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SOCIOECONOMIC FACTORS INFLUENCING PRENATAL CARE IN PAKISTAN

The paper examines the socioeconomic determinants of prenatal consultation service as the components of prenatal care of women in the age group 15–49 years. 13594 observations from Pakistan Integrated Household Survey 2001 have been utilized. A series of models have been created to estimate the proper time of first consultation and source of consultation through binary logistic regression. The explanatory variables are categorized into individual characteristics, household characteristics and community characteristics. The results explained that woman' age and education, and the urban locality of a household positively impact the proper time (within the first trimester) for the first consultation and public sector source of consultation. Birth order of a child negatively affects the proper time for consultation. The number of children and electricity provision in a household negatively affect both components of prenatal care use. The provision of safe drinking water is the component of healthcare practice that positively influences the public sector source of consultation. An important result is that women in Balochistan are less likely to take prenatal consultations in proper time. And women in Punjab and Sindh are more likely to use public sector prenatal consultations.

Keywords: *women health; rural-urban disparity; Pakistan; healthcare; household economics; women education.*

JEL classification: I10, J13, I18, O18.

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СОЦІАЛЬНО-ЕКОНОМІЧНІ ЧИННИКИ ВПЛИВУ НА МЕДИЧНЕ ОБСЛУГОВУВАННЯ ВАГІТНИХ У ПАКИСТАНІ

У статті досліджено широкий спектр соціально-економічних детермінант медичного обслуговування вагітних у віковій групі з 15 до 49 років (Пакистан). Для аналізу використано дані 13594 опитувань, взятих із загальнонаціонального дослідження за 2001 рік. За даними опитування змодельовано середній час першої консультації у лікарні під час вагітності. Всі чинники, що впливають на охорону здоров'я вагітних, можна розділити на 3 групи: індивідуальні, сімейні та соціальні. На своєчасне перше звернення до лікаря позитивно впливають такі чинники як вік та освіта жінки, а також проживання у міській місцевості. Кількість попередніх вагітностей негативно впливає на час та кількість звертань до лікаря. Також негативно впливають і такі змінні як кількість дітей у родині та наявність електрики. У той же час наявність безпечної питної води має позитивну кореляцію з медичним забезпеченням вагітних. Найгірше забезпечені своєчасною медичною допомогою вагітні провінції Балочистан, найкраще – провінцій Пенджаб та Сінд.

Ключові слова: *здоров'я жінок; нерівність між містом та селом; Пакистан; охорона здоров'я; економіка домашнього господарства; жіноча освіта.*

Форм. 2. Табл. 3. Літ. 23.

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СОЦИАЛЬНО-ЭКОНОМИЧЕСКИЕ ФАКТОРЫ ВЛИЯНИЯ НА МЕДИЦИНСКОЕ ОБСЛУЖИВАНИЕ БЕРЕМЕННЫХ В ПАКИСТАНЕ

В статье исследован широкий спектр социально-экономических детерминант медицинского обслуживания беременных в возрастной группе от 15 до 49 лет (Пакистан).

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Для анализа использованы данные 13594 опросов, взятых из общенационального исследования за 2001 год. По данным опроса смоделировано время усреднённого первого обращения к врачу в случае беременности. Все факторы, влияющие на здравоохранение беременных в Пакистане, можно разделить на 3 группы: индивидуальные, семейные и социальные. На своевременное первое обращение к врачу позитивно влияют такие факторы как возраст и образование женщины, а также проживание в городской местности. Количество предыдущих беременностей отрицательно сказывается на времени и количестве обращений к врачу. Также негативно влияют и такие переменные как количество детей в семье и обеспеченность электричеством. В то же время наличие безопасной питьевой воды позитивно сказывается на медицинском обеспечении беременных. Хуже всего обеспечены своевременной медицинской помощью беременные провинции Балочистан, лучше всего – провинций Пенджаб и Синд.

