GLOBAL JOURNAL OF MEDICINE AND PUBLIC HEALTH

Socio-economic inequity in use of antennal care and child immunization services in Goa

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ABSTRACT

The antenatal care and child immunization are important strategies for reducing maternal and infant mortality rate. The present study aims to measure the economic and educational inequity in the use of antenatal care and child immunization for the state of Goa. The data for the present study was collected using a cross sectional study design based on two stage stratified random sampling method in North Goa District. The sample size consisted of 250 mothers delivered during last two years for measuring antenatal care, and 250 mothers of children in the age group 12-24 months. The data was analyzed using chi-square test, logistic regression, Lorenz's curve and Gini coefficient. The analysis of the data revealed that the use of antenatal care was 78.2% and the use of child immunization was 89.2 %. There was significant disparity in the use of antenatal care and use of child health care according to education of mother, religion and socio-economic status of mother. The Gini coefficient for the utilization antenatal care was 0.07 and 0.11 for educational and economic inequity respectively, whereas the Gini coefficient for child immunization was 0.04 and 0.03 for educational and economic inequity respectively. The inequity was more in use of antenatal care compared to child immunization, which highlights the needs for health administrators to reduce the gap in the antenatal care services provided to the pregnant women.

GJMEDPH 2015; Vol. 4, issue 2

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Conflict of Interest—none

Funding—none

Keywords: Antenatal Care, Child Immunization, Inequity, Gini Coefficient, Concentration Curve

INTRODUCTION

India accounts 20 percent of global maternal deaths with a maternal mortality rate of 178 per lakh live births, and infant mortality rate still continues to be high with 50 infant deaths per thousand live births.[1] The antenatal care is an effective intervention for reducing maternal mortality and child immunization is an effective strategy for reducing infant mortality rate.[2] The Millennium Development Goal aims at reducing the maternal mortality ratio by 75 percent and infant mortality rate by 50 percent during 1990-2015. In order to achieve these goals, all women need access to antenatal care and children needs to be fully immunized against vaccine preventable diseases. Though the antenatal care and child immunization services are available and accessible through private and public health sector, there exists a lot of inequity in availing these services by the target population. However antenatal care services are available in developing countries but utilization of these existing services is poor. The National Family Health Survey-3 data shows only 19.4 percent of pregnant women in India utilized the Reproductive and Child Health (RCH) programme recommended antenatal care of three or more antenatal checkups with first check-up within the first trimester of pregnancy.[3] The NFHS -3 survey also showed inequality in the use of antenatal care and child

immunization was due to socio-economic and demographic factors.

Equity in health is considered to be a basic principle for human development and social justice.[4] The concept of inequity has been considered synonymous with the concept of inequality. While inequality implies differences between individuals or population groups, inequity refers to differences which are unnecessary and avoidable but, in addition, are also considered unfair and unjust. Not all inequalities are unjust, but all inequities are the product of unjust inequalities. In the context of health, one of the more accepted definitions of "just" refers to equal opportunities for individuals and social groups, in terms of granting access to and using the health services, in accordance with the needs of the various groups of a population, regardless of their ability to pay.[5] The present study aims to measure the economic and educational inequity in the use of antenatal care and child immunization for the state of Goa. Goa, a western coastal state of India is a former Portuguese colony with a population of 14.57 lakhs as per 2011 census. [6]

METHODS AND MATERIALS

The data for the present macro level study was based on the household survey of two stage stratified random sampling method conducted in the North Goa District using a cross sectional study design. The sample consisted of 250 mothers delivered during last two years were selected for measuring antenatal care and another sample of 250 mothers of children in the age group 12-24 months were selected for measuring child immunization. In the first stage 20 rural blocks and 5 urban blocks were selected, and at second stage 10 women who had delivered a child during last two years, and 10 mothers of children in the age group 12-24 months, were selected from each of the first stage unit using simple random sampling method.

The data was collected on pre designed and pretested questionnaire from the mothers and the informed consent was obtained from the mothers. The dependent variable, the use of antenatal care was defined as "A pregnant women who registered with a health facility or health worker at home before 12 weeks of pregnancy and received 5 or more visits during entire period of gestation and received two doses of tetanus toxoid vaccine". The use of child immunization was defined as "A child who received BCG, three doses of oral polio vaccine, three doses of DPT and measles vaccine before age of one year".

