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Gender Differentials in Preventive Health Care: Incidences and Determinants among Pakistani Children

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Abstract

In this study, an attempt has been made to estimate gender health differential with a focus on preventive health care. Using the Pakistan Demographic Health Survey (PDHS) of 2006-07, the study has targeted the children of age 12-23 months and found substantial sex differences in the immunization status of children where boys are more immunized than girls, reflecting gender biasness over preventive health provision. Through bi-variate and multi-variate analysis, the study found that a variety of factors, including individual, socio-demographic and economic factors are causing this dilemma. Mother's characteristics including age, literacy and headship of the household significantly affect the immunization status of the children. Similarly, the socio-economic status of the household including income, household size, structure and gender of the head of the households are also the key determinants of preventive health care differentials. Across the provinces, the variation of coverage and discrimination is also evident with more coverage in Punjab and least in Baluchistan.

Keywords: Human Health, Children, Child care, Discrimination.

1. Introduction

Good health is essential for the survival s well as the general well-being of individuals, is also an important indicator of development at the national level. Healthy population is a prerequisite for enhancing economic growth, especially of children who are the basis of future human capital and productive labor force. According to United Nations Children's Fund (UNICEF), the provision of adequate health and education are the fundamental human rights that must be granted to every child irrespective of their race, ethnicity, religion and gender. 2nd, 3rd and 4th goal of the Millennium Development as set by the United Nation has also mentioned a similar priority.

Gender inequalities are apparent and wide-spread in access to health care services in different parts of the world and are more pronounced especially in South Asia (Hill and Upchurch, 1995; Pandey et al, 2002). The preference for having male children is deep rooted in South Asian culture, thus making a girl child more vulnerable to malnutrition,

poorer physical growth and lower health status (MHHDC, 2004);[1] resulting higher childhood mortality among girls (Chen, Huq and D'Souza, 1981).

During infancy, the genetic factors largely determine the probability of survival. As biologically, the girls are comparatively stronger than the boys, therefore the mortality of girls is lower as compared to the boys. However, after the age of infancy, the behavioral and/or the environmental factors are more susceptible to affect influence the survival of child as the child starts taking supplementary foods and the environmental factors affects the hygiene. It is the crucial time when he/she needs extra care from parents to overcome a host of infections that are mostly associated with contaminated weaning foods. However, in less developing countries especially in the South Asia, the reversal of excess female deaths during childhood is indicative of discriminatory behavior against girls as the birth of girls are not as warmly welcomed as the birth of boys. Even after the age of infancy, girls are fed last and least and they are less likely to receive treatment during sickness (Behrman, 1988; Bhatia, 1983; Hazarika, 2000).

The gender discrimination against girls in health care can be seen in two ways; active elimination and passive elimination.[2] Active elimination can be seen in terms of female infanticide and sex-selective abortions while in the later, the girls are neglected in preventive and curative health care treatment.

Like other countries of the region, Pakistan is also a traditional son preference society as son is considered a source of power, satisfaction and pleasure for the family (Khan and Sirageldin, 1977; Sathar, 1987). However, such discrimination would result to the higher morbidity and higher mortality rates among the female children. Further, it would lead to a gender-based differential in the allocation of food and health care that obviously favor boys than girls. The consequences of such discrimination are perpetuated in reproductive years or even across generations (Pande, 2003; Patra, 2008). On one side, such biasness would undermine the efforts to achieve the health upgrading when resources are already limited as Pakistan is hardly investing only 0.5-0.6 percent of its GDP on health since 1980. On the other side, it would harm the entire society with a heavy economic cost by damaging the health of all, including the men.

In Pakistan, a girl of one to five year age is more likely to die by 30-50 percent as compared to the male with variations across the region and provinces (Filmer et al., 1998). The Global Gender Gap Report (2011) has ranked Pakistan at 133 number out of 135 countries, reflecting among the countries of having very high gender disparities in health provision. Research evidence shows that in Pakistan the major causes of sickness of children are infectious diseases, many of which are preventable through vaccinations (Khan, 1993). Realizing this, the government of Pakistan is making tremendous efforts to increase the Expanded Programme on Immunization (EPI) that would help to achieve the MDG target of universal child immunization by 2015.

