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Household Choice of Public versus Private Health Institution for Maternal Health-Care: A Case Study of Bahawalpur (Pakistan)

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Abstract

In Pakistan the ratio of institutional delivery that is one of the most important components of maternal health-care is lower than in a number of developing economies. The ratio of public sector institutional delivery is again lower than private sector institutional delivery. Government of Pakistan spends a lot of money for health services and there is a complete system of health-care comprising of basic health units to bigger hospitals in the country. For policy making it is necessary to analyze why the households choose private sector health institutions. The paper empirically analyzes the determinants of choice of public versus private sector health institution by the household. For the purpose binary logistic regression (bivariate and multivariate) has been applied on primary data collected form Bahawalpur. The results have shown that birth-interval, woman education, partner's education, woman autonomy (freedom of movement), planned pregnancy, media exposure, wealth index, birth-interval, number of pregnancies and pregnancy complications decreases the probability of delivery at public sector health institution. The inter-spouse age gap, woman work status and health worker' visit enhance the likelihood of delivery at public sector health institution. It may be concluded that quality of health-care matters for choice of private sector health institutions and private sector health institutions are substitute to public sector health institutions. The public sector institutions should increase the quality of health-care and there should be a regulatory body for ranking the health institutions.

Keywords: maternal health, natal-care, health economics, household economics, household decision-making, woman autonomy, public sector health institutions, private health institutions.

1. Introduction

Maternal health is one of the important parts of Sustainable Development Goals (SDGs). The goal 3 is mainly concerned with maternal health, which narrates: Ensure healthy lives and promote well-being for all at all ages. The target of SDG for maternal health-

care is that by 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births. Currently it is 216 for 183 countries globally and 176 for South Asia. The maternal mortality ratio in developing economies is 20 times higher than developed region. Pakistan is having a disappointing evidence of maternal mortality. The maternal mortality ratio is 178 in the country. The SDG target cannot be achieved without improvement in quality utilization of maternal health-care services.

A variety of indicators monitor the status and progress of maternal health-care. They include prenatal-care, birth attended by skilled health personnel, postnatal-care, institutional delivery and contraceptive prevalence, etc. Institutional delivery is central goal of safe motherhood and neonate survival. Broadly two sources of health institutions, i.e. public sector and private sector are available in Pakistan[1]. The public sector health institutions are much cheaper than private sector health institutions. The ratio of institutional delivery at private sector is higher than public sector. The increasing gap in health-care utilization between private and public sector health institutions reinforces the health inequalities (in utilization and accessibility) in the country. The rich segment of the society benefits from access to both better quality health-care from private sector as well as subsidized health-care services from public sector. The poor community of the country loses the service from private sector due to non-accessibility and utilizes low health quality (if it is) from the public sector health institutions[2].

The private health sector is expanding rapidly in Pakistan. If government assumes that people prefer private sector health institutions and it should promote private sector, then there may be a critical problem of sustainable development of health sector in the country (see also Kumar and Prakash 2011 for India). The phenomenon has raised some concerns for health policy analysts as they see the quality of private sector health institutions poor (Brugha and Zwi 1998). Furthermore the real victims of unregulated growth of private health sector in Pakistan are the poor who need better and low-cost health facilities. They spend a greater part of their income on health-care than the rich one. In this situation an important question arises for health policy makers, that is, whether the government should direct the public funds to subsidize the private health sector or to the public health sector which focuses on serving the poorest of the poor. To answer this question it is important to investigate the determinants of demand for public vs private sector health institutions. Such an analysis is also necessary for an appropriate policy response to rise in use of private sector health institutions if the social objectives of the health policy are to be met (Akberi, et. al. 2009).

[1] Public sector health institutions include hospitals, rural health centers, basic health units and maternal and child health centers administered by government while private sector health institutions includes hospitals, maternity care centers, polyclinics, individual clinics, private practitioners administered by individuals or private organizations.

[2] The quality of private sector health institutions is an enigma as the literature has presented both types of evidences about quality of private sector health institutions. The employment of public sector staff in private sector health institutions creates ambiguity whether private or public sector is providing quality services (Ferrinho, et. al. 2001).

