



Original Article

Socioeconomic Position as a Determinant of Maternal Healthcare Utilization: A Population-Based Study in Namibia

Mamunur Rashid (MSS, MMSc)^a, and Diddy Antai (MD, PhD)^{bc*}

^a Department of Public Health Sciences, Division of Public Health Epidemiology, Karolinska Institute, Stockholm, Sweden

^b City University London, School of Health Sciences, Centre for Public Health Research, Northampton Square, London, UK

^c Division of Global Health & Inequalities, the Angels Trust - Nigeria, Abuja, Nigeria

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* Correspondence

Diddy Antai (MD, PhD)

Tel: +44 20 70403293

E-mail: Diddy.Antai.1@city.ac.uk

ABSTRACT

Background: Improving maternal health is one of the eight Millennium Development Goals (MDGs) aimed at improving maternal healthcare and reducing maternal mortality. The utilization of maternal health services is influenced by several factors that need to be better understood. The objective of this study was to estimate the role of socio-economic position as a determinant of the utilization of maternal health care in Namibia.

Methods: Data were collected from the Namibia Demographic and Health Survey in 2006-2007, based on survey responses from 9,804 female respondents aged 15-49 years. Multivariate logistic regression analysis was performed accounting for socio-economic factors associated with the use of maternal health care services.

Results: The results from both bivariate and multivariate analyses confirmed the importance of education, wealth index, place of residence and marital status in explaining the utilization of maternal health care services. Wealth index was the only consistently significant predictor of all indicators of maternal health services; with other factors being significantly associated with one or more of the indicators. Women's age and occupation showed inconclusive results in relation to access to maternal health care services.

Conclusion: Several socio-economic factors significantly influence the three indicators of maternal health services utilization. Effective interventions need to take these factors into consideration and to explore means that increase maternal health service utilization especially among lowly educated and poor women in rural areas.

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Introduction

One of the eight Millennium Development Goals (MDGs) includes reducing the maternal mortality ratio (MMR) by three-quarters between 1990 and 2015¹. Globally, over half a million women suffer complications during or after pregnancy¹. An estimated 358,000 maternal deaths occurred worldwide in 2008, declining by thirty-four percent from the 1990 levels. Despite this global decline, developing countries accounted for 99% of these deaths, of which 87% occurred in sub-Saharan Africa and South Asia². Evidence of pervasive socio-economic inequalities in health and health care between and within countries³ has awakened renewed global and national interests and initiated appropriate policy responses⁴. Namibia's MMR increased substantially, almost doubling between 1992 and 2007. The Namibia Demographic and Health Survey (NDHS) conducted in 2000 and 2006 - 2007 showed that MMR increased significantly from 271 to 449 deaths per 100,000 live births between 2000 and 2007, occurring mainly at childbirth or two months post-partum⁵. A systematic analysis of maternal mortality for MDGs in 181 countries from 1980 to 2008 identified an increasing trend of MMR in

Namibia (397 maternal deaths in 1980, 354 deaths in 1990, 558 deaths in 2000, and 586 deaths in 2008 per 100,000 live births)⁶. Key reasons for the increased MMR in Namibia include poor transportation, low quality of health services, and large centralized healthcare facilities⁵. Namibia is situated in South-Western Africa and had an estimated population of 2.1 million people in 2009. The country is administratively divided into 13 regions corresponding to the health regions, and 108 constituencies⁷. The country is largely dry, sparsely populated, and mostly rural despite rapid urbanization. Health services delivery is by primary health care (PHC), with public health services provided through public district hospitals, health centers, and clinics. Limited access to emergency obstetric care and lack of transport and communication facilities compound the direct and indirect causes of maternal mortality⁸.

An understanding of women's subjective perspective and contextual factors are needed to reduce maternal mortality and morbidity^{3, 9}. Factors such as maternal education, women's employment, marital status, household income could influence health, and cultural beliefs about pregnancy influ-

ence antenatal care^{10, 11}. However, studies have not established a consistent relationship between these factors and maternal health service utilization in different social contexts. For instance, though some studies have reported a positive correlation between age and the use of skilled attendants at child birth^{11, 12}, others found a curvilinear relationship¹³. Evidence generally indicates that socio-economic determinants of maternal health service utilization vary across and within countries^{10, 13}, increasing the need for further studies in different social contexts.

