



Effect of Socioeconomic Factors on the Choice of Health care Institutions for Delivery Care

Sohail Akhtar^{1,2*}, Zafar Ahmed^{1,3}, Kesavan Sreekantan Nair⁴, Yasir Hayat Mughal⁴, Asim Mehmood⁵, Wajiha Rehman⁵, Sumaira Idrees⁵

¹Department of Community Medicine and Public Health, Faculty of Medicine and Health Sciences UNIMAS, Universiti Malaysia Sarawak, Kota Samarahan, Malaysia; ²Department of Health Informatics, College of Public Health and Health Informatics, Qassim University, Al Bukayriyah, Saudi Arabia; ³Department of Social Work, Education and Community Wellbeing, Northumbria University, Newcastle upon Tyne, United Kingdom; ⁴Department of Health Administration, College of Public Health and Health Informatics, Qassim University, Al Bukayriyah, Saudi Arabia; ⁵Department of Health Informatics, Faculty of Public Health and Tropical Medicine, Jazan University, Jizan, Saudi Arabia

Abstract

BACKGROUND: During the past two decades, Pakistan witnessed a significant progress in maternal health outcomes. However, there exist persistent urban-rural and socioeconomic inequalities in access and utilization of maternal health-care services across the country.

AIM: The objective of this research was to assess the significant socioeconomic factors influencing the choice of health care institutions for delivery care.

METHODS: This was a cross-sectional study conducted in Rajan Pur, a predominantly rural district in Punjab province. Using a multi-stage random sampling technique, 368 mothers who had childbirths from October 1 to December 31, 2020 in different health care institutions were interviewed. Data for the study were collected through a validated study instrument used by earlier studies on maternal health-care utilization.

RESULTS: The results of logistic regression analysis showed that use of public health-care facilities for delivery care increases with increasing maternal education, monthly household income, and distance to health-care facilities.

CONCLUSION: The findings and recommendations drawn from the research would provide some insights to health policymakers and planners in developing an integrated and viable maternal health-care program in Pakistan.

Edited by: Sasho Stoleski

Citation: Akhtar S, Ahmed Z, Nair KS, Mughal YH, Mehmood A, Rehman W, Idrees S. Effect of Socioeconomic Factors on the Choice of Health care Institutions for Delivery Care. Open Access Maced J Med Sci. 2022 Sep 02; 10(E):1571-1581. https://doi.org/10.3889/oamjms.2022.10394

Keywords: Delivery care; Out-of-pocket expenditure; Public sector; Private sector

***Correspondence:** Sohail Akhtar, Faculty of Medicine and Health Sciences UNIMAS, Universiti Malaysia Sarawak, Malaysia. E-mail: drsohailakhtar78@gmail.com

Received: 12-Jun-2022

Revised: 08-08-2022

Accepted: 31-08-2022

Copyright: © 2022 Sohail Akhtar, Zafar Ahmed, Kesavan Sreekantan Nair, Yasir Hayat Mughal, Asim Mehmood, Wajiha Rehman, Sumaira Idrees

Funding: This research did not receive any financial support

Competing Interests: The authors have declared that no competing interests exist

Open Access: This is an open-access article distributed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (CC BY-NC 4.0)

Introduction

The past decade witnessed a significant improvement in maternal health outcomes in Pakistan. Although all provinces in the country have made progress in improving the access to maternal health services, there has been a substantial urban-rural variation in the utilization of maternal health-care services. Maternal health-care system in Pakistan has a blend of both public and private sector providers. In the public sector, maternal health-care services are delivered at different levels of the health-care system [1]. While primary health-care centers deliver basic maternal healthcare, secondary level facilities provide comprehensive services including complicated delivery care, cesarean deliveries, care for new-borns, and advanced resuscitation; and specialists care is delivered by the larger hospitals [1]. The private providers deliver various types of maternal healthcare through smaller clinics and nursing homes. Private

hospitals deliver specialists services, but most of these facilities are concentrated in urban areas and cities, leaving rural populations no choice but to travel to cities to avail these services.

Despite the availability of maternal health-care services free of cost at public health-care facilities, the utilization of these services remains low. This could be due to a lack of availability and accessibility of appropriate maternal health-care services at affordable costs. Moreover, the unavailability of lady doctors in rural areas has been a big hurdle in availing maternal health-care services in the public health-care facilities. These deficiencies in the public health facilities result in increasing dependence on the private health sector for maternal health-care services [2], [3], [4]. Due to non-availability of a health insurance scheme, most of the women had to incur out-of-pocket expenditures on availing maternal healthcare from both public and private health facilities [3], [4]. Evidences show that the choice of health care institutions for maternal care depends on several factors. Earlier studies have shown

that socioeconomic, cultural, demographic, and health systems factors play a significant role in the choice of health care institutions for maternal care. Socioeconomic factors such as age, education, occupation, family income, household size, and distance to health facilities play a paramount role in determining the choice of health care institutions for maternal care, especially delivery care [2], [5]. Apart from these factors, accessibility to maternal care facilities, availability of services, and cost of services also affect the use of maternal health-care services in private or public health facilities.

The objective of this paper was to assess the socioeconomic factors influencing the choice of health care institutions for delivery care in district Rajan Pur. An understanding of the socioeconomic factors determining the choice of health care institutions for delivery care at the individual, household, and community levels may offer some policy responses to health policymakers to ensure access to maternal health-care services to the population. The research findings would add a significant dimension in addressing the barriers and challenges affecting the utilization of maternal health-care services beyond individual and contextual perspectives.

Review of Literature

In the past, various theoretical models have been formulated to determine the variables influencing health-care utilization. Andersen's health service utilization theory assumes that utilization of maternal health-care services can be seen as a kind of personal behavior affected by socioeconomic, demographic, and health-related factors of the women in question [6]. Several pieces of research have shown that the age of women is linked with the choice and utilization of maternal health-care services. Studies have shown that young women are more exposed to education and health awareness and are more likely to use private health-care services than their older counterparts [7]. A recent study in Nepal [8] based on various demographic and health surveys revealed that women with more education delivered at a private health-care facility in all surveys. A study based on national family health surveys in India has shown that women in the lower age groups are more likely to choose the public health-care facility over the private sector for delivery care services [9]. A study in Nepal [10] found no variation in delivery care utilization for mothers over 35 years of age. Another study in Bangladesh also showed that the age of women influenced health-care facility utilization [11].