The critics of privatization have also concerns about the private health sector as it provides low-quality treatment and overprescribes diagnostics, procedures and pharmaceuticals (Hanson, et. al. 2008; Marriott 2009). However, it is not clear that private health sector works in the same way in each economy. In some cases it caters the patients for whom public sector underprovides the health services, acting as complement. On the other hand, in some cases private and public sector act as substitutes to each other and patients choose between them on quality and cost basis. In the case of complementarity the private sector contributes a greater coverage of health-care while in the case of substitution the direction of effect is not clear. It is necessary to see whether the private and public sector health institutions are complement or substitute to each other in provision of maternal health-care particularly delivery care in Pakistan.

The utilization of public/private health services for delivery differs by demographic and socioeconomic status of the households as well the availability, accessibility and quality of the services. The factors of utilization of public/private sector health institutions for delivery also vary by regions and nations. For instance, in Africa, the choice of private health sector is less related to economic indicators but more to socio-demographic characteristics. Similarly it is expected that mother with a previous child death would go to private health facility for delivery but it is not the case empirically. In Bolivia, a previous child death decreases the likelihood of use of private facility for delivery and in Bangladesh, India, Cambodia, Indonesia and Philippines, it has no significant effect on choice of pubic/private health institutions. In Bangladesh the prenatal-care visits has positive impact on private use of delivery services but in India, Cambodia, Nepal and Philippines it has no significant effect (Pomeroy, et. al. 2010).

The core objective of the current study is to analyze the determinants of choice of public versus private sector health institution for delivery.

2. Review of Literature

Generally, utilization of maternal health-care services (prenatal, natal and postnatal health-care, and family planning) is affected through a set of factors. They are classified as demographic, socioeconomic and obstetric characteristics. Demographic characteristics are birth-order, current age of woman, age of woman at first marriage, and age difference between spouses, etc. while socioeconomic characteristics include education of woman, exposure to media, place of residence, husband education, woman poverty, woman autonomy, household wealth status and region of residence, etc. The obstetric characteristics are comprised of number of pregnancies, birth-interval, number of preterm deliveries, problem during labor, and duration of labor. Some of the studies termed these factors as social and cultural factors (Naveentham and Dharmalingam, 2000; Chakraborty, et. al. 2003). The literature has also classified these factors as structural and intermediary factors (Goland, et. al. 2012; Birmeta, et. al. 2013) while Ajaegbu (2013) has categorized them as socio-demographic characteristics. Tsegay, et. al. (2013) classified these factors as socioeconomic, socio-demographic, perceived/ actual needs, physical access, geographical and economic factors. Khan and Raza (2013) have classified such type of factors as individual characteristics, household characteristics and regional characteristics. Same type of factors may affect the choice of the public/private health institutions for maternal health-care (see Kumar and Prakash 2011 for India; Pomeroy, et. al. 2010, 2014) for developing countries.

The literature exists on quality comparison of private and public sector health institutions and the determinants of choice of public vs private sector health institutions. Andaleeb (2000) compared the quality of services provided by public and private hospitals in Bangladesh. The study also estimated the choice of hospital through discriminated function. It concluded that quality perception drive the patients to private hospitals. The private hospitals are better in responsiveness, communication and discipline and they attract the patients. Income, communication and education are also the predictors for choice of private sector hospitals.

Siddiqui and Khandaker (2007) have compared the quality of health-care services provided by public, private and foreign hospitals using the SERVQUAL comprising eight components, i.e. empathy of physicians, availability of physicians, assurance/competence of physicians, empathy of nurses, responsiveness of nurses, availability of drugs, tangibility, and perceived cost. The study concluded that private hospitals are better than public sector hospitals. Irfan and Ijaz (2011) have also estimated the quality score of hospitals in Lahore (Pakistan) by measuring patients perception of quality through SERVQUAL by using the components of empathy, tangibility, assurance, timeliness and responsiveness. The study found that private hospitals are offering good quality services and it is the reason of demand for private sector hospitals.

Bazant, et. al. (2009) using the survey carried out by World Bank and African Population and Health Research Center estimated the use of private and government health facilities by women in informal settlements of Nairobi. The explanatory variables included were woman' age and education, children ever born, marital status, household wealth status, unaccompanied mobility, occupation, intendedness of pregnancy, antenatal-care, source of antenatal-care, expenditures of antenatal-care, complications experienced during last pregnancy and husband's education and profession. The study found that women's education, ethnic group, and household wealth were associated with institutional deliveries, especially in government hospitals. Residents in the more disadvantaged settlement were more likely than those in the better-off settlement to give birth in private facilities. Similarly, the study found that women's having achieved secondary education was associated with their giving birth in a government facility. Women with more education may be more cognizant than others of the potential risks of childbirth and the subsequent need for emergency care, which is available at the government hospitals in Nairobi.