This study examined the relationship between socio-economic position and maternal healthcare utilization, with special emphasis on antenatal care, delivery care by skilled attendance, and postnatal care. We hypothesized that women with higher socioeconomic position will have better access to maternal health services.

Methods

Data and study design

This study used data from the 2006-2007 NDHS⁵. The third comprehensive survey in the series conducted in Namibia within the Demographic and Health Surveys (DHS) program, the NDHS is a nationally-representative survey of 9,804 women age 15-49 years. The primary objective of the 200-07 NDHS was to provide detailed information on important population characteristics, such as fertility, contraceptive prevalence, selected health indicators, and infant mortality rates for Namibia. A representative two-stage probability sample of 10,000 households was initially selected. In the first stage, 500 primary sampling units (PSUs) were selected from a sampling frame of 3,750 PSUs with probability proportional to size; the size being the number of households in the 2001 Population Census. The second stage involved the systematic selection of 20 households in each PSU, resulting in a total of 9,970 households. From these households, a total of 10,352 eligible women age 15-49 yr were identified for the women's questionnaires, of which 9,804 women were successfully interviewed – a response rate of 95%. Following the collection of a written informed consent from each interviewer, the questionnaires were filled out by well-trained interviewers with the informant to ensure that the questionnaires were filled correctly.

Conceptual framework

The utilization of health services can be viewed as a sort of individual behavior, which is in turn explained as a function of characteristics of the individual, the environment in which the individual resides, and/or an interaction of these individual and societal forces¹¹. The analysis in this study is based on the conceptual framework developed by Andersen and Newman (1973)¹² (Figure 1). This framework emphasizes the importance of the conditions that either facilitate or impede utilization, and examines three set of characteristics of health care use among women in Namibia - predisposing factors, enabling factors, and perceived needs. Predisposing factors are biological factors that may influence the probability of an individual requiring a health service; social structure that may influence how an individual copes with health problems; and health beliefs that may influence an individual's perception of their health service needs¹². Predisposing factors include demographic characteristics and socio-structural characteristics such as those used in this study: women's age, marital status, women's education, and part-

ner's education are considered as the predisposing factors. Previous studies have demonstrated that a higher economic status and education level are associated with the increased likelihood of accessing professional antenatal care and delivering in a health facility¹³. Marriage is also known to increase the probability of health-facility delivery¹⁴. Enabling factors indicate that some families may either be predisposed to use health services, or must have some means to obtain them. These include income, health insurance coverage, family support, and access to services (transportation and distance to care), and such community characteristics as availability of resources and region of the country¹⁵. Perceived needs refer to the individuals' health beliefs or patterned reaction by the family, and include aspects of the individual's attitudes, values, and knowledge about health problems and services that affect their perception of whether they need or do not need health services. Perceived belief that antenatal care was not adequate has been reported to be associated not receiving this preventive care¹⁶.