Several studies have revealed that women's education influences their choice of health-care providers [12], [13], [14], [15], [16]. Women with a low level of education are less expected to seek modern maternal health-care services [17], [18]. It is recognized

that education exposes women to information and improves their understanding of all health-related issues, including reproductive health lifestyle and choice of health-care facilities [19]. Several studies in India including those based on national level surveys revealed that mothers' educational level is positively associated with the delivery care utilization and OOPE in private health sector [9], [20], [21]. A study in Ethiopia showed that the education of women and their spouses positively influenced maternal health-care utilization in private health-care facilities [22]. A study in revealed that the utilization of maternal health services from private healthcare institutions increases with the increasing education level of women, including their socioeconomic status [23]. Another study in Pakistan also showed the impact of mothers' education on the utilization of private hospitals for maternal care, particularly for delivery [24]. It is generally understood that educated mothers have better opportunities to avail maternal care from private health-care facilities due to their higher preferences for educated and wealthier spouses [25], [26]. Tellis *et al.* [27] showed that the years of schooling of mothers and their spouses affect the choice of health-care providers. It is recognized that education improves woman's knowledge and awareness about the quality of health-care services and the use of private health care institutions for delivery care.

The income status of the households represents their capability to afford the OOPE on delivery care. It is assumed that the occupation of the women affects the choice of health-care facilities as women having better occupations have more probability of using the private sector. It is also recognized that working woman is likely to have more knowledge and awareness about access to maternal care, including quality and source of care, and she is likely to prefer private health-care facilities for delivery care. Moreover, working women usually have physical and social mobility; hence, private health-care facilities will be preferred. A study in Pakistan showed that women working in the agriculture sector chose to deliver their babies at a nearby by public health facility, whereas the largest proportion in the service sector preferred private health sector [28]. Studies in India [10] and Kenya [29] showed that women having employment utilized maternal health-care services more frequently than others, and they had updated knowledge about the type and availability of mother and child health services due to more interaction with outside people. In many developing societies, spouses are the nucleus of household's economic activities, and wives are depending on them for existence which is considered as the key barrier to the maternal health-care utilization. Occupation of the husband indicates the level of education and wealth of the family. Women whose husbands were holding high-status jobs had better opportunities to use private health services [7]. Similar findings were reported by studies in Nepal [30]. A study in Pakistan showed that mothers whose spouses were highly educated were more likely to

deliver at a private health care institution, contrary to those whose husbands were not educated [28].

Several studies have shown that economic factors play a significant role in the household's decision to choose health care institutions for maternal care [31], [32], [33]. Kesterton *et al.* [32] revealed that household income influences an individual's choices between health care institutions, and the women from high-income households were more likely to opt for deliveries in private hospitals. Several studies have supported this argument [14], [15]. Studies in India [9], [21], [34], [35], Nepal [8], and Bangladesh [36] showed that higher household income was significantly associated with maternal health-care utilization in private hospitals. A study based on national data from 16 countries in sub-Saharan African, Latin America, and Asia showed that household economic status was the key determinant associated with delivery at private facilities [37]. A recent study based on India's national family health survey showed that the wealth index has a prominent place in making a decision to avail delivery services from the private sector. A study on determinants of the choice of public versus private health care institutions for delivery services for six Asian countries, that is, Bangladesh, Cambodia, India, Indonesia, Nepal, and the Philippines, showed that private-sector delivery care in three out of six countries is influenced by the wealth of the families [2].

The utilization of maternal health care can be influenced by the number of living children in the family. Many studies have observed that mothers with more children are likely to utilize maternal care from the public or private sector. Hollowell *et al.* [38] showed that women's perception of risk is likely to increase during the first pregnancy, and, therefore, they prefer to utilize maternal health care from private hospitals than in later pregnancies. A study in India [39] found that mothers having more children enhanced the decision for institutional delivery in private health sector. A study in China showed that mothers who had more than one child were more likely to go to a private hospital for delivery care [40].

The distance from women's residences to health care institutions can also influence the choice of health care institutions, particularly in rural and remote areas of low-income countries. Findings from countries such as Uganda, Zimbabwe, Vietnam, Thailand, and India have reported that barriers like distance to health-care facilities and availability of transport are the barriers to institutional delivery [39], [41], [42], [43], [44]. Further poor road infrastructure and transportation facilities in a few countries are also challenges for health-care systems to ensure universal access to maternal health care. A study in India [45] showed that long-distance to health-care facilities is one of the factors for the lower use of delivery care in public health care institutions. Studies in Nepal found that distance to healthcare facilities affected the utilization of maternal health-care

services from the public sector [46], [47]. In Pakistan, women living more than 5 km away from health-care facilities were reported to spend a higher amount on transport, and almost 70% of the respondents chose to visit a private facility [48]. Few studies have revealed a negative association between the costs of transport utilization from government health-care facilities. Shreds of evidence from Asian and African countries have shown that transportation cost is one barrier that restricts deliveries in public health-care facilities [39], [41], [42], [43]. Sahoo *et al.* [49] showed that high transportation costs and poor roads were the significant barriers to accessing maternal care from the public health-care facilities. The study found that the cost of transportation is the key barrier faced by about 50% of women in rural areas for institutional delivery.

Material and Methods

Study design and sampling

This was a cross-sectional study conducted in Rajanpur district in Pakistan, which is predominantly a rural district in the province of Punjab. Moreover, the research applied descriptive and analytical techniques. All mothers who had childbirth in health-care facilities (public and private) in the district from October 1, to December 31, 2020 were the population of the study. The sample size for the study was calculated using the formula: $n = z^2pq/d^2$; where $z = 1.96$ at 95% confidence interval, $p = 0.59$ (this is the proportion of institutional delivery in rural areas as per Pakistan Demographic and Health Survey 2017–2018), $q = (1-p) = 0.41$, $d = \text{acceptable error } 5\% = 0.05$. The sample size thus calculated was 368 (approximately).

A multi-stage random sampling technique was followed to select the participants in the study. As a first step, a total number of three BHUs were selected from each of the six Rural Health Centres for this study. Second, the number of mothers who had institutional deliveries in each of the selected BHU areas during 3 months, that is, October 1, – December 31, 2020, was collected from the chief executive officer (Health), Rajan Pur. As per the list, there were 2362 institutional deliveries reported during this period in all the 18 BHUs selected for the study. BHU-wise list of mothers with their names and addresses were collected with the assistance of the LHWs in the concerned BHUs. It was decided to select 25 mothers randomly from the list received from each BHU, making a total number of 450 mothers from 18 BHUs. This was done keeping in view the non-availability of household members or incomplete responses. Interviews were conducted with the selected participants with the assistance of LHWs who were in charge of the selected village areas. Although efforts were made to contact 450 mothers;

however, due to the non-availability of male members in the family and non-cooperation or non-response from the participants; only 408 mothers from were contacted and interviewed. After scrutiny of all data collected through the interview schedules, it was found that 368 interview schedules were fully completed in all respects, and they were used in the analysis yielding a response rate of 82%.