Akbari, et. al. (2009) have analyzed the demand for public health-care for all the provinces of Pakistan using time series data for the years 1989-2006. The demand for government hospitals was measured by the number of patient visits to government hospitals. The explanatory variables were the number of hospitals per-capita, doctor fee per visit, income per-capita and price of medicine. All these variables have been found significant determinants of demand for health-care from public sector hospitals but with varying magnitude and signs in provinces. These factors and improved accessibility of health-care facilities should be the focus of public policy to increase the usage of public sector health facilities.

Pomeroy, et. al. (2010) have analyzed the trend of utilization of private health-care services for delivery in sixteen sub-Saharan Africans, Asians and Latin American

countries using the data-set of Demographic and Health Surveys (DHS)[3]. The determinants have been grouped into socioeconomic characteristics, economic and physical access and actual/perceived need. The results have shown a positive trend of use of private health services. In three African countries, socioeconomic characteristics are associated with use of private delivery care which explains the complementarity of public sector services, i.e. private sector covers the population that may not be reached by public sector. In Bolivia and four Asian countries, economic indicators are more relevant which explains the existence of competition between public and private sector (private sector substitute the public sector).

Kumar and Prakash (2011) have estimated the determinants of decision of patients to choose private health-care services over public ones in India using National Sample Survey 2004 and District Level Household Survey 2002-04. The study included seven health services for taking the decision of the patients, i.e. induced abortion, antenatal check-ups, temporary contraceptive use, treatment of any health problem during pregnancy, place of delivery, RTI, STI related treatment and treatment of Diarrhea/Pneumonia to children below three years of age. The explanatory variables, although differ for different models were age of woman, woman and spouse education, marital duration, caste, religion, reasons not to visit government hospital, household standard of living, residential status and macro regions of India. The woman's years of schooling, spouse's years of schooling, poor quality of public sector, standard of living of the household and public sector not examined the patient properly were identified as the major factors for utilization of private sector health services.

Pomeroy, et. al. (2014) have estimated the determinants of choice of public vs private health-care institutions for delivery services for six Asian countries, i.e. Bangladesh, Cambodia, India, Indonesia, Nepal and Philippines. The key variables chosen were categorized as: socio-demographics (mother's age, education of mother and father, household size), perceived/actual need (birth order, previous child death, mean ANC visits for mother, where previous birth occurred) and economic, social and physical access (perceived distance to health facility, residence, wealth index, who has final say on mother's health care) as those that had the strongest theoretical relationships with choice of facility. The study concluded that wealth and education are related to private sector delivery care in three out of six countries. More in depth work is needed to understand the behavior of the private sector in these countries. The results cannot be generalized about private sector delivery care. The study also concluded that private sector provides a good quality of care (in Bangladesh, Cambodia, India and Nepal), if trained doctors are considered as proxy of quality.

Basu, et. al (2016) through a systematic review claimed that private health sector has not been more efficient, accountable or medically effective than public sector. There is evidence of several reports observing higher prescription drug costs in the private sector for equivalent clinical diagnoses. On the other hand the public sector appears frequently to lack timeliness and hospitality towards patients. The study proposed more policy

[3] DHS provides a comprehensive national level data-set about health and nutrition. It has also been used for maternal health-care by Khan and Raza (2013), Kitui, et. al. (2013) and Pomeroy, et. al. (2014).

research to determine how targeted intervention might address the weakness of public sector health institutions.

The existing literature lacks the work for estimating the determinants of choice of pubic versus private sector health institutions for delivery care in Pakistan. The gap will be filled by the current study utilizing the primary data-set collected from Bahawalpur.

3. Theoretical Foundations for Choice of Health Institution

The theory of demand for health-care originates from the work of Grossman (1972). A number of studies are based on theoretical framework of demand for health-care. The same framework is utilized for maternal health-care by Khan and Raza (2013). So this framework may be utilized for analysis of the choice of public versus private sector health institution for delivery.