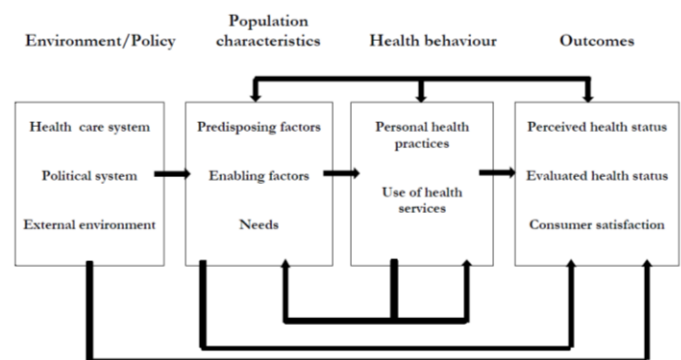


Figure 1: Theoretical framework of the behavioral model of health services use

Outcome variables

Three outcome variables were used to operationalize women's access to reproductive health care: (1) access to skilled prenatal care, measured from responses to question asked the women whether they had attended antenatal care in a healthcare setting under the supervision of qualified healthcare personnel. Responses were then dichotomized, into a "yes" or "no" variable; (2) access to institutional delivery, categorized as "home" (if respondent delivered in own home/parent's home/someone else's home) or "institutional" (if respondent delivered in government hospital/government health clinic/other public or rural hospital/private hospital/maternity clinic/other private clinic/nongovernmental organization/Red Cross/other); and (3) access to postnatal care, referred to as care after delivery but before discharge from the health care facility conducted by a qualified or non-qualified personnel. Responses were measured as a dichotomized "yes" or "no" variable. These outcome measures were assessed separately.

Exposures

Exposure variables included: predisposing factors such as women's age, marital status and place of residence; and enabling factors, such as women's education, partner's education, women's occupation, partner's occupation and wealth index. Perceived needs could not be analyzed due to absence of data. Women's age was categorized as 15-24, 25-34 and ≥ 35 yr. Place of residence was assessed as rural and urban areas, and marital status was categorized as single, and married. Socio-economic position (SEP) for both women and partners were assessed on the basis of education, which was

categorized as no education, primary education, and secondary or higher education. Occupation was categorized as not working, agriculture self-employed/household & domestic unskilled manual, clerical/ sales/ services, skilled manual, and professional/ technician/ management. Wealth index is an indicator of the SEP of households commonly used in many low-and middle-income countries, especially in situations where income is not fixed and recurrent, for example many agriculture workers work seasonal and thus their income is seasonal. Wealth index assigns weights or factor scores generated by principal component analysis to information on household assets collected from censuses and surveys. By using principal components analysis, each asset owned is designated a score, and the factor loading scores are then used to create linear composites of each household SEP variable, and then summed and divided into quintiles (poorest, poorer, middle, richer, and richest) to represent different levels of wealth. For the purpose of this study, wealth index was re-categorized as poor, medium or rich.

Statistical analysis

Firstly, we assessed the distribution of the exposure variables in the sample by the outcome variables and used Pearson's chi-square (χ) test to examine differences in proportions. The level of significance was set at $P < 0.05$. Secondly, we used multivariate logistic regression analysis to examine

the association between women's socio-economic position and the use of maternal health care services. All variables in the univariate analysis were included in this analysis. Odds ratios (OR) with 95% confidence intervals (CI) were computed. All statistical analyses were performed with IBM Statistical Package for the Social Sciences (SPSS) version 20.

Results

Indicators of maternal healthcare utilization

Table 1 shows the distribution of predisposing and enabling factors by maternal healthcare utilization. Women without education (21%) and their partners' without education (16%) reported fewer antenatal visits than women and their partners' with secondary or higher education, respectively. Both women (7%) and their partners (14%) who were agricultural self-employed, household & domestic unskilled manual workers reported lesser access to prenatal care compared to professional, technical, management workers. A higher proportion of rural residents (6%) and women in poor households (8%) had lacked to prenatal care than urban residents and those from rich households, respectively. Similar partners were observed in association with access to institutional delivery and postnatal care.