Participants and data collection

Participants of the study included the women residents of the selected BHU area, aged 15–49 years, who had delivered within 3 months, that is, October 1, – December 31, 2020 in a health-care facility in the district and were willing to participate in the study. They should be present at the study area during data collection. Primary data for the study were collected using a locally translated structured interview schedule, which was initially developed in English. The interview schedule was prepared based on the validated study instruments used by earlier studies on maternal health-care utilization in Pakistan [23] and similar studies in other countries [30], [50], [51].

Besides including various questions related to various socioeconomic characteristics of mothers, the interview schedule contained information related to delivery details such as mode of delivery, outcome of delivery, place of delivery, distance to the health-care facility, reasons for seeking care from the private health-care facilities, and perception about public health-care facilities. Socioeconomic characteristics included both individual and family details such as age of mother, education of mother, occupation of mother, occupation of spouse, number of children, monthly household income, distance to health facility, cost of transport, and health insurance status.

Data analysis

Primary data collected through the interview schedule were entered into SPSS software version-25 and were analyzed using qualitative and quantitative techniques. Descriptive statistics were used to summarize respondents' socioeconomic characteristics. To identify significant factors affecting utilization of delivery care at public and private healthcare facilities, the researcher has chosen regression analysis. Regression analysis is used to investigate the influence of predictors over criterion variables. It is applied to know how much variance and unit change occurs in regress and due to regressor variables. There are numerous types of regression, that is, linear regression, multiple regression, step-wise and hierarchical regression, ordinary least square, nominal, and binary logistic regression. According to Field [52], the selection of regression analysis and test mainly depends on the objective of the study and the

nature of the data. Usually, binary logistic regression is used when there are categorical and continuous or a mixture of these variables selected by researchers. If the dependent variables have two categories, then binary logistic regression can be used if there are more than two classes; then, it is called nominal regression.

In this study, it is hypothesized that the choice of health-care facilities (public or private), which is a dependent variable, is affected by a set of independent variables such as the age of mother, education of mother, occupation of mother, occupation of the spouse, family income, number of children, distance to health facility, and cost of transport. The general equation for binary logistic regression is as follows:

$$\ln(\text{ODDS}) = \ln\left(\frac{y}{1-y}\right) = \alpha + \beta X$$

The following regression equation was used as the initial model

$\text{Log}(\text{Place}) = \alpha_0 + \alpha_1 \text{Age of mother} + \alpha_2 \text{Education of mother} + \alpha_3 \text{Occupation of mother} + \alpha_4 \text{Occupation of Spouse} + \alpha_5 \text{Family Income} + \alpha_6 \text{No of children living} + \alpha_7 \text{distance to health facility} + \alpha_8 \text{cost of transport}$.

Different models were run in backward logistic regression to arrive at the optimal model for the choice of delivery care. The definition of variables used in the regression models and values used is shown in Table 1.

Table 1: Definition of variables and values used in regression model

Serial number	Variables	Values
Dependent variables		
1	Where log (place) = Place of the delivery	Public versus private healthcare facility 1 = Public health facility, 0 = Private health facility
Independent variables		
2	Age of mother	1 = < 19, 2 = 20–30, 3 = 31–40, 4 = Above 40 years
3	Education of mother	1 = No schooling, 2 = Primary, 3 = Secondary, 4 = Higher secondary and above
4	Occupation of mother	1 = House wife, 2 = Private job, 3 = Government job
5	Occupation spouse	1 = Daily wage earner, self-employed, 3 = Private job, 4 = Government job,
6	Family income (PKR)	1 = < 10,000, 2 = 10,000–20,000, 3 = 20,000–40,000 4 = 40,000 and above
7	Number of children	1 = 1–3, 2 = 4–6, 3 = 7–10, 4 = above 10
8	Distance to health facility	1 = Below 10 km, 2 = 10–20 km, 3 = 20–30 km, 4 = 30–40 km, 5 = 40 and above
9	Cost of transport (PKR)	1 = Below 1000, 2 = 1000–2000, 3 = 2000–3000, 4 = 3000 and above

Ethical approval

The ethical approval for this study was obtained from the Medical Ethics Committee, Faculty of Medicine and Health Sciences, UNIMAS. Further, a consent statement was either submitted or read to the participants before the commencement of the data collection process. The participants were assured that the data collected through the study instrument would be used only for academic purposes, and in no way would their privacy be affected.

Findings

Socioeconomic characteristics

The study showed that the mean age of mothers was approximately 28.3 years, with more than 60% of them between 20 and 30 years' age group. Of them, 59.5% did not have any schooling, 16% had primary schooling, 16.57% had secondary level schooling, and 7.88% had higher secondary and above qualification. A majority of mothers who participated in the study (85.6%) were housewives, 7.8% of them were working in the government or private sector, 3.8% were contract wage earners, and 2.7% were self-employed. The household income of the respondents revealed that almost 54% of them had lower than 10000 PKR, 32.34% had a monthly household income more in between 10001 and 30000 PKR and 13.32% had monthly household income more than 30000 PKR (Table 2). As a majority of mothers were housewives, most of the families had to depend on salaries of their spouses.

Table 2: Socioeconomic characteristics of mothers (n = 368)

Variables	n (%)
Age group of women	
Below 25 years	141 (38.31)
26–35 years	174 (47.28)
36 years and above	53 (14.40)
Education of Women	
No formal education	219 (59.51)
Primary level	59 (16.03)
Secondary level	61 (16.57)
Higher secondary and above	29 (7.88)
Occupation of women	
Housewife	315 (85.60)
Working (government and private)	29 (7.88)
Daily wage earners	14 (3.80)
Self employed	10 (2.72)
Monthly household income (PKR)	
Below 10,000	200 (54.34)
Between 100,001 and 30,000	119 (32.34)
Between 300,001 and 60,000	49 (13.32)

Determinants of the choice of health-care facilities

In this study, four models were run in backward logistic regression to arrive at the optimal model for the choice of health care institutions for delivery care. Detailed results of the models are discussed in the following sections.