The conceptual framework of health-care behavior developed by Kroeger (1983) and Anderson and Newman (2005) is relevant to the maternal health-care. This model has been extensively used in the analysis of health-care services in diverse disciplines like, breast cancer, care for elderly persons, clinical preventive services as well as maternal health-care (Titaley, et. al. 2010; Khan and Raza, 2013). This behavioral model proposes that the utilization of health-care services is a function of three sets of characteristics, i.e. predisposing factors, enabling factors and illness factor. It is adopted by the current study.

4. Methodology

The choice of public or private health institution for delivery has been analyzed by employing logistic regression on primary data comprising 666 observations. The use of primary data has its own advantages but in the current study the region under study has specific characteristics which makes it more appropriate to use primary data having specific variables.

4.1 Sampling and Survey

Probability sampling technique, i.e. cluster sampling has been adopted for sampling. For the purpose, we have divided Bahawalpur district into 34 clusters. There is heterogeneity within the clusters. All of the married females of reproductive age, i.e. 15-49 years who have given birth to at least one child four years prior to survey were included for interview. In the survey it was asked that where did you (respondent woman) deliver your child? The response to this question may be institution or home. If the delivery of child takes place at institution the follow up question asked in the survey was: in which institution you gave birth to a child? The response to this question is coded as "1" for public sector health institution and "0" for private sector health institution.

4.2 Model Specification

Under the Grossman (1972) model of demand for health-care, and Kroeger (1983) and Anderson and Newman (2005) framework of health-care behavior the function for choice of public vs private health institution is given as:

$$CHOICE = f(AGEW, EDUW, EDUP, AUTOMW, AGEGAP, PLANPREG, MEDIA, WORKW, WEALTH, HWORKER, INTERVL, NPREG, PREGC, MORTAL) \ldots\ldots (1)$$

The equation for the choice of health institution is as follows:

$$CHOICE = \mu_0 + \mu_1 AGEW + \mu_2 EDUW + \mu_3 EDUP + \mu_4 AUTOMW + \mu_5 AGEGAP + \mu_6 PLANPREG + \mu_7 MEDIA + \mu_8 WORKW + \mu_9 WEALTH + \mu_{10} HWORKER + \mu_{11} INTERVL + \mu_{12} NPREG + \mu_{13} PREGC + \mu_{14} MORTAL + \varepsilon \quad \ldots\ldots\ldots\ldots\ldots (2)$$

The operational definitions of the variables have been given in table 1.

Table 1: Measurement and Operational Definitions of Variables

Variable (Name)	**Definitions**
Dependent Variable	
CHOICE (Choice of health institution)	If the woman receives delivery services from public sector institution = 1, otherwise (from private institution) = 0
Independent Variable	
Predisposing Factors	
Demographic characteristics	
AGEW (Age of woman at first marriage)	≤ 24 years = 1, 25-29 years = 2, ≥ 30 years = 3
Sociocultural Characteristics	
EDUW (Education of woman)	Illiterate =0, Primary=1, Secondary=2, Postsecondary=3, Higher= 4
EDUP (Education of partner)	Illiterate =0, Primary=1, Secondary=2, Postsecondary=3, Higher=4
Woman Autonomy and Information	
ATOMW (Freedom of movement index)	Freedom of movement index ranging 0 to 3.
AGEGAP (Inter spouse age gap)	Age of partner – Age of woman: > 10 years=1, 5-9 years =2 < 5 years =3
PLANPREG (Planned pregnancy)	If the woman bears a planned pregnancy =1, otherwise=0
MEXP (Media exposure)	Continuous variable: The value of index ranges 0 to 4
Enabling Factors	
Family Characteristics	
WORKW (Work status of woman)	Work =1, No Work =0
WEALTH (Wealth index)	Poorest=1, Poorer=2, Middle=3, Rich=4, Richest=5
Community Characteristics	
HWORKER (Health worker visit)	Yes =1, No=0
Illness Factors	
INTERVL (Birth interval)	≥ 24 months = 1, < 24 months = 0
NPREG (Number of pregnancies)	1-3 pregnancies = 1, otherwise 0
PREGC (Pregnancy complication)	Complication during pregnancy =1, Otherwise=0
MORTAL (Neonatal mortality/ Miscarriage)	Yes =1, No=0

Majority of the explanatory variables given in equation 2 are self-explanatory however some of them need explanation for their construction. Woman empowerment index is one of them. Women empowerment is very multifaceted phenomena to quantify in a consistent mode. The literature assessed woman empowerment through constructing an index via pile up of different major and minor decisions of woman in the household. The current study assessed woman autonomy by freedom of movement index and used it as explanatory variable in the analysis. The components of this indicator come from the question: you (woman) is allowed to go alone to (i) market, (ii) health-care center, and (iii) outside community. The index is constructed through the method of additive index and it ranges zero to 3.