Table 1: Frequency distribution of respondents' characteristics

Variables	Prenatal care		Place of delivery		Postnatal care	
	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)
Women's age (yr)						
15-24	1269 (95.0)	66 (5.0)	1115 (83.4)	222 (16.6)	881 (79.2)	231 (20.8)
25-34	1712 (95.7)	76 (4.3)	1491 (83.3)	300 (16.7)	1248 (83.8)	242 (16.2)
≥35	824 (92.7)	65 (7.3)	671 (75.3)	221 (24.7)	557 (83.0)	114 (17.0)
Marital status						
Single	2600 (95.5)	138 (4.5)	2237 (81.6)	503 (18.4)	1800 (80.6)	433 (19.4)
Married	975 (94.5)	57 (5.5)	844 (81.5)	192 (18.5)	721 (85.4)	123 (14.6)
Women's education						
Illiterate	343 (79.2)	90 (20.8)	217 (50.0)	217 (50.0)	164 (75.9)	52 (23.1)
Primary school	1129 (94.6)	64 (5.4)	869 (72.7)	327 (27.3)	651 (75.0)	216 (25.0)
Secondary/high school	2333 (97.7)	53 (2.2)	2191 (91.7)	199 (8.3)	1871 (85.4)	319 (14.6)
Partner's education						
Illiterate	446 (83.6)	87 (16.4)	322 (60.3)	212 (39.7)	233 (72.3)	89 (27.7)
Primary school	565 (94.6)	32 (5.4)	422 (70.5)	176 (29.5)	341 (80.9)	80 (19.1)
Secondary/high school	1088 (96.8)	35 (3.2)	1018 (90.3)	109 (29.7)	869 (85.3)	149 (14.7)
Women's occupation						
Unemployed	1712 (93.5)	111 (6.5)	1438 (78.6)	391 (21.4)	1146 (79.8)	290 (20.2)
Unskilled manual ^a	480 (92.7)	38 (7.3)	353 (68.3)	164 (31.7)	278 (79.0)	74 (21.0)
Skilled manual ^b	1285 (96.2)	51 (3.8)	1168 (87.4)	169 (12.6)	978 (83.8)	189 (16.2)
Professional ^c	210 (99.0)	2 (1.0)	209 (97.7)	5 (2.3)	188 (90.0)	21 (10.0)
Partner's occupation						
Unemployed	200 (90.4)	21 (9.6)	151 (67.7)	72 (32.3)	106 (70.2)	45 (29.8)
Unskilled manual ^a	521 (86.3)	83 (13.7)	380 (63.0)	224 (37.0)	318 (83.7)	62 (16.1)
Skilled manual ^b	977 (96.7)	33 (3.3)	880 (86.9)	132 (13.1)	721 (82.0)	158 (18.0)
Professional ^c	205 (97.6)	5 (2.4)	196 (92.9)	15 (7.1)	166 (84.7)	30 (15.3)
Place of residence						
Rural	2222 (93.4)	157 (6.4)	1746 (73.2)	638 (16.8)	1404 (80.5)	339 (19.5)
Urban	1583 (97.0)	50 (3.0)	1531 (93.6)	105 (6.4)	1282 (83.8)	248 (16.2)
Wealth index						
Poor	1409 (91.7)	128 (8.3)	1018 (66.1)	522 (33.9)	776 (76.5)	239 (23.5)
Middle	970 (95.5)	45 (4.5)	874 (85.8)	144 (14.2)	718 (81.8)	156 (18.2)
Rich	1426 (97.7)	34 (2.3)	1385 (94.7)	77 (5.3)	1192 (86.2)	192 (13.8)

^a Agric. Self-employed, household & domestic unskilled manual

^b Clerical, sales, services, skilled manual

^c Professional, technician management

Socio-economic predictors of maternal healthcare utilization

Table 2 represents findings from the multivariate logistic regression analyses examining the association between socio-economic and other explanatory factors and maternal health care utilization.

Prenatal care

Women with no education [odds ratio (OR) = 0.15; 95% confidence interval CI: 0.08, 0.28] and women in poor households (as indicated by wealth index) (OR=0.40; 95% CI: 0.20, 0.81) were less likely to use prenatal care by professional healthcare workers compared to women who had secondary or higher education and women in rich households, respectively.