Ключевые слова: *здоровье женщин; неравенство между городом и селом; Пакистан; здравоохранение; экономика домашнего хозяйства; женское образование.*

1. Introduction

Prenatal care is an important indicator of maternal health. It is significant for both mothers and newborns to avoid health complications. According to health standards, initiation of prenatal care should be in the first trimester of pregnancy to avoid complications (Beeckman et al., 2010). Prenatal care is more likely to be effective if women begin to receive care in the first trimester of pregnancy and continue to receive it throughout the pregnancy period. The lack of prenatal care is associated with many complications like premature delivery, infant and maternal mortality (Heaman et al., 2008; Titlay et al., 2010). Low quality of prenatal care also has implications after delivery. For instance, delivery assisted by non-professionals, few prenatal care checks and less post-natal home visits by a public health midwife result in poor acceptable diet by child during breastfeeding. Fewer prenatal visits also delay the introduction of complementary food for child in infancy. Similarly fewer prenatal visits and lack of postnatal check ups are the determinants of poor dietary diversity of child (Senarth et al., 2012). Heaman et al. (2008) concluded that likelihood of preterm birth and low birth weight increases by 22 and 40% by inadequate and no prenatal care respectively. Worldwide more than half of women die annually due to pregnancy related complications. About 90–95% of them come from developing countries. In Pakistan women receiving prenatal care are 61% (against 95% in Indonesia, 95% in Turkey and 75% in India), while the maternal mortality rate is 260 per 100,000 live births against 220, 20 and 200 per 100,000 live births in Indonesia, Turkey and India respectively.

On this background, we focus on the low-income economy, i.e. Pakistan, to see the determinants of prenatal care use in terms of proper time of the first consultation and public/private source of such consultations.

2. Literature review

In literature a number of components of prenatal care have been analyzed. Researchers have focused on multiple individual, household, socioeconomic, demographic, environmental and pregnancy-related factors associated with prenatal care. Individual characteristics like age, education, income, employment, living with child's father (proxy of family support), attempted abortions (proxy of maternal attitudes) and satisfied with pregnancy (Bassani et al., 2009), socioeconomic variables

such as household assets, owning a modern vehicle, husband's education and occupation, wealth index, health insurance, receiving welfare benefits (Beechman et al., 2011), community variables like the availability of electricity and quality of home affect the probability of prenatal care use. Similarly, regional attributes like rural-urban settings (Alexandre et al., 2005) and place of living emerged as imperative determinants of prenatal care use (Hibibov, 2011). Ethnic and religious variables like European and non-European in Belgium (Beechman et al., 2011) and Protestantism or Catholic in Haiti (Alexandre et al., 2005) have also been found significant for prenatal care use. On the supply side the long waiting time at clinics has been emerged as a significant determinant of prenatal care use (Mikhail, 2000) along with insufficient supply of medicine and vaccination (Nisar, Amjad, 2007).

Researchers categorize the levels of prenatal care in terms of underuse and inadequate use. Bassani et al. (2009) adopted the Kessner Index (Kessner et al., 1973) for adequacy of prenatal care. Titley et al. (2010) defined the underuse of prenatal care as never attended prenatal care service or less than 4 recommended prenatal care services. Mikhail (2000) calculated the inadequate use of prenatal care by the Kotelchuck's Index.

Some studies have not used the term "inadequacy" or underuse of prenatal care but analyzed the use of prenatal care services in other ways. For instance, Beeckman et al. (2010) analyzed the total number of prenatal visits by women. Cross et al. (2012) assessed the timing of the first prenatal visit by adult and adolescent pregnant women. Beeckman et al. (2011) probed the late initiation of prenatal care, i.e. the first visit after 12 weeks. For Pakistan, Nisar and White (2003) estimated the use of prenatal care by taking it as the prenatal service received during the last pregnancy once by doctor, nurse, lady health visitor, midwife or Dai (traditional birth attendant). Fatimi and Avan (2002, for Pakistan) and Mumtaz and Salway (2007, for Pakistan) have also used the same conceptualization. Agha and Carton (2011, for Pakistan) have taken the use of prenatal care as at least 3 prenatal care visits.