The media exposure is also measured by additive index. The indicators of index are: ever watch television, listen radio/FM, read newspaper and visit internet websites regarding maternal health during the pregnancy.

Wealth index is a good proxy of socioeconomic status of household. Following Demographic and Health Survey (DHS), we have gathered information on household assets and living condition. The wealth index is based on household utilities and assets and PCA is used for the index construction. The households are ranked according to total score and divided into quintiles, i.e. poorest, poorer, middle, rich and richest. They represent five socioeconomic levels with equal ratio of households in each quintile. Rutstein and Johnson (2004) is followed for this procedure.

4.3 Major Assumptions of the Model

The core of the current study is to see whether there exists competition between the private and public sector health institutions in the provision of delivery services (in this case public and private sector are substitute to each other and households choose the public/private sector on quality basis) or private sector is complement to public sector where private sector provides the services where public sector is non-existent. It is hypothesized that if the private health institutions compete public sector health institutions (substitutes) for clients based on perceived quality then the clientele will be wealthier, more educated and likely to live in an area where there are enough health facilities to allow for competition. The private sector may be complement to public sector, in this case the clientele should come from a more diverse set of socioeconomic groups (see also, Pomeroy, et. al. 2014).

5. Results and Discussion

The results of bivariate and multivariate analysis for choice of public versus private health institution for delivery are shown in table 2 and table 3.

The results in table 2 explain the relationship between choice of health institution (public or private) for delivery and explanatory variables with the help of bivariate analysis and chi square test. In the predisposing factors, the age group of first marriage of woman has positive impact on choice of public health institution for delivery. Educational level (illiterate, primary, secondary, postsecondary, higher) of woman and her partner have negative impact on choice of public health institution. Woman autonomy negatively impacts the choice of public sector health institution, i.e. woman having autonomy prefers the private sector health institution. The inter-spouse age gap positively influences

the choice of public health institution. The planned pregnancy also positively impacts the choice of public health institution.

Table 2: Bivariate Analysis for Choice of Public versus Private Health Institution

Dependent variable (Choice of institution): If the woman goes to public sector health institution for delivery = 1, if she goes to private sector health institution = 0		
Independent variables		
Variable Name	Odd Ratio (p-value)	Chi Square (P- value)
Predisposing Factors		
Demographic characteristics		
AGEW (Age of woman at first marriage)	.009114 (0.953)	7.7322 (0.021)*
Sociocultural Characteristics		
EDUW (Education of woman)	-.2264513 (0.000)*	29.3702 (0.000)*
EDUP (Education of partner)	-.237362 (0.000)*	32.1434 (0.000)*
Woman Autonomy and Information		
AUTOMW (Freedom of movement index)	-.3932246 (0.013)*	6.1743 (0.0138)
AGEGAP (Inter spouse age gap)	.0548954 (0.000)*	26.5478 (0.276)
PLANPREG (Planned pregnancy)	.2673453 (0.030)*	5.5756 (0.062)**
MEDIA (Media exposure)	-.2389366 (0.131)	5.7050 (0.222)
Enabling Factors		
Family Characteristics		
WORKW (Work status of woman)	1.048362 (0.774)	0.0824 (0.765)
WEALTH (Wealth index)	-.1520874 (0.012)*	7.9403 (0.094)**
Community Characteristics		
HWORKER (Health worker visit)	.758018 (0.000)*	21.9731 (0.000)*
Illness Factors		
INTERVL (Birth interval)	-.2667081 (0.117)**	2.5706 (0.109)**
NPREG (Number of pregnancies)	-.8420449 (0.000)*	19.9771 (0.000)*
PREGC (Knowledge of pregnancy complication)	-.4890817 (0.002)*	9.2459 (0.002)*
MORTAL (Neonatal mortality/ Miscarriage)	1.290688 (0.071)**	6.5129 (0.039)*
Number of observations = 666		

*, ** denote 5 and 10 percent of level of significance respectively

In the enabling factors, wealth index negatively influence the choice of public health institution for delivery. The negative association shows that richer women are more likely to choose private health institution for delivery. Health worker's visit to the household positively influences the choice of public health institution.

