0.296	0.004	0.025
Skilled/unskilled work	-0.043	-0.296	0.013	0.080
Professional work	-0.006	-0.096	0.001	0.004
Mass media exposure				
Any exposure	0.212	0.297	0.063	0.402
Type of residence				
Rural	-0.031	-0.340	0.010	0.067

* Based on predicted percentages obtained from multinomial logit regression.

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