The data was analyzed using Chi-Square test and multivariate logistic regression model was used to quantify net effect of each variable on the use of antenatal care after controlling for the effects of the all other variable included in the model. A p value less than 0.05 was considered statistically significant.

The inequity in maternal and child health was measured using Lorenz's curve and Gini coefficient. The Gini coefficient is based on the Lorenz curve, a cumulative frequency curve that compares the distribution of a specific variable with the uniform distribution that represents equality. This equality distribution is represented by a diagonal line, and the greater the deviations of the Lorenz curve from this line, the greater the inequality. The Gini coefficient is calculated as

$$G = 1 - \sum_{i=0}^{k-1} (Y_{i+1} + Y_i)(X_{i+1} - X_i)$$

Y = Cumulated Proportion of the health variable
X= Cumulated Proportion of the population variable

RESULTS

The background characteristics of the study population of mothers receiving antenatal care and child immunization reveals that majority of mothers were in the age group of 25-34 years. More than one half of the mothers had education level of S.S.C and above and more than one third of them belonging to lower socio economic group (Table 1).[7]

ISSN#- 2277-9604

Table 1 Background Characteristics of Mothers

	Antenatal Care (n=250)	Child Immunization (n=250)
Age Group (Years)	No. (%)	No. (%)
15-24	75 (30.0)	40 (16.0)
25-34	169 (67.6)	190 (76.0)
35-45	6 (2.4)	208 (18.0)
Education Level		
Illiterate	19 (7.6)	18 (7.2)
Primary	27 (12.8)	31 (12.4)
Secondary	61 (24.4)	62(24.8)
S.S.C and above	143 (57.2)	139 (55.6)
Socio-economic Status		
Upper class	45 (18.0)	41 (16.4)
Upper middle	62 (24.8)	63 (25.2)
Lower middle	47 (18.8)	48 (19.2)
Upper lower	67 (26.8)	68 (27.2)
Lower	29 (10.6)	30 (12.0)

In the present study the 197 mothers out of 250 utilized antenatal care services (78.8 %), while use of child immunization was 89.2 %. i.e. 223 children out of 250 were completely immunized (Figure 1).

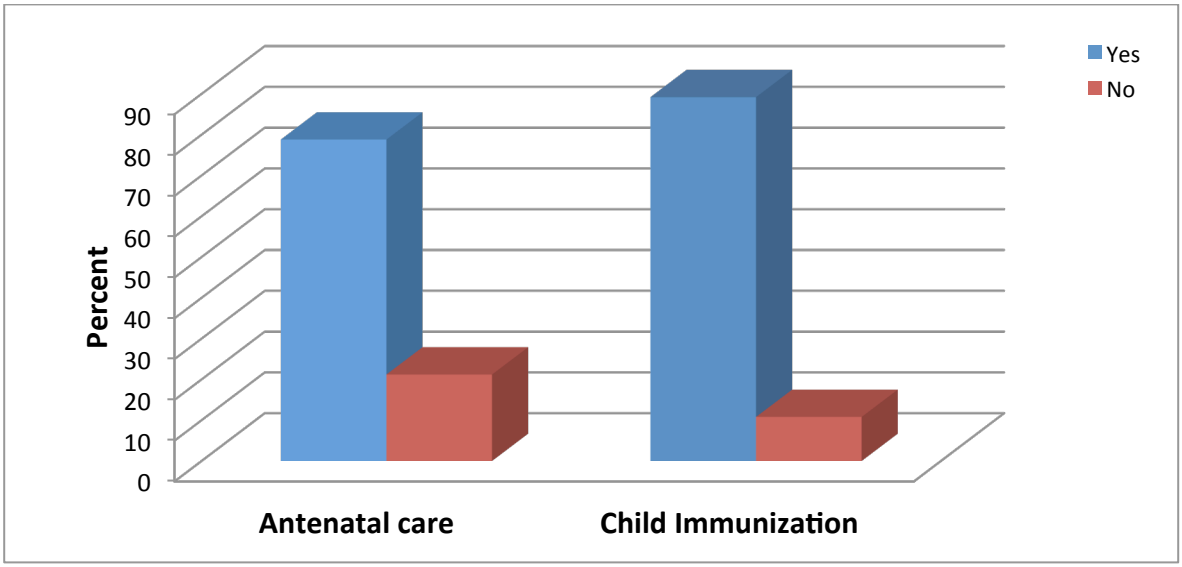

Figure 1 Use of Antenatal care and child immunization care services in Goa

In this study 31.6 percent of the illiterate mother used antenatal care services and 55.6 children were utilized child immunization (Table 2). The chi-square test revealed that education of mothers was significantly associated with use of antenatal care ($p<0.01$) and as well as child immunization ($p<0.05$). The association was statistically significant and positive.