The illness factors comprised of four variables and all these variables are significant. Birth interval measured as a binary variable has shown negative impact on the choice of public health institution for delivery. Similarly the number of pregnancies to a woman has negative impact on choice of public health institution. Pregnancy complication to the woman also negatively affects the choice of public health institution. Neonatal mortality/miscarriage to a woman positively impacts the choice of public health institution for delivery.

Table 3: Multivariate Binary Logistic Regression: Choice of Health Institution

Dependent variable (Choice of institution): If the woman goes to public sector health institution = 1, if she goes to private sector institution = 0				
Independent variables				
Variable Name	Coefficient	Standard Error	P-value	Odd Ratio
Predisposing Factors				
Demographic characteristics				
AGEW (Age of woman at first marriage)	.247101	.1727298	0.153	1.280308
Sociocultural Characteristics				
EDUW (Education of woman)	-.1059255	.1002702	0.091**	.8994917
EDUP (Education of partner)	-.1173126	.1032242	0.056*	.8893072
Woman Autonomy and Information				
AUTOMW (Freedom of movement index)	-.3368406	.171371	0.049*	.7140226
AGEGAP (Inter spouse age gap)	-.0566273	.0294525	0.055**	1.058261
PLANPREG (Planned pregnancy)	-.2178123	.13272	0.095**	1.243354
MEDIA (Media exposure)	-.0619747	.0806353	0.042*	1.063935
Enabling Factors				
Family Characteristics				
WORKW (Work status of woman)	.4095702	.203451	0.044*	1.50617
WEALTH (Wealth index)	-.0436884	.0783248	0.077*	.9572522
Community Characteristics				
HWORKER (Health worker visit)	.7188753	.1737486	0.000*	2.052124
Illness Factors				
INTERVL (Birth interval)	-.3112308	.180269	0.084**	.7325448

NPREG (Number of pregnancies)	-.7587191	.2068499	0.000*	.4682659
PREGC (Knowledge of pregnancy complication)	-.5215782	.1727298	0.002*	.593583
MORTAL (Neonatal mortality/ Miscarriage)	.0269775	.1665043	0.871	1.027345
Constant	.5661147	.3971824	0.154	1.76141
LR Chi Square	77.95	0.000	Pseudo R Square 0.0861	
Number of observations = 666				

*, ** denote 5 and 10 percent of level of significance respectively

Majority of the results expressed in table 3 are according to the theoretical implications of the function. They have been discussed here. The educational status of the household has been captured by the educational level of the woman and husband and they are the variables related with major assumption of the current study. On the basis of the results of these two variables we can decide the substitutability or complementarity of the public and private sector health institutions. The results have shown that educational level of household (woman and her husband's education) has been emerged as one of the important determinants of choice of public vs private sector health institution for delivery. The current estimates have shown that woman education negatively influences the choice of public sector health institution for delivery care services, i.e. private sector is preferred. Pomeroy, et. al. (2010) also concluded that woman's education (secondary and tertiary) positively influence the use of private facilities for delivery in eight developing countries under analysis, i.e. Mali, Rwanda, Zambia, Bangladesh, Indonesia, Nepal, Philippines and Bolivia. The socioeconomic explanation of the phenomenon is based on the quality consciousness of educated woman about maternal health-care and affordability of private sector cost. The education enhances the awareness of women about quality health-care services. Ultimately the use of private sector health-care institution for delivery is increased by the educational level of women based on quality and cost.

Education of the partner has also been found to negatively influence the utilization of public sector health institution for delivery care services. The explanation is corroborated from the discussion about the impact of woman education on use of private sector health institution for delivery. The education of the partner not only enhances the comprehension of quality of health-care but the affordability of the private sector cost. It may be concluded from the results of above two variables that private sector health institutions are substitute to public sector health institutions. There exists a competition between these two kinds of health institutions.

The woman autonomy as a measure of woman empowerment has been included in the analysis as an explanatory variable. The results have shown that woman empowerment measured by woman autonomy index negatively influences the choice of public sector health institution. It confers that the woman prefers the private health-care institution.