Backward logistic regression for delivery care

Model-1

Log (Place) = $\alpha_0 + \alpha_1$ Age of mother + α_2 Education of mother + α_3 Occupation of mother + α_4 Occupation of Spouse + α_5 Family income + α_6 No of children living + α_7 distance to health facility + α_8 cost of transport (1)

In Model 1, variables such as age of mother, education of mother, occupation of mother and spouse,

family income, number of children living, distance to health facility, and cost of transport are included in the study. The omnibus coefficients provided us with Chi-square of 65.139, $p < 0.05$, $-2 \log$ likelihood Model 1 = 390.446 with $R^2 = 0.230$, provided that all predictors explained variance on place of delivery, that is, selection of health-care facility up to 23% (Table 3).

Model-2

Log (Place) = $\alpha_0 + \alpha_1$ Education of mother + α_2 Occupation of mother + α_3 Occupation of Spouse + α_4 Family Income + α_5 No of children living + α_6 distance to health facility + α_7 cost of transport (2)

In Model 2, age of mother was excluded because of highest insignificant p value, while education of mother, occupation of mother and spouse, family income, number of children living, distance to health facility, and cost of transport are included in the study. The omnibus coefficients provided us with Chi-square of 65.118, $p < 0.05$, $-2 \log$ likelihood Model 2 = 390.467 with $R^2 = 0.230$, showing that that all predictors explained variance on place of delivery, that is, selection of healthcare facility up to 23% (Table 4).

G statistics = ($-2 \log$ likelihood of Model 1) - ($-2 \log$ likelihood of Model 2)
(390.446–390.467) = -0.021

Model-3

Log (Place) = $\alpha_0 + \alpha_1$ Education of mother + α_2 Occupation of mother + α_3 Family Income + α_4 No of children living + α_5 distance to health facility + α_6 cost of transport (3)

In Model 3, occupations of head were excluded because of highest insignificant p value, while education of mother, occupation of mother, family income, number of children living, distance to health facility, and cost of transport are added. The omnibus coefficients provided us with Chi-square of 64.425, $p < 0.05$, $-2 \log$ likelihood Model 3 = 391.161 with $R^2 = 0.228$, provided that all predictors explained variance on place of delivery, that is, selection of health-care facility up to 22.8% (Table 5).

G statistics = ($-2 \log$ likelihood of Model 2) - ($-2 \log$ likelihood of Model 3)
(390.467–391.161) = -0.694

Model-4

Log (Place) = $\alpha_0 + \alpha_1$ Education of mother + α_2 Family Income + α_3 No of children living + α_4 distance to health facility + α_6 cost of transport (4)

In Model 4, occupation of mother was excluded because of highest insignificant p value, while education of mother, family income, number of children living, distance to health facility, and cost of transport are included in the study. The omnibus coefficients provided with Chi-square of 63.148, $p < 0.05$, $-2 \log$ likelihood Model 4 = 392.438 with $R^2 = 0.224$, provided that all predictors explained variance on place of delivery, that is, selection of health-care facility up to 22.4% (Table 6).

G statistics = $(-2 \log$ likelihood of Model 3- $(-2 \log$ likelihood of Model 4) $(391.161-392.438) = -1.277$

Four models were produced by backward logistic regression. In the first model, age of mother was found to be highly insignificant in determining the choice of health care institutions, and, therefore,

this variable was excluded in Model 2. In Model 2, occupation of spouse was found to be insignificant and so it was excluded in Model 3. Analysis of results in Model 3 revealed that job of mother was found to be an insignificant factor in determining the choice of health care institutions for delivery care and, therefore, excluded in model 4.

Further analysis of Model 4 shows that it is a best fit optimal model for factors determining the choice of health care institutions for delivery care. The statistic details are: Education of mother $\beta = 0.367$, $p < 0.05$, odd ratio 1.444, family income $\beta = 0.200$, $p < 0.05$, odd ratio=1.222; moreover, number of children $\beta = -0.206$, $p < 0.05$, odd ratio = 0.814, distance to health facility $\beta = 0.553$, $p < 0.05$ odd ratio = 1.407, and cost of transport $\beta = 0.000$, 0.05, odd ratio = 1.000 are found

Table 3 : Results of backward logistic regression analysis for delivery care (Model - 1)

Variables	Age of mother	Education of mother	Occupation of mother	Occupation of spouse	Family income	Number of children	Distance to health facility	Cost of transport	Constant
B^a	0.02	0.35	0.13	0.07	0.18	-0.23	0.57	0.00	-2.97
SE	0.12	0.12	0.12	0.09	0.10	0.11	0.11	0.00	0.74
Wald	0.02	8.23	1.31	0.70	3.24	4.37	26.7	6.03	16.0
Df	1	1	1	1	1	1	1	1	1
Significance ^d	0.88	0.00	0.25	0.40	0.07	0.04	0.00	0.01	0.00
Exp (B)	1.02	1.42	1.14	1.08	1.20	0.79	1.77	1.00	0.05
Upper ^e	0.80	1.12	0.91	0.91	0.98	0.64	1.43	1.00	
Lower ^f	1.29	1.81	1.43	1.28	1.47	0.99	2.20	1.00	
Omnibus				65.1					
$-2 \log$ likelihood				390					
R^2				0.23					

^aBeta coefficient, ^bSignificance level, ^cUpper limit of 95% CI for EXP (B), ^dLower limit of 95% CI for EXP (B) and ^e R^2 coefficient of regression. SE: Standard error, df: Degree of freedom, CI: Confidence interval.

Table 4: Results of backward logistic regression analysis for delivery care (Model-2)

Variables	Education of mother	Occupation of mother	Occupation of spouse	Family income	Number of children	Distance to health facility	Cost of transport	Constant
B^a	0.02	0.35	0.13	0.07	0.18	-0.23	0.57	0.00
SE	0.12	0.12	0.12	0.09	0.10	0.11	0.11	0.00
Wald	0.02	8.23	1.31	0.70	3.24	4.37	26.7	6.03
Df	1	1	1	1	1	1	1	1
Significance ^d	0.88	0.00	0.25	0.40	0.07	0.04	0.00	0.01
Exp (B)	1.02	1.42	1.14	1.08	1.20	0.79	1.77	1.00
Upper ^e	0.80	1.12	0.91	0.91	0.98	0.64	1.43	1.00
Lower ^f	1.29	1.81	1.43	1.28	1.47	0.99	2.20	1.00
Omnibus				65.1				
$-2 \log$ likelihood				390				
R^2				0.23				

^aBeta coefficient, ^bSignificance level, ^cUpper limit of 95% CI for EXP (B), ^dLower limit of 95% CI for EXP (B), and ^e R^2 coefficient of regression. SE: Standard error, df: Degree of freedom, CI: Confidence interval.