Table 2: Logistic regression analysis

Characteristics	Prenatal care	Place of delivery	Postnatal care
	OR (95 % CI)	OR (95% CI)	OR (95% CI)
Women's age (group)			
15-24	0.61 (0.36, 1.03)	1.06 (0.73, 1.53)	0.65 (0.44, 0.95)
25-34	1.16 (0.72, 1.86)	0.99 (0.74, 1.36)	0.89 (0.65, 1.23)
≥35	1.00	1.00	1.00
Marital status			
Single	0.70 (0.46, 1.07)	0.70 (0.53, 0.92)	0.66 (0.48, 0.89)
Married	1.00	1.00	1.00
Women's education			
Illiterate	0.15 (0.08, 0.28)	0.20 (0.13, 0.31)	0.75 (0.44, 1.23)
Primary school	0.57 (0.31, 1.02)	0.53 (0.38, 0.75)	0.81 (0.57, 1.14)
Secondary/high school	1.00	1.00	1.00
Partner's education			
Illiterate	0.71 (0.40, 1.27)	0.65 (0.45, 0.95)	0.58 (0.38, 0.87)
Primary school	1.22 (0.66, 2.22)	0.61 (0.43, 0.86)	0.95 (0.65, 1.37)
Secondary/high school	1.00	1.00	1.00
Women's occupation			
Unemployed	No data	0.35 (0.10, 1.20)	0.55 (0.26, 1.18)
Unskilled manual ^a	No data	0.34 (0.09, 1.18)	0.66 (0.28, 1.55)
Skilled manual ^b	No data	0.33 (0.10, 1.15)	0.54 (0.26, 1.15)
Professional ^c	1.00	1.00	1.00
Partner's occupation			
Unemployed	1.33 (0.43, 4.08)	0.75 (0.36, 1.56)	0.86 (0.46, 1.62)
Unskilled manual ^a	0.88 (0.31, 2.51)	0.73 (0.37, 1.44)	1.76 (0.98, 3.17)
Skilled manual ^b	2.16 (0.77, 6.07)	1.30 (0.67, 2.53)	1.26 (0.77, 2.08)
Professional ^c	1.00	1.00	1.00
Place of residence			
Rural	0.76 (0.43, 1.36)	0.43 (0.29, 0.63)	1.47 (1.03, 2.12)
Urban	1.00	1.00	1.00
Wealth index			
Poor	0.40 (0.20, 0.81)	0.29 (0.19, 0.45)	0.41 (0.26, 0.64)
Middle	0.83 (0.40, 1.70)	0.67 (0.42, 1.05)	0.65 (0.44, 0.96)
Rich	1.00	1.00	1.00

^a Agric. Self-employed, household & domestic unskilled manual

^b Clerical, sales, services, skilled manual

^c Professional, technician management

Postnatal care

Rural residence (OR=1.47; 95% CI: 1.03, 2.12) increased the likelihood of women having access to postnatal care compared to urban residence; conversely, women in poor (OR=0.41; 95% CI: 0.26, 0.64), and middle class (OR=0.65; 95% CI: 0.44, 0.96) households, women whose partners had no education (OR=0.58; 95% CI: 0.38, 0.87), single women (OR=0.66; 95% CI: 0.48, 0.89), and women aged 15-25 years (OR=0.65; 95% CI: 0.44, 0.95) were less likely to access postnatal care than those in the reference groups.

Delivery care

Women with no education (OR=0.20; 95% CI: 0.13, 0.31), and primary education (OR=0.53; 95% CI: 0.38, 0.75), as well as women whose partners had no education (OR=0.65; 95% CI: 0.45, 0.95), and only primary education (OR=0.61; 95% CI: 0.43, 0.86) had a lower likelihood of having delivery care in hospital by skilled attendance, compared to their counterparts with secondary or higher education. Residence in rural areas (OR=0.43; 95% CI: 0.29, 0.63) decreased the likelihood of women giving birth in a hospital by skilled attendance than residence in urban areas. Poor women (OR=0.29; 95% CI: 0.19, 0.45) were less likely to deliver in a hospital attended by skilled attendance, compared to rich women, and single women (OR=0.70; 95% CI: 0.53, 0.92) were less likely to have delivery care in hospital by skilled attendance than women who were married.

Discussion

This study examined the association between socio-economic and other factors, conceptualized as predisposing and enabling factors, and the utilization of maternal health care services in the form of prenatal care, place of delivery, and postnatal care. The results from both univariate and multivariate analyses confirmed the influence of education, wealth index, marital status and place of residence on the utilization of health care services. These findings provide

support for our hypothesis that women with higher SEP will have better access to maternal health services.