In the context of social fabric of South Asia and particularly Pakistan it is assumed that the inter-spouse age represents the woman empowerment at the household level. The

lesser inter-spouse age gap represents the high woman empowerment at the household level. The results of current study have shown that inter-spouse age gap decrease the probability of utilization of public sector health institution. It explains that woman's higher empowerment increases the use of private sector health institution for delivery. It is supported by the results of the variable of woman empowerment captured by woman autonomy. It may be conferred that generally the women prefer the private sector service for delivery.

The planned pregnancy as a part of family planning is basically related with decision/desire of household for number of children, birth-interval and managing the time and resources for prenatal-care, delivery as well as child rearing. The households when plan the pregnancy they manage all the relevant requirements including the medical check-ups, accessibility of the medical services and affordability. The results have shown that choice of the public sector health institution is negatively related with planned pregnancy. It explains that planned pregnancy makes the household more intended to choose private sector institution for delivery. It explained that women with planned pregnancy prefer private sector due to more reliability. A planned pregnancy represents the well-management of the household as well as having the awareness about maternal health-care. It is inferred that when the households plan pregnancy they choose the private sector health institution for delivery. The preference is based on awareness and affordability.

To capture the effect of information and awareness about maternal health, general health-care of women and quality, and source of health-care we have included the proxy variable of exposure to media. Media enhances the information about health-care. The multivariate logistic regression results have shown that media exposure to the woman decreases the probability of public sector health institution for delivery.

The working status of the woman represents the ability of the woman to afford the cost of maternal health-care including delivery services. It is hypothesized that working status of the woman may affect the choice of the public sector health institutions positively as well as negatively. If we consider the affordability of the cost of delivery the probability for private sector should be increased. Similarly from the awareness and information perspective the working women have more awareness and information about quality and source of quality of maternal health-care. The working women should prefer the private sector. The working women have generally more physical and social mobility so again the private sector will be preferred. On the other hand in Pakistan, the higher ratio of women is employed in informal sector. They not only bear the burden of longer working hours but are unpaid and generally belong to poor households. Due to affordability they will prefer the public sector. They have also lower educational level. The results of multinomial regression have shown that work status of woman positively influences the public sector health institution for delivery care services. It explains the existence of informal sector employment of women. We can infer that choice of public sector is due to lower cost. It is further supported by the fact that informal sector working women have incentive of reimbursement of the delivery cost if they avail the public health institution.

The socioeconomic status of household plays an important role in the choice of public vs private sector health institutions for maternal health-care. Due to perception of low quality of health-care at public sector health institutions it is speculated that public sector health institution is inferior good. The socioeconomic status of the household measured

by wealth index in the current study is one of the principal variables of the current study. We may decide whether the private sector health institution is substitute or complement to public sector. In our results the decision for the public sector health institution for delivery is negatively related with wealth index, i.e. the women from wealthy households are more likely to have private institutional delivery. It explains that for high socioeconomic status households the utilization of maternal health-care at public sector health institutions is an inferior good with low quality and low socioeconomic status of household restricts the woman's access to private institutional delivery care. It is conferred that private sector health institution is substitute to public sector health institution. There exists a competition between these two kinds of institutions based on quality and cost. It is supported by Kumar and Prakash (2011 for India) through the results that standard of living of woman increases the utilization of private sector health services for prenatal-care, pregnancy problems, place of delivery and induced abortion. Pomeroy, et. al. (2010) concluded that household wealth has a positive impact on private delivery care services in Bangladesh, Cambodia, India, Indonesia and Philippines. The better off women go to private sector health institutions as they can afford it while majority of poor woman visit public sector (see also Haq and Arshad, 2007 for Pakistan). It may be inferred that public sector health institutions have no good quality services.

The mobile supply of health-care services are also provided by the public sector in the form of visits to the households by lady health visitors. We have included the visits of health workers to the household as explanatory variable to see that whether after consultation with lady health visitor the household's choose the public or private sector health institution. The results expressed that the probability of the choice of public sector health institution increases by the visits of health worker to the household. The explanation may be that if health worker regularly visits the households, the woman is inclined to the public sector health institution for delivery. Furthermore, the comparatively poor households are generally visited by the health-workers. These households prefer public sector health institution for delivery due to lower cost of the health-care.