ISSN#- 2277-9604

Table 2 Association between the Education level of mother and use of antenatal care and child immunization

Education level of mother	Antenatal care n=250			Child Immunization n=250		
	Yes No (%)	No No (%)	Total No (%)	Yes No (%)	No No (%)	Total No (%)
Illiterate	6(31.6)	13(68.4)	19 (100)	10 (55.6)	8 (44.4)	18 (100)
Primary	18(66.7)	9(33.3)	27(100)	22 (71.0)	9 (29.0)	31 (100)
Secondary	42 (68.9)	19(31.1)	61 (100)	60 (96.8)	2 (3.2)	62 (100)
S.S.C.+	131(90.8)	12 (9.2)	143 (100)	131 (94.2)	8 (5.8)	139 (100)
	χ^2 = 25.3, d.f = 3, P<0.01			**χ2 = 39.21, d.f = 2, P< 0.05**		

The Muslim women (48 percent antenatal care and 75percent child immunization) were significantly less likely to use the maternal and child health care services compared to Christian and Hindu mothers (Table 3). The religion of the mothers was also significantly related with use of antenatal care (p<0.05) and child immunization (p<0.05).

Table 3 Association between the Religion and use of antenatal care and child immunization

Religion	Antenatal care n=250			Child Immunization n=250		
	Yes No (%)	No No (%)	Total No (%)	Yes No (%)	No No (%)	Total No (%)
Hindu	134(78.8)	36(21.2)	170(100.0)	155 (89.6)	18 (10.4)	173 (100.0)
Christian	51(92.7)	4(7.3)	55 (100.0)	18 (94.3)	3 (5.7)	53 (100.0)
Muslim	12(48.0)	13(52.0)	25 (100.0)	18 (75.0)	6 (25.0)	24 (100.0)
	χ2 =20.58, d.f = 2, P< 0.05			**χ2 =6.5, d.f = 2, P< 0.05**		

The use of antenatal care was 59.4 percent and child immunization was 82.7 percent among mother belonging to lower socio-status (Table 4). The socio-economic status of the mothers was also significantly related with use of antenatal care (p<0.01) and child immunization (p<0.05).

Table 4 Association between the Socio-economic status and use of antenatal care and child immunization

Socio-Economic Status	Antenatal care n=250			Child Immunization n=250		
	Yes No (%)	No No (%)	Total No (%)	Yes No (%)	No No (%)	Total No (%)
Upper class	38 (84.4)	7 (15.6)	45 (100)	40 (97.6)	1 (2.4)	41 (100)
Upper middle and lower middle class	96 (88.1)	13 (11.9)	109 (100)	102 (91.9)	9 (8.1)	111(100)
Upper lower and lower class	63 (59.4)	43 (40.6)	106(100)	81 (82.7)	17 (17.3)	98(100)
	χ^2 = 23.96, d.f = 2, P<0.001			**χ2 = 8.17, d.f = 2, P< 0.05**		

ISSN#- 2277-9604

The table 5 represents the logistic regression coefficients showing odds ratio of use of antenatal care and child immunization, when controlled for the confounding variables which are likely to influence the dependent variables. Among all the factors studied education of mothers was found to be most significant variable influencing use of antenatal care and child immunization, when controlled for the parity and exposure to mass media in the logistic regression model.

Table 5 The logistic Regression coefficients showing Odds ratio of use of antenatal care and child immunization

Independent Variables	Antenatal care	Child immunization
Women's Education		
Illiterate (Ref)	1.0	1.0
Primary	1.73 (0.9, 3.2) ns	1.36 (0.13-5.81) ns
Secondary	1.98 (0.8, 4.8) ns	16.24 (2.5-103.7) *
S.S.C. and above	4.41 (2.1, 7.6) *	5.81 (3.35-10.06)*
Exposure to radio		
Yes	2.52 (1.2, 5.2) *	1.0
No (Ref)	1.0	4.08 (1.12-14.93) *
Parity	0.51 (0.3, 0.7) *	0.59 (0.39-0.89) *
Const	2.43 *	-1.99*

**-Significant*

The Gini concentration index for the utilizations of antenatal care was 0.07 and 0.11 for economic and educational inequality respectively, while that of the child immunization was 0.04 and 0.03 for economic and educational inequity respectively. Thus Gini concentration index (Figure 2-5) reflects more inequity in the use of antenatal care compared to child immunization.