Table 5: Results of backward logistic regression analysis for delivery care (Model-3)

Variables	Education of mother	Occupation of mother	Family income	Number of children	Distance to health facility	Cost of transport	Constant
B^a	0.35	0.13	0.18	-0.22	0.57	0.00	-2.51
SE	0.12	0.11	0.10	0.09	0.11	0.00	0.47
Wald	8.04	1.32	3.32	5.53	26.7	5.98	29.0
Df	1	1	1	1	1	1	1
Significance ^d	0.01	0.25	0.07	0.02	0.00	0.01	0.00
Exp (B)	1.42	1.14	1.20	0.80	1.76	1.00	0.08
Upper ^e	1.11	0.91	0.99	0.67	1.42	1.00	
Lower ^f	1.80	1.42	1.47	0.96	2.19	1.00	
Omnibus				64.4			
$-2 \log$ likelihood				391			
R^2				0.23			

^aBeta coefficient, ^bSignificance level, ^cUpper limit of 95% CI for EXP (B), ^dLower limit of 95% CI for EXP (B) and ^e R^2 coefficient of regression. SE: Standard error, df: Degree of freedom, CI: Confidence interval.

Table 6: Results of backward logistic regression analysis for delivery care (Model-4)

Variables	Education of mother	Family income	Number of children	Distance to health facility	Cost of transport	Constant
B^a	0.37	0.20	-0.21	0.55	0.00	-2.41
SE	0.12	0.10	0.09	0.11	0.00	0.46
Wald	9.20	4.01	4.93	26.3	5.67	27.8
Df	1	1	1	1	1	1
Significance ^d	0.00	0.05	0.03	0.00	0.02	0.00
Exp (B)	1.44	1.22	0.81	1.74	1.00	0.09
Upper ^e	1.14	1.00	0.68	1.41	1.00	
Lower ^f	1.83	1.49	0.98	2.15	1.00	
Omnibus		63.1				
$-2 \log$ likelihood		392				
R^2		0.22				

^aBeta coefficient, ^bSignificance level, ^cUpper limit of 95% CI for EXP (B), ^dLower limit of 95% CI for EXP (B) and ^e R^2 coefficient of regression. SE: Standard error, df: Degree of freedom, CI: Confidence interval.

significant in determining the choice of health care institutions for delivery care. All predictors explained variance on place of delivery, that is, choice of health-care facility for delivery care up to 22.4%.

Discussion

The findings reveal that almost 60% of mothers who participated in the study did not have any schooling, and 60% were young within the age group of 20–30 years. More than four-fifths of mothers who participated in the study were housewives, which shows the lower rate of female work participation in the district. Almost 50% of the families had an average monthly family income up to PKR 10,000, which could be due to low economic contributions from female workforce. While 79.3% of mothers had normal deliveries, the rest of the mothers had cesarean deliveries (20.6%). Of the 368 mothers, 247 (67.12%) opted for delivery care in public health-care facilities and among them, 9.3% of deliveries were conducted through cesarean sections.

Some of the findings of backward logistic regression analysis in Table 5 are in accordance with the theoretical implications. Model 4 in the analysis (which is the best fit model) shows that socioeconomic factors such as the mother's educational status, family income, number of children, distance to a health-care facility, and transport cost are related to the present study's assumptions. Together, these variables explain a 22.4% variation in dependent variables regarding the choice of public versus private health-care facilities for delivery care. However, many other factors which are not included in the present study, including several supply-side factors, may play significant role in choosing a health-care facility for delivery care.

The results of the analysis show that the educational level of mothers positively influences the choice of public health-care facilities for delivery care. This means that women with more years of schooling are 1.4 times more likely to choose public health-care facilities for delivery care. It is noted that except for a few private clinics, a well-developed private health-care sector is not present in the district. Therefore, educated and working women may seek maternal health care in larger government hospitals, where comprehensive maternal health-care services are available. Several studies have pointed out that mothers' educational qualification influences their choice of care providers [12], [14], [15], [16], [53]. However, the present study finding is in contrast to earlier studies. Pomeroy *et al.* [37] concluded that mothers' education positively influences the utilization of private health-care facilities for delivery care in eight developing countries such as Bangladesh, Indonesia, Nepal, Philippines, Mali, Zambia, Rwanda, and Bolivia.

Studies in India have shown that a high educational level is a significant predictor of choosing a private hospital for delivery care [20], [54]. Similar studies conducted in Pakistan showed that preference to private health-care facilities for delivery care increases with increasing mothers' education [23], [24]. This study also showed that a woman's educational status enhances her awareness about the quality of health-care services and improves quality consciousness, making them use the best available maternal care services in the district. Rajan Pur is a predominantly rural district and there has been a lack of private health-care facilities delivering comprehensive maternal health-care services. Although individual clinics are present, the district does not have nursing homes with specialist doctors. Therefore, educated women may like to seek delivery care in a district hospital funded and managed by the government, which has all facilities to provide comprehensive maternal health-care services.

Family income is an essential factor in determining the choice of public versus private health-care facilities for delivery care. Our study shows that use of public health-care facility for delivery care is positively related to family income. This means that women in the higher family income group are 1.2 times more likely to choose a public health-care facility for delivery care. This finding is supported by an earlier study [55] in Vietnam, which showed that increased access to public health-care services was associated with an increased likelihood of deliveries in public hospitals by women. Das *et al.* [34] showed that most women in rural Nepal preferred public health-care facilities for delivery care regardless of their wealth position. However, this finding contradicts many other studies that explain that high-income category households consider maternal health care delivered at government health-care facilities as an inferior good with low quality of care, and low-income status restricts women's access to delivery care in private health care institutions. One can infer that the economic status of households dramatically influences the choice of public versus private health facilities for delivery care. A systematic review by Banke-Thomas *et al.* [56] in low and middle-income countries has shown that economic factors were the significant factors influencing the utilization of maternal health services. Many studies have found that women from the wealthiest households are more likely to choose private hospitals to deliver care [8], [48], [57].