The findings regarding the significant influence of higher education level on women's use of maternal health services are consistent with those from other previous studies^{14,15,17,18}. Education exerts effect on health-seeking behavior through a number of pathways,¹⁹ among which include being associated with a better state of preventive health, greater knowledge and information in accessing the health care services and availability of maternal health care services, thereby increasing the probability that women would make critical choices regarding the availability and quality of service provided by health institutions^{20,21}. In addition, women whose husbands are educated tend to support the women's access to healthcare services, especially during the period associated with delivery; this increases the women's probability of getting maternal care. Education may also increase self-confidence and knowledge, and reduces the gap between service providers and clients²².

The finding of a negative association between rural residence and access to institutional delivery is consistent with existing literature²³, and may be due to longer travelling distances and time to delivery centers, costs of reproductive health care services for rural women, often fewer health care facilities, and a general lack of skilled health care worker. In addition, urban residence tends to confer an advantage with regards to access to maternal health care, as well as the tendency of women resident in rural settings to be less educated and of lower SEP that may further limit their access to health care. Our finding of a higher likelihood of postnatal care amongst women resident in rural areas may be the resulting effect of prenatal care attendance, given prenatal care attendance and adequate counselling of mothers previously been associated with postnatal care attendance, and is consistent with previous findings²⁴.

We also found that SEP in the form of household wealth index is a significant predictor of maternal health services, with women in poorer households being less likely to receive services in all three indicators. Our findings are consistent with those in previous studies^{23,25}, and may be associated with the high proportion of poorer households compared to richer households borrowing and selling assets to cope with medical bills^{26,27}. In addition to being indicative of the ability to pay for services^{26,27}, better wealth status may also reflect a greater use the public facilities more than the poor for child delivery²⁷.

Our findings regarding the lower likelihood of single women to receive institutionalized delivery and postnatal care than married women are consistent with previous findings¹⁴. Plausible reasons include the possibility of access to dual incomes for married women, which could increase in total assets and affordability of maternal health care services. That women aged 15-24 years were significantly less likely to use postnatal care than women aged 25-34 years and 35 years or older is a finding that corroborates those from other studies^{28,29}. Some however did not show such differences³⁰.

Our results have some policy implications based on our findings. This study particularly identifies inequality in maternal level of education as the major driver of inequities in prenatal care and delivery by trained health providers; thus, healthcare programs need to explore effective ways to improve services for lower educated and poor women who are

less likely to use these services so as to narrow inequities in the use of prenatal care, and delivery services by skilled health providers. It may be difficult in the current study to provide adequate explanations for the contrasting varying effect of rural-urban residence on inequalities in delivery, and postnatal care by skilled attendants. The lower used of delivery care by skilled attendants may partly be explained by the "urban-bias" i.e. increased availability of delivery care by skilled attendants compared to rural areas. This may not be unconnected with the higher concentration of the economically better-off and the better educated individuals in urban areas. In contrast, access to postnatal care was in favor of rural areas, and as previously stated, may be linked to the increased sensitization of rural women who may have attended prenatal care. Thus, there is a need to attain a better understanding of the mechanisms that influence uptake of maternal health services, and to take equity-promoting enhancing measures accordingly. This study had some strengths and limitations worthy of mention. The strengths of the current study include: the use of a national survey data, a relatively large sample size with a high response rate (95%)⁷, and the generalizability of the findings to the entire country and with other countries since the demographic and health surveys are internationally validated and nationally adapted surveys.

The limitations of the current study however include: the cross-sectional nature of survey limits the ability to draw any causal inferences. This study was based on self-reports by respondents, and provided no validation of information with other objective sources, which can affect the validity and reliability of the data. Despite the concern of the validity of self-reports, it is logical to assume that biases are less likely in maternal health care events as compared to other sensitive issues such as sexual behavior and drug abuse. Data were collected retrospectively from respondents, which may have resulted in recall bias; however, this bias is not considered problematic since this study included only women giving birth within five years preceding the survey.

Conclusions

Education, wealth index, marital status and place of residence were consistently strong predictors and impact on the use of all three indicators of maternal health services - antenatal, delivery and postnatal care by skilled attendants. There is a need to take measures that effectively increase maternal service utilization among low educated and poor women, especially in rural areas, who are less likely to use maternal health services.

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Conflict of interest statement

The authors declare that they have no conflict of interest in the undertaking of this research.

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