This study enfolds in two objectives; first is to analyze the gender differentials in preventive health care treatment of children in Pakistan by observing the coverage of

[1] Mahbub ul Haq Human Development Centre

[2] In Pakistan active elimination is not common because abortion is not legal in the country due to moral and religious factors. However, there is evidence of passive elimination against girls (Filmer, King and Prichett, 1998) Hazarika, 2000; Mahmood and Mahmood, 1995).

immunization status. The preventive measures include immunization, breastfeeding and age for the start of supplementary food (Mahmood and Mahmood, 1995). Among these, immunization status is the most commonly used measure for preventive health care (Hazrika, 2000; Mishra et al., 2004; Pande, 2003). The second objective is to investigate the underlying socio-demographic and economic factors which are contributing to gender differentials in preventive health care treatment of children in Pakistan. The structure of this paper is organized as follows. A review of literature has been reported in section 2 followed by section 3 with details over data and methodology. The penultimate section discussed the results followed by conclusions and policy considerations in the final section.

2. Preventive Health Care: A Review of Literature

The persistence of gender discrimination against girls in health care and mortality during childhood ages (1-4 years) has been widely documented in various South Asian studies. Using the Demographic Health Surveys (DHS) dataset, Hill and Upchurch (1995) examined the gender disparities in health outcomes among children in 35 developing countries and found differences in immunization coverage. The study of Arnold (1992) found the link between son preference and gender differences in child health indicators. Fikree and Pasha (2004) estimated that the neglect of girls was found at all ages in South Asia with the highest gender based health disparity in the world among the under five year children. These disparities may be in the form of poor nutrition, lack of preventive care, delays in preventive care and delays in seeking health care for disease which results in differences in their probability of dying and healthy life expectancies at birth.

'There is no need to provide (preventive) care to the girls, not even in infancy. They are like Kikar (acacia, a thorny plant which grows without any care). Girls will grow up without any care just as the Kikar tree grows up without any care. But boys are like Shisham (a precious timber wood tree which needs special care to grow).Moreover, caring for a girl means caring for someone else's bag (garden) because she is a Paraya Dhan (other's property) and will go to others house after marriage' (mother of three daughters and one son; Jatrana, 2003).

As prevention is better than curative and it reduces hospitalization and treatment costs, therefore, the preventive care measures have been adopted in order to avoid a disease. Immunization is the most commonly used measure for preventive health care (Jatrana, 2003; Mishra et al., 2004; Pande, 2000). It is also an indicator of parent's motivation to ensure a child's future wellbeing. As argued by (Pande, 2003) that parents are more likely to care for desired (male) children as compared to unwanted (female) children, thus neglect can be seen in immunization.

In Haryana State (India), the girls are less likely to receive each of the individual vaccinations with variations over various age brackets. Moreover, the immunization status has also been influenced by the birth order of the child and also by socioeconomic status and the level of awareness of the household (Jatrana, 2003). Targeting the children of age 12-23 months and using the two periods survey National Family Health Surveys (NFHS), Mishra et al. (2004) also found significant gender differentials in immunization in both the survey with rising level of overall vaccination. Girls with higher birth orders and have multiple sisters face more discrimination in receiving vaccinations (Arokiasamy and Pradhan, 2005; Patra, 2008).

Corsi et al., (2009) found that girls have significantly lower coverage of immunization for BCG, DPT, and measles in the three Indian National Health Family surveys undertaken between 1992 and 2006. The study also found that the girls with a surviving older sister were less likely to be immunized. Pande and Yazbek (2003) analyzed the 17 Indian States and found the higher immunization rates among boys and children living in urban areas and belong to wealthy families. A case study of Bikaner (Rajasthan) found that in addition to being less likely to get fully immunized, girls drop out at a faster rate than boys for the three dose vaccinations of DPT and Polio (Gupta, Jain, and Singh; 1978) and they are immunized at a later age than boys (Sharma and Sharma, 1991).