In many developing societies, spouses are the nucleus of household's economic activities, and wives are depending on them for existence which is considered as the key barrier to the maternal health-care utilization. In such societies, the empowerment of women with more control on economic decisions at the household level can increase control on utilizing modern maternal health services. It is considered that women who have economic independence are more aware of maternal health services due to

increased interaction with their colleagues and the public [10]. A study in Kenya reported that women having employment utilized maternal health services more frequently than others, and they had updated knowledge about the type and availability of mother and child health services due to more interaction with outside people [29]. However, studies have also shown that mother's occupation is not always associated with the more use of maternal health services because, in developing countries, women employment is mostly associated with poverty, with women at home were quite well off than the women at work [10]. A study in Pakistan showed that women working in the agriculture sector had the lowest percentage (27%) of those who chose to deliver their babies at a health facility, whereas the largest proportion (54%) belonged to the women who served in the service sector [28].

The number of children or number of previous pregnancies by the women may affect the choice of health-care facilities for delivery care. The present study shows that the choice of public health care institutions for delivery care is negatively related to the number of children in the family. It means that women having more children or previous pregnancies are likely to choose private health-care facilities for delivery care or have 19% lower chances of selecting a public health care institution for delivery care. With more pregnancies, women may have chances of complications and prefer private health-care facilities due to better quality services, including the availability of female doctors. Bhattacharjee *et al.* [39] found that mothers having more children enhanced the utilization of institutional delivery care utilization in private health-care facilities. A study in China [40] showed that mothers who had more than one child were more likely to go to a private hospital for delivery care. Contrary to this finding, Hollowell *et al.* [38] concluded that in a first pregnancy, perception of risk increased the utilization of maternal health services in private health-care facilities than in later pregnancies.

Distance from home to the health-care facility is an essential factor influencing the choice of health care institutions for delivery care. The results indicate that the higher the distance to a health facility, the higher the likelihood of families choosing public health-care facilities for delivery care. The odd ratio corresponding to this variable indicates that women whose residence is far from health-care facilities are 1.7 times more likely to choose a public health care institution for delivery. The mothers living farther from the health-care facilities had greater odds of choosing public health-care facilities for delivery care, which may be due to the availability of ambulance facilities arranged by the government in the district. Moreover, the women prefer to visit the district hospital, which has all facilities of comprehensive maternal health-care services.

Findings from countries such as Vietnam, Zimbabwe, Uganda, India, and Thailand have shown that the location, and distance to health-care facilities are often observed to influence the utilization of maternal health-care services [41], [42], [43], [44]. A recent study in Nigeria showed that distance to health-care facility and availability of an efficient transport system is significant factors affecting mother's decision to choose a health-care facility for emergency obstetric care [58]. Thus, the study presented an opportunity for the public health-care system to set up emergency transport facilities for women seeking maternal health care from the public health-care facilities. To improve access to health-care facilities, it is also significant to build an effective referral linkage between different levels of health-care facilities through an efficient transport system.

There are certain limitations to this research. First, this research was conducted among the women living in Rajan Pur district of Pakistan, which is predominantly a rural district and therefore, the findings of this study cannot be generalized as a whole. Second, while performing the logistic regression analysis for the choice of health care institutions for delivery care, the study considered only the socioeconomic factors. However, the choice of health care institutions is affected by both supply-side and demand-side factors. Supply-side factors may include availability of health-care providers, medicines, diagnostic facilities, quality of care; and demand-side factors such as culture, customs, and community health awareness. These factors were not considered in this research. More research is required on multiple factors influencing the choice of health care institutions for maternal care. The future researches should focus on both supply-side and demand-side factors influencing the choice of health care institutions for antenatal, delivery, and postnatal care.

Conclusion

The choice of health care institutions for maternal health care involves the interplay of many factors. The objective of this research was to assess the socioeconomic factors influencing the choice of health care institutions for delivery care. The study showed that the choice of public health-care facilities for delivery care is positively influenced by maternal education, monthly household income, and distance to health-care facilities. This implies that woman's education enhances her awareness of health-care services and improves quality consciousness, making her use the district's best available maternal care services in the public sector. The research findings would add a significant dimension to addressing the

socioeconomic barriers and challenges affecting the utilization of maternal health-care services beyond individual and contextual perspectives. Although the study has certain limitations, the findings of the research would provide some direction for interventions aimed at scaling up the existing maternal health-care programs at the district level. Finally, the findings and recommendations drawn from the research would provide some insights to health policymakers and planners in developing an integrated and viable maternal health-care program in Pakistan.