Fatimi and Avan (2002) probed the determinants of prenatal care in rural areas of Pakistan by primary data. A variety of explanatory variables were included into the analysis. For instance, woman's education, husband's education, ethnic origin, woman's work status, family type, husband's job, household income, electricity in a household, electronic media, home appliances, own cattle, own transport, construction of a house, type of latrine and husband's white collar job were the explanatory variables. The results were obtained through odd ratios. Husband's education, white collar job, living in pucca (cemented) house, flush latrine in the household, provision of electricity were found positively influencing the prenatal care, while own cattle and own transport cattle were found negatively affecting the prenatal care use.

We will focus on the two components of prenatal care mentioned above by application of the microdata. Using the microdata in Anderson and Newman's (1973) framework will be the uniqueness of the study for Pakistan.

3. Data set and methodology

3.1. Data set. For estimating the determinants of prenatal care use, the microdata has been taken from Pakistan Integrated Household Survey 2001 (PIHS) by the Federal Bureau of Statistics, Pakistan. The PIHS is a demographic, socioeconomic and health survey program devising data on family planning, reproductive health, maternal and child health, nutrition, immunization, education and employment.

3.2. Proper time of first consultation and public/private source of prenatal care. The analysis is composed of two questions, firstly, whether the first consultation by a woman has been taken in the first trimester or later; and secondly, whether a woman has used the public or private source of consultation.

3.3. Selection of explanatory variables. Grossman (1972) first introduced the concept that demand for medical care to be derived from the demand for good health. The determinants of medical care in the case of prenatal care in developing countries may be: women sociodemographic characteristics, current pregnancy characteristics, household characteristics, regional characteristics and community characteristics etc. (Habibov, 2011). Andersen and Newman (1973) developed the behavioral model for healthcare. The model gives the conceptual framework for determinants of healthcare. The components of healthcare (in the case of prenatal care) are external environment, predisposing factors, enabling factors and need factors. We have selected the variables from PIHS, partially covering the framework given by Andersen and Newman (1973).

3.4. Model specification. We have included two components of prenatal care use. For this purpose we have developed a series of models. The multivariate analysis is done for each model. For both models binary logit regression has been applied. Each model has a set of explanatory variables. These variables are classified into 3 categories, so the general function of the prenatal care use is given as:

Prenatal care use = f (individual characteristics, household characteristics, regional characteristics)

The models are expressed as below:

$$PTCON = f\begin{pmatrix}\mu_0 + \mu_1 AGE + \mu_2 AGESQ + \mu_3 EDU + \mu_4 BORD + \mu_5 DYCHILD + \\ + \mu_6 MISCAR + \mu_7 ELECT + \mu_8 GAS + \mu_9 SEWR + \mu_{10} NROOM + \\ + \mu_{11} SDW + \mu_{12} REG + \mu_{13} PUN + \mu_{14} KPK + \mu_{15} BAL + \mu_{16} SIND\end{pmatrix} \quad (1)$$

$$SOUR = f\begin{pmatrix}\Omega_0 + \Omega_1 AGE + \Omega_2 AGESQ + \Omega_3 EDU + \Omega_4 BORD + \Omega_5 DYCHILD + \\ + \Omega_6 MISCAR + \Omega_7 ELECT + \Omega_8 GAS + \Omega_9 SEWR + \Omega_{10} NROOM + \\ + \Omega_{11} SDW + \Omega_{12} REG + \Omega_{13} PUN + \Omega_{14} KPK + \Omega_{15} BAL + \Omega_{16} SIND\end{pmatrix} \quad (2)$$

The operational definitions of the variables are given in Table 1.