The variable of birth-interval has been classified as illness factor under the Anderson and Newman (2005) model. The multivariate binary logistic regression show that birth-interval greater than or equal to 24 months decreases the probability of the choice of public health institution. The negative association may be explained as the shorter birth-interval increasing chronic and general under nutrition (Rutstein, 2005) which increases the delivery complications and households prefer the private sector health institution due to assumption of good quality of private sector.

The number of previous pregnancies by the woman may affect the choice of public sector health institution for delivery positively or negatively based on the economic and health factors. The small number of pregnancies represents the comparatively lesser economic burden on the household for maternal health-care so they may avail private health institution. As the illness factor, the higher number of previous pregnancies devastates the woman health so the woman needs good quality and costly health-care which increases the probability of choice of private health-care institution. The earlier pregnancies particularly the first pregnancy is assumed requiring more attention, care and quality medical provision. So the households prefer private health institution. On the other hand larger number of pregnancies represents the high economic burden of

maternal health-care so for the next pregnancy the households prefer the low-cost public sector health institution. Furthermore, due to earlier pregnancies the women gain confidence and awareness about the procedure and they assume less need for experts on costly health-care and prefer the public sector health institution. The results have shown that smaller number of pregnancies (1-3) decreases the probability of the choice of public health institution for delivery. The explanation of this may be that higher number of pregnancies put the economic burden on the household which force the household to utilize public sector health facilities. Furthermore, the phenomenon of large number of pregnancies is related with poor households. These households prefer the public sector health utilities due to subsidized cost (Arther 2012). In the analysis, the smaller number of pregnancies includes the first pregnancy which needs particular health-care so the households utilize the private health institution (Kitui, et. al. 2013 for Kenya).

The pregnancy complication by the woman decreases the choice of public sector health institution for delivery. The variable is part of the illness factor as if a woman has information about the complication in current pregnancy there is strong need for maternal health-care. She would prefer to go to private sector health-care institution. Our results have supported the view that the women who need intensive care for delivery they prefer the private sector health institution.

6. Conclusion and Policy Recommendations

The objective of the study was to see the factors which determine the choice of public or private sector health institution for delivery by women. The results have shown that affordability of the delivery cost in private sector health institution expressed by the educational level of the woman and her partner, and wealth index or socioeconomic status of the household increases the private sector health utilization. On the basis of our hypothecation it may be concluded that private sector competes to public sector. The both sources of health-care are substitutes to each other. The households choose the private sector for delivery care on quality basis. The awareness about the maternal health-care and general awareness captured by media exposure, education of the woman and the partner also increase the choice of private sector health institution for delivery. It confirms the confidence of households on private sector.

The autonomy of the woman at the household level increases the choice of private sector health institution. It explains the confidence of woman on private sector health institution. Similarly the illness factor like the shorter birth-interval, number of pregnancies and pregnancy complications which needs intensive care during pregnancy and delivery also enhance the probability of choice of private sector health institution for delivery. It means that for the care of severe cases of delivery the women go to private health sector. It also explains the household's confidence on private sector.

The four points which enhance the utilization of private sector health institutions, i.e. affordability of private sector health institutions, awareness and information about the maternal health-care and sources, the serious need of delivery health-care and woman autonomy explain that private sector health institutions are better in quality, access and care as compared to the public sector health institutions.

It may be concluded that quality in the basic drive for preference of private sector institution. In the policy perspective it may be recommended that quality of public sector health institution should be increased to enhance the trend of public sector health services

utilization. It may be disaggregated into medical staff availability, infrastructure and behavior of the staff. As the qualification of the staff is concerned it is equal in both types of health institutions. It is already discussed that the medical experts from public sector after their duty hours joins the private sector. So the difference may be in availability of staff, timeliness, infrastructure and behavior. These two aspects need the attention of policy makers.

The regulatory mechanism is proposed for both sector health institutions. The quality of public sector institutions should be regulated by some public sector authority and evaluation system may be introduced to rank the hospital (such as universities by Higher Education Commission of Pakistan). It will increase the quality of overall hospitals (see also Andaleeb 2000 for Bangladesh).

The results may not be generalized as data-set of the current study comprised of a single city of the country and inclusion of supply side determinants are essential to make conformity for increasing tendency of private sector health utilization for delivery.

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