References

1. Ansari M, Manzoor R, Siddiqui N, Ahmed A. Access to comprehensive emergency obstetric and newborn care facilities in three rural districts of Sindh province, Pakistan. *Health Res Policy Syst.* 2015;13(S1):55. <https://doi.org/10.1186/s12961-015-0042-7>
2. Pomeroy AM, Koblinsky M, Alva S. Who gives birth in private facilities in Asia? A look at six countries. *Health Policy Plan.* 2014;29(Suppl 1):i38-47.
3. Pakistan Bureau of Statistics PBS. Pakistan: Pakistan Bureau of Statistics PBS; 2018. Available from: <https://www.pbs.gov.pk/content/population-census> [Last accessed on 2022 Apr 15].
4. Rehman A, Adnan M, Mahmood H, Hassan M, Humayun A. Maternal health care expenditure among women in rural areas of Pakistan. *Ann King Edward Med Univ.* 2017. <https://doi.org/10.21649/akemu.v23i2.1587>
5. Riaz A, Zaidi S, Khowaja AS. Perceived barriers to utilizing maternal and neonatal health services in contracted-out versus government-managed health facilities in the rural districts of Pakistan. *Int J Health Policy Manage.* 2015;4(5):279-84.
6. Andersen RM. Revisiting the behavioral model and access to medical care: Does it matter? *J Health Soc Behav.* 1995;36(1):1-10. PMID:7738325
7. Daniel A, Meleko A, Bekele Y, Sileshi S, Setegn M, Ginbeto T, et al. Institutional delivery service utilization and its associated factors among women who gave birth during the past one year in Mizan Aman City administration, Bench Maji Zone, South West Ethiopia, 2017. *Ann Med Health Sci Res.* 2018;8:54-61.
8. Adhikari RP, Shrestha ML, Satinsky EN, Upadhaya N. Trends in and determinants of visiting private health facilities for maternal and child health care in Nepal: Comparison of three Nepal demographic health surveys, 2006, 2011, and 2016. *BMC Pregnancy Childbirth.* 2021;21(1):1. <https://doi.org/10.1186/s12884-020-03485-8> PMID:33388035
9. Thakur B, Kar S, Pathak M, Thakur N. Public-private share in maternal health care services utilization in India: A multinomial logistic regression analysis from three consecutive survey data. *Clin Epidemiol Global Health.* 2019;7(1):22-8. <https://doi.org/10.1016/j.cegh.2017.12.003>
10. Sharma SK, Sawangdee Y, Sirirassamee B. Access to health: Women's status and utilization of maternal health services in Nepal. *J Biosoc Sci.* 2007;39(5):671-92. <https://doi.org/10.1017/S0021932007001952> PMID:17359562
11. Paul BK, Rumsey DJ. Utilization of health facilities and trained birth attendants for childbirth in rural Bangladesh: An empirical study. *Soc Sci Med.* 2002;54(12):1755-65. [https://doi.org/10.1016/s0277-9536\(01\)00148-4](https://doi.org/10.1016/s0277-9536(01)00148-4) PMID:12113433
12. You W, Boyle KJ. Delivery at Home Versus Delivery at a Health Care Facility: A Case Study of Bihar, India. Annual Meeting, Seattle, Washington; 2012. Available from: https://www.ageconsearch.tind.io/bitstream/124625/2/KYK_AAEA_2012.pdf [Last accessed on 2022 May 01].
13. Smith ME, Tawiah EO, Badasu DM. Why some women deliver in health institutions and others do not: A cross sectional study of married women in Ghana, 2008. *Afr J Reprod Health.* 2012;16(3):36-47. PMID:23437498
14. Mehari AM. Levels and Determinants of Use of Institutional Delivery Care Services among Women of Childbearing Age in Ethiopia: Analysis of EDHS 2000 and 2005 Data; 2013. Available from: <https://www.dhsprogram.com/pubs/pdf/WP83/WP83.pdf> [Last accessed on 2022 May 05].
15. Hagos S, Shaweno D, Assegid M, Mekonnen A, Afework MF, Ahmed S. Utilization of institutional delivery service at Wukro and Butajera districts in the Northern and South Central Ethiopia. *BMC Pregnancy and Childbirth.* 2014;14(1):178. <https://doi.org/10.1186/1471-2393-14-178> PMID:24886375
16. Paneru D. Pattern of institutional delivery in Dadeldhura district of Nepal: A cross-sectional study. *J Sci Soc.* 2014;41(2):94-100.
17. El Shiekh B, Van der Kwaak A. Factors influencing the utilization of maternal health care services by nomads in Sudan. *Pastoralism.* 2015;5:23. <https://doi.org/10.1186/s13570-015-0041-x>
18. Hazarika I. Factors that determine the use of skilled care during delivery in India: Implications for achievement of MDG-5 targets. *Matern Child Health J.* 2010;15(8):1381-8. <https://doi.org/10.1007/s10995-010-0687-3> PMID:20859759
19. Singh PK, Rai RK, Alagarajan M, Singh L. Determinants of maternity care services utilization among married adolescents in rural India. *PLoS One.* 2012;7(2):e31666. <https://doi.org/10.1371/journal.pone.0031666> PMID:22355386
20. Govil D, Purohit N, Gupta SD, Mohanty SK. Out-of-pocket expenditure on prenatal and natal care post Janani Suraksha Yojana: A case from Rajasthan, India. *J Health Popul Nutr.* 2016;35(1):15. <https://doi.org/10.1186/s41043-016-0051-3> PMID:27207164
21. Mohanty SK, Kim R, Khan PK, Subramanian SV. Geographic variation in household and catastrophic health spending in India: Assessing the relative importance of villages, districts, and States, 2011-2012. *Milbank Q.* 2018;96(1):167-206. <https://doi.org/10.1111/1468-0009.12315> PMID:29504205
22. Aregay A. Factors Associated with maternal health care services in enderta district, Tigray, Northern Ethiopia: A cross sectional study. *Am J Nurs Sci.* 20143(6):117-25.
23. Khan RE, Noreen S. Household choice of public versus private health institution for maternal healthcare: A case study of Bahawalpur (Pakistan). *Pak J Commer Soc Sci.* 2016;10(3):444-60.
24. Khan RE, Raza MA. Maternal health care in India: The case of tetanus toxoid vaccination. *Asian Dev Policy Rev.* 2013;1(1):1-14.
25. Schultz TP. Studying the impact of household economic and community variables on child mortality. *Popul Dev Rev.* 1984;10:215-35. <http://doi.org/10.2307/2807962>
26. Govindasamy P, Ramesh BM. Maternal Education and the