Table 1. **Operational definitions of variables**

Variables	Definitions
Dependent Variables	
Model-1	
PTCON (Proper Time of Consultation)	If the woman has received consultation in the first trimester = 1, otherwise = 0
Model-2	
SOUR (Source of Consultation)	If the woman has taken consultation from a government hospital =1, otherwise = 0
Explanatory variables	
Individual Characteristics	
AGE (Age)	Age of the woman in full years
AGESQ (Square of the age)	Square of the age
EDU (Education)	Education of the woman in full years
BORD (Birth order)	Birth order of the child of the last pregnancy
DYCHILD (Died children)	Number of died children of the woman
MISCAR (Miscarriages)	Number of miscarriages
Household Characteristics	
ELECT (Electricity)	If the household has electricity = 1, otherwise = 0
GAS (Gas)	If the household has gas = 1, otherwise = 0

Continuation of Table 1

SEWR (Sewerage)	If the household has sewerage = 1, otherwise = 0
NROOM (Number of room)	Number of rooms in the household
SDW (Safe drinking water)	If the household has safe drinking water = 1, otherwise = 0
Regional Characteristics	
REG (Region)	If the household is urban =1, otherwise (rural) = 0
PUN (Punjab)	If the household is situated in Punjab = 1, otherwise = 0
KPK (Khyber Pakhtunkhwa)	If the household is situated in Khyber Pakhtunkhwa = 1, otherwise = 0
BAL (Balochistan)	If the household is situated in Balochistan = 1, otherwise = 0
SIND (Sindh)	If the household is situated in Sindh = 1, otherwise = 0

4. Econometric estimates

4.1. Results of Model 1 (proper time of the first consultation). The results of logistic regression on the proper time of the first consultation, i.e. whether the first consultation was taken at appropriate time (the first trimester) or not, are shown in Table 2.

Table 2. **Results of Model 1 (multivariate logit analysis of proper time of first consultation)**

Dependent Variable: PTCON				
Method: ML - Binary Logit (Quadratic hill climbing)				
Date: 09/29/12 Time: 14:58				
Sample (adjusted): 17 13566				
Included observations: 3183 after adjustments				
Convergence achieved after 7 iterations				
Covariance matrix computed using second derivatives				
Variable	Coefficient	Std. Error	z-Statistics	Prob.
AGE	0.213478	0.079869	2.672865	0.0075*
AGESQ	-0.003053	0.001136	-2.686916	0.0072*
EDU	0.039800	0.016875	2.358462	0.0184*
BORD	-0.021676	0.041151	-1.192675	0.0584**
DYCHILD	-0.199286	0.151353	-2.196680	0.0391*
MISCAR	0.027984	0.075090	0.372673	0.7094
ELECT	0.865761	0.255207	3.392391	0.0007*
GAS	-0.188718	0.172281	-1.095408	0.2733
SEWR	0.249172	0.173735	1.934213	0.0515**
NROOM	0.005791	0.042048	0.137716	0.8905
SDW	0.051455	0.211258	0.243566	0.8076
REG	0.486392	0.189144	2.571545	0.0101*
PUN	-0.335310	0.270474	-1.239711	0.2151
KPK	-0.088154	0.272977	-0.322934	0.7467
BAL	-0.842639	0.353075	-2.386571	0.0170*
SIND	-0.420259	0.280738	-1.496984	0.1344
C	-6.519910	1.413368	-4.613031	0.0000*
McFadden R-squared = 0.046264		Mean dependent var = 0.089538		
S.D. dependent var = 0.285564		S.E. of regression = 0.282441		
Akaike info criterion = 0.586981		Sum squared resid = 252.4011		
Schwarz criterion = 0.623187		Log likelihood = -915.1795		
Hannan-Quinn criter. = 0.599965		Deviance = 1830.359		
Restr. Deviance = 1919.145		Restr. log likelihood = -959.5727		
LR statistics = 88.78639		Avg. log likelihood = -0.287521		
Prob (LR statistics) = 0.000000				
Obs (with Dep = 0) = 2898				
Obs (with Dep = 1) = 285				
Total obs = 3183				

* represents 5% level of significance and ** represents 10% level of significance.

4.3. Results of Model 2 (source of prenatal care). The results of public/private source of consultation are shown in Table 3.