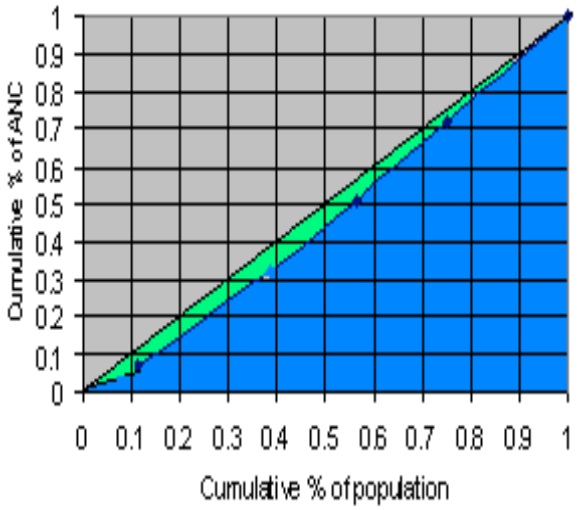

Figure 2 Lorenz curve showing inequity in use of antenatal care by education of mother

ISSN#- 2277-9604

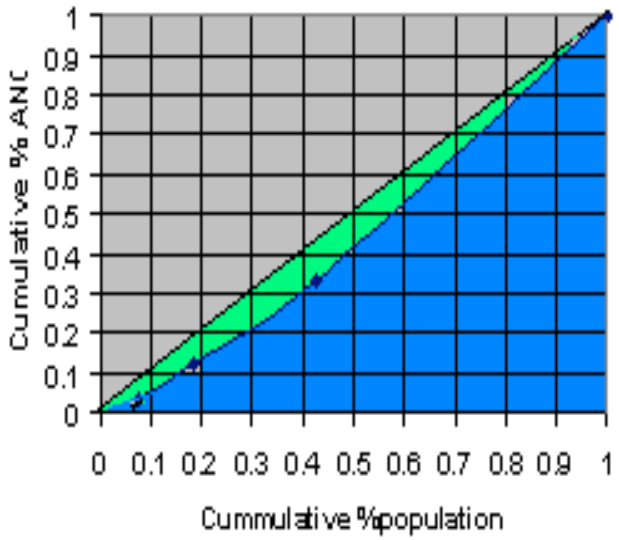

Figure 3 Lorenz curve showing inequity in use of antenatal care by socio-economic status

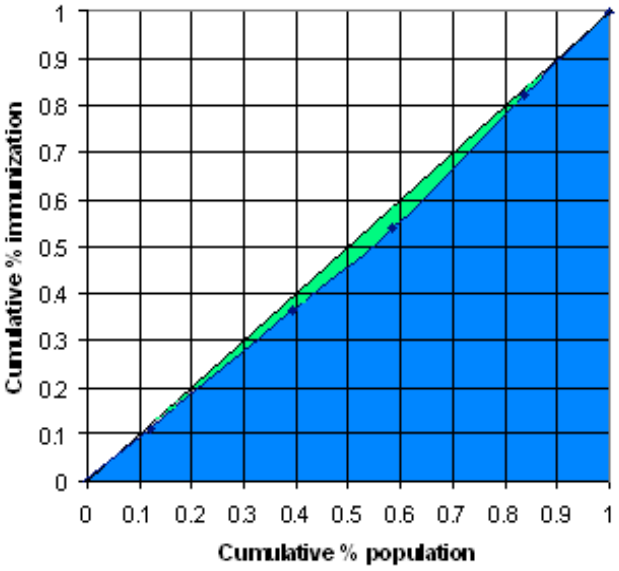

Figure 4 Lorenz curve showing inequity in use of child immunization by education of mother