- Utilization of Maternal and Child. Mumbai, India: International Institute for Population Sciences. National Family Health Survey Subject Reports Number 5; 1997.
27. Tellis, S. B., Rent, P. D., & Dmello, M. K. (2018). Utilization of antenatal care and out of pocket expenditure on delivery care in Dakshina Kannada. *Int J Community Med Public Health*, 5(8), 3553-3558
 28. Husnain MI, Rashid M, Shakoor U. Decision-making for birth location among women in Pakistan: Evidence from national survey. *BMC Pregnancy Childbirth*. 2018;18(1):226.
 29. Magadi M, Diamond I, Rodrigues R. The determinants of delivery care in Kenya. *Biodemography Soc Biol*. 2000;47(3-4):164-88.
 30. Chhetri S, Shah R, Rajbanshi L. Factors associated with utilization of complete postnatal care service in baglung municipality, Nepal. *Int J Reprod Med*. 2020;2020:1-8.
 31. Bazant ES, Koenig MA, Fotso JC, Mills S. Women's use of private and government health facilities for childbirth in Nairobi's informal settlements. *Stud Fam Plann*. 2009;40(1):39-50. <https://doi.org/10.1111/j.1728-4465.2009.00185.x> PMID:19397184
 32. Kesterton AJ, Cleland J, Sloggett A, Ronsmans C. Institutional delivery in rural India: The relative importance of accessibility and economic status. *BMC Pregnancy Childbirth*. 2010;10(30):30.
 33. Benova L, Macleod D, Footman K, Cavallaro F, Lynch CA, Campbell OM. Role of the private sector in childbirth care: Cross-sectional survey evidence from 57 low-and middle-income countries using demographic and health surveys. *Trop Med Int Health*. 2015;20(12):1657-73. <https://doi.org/10.1111/tmi.12598> PMID:26412496.
 34. Das S, Alcock G, Azad K, Kuddus A, Manandhar DS, Shrestha B, *et al*. Institutional delivery in public and private sectors in South Asia: A comparative analysis of prospective data from four demographic surveillance sites. *BMC Pregnancy Childbirth*. 2016;16:273.
 35. Rayhan SK. Does delivery in private hospitals contribute largely to caesarean section births? A path analysis using generalised structural equation modelling. *PLoS One*. 2020;15(10):e0239649. <https://doi.org/10.1371/journal.pone.0239649> PMID:33031397
 36. Larson CP, Saha UR, Islam R, Roy N. Childhood diarrhoea management practices in Bangladesh: Private sector dominance and continued inequities in care. *Int J Epidemiol*. 2006;35(6):1430-9.
 37. Pomeroy A, Koblinsky M, Alva S. Private Delivery Care in Developing Countries: Trends and Determinants. *Calverton: ICF Macro*; 2010. p. 24.
 38. Hollowell J, Oakley L, Kurinczuk JJ, Brocklehurst P, Gray R. The effectiveness of antenatal care programmes to reduce infant mortality and preterm birth in socially disadvantaged and vulnerable women in high-income countries: A systematic review. *BMC Pregnancy Childbirth*. 2011;11(1):13. <https://doi.org/10.1186/1471-2393-11-13> PMID:21314944
 39. Bhattacharjee S, Datta S, Saha J, Chakraborty M. Maternal health care services utilization in tea gardens of Darjeeling, India. *J Basic Clin Reprod Sci*. 2013;2(2):77-84. <https://doi.org/10.4103/2278-960X.118645>
 40. Chen L, Dai Y, Zhang Y, Wu Q, Rudan D, Saftić V, *et al*. A comparison between antenatal care quality in public and private sector in rural Hebei, China. *Croatian Med J*. 2013;54(2):146-56. <https://doi.org/10.3325/cmj.2013.54.146> PMID:23630142
 41. Ghaffar A, Pongpanich S, Ghaffar N, Mehmood T. Factors associated with utilization of antenatal care services in balochistan province of Pakistan: An analysis of the multiple indicator cluster survey (MICS) 2010. *Pak J Med Sci*. 1969;31(6):1447-52. <https://doi.org/10.12669/pjms.316.8181> PMID:26870113
 42. Filippi V, Ronsmans C, Campbell O, Graham W, Mills A, Borghi J, *et al*. Maternal health in poor countries: The broader context and a call for action. *Lancet*. 2006;368(9546):1535-41. [https://doi.org/10.1016/S0140-6736\(06\)69384-7](https://doi.org/10.1016/S0140-6736(06)69384-7) PMID:17071287
 43. Ensor T. Overcoming barriers to health service access: Influencing the demand side. *Health Policy Plan*. 2004;19(2):69-79. <https://doi.org/10.1093/heapol/czh009> PMID:14982885
 44. Memon Z, Zaidi S, Riaz A. Residual barriers for utilization of maternal and child health services: Community perceptions from rural Pakistan. *Global J Health Sci*. 2015;8(7):47-57. <https://doi.org/10.5539/gjhs.v8n7p47> PMID:26925902
 45. Joshi P, Mahalingam G, Sorte D. Factors influencing utilization of maternal and child health services among the postnatal mothers in hilly region. *Int J Res Med Sci*. 2016;4(6):2170-6.
 46. Ovaskainen K, Ojala R, Gissler M, Luukkaala T, Tammela O. Out-of-hospital deliveries have risen involving greater neonatal morbidity. *Acta Paediatr*. 2015;104(12):1248-52. <https://doi.org/10.1111/apa.13117> PMID:26174411
 47. Karkee R, Lee A, Binns C. Why women do not utilize maternity services in Nepal: A literature review. *WHO South-East Asia J Public Health*. 2013;2(3):135-41. <https://doi.org/10.4103/2224-3151.206759> PMID:28615588
 48. Zakar R, Zakar M, Aqil N, Chaudhry A, Nasrullah M. Determinants of maternal health care services utilization in Pakistan: Evidence from Pakistan demographic and health survey, 2012-13. *J Obstet Gynaecol*. 2016;37(3):330-7. <https://doi.org/10.1080/01443615.2016.1250728> PMID:27981860
 49. Sahoo M, Som M, Pradhan J. Perceived barriers in accessing the reproductive health care services in Odisha. *Indian J Community Health*. 2017;29(3):229-38.
 50. Rahman M, Gilmour S, Saito E, Sultana P, Shibuya K. Health-related financial catastrophe, inequality and chronic illness in Bangladesh. *PLoS One*. 2013;8(2):e56873. <https://doi.org/10.1371/journal.pone.0056873> PMID:23451102
 51. Issac A, Chatterjee S, Srivastava A, Bhattacharyya S. Out of pocket expenditure to deliver at public health facilities in India: A cross sectional analysis. *Reprod Health*. 2016;13(1):99. <https://doi.org/10.1186/s12978-016-0221-1>
 52. Andy Field; 2013. Available from: <https://www.sadbhavanapublications.org/research-enrichment-material/2-statistical-books/discovering-statistics-using-IBM-SPSS-statistics-4th-c2013-andy-field.pdf> [Last accessed on 2022 Apr 21].
 53. Smith M, Tawiah E, Badasu D. Why some women deliver in health institutions and others do not: A cross sectional study of married women in Ghana, 2008. *Afr J Reprod Health*. 2012;16(3):36-47. PMID:23437498
 54. Mohanty SK, Kastor A. Out-of-pocket expenditure and catastrophic health spending on maternal care in public and private health centers in India: A comparative study of pre and post national health mission period. *Health Econ Rev*. 2017;7(31):1-15. <https://doi.org/10.1186/s13561-017-0167-1>
 55. Do M. Utilization of skilled birth attendants in public and private sectors in Vietnam. *J Biosoc Sci*. 2009;41(3):289-308. <https://doi.org/10.1017/S0021932009003320>

-
- PMid:19254425
56. Banke-Thomas OE, Banke-Thomas AO, Ameh CA. Factors influencing utilisation of maternal health services by adolescent mothers in low-and middle-income countries: A systematic review. *BMC Pregnancy Childbirth*. 2017;17(1):65. <https://doi.org/10.1186/s12884-017-1246-3>
PMid:28209120
57. Rayhan K. Does delivery in private hospitals contribute largely to Caesarean Section births? A path analysis using generalized structural equation modelling. *PLoS One*. 2020;15(10):e0239649
58. Ekpenyong MS, Matheson D, Serrant L. The role of distance and transportation in decision making to seek emergency obstetric care among women of reproductive age in South-South Nigeria: A mixed methods study. *Int J Gynecol Obstet*. 2022;154(2). <https://doi.org/10.1002/ijgo.14103>
PMid:35044678