Table 3. **Results of Model 2 (multivariate logit analysis for source of consultation)**

Dependent Variable: SOUR				
Method: ML - Binary Logit (Quadratic hill climbing)				
Date: 09/29/12 Time: 14:55				
Sample (adjusted): 17 13587				
Included observations: 3201 after adjustments				
Convergence achieved after 7 iterations				
Covariance matrix computed using second derivatives				
Variable	Coefficient	Std. Error	z-Statistics	Prob.
AGE	0.039425	0.064945	2.607062	0.0543**
AGESQ	-0.000365	0.000921	-0.396034	0.6921
EDU	0.018201	0.014836	3.226807	0.0199*
BORD	0.023867	0.036062	0.661844	0.5081
DYCHILD	0.077873	0.138512	0.562211	0.5740
MISCAR	0.002013	0.067350	0.029894	0.9762
ELECT	0.640202	0.215181	2.975174	0.0029*
GAS	0.230581	0.153438	1.502761	0.1329
SEWR	0.116645	0.148854	0.783620	0.4333
NROOM	0.314507	0.455247	2.843183	0.0583**
SDW	0.516116	0.227293	2.270710	0.0232*
REG	0.528304	0.161921	3.262726	0.0011*
PUN	0.616271	0.322072	1.913458	0.0557**
KPK	0.236240	0.344356	0.686034	0.4927
BAL	0.350242	0.366640	0.955273	0.3394
SIND	0.937232	0.322411	2.906945	0.0036*
C	-5.026921	1.179188	-4.263036	0.0000*
McFadden R-squared = 0.066599		Mean dependent var = 0.120275		
S.D. dependent var = 0.325334		S.E. of regression = 0.318015		
Akaike info criterion = 0.696620		Sum squared resid = 322.0086		
Schwarz criterion = 0.728863		Log likelihood = -1097.941		
Hannan-Quinn criter. = 0.708180		Deviance = 2195.881		
Restr. Deviance = 2352.558		Restr. log likelihood = -1176.279		
LR statistics = 156.6772		Avg. log likelihood = -0.342999		
Obs (with Dep = 0) = 2816				
Obs (with Dep = 1) = 385				
Total obs = 3201				

* represents 5% level of significance and ** represents 10% level of significance.

5. Discussion

This analysis helps to identify the determinants of prenatal consultation at the proper time and the public source of consultations.

In individual characteristics, woman's age is significant in both models. It positively influences the proper time of the first consultation and the public source of consultations. Positive association shows that as age of woman increases the likelihood of proper time of consultation and consultation from public sector source of consultation multiplies. Age is an important determinant of female health-seeking behavior in the social perspective. The explanation of positive association may be that as age of female increases, the level of awareness boosts up, more information on health and healthcare is gathered, and awareness about consultation and healthcare providers

increases. It also causes the increase in the awareness on the quality of consultation. That is why older females are more likely to take prenatal care at the proper time as well as from public sector as compared to younger ones. Prenatal care is negatively associated with age square in the second model showing that by increase in age, the proper time of the first consultation first increases and then decreases.

Women education is an important determinant of prenatal care use. In our results education of women as a continuous variable positively influencing both components of prenatal care, i.e. the proper time of the first consultation and public source of this consultation. Women with better education are more likely to receive the first consultation at the proper time (during the first 3 months of pregnancy). The explanation may be that more educated women seek high quality services and have greater ability to use healthcare to maintain their health (Nisar, White, 2003; Basani et al., 2009; Titlay et al., 2010; Beeckman et al., 2010, 2011; Habibov, 2011). Education also impacts individual behavior regarding health. Educated women may take preventive healthcare measures, as they have more control over their lives (Alexndar et al., 2005). Education enhances women decision-making power and confidence. Educated women have a position in a household to take decisions regarding their own as well as their children' health. Another explanation may be that education increases the overall awareness including on health and healthcare.