ISSN#- 2277-9604

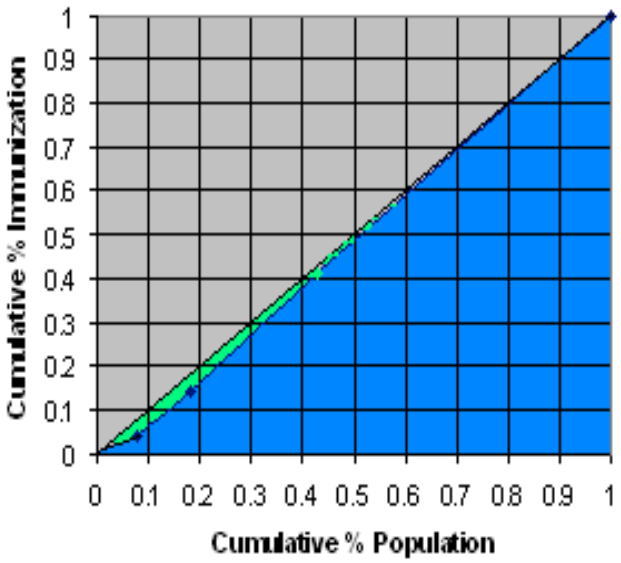

Figure 5 Lorenz curve showing inequity in use of child immunization by socio-economic status

DISCUSSIONS

The present study was conducted to know the inequity due to socio-economic factors in the use of antenatal care and child immunization. There is a need to cover entire pregnant women for antenatal care and children for child immunization, as the use of antenatal care and child immunization found to be 78.8% and 89.2% respectively. In this study significant disparity in the use of antenatal care and child immunization was observed due to education of mother, religion and socio economic status.

The analysis through logistic regression demonstrated that mother's education was found to be most significant variable associated with the use of antenatal care and child immunization, when controlled for the confounding factors such as parity and exposure to mass media. The parity and the exposure to mass media were confounding factors with the education of mother and use of antenatal care as well as child immunization. The higher parity mothers were less likely to use antenatal care and child immunization services, were more likely to be illiterate and literate mothers were more exposed to mass media, were also more likely to use antenatal care and child immunization services. [8,9]

The NFHS-3 survey in Goa reported that 86% of women received antenatal care during first trimester and 79% children in the age group 12-23 months were fully immunized, which was more compared to other states 3. This survey also observed inequality in use antenatal care and child immunization due to education of mothers, wealth of the household.

The present study demonstrated inequity in use of antenatal care and child immunization. The analysis based on the shape of Lorenz's curve revealed the use of antenatal care and child immunization services are pro rich. The level of inequity was more in the use of antenatal care services compared to child immunization. The inequity in use of antenatal care services was more due to socio-economic status than mother's education, and inequity in use of child immunization was more due to mother's education, than socio-economic status.

The Gini concentration index in Bihar and Orissa also showed that the extent of inequality in child immunization was low compared to full ANC.[10] Hazara et al., reported the Gini Index for full ANC, and full immunization was 0.386, and 0.228 respectively, pointing out the presence of inequality in utilization to certain extent in the use of ANC and immunization.[11]

Lavado and Lagrato noticed inequity in antenatal care due to living standards, the richest quintiles were two times more likely than those in the poorest

ISSN#- 2277-9604

to have antenatal care. In this study also the inequity in antenatal care (Gini's Coefficient =0.12) was more Andrade et al compared the extent of socioeconomic inequalities in antenatal care use in Brazil and India using logistic regression and Gini's concentration Index.[13] There was inequality in access to four or more antenatal care visits in India, where as in Brazil the difference was significant for those who had six or more visits. In Brazil the use of antenatal care of four or more visits was 90% and wealth index, age, education, newspaper and TV were strong predictors of use of antenatal care. In India the use of antenatal care was 37% and education, household wealth, residence and mass media exposure were strong predictors of use of antenatal care. The concentration index showed the presence of social inequality in the provision of antenatal care favoring the richer groups in Brazil, but level of inequality was small, where as in India there were substantial inequalities in utilization of antenatal care favoring women belonging to the richest households. Similar study in Nairobi related to inequity in child immunization reported that concentration index for not fully immunized was −0.08 indicating that immunization inequality was mainly concentrated among children from poor families.[14]

The inequity studies in maternal and child health have to be conducted at regular interval to identify the factors responsible for the inequity in the health care use among the target population, so as to narrow down the gaps in the use of antenatal care and child immunization

CONCLUSIONS

The use of antenatal care and child immunization was more in the state of Goa compared to other states of the country. Further effort should be made to achieve complete registration of mothers for antenatal care and child immunization. There exists significant disparity in the use of antenatal care and use of child health care by education of mother, religion and socio-economic status of mother. The analysis of the data by Lorenz's curve revealed that the maternal child health services are not pro poor. The inequity in use of antenatal care was more than child immunization. The inequity in these services was more due to mother's education, than socio-economic status. The health policy should aim at reducing the inequity in antenatal care and child immunization by focusing on women's education.

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