Birth order of a child has shown significant result in the first model. It negatively affects the proper time of the first consultation. Such type of impact is supported by a number of studies. Women experiencing higher number of births have less likelihood of prenatal care use (Titlay et al., 2010; Habibov, 2011). The possible explanation may be that during the first pregnancy females are more vigilant, so they attempt to seek prenatal care at proper time. With the passage of time due to experience and confidence from previous pregnancies they feel less need of care for subsequent pregnancies. Other explanation may be that the number of births decreases the marginal propensity to have a child, consequently the mother receives less prenatal care in the form of the proper time for the first consultation.

Electricity provision in households has been used as a proxy of social status of a household. It emerged significant in both models of prenatal care use. The socioeconomic status of a household positively impacts the proper time of the first consultation and public sector source of prenatal care. A number of studies have supported the positive impact of electricity on prenatal care use (Fatmi, Avan, 2002; Titlay et al., 2010).

Provision of safe drinking water in households has been used as an explanatory variable for prenatal care use. It is also an input of healthcare. The public sector source of prenatal consultations is positively related with safe drinking water. It means that safe drinking water and public sector source of prenatal consultation complement to each other. The number of rooms in a household is another proxy of socioeconomic status of a household. The public sector source of prenatal consultation is found positively associated with this variable. The variables representing the socioeconomic status of households have shown positive impact on both components of prenatal care use. The socioeconomic status of a household is a requisite for prenatal care use, that is woman or a household should have accessibility to prenatal care services. It also explains the cost aspect of prenatal care use.

In our analysis, rural/urban locality of households has emerged as one of the determinants showing significant results for both components of parental care use, i.e. proper time of the first consultation and public sector source of such consultations. The rural/urban disparity is a distinguished feature of developing economies. In our study living in urban areas has a positive effect on the proper time of the first consultation and public sector source of consultation. The result is supported by a number of studies in developing countries (see for instance, Fatimi, Avan 2002; Alexndar et al., 2005; Titlay et al., 2010; Habibov, 2011). The obvious explanation may be that there is lack of health-care infrastructure in rural settings, which decreases the likelihood of prenatal consultation at proper time. Transportation costs and traveling time also matter for rural population. Moreover, the income of rural households is lower as compared to their urban counterparts. The income of the farming population also remains seasonal. They are more inclined towards traditional and conventional tools to deal with health problems, particularly of females due to social norms. On the other hand, urban population has more access to health services due to education, information and awareness.

At the national level disparity not only exists at the rural/urban level but it also exists among provinces. To see the effect of existence of a household in a certain province on the use of prenatal care, we have included the dummy variables of provinces in the analysis. A woman in Balochistan is found less likely to take prenatal consultation at proper time. The explanation is based on the fact that in Balochistan public health expenditures are insufficient and the population is scattered. The literacy status, particularly of females, is much lower in Balochistan as compared to other provinces. Furthermore, cultural set up of the province stands as a hurdle for female health-seeking behavior. Majority of population is living in rural areas. Basic infrastructure of roads and transportation is not sufficient for the socioeconomic development of the province.

The dummy variables of Punjab and Sind have positive impact on public sector source of consultation. It explains that healthcare facilities are better provided by public sector in both provinces as compared to other provinces.

6. Conclusion

The empirical evidence emerged from this study has several implications for health policy in Pakistan. Education of women should be a part of the policy. Along with an increase in prenatal care use a variety of spillover effects of female education may be obtained. The socioeconomic status proxied by a number of dummy variables has shown positive effect on prenatal care use. The policy should have the provision of basic utilities like safe drinking water, sewerage and electricity in households. The results demonstrate the existence of inequality in prenatal care use in rural and urban areas as well as among provinces. These inequalities explained the lack of regional (rural-urban) and provincial priorities and government healthcare expenditures by regions and provinces. The needs of provinces are not identified and allocation of funds remains lower than the needs. Moreover, public expenditures on healthcare are not effectively utilized in provinces. In the context of disparities among provinces there should be an emphasis on Balochistan in all the areas of social and economic development. There should be changes in the mechanism of budget resources allocation for the provinces.

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