The findings of Singh (2012) show that over the coverage of immunization (under five year), the female children are at more disadvantaged position in Nepal and India out of four South Asian countries (Bangladesh, Nepal, India and Pakistan). Using the Pakistan Integrated Household Survey (PIHS) 1991 and Pakistan Demographic Health Survey (PDHS) 1990-91, Mahmood and Mahmood (1995) and Hazarika (2000) found that boys are more likely to be immunized than girls in Pakistan. The study of Barcellos, Carvalho and Liheras-Muney (2012) have shown that the boys are more likely to be breastfed longer, and to be given vaccinations and vitamin supplements and received more child care time than girls.

3. Data Description and Methodological Framework over Preventive Health Care

3.1 Data Sources

This study has used the nationally representative dataset Pakistan Demographic Health Survey (PDHS) 2006-07. It is one of the largest surveys which provide information on various demographic and health related characteristics of women by covering a sample of about 100,000 households. The provincial sample distribution is representative of the proportion of population in each province: Punjab the most populous province has sample share of more than 50 percent.

Four sets of questionnaires were administered to gather information on a wide range of topics. First set cover the child by covering the information over fertility, infant, child and maternal mortality, family planning, nutrition, mother and child health and knowledge of diseases at national and provincial levels. The women's part collects the information from married women about their complete birth histories during their reproductive years. The household part covers the demographic and socioeconomic information on respondents' households and the community/village part gathered data on the facilities and services in rural areas and communities (Pande, 2003; Pande and Yazbek, 2003).

3.2 Methodological Framework over Preventive Health Care

As this study aims to analyze the gender differentials in preventive health care of children by focusing on immunization status in which the children of age 12-23 months has been selected for analysis. The targeted sample is comprised on 816 male children (54%) and 706 female children (46%). Children of the age 12-23 months have been selected for the analysis providing each child an appropriate exposure time for the full range of vaccinations as specified by World Health Organization (WHO) guidelines to ensure that each child is fully vaccinated by the time they complete their first year of life. The PDHS has detailed information related to the status of eight vaccinations which are diphtheria, pertusis, tetanus, three doses of poliomyelitis vaccine, measles vaccine and tuberculosis

vaccine. The detailed schedule of vaccination card has been mentioned in Appendix Table B1.

The second objective is to find out the determinants of vaccination coverage which is an indicator of preventive health care. As suggested by the empirical findings, the child preventive health care is influenced by the individual characteristics of the child including the sex of the child and by many other socio-economic and demographic factors. To find out the effect of these determinants, the study has undertaken both the bi-variate and multivariate analysis. In PDHS survey, the vaccination card covers eight types of vaccines with its range from 0 'no vaccination' to 8 'complete vaccination' of children with age 12-23 months. For multi-variate analysis, the categories 1 to 8 has been grouped together to form one group 'vaccination received' and the other one is no vaccination received. Now the immunization status is dichotomous in nature, with only two values; 1 if a child is vaccinated and 0 if he/she not, therefore the logistic regression has been applied. Logistic regression analysis is a uni/multivariate technique which allows for estimating the probability that an event occurs or not, by predicting a binary dependent outcome from a set of independent variables.

$$p_i = E(Y = 1 \mid X_i) = \beta_1 + \beta_2 X_i$$

$$p_i = E(Y = 1 \mid X_i) = \frac{1}{1+\exp\left[-(\beta_1+\beta_2 X)\right]_i} = \frac{1}{1+\exp(-Z_i)} \qquad (1)$$

Where $Z_i = \beta_1 + \beta_2 X$

The equation a1 is known as the (cumulative logistic distribution function. Here Z_i ranges from $-\infty$ to $+\infty$; P_i ranges between 0 and 1; P_i is non-linearly related to Z_i (i.e. X_i) thus satisfying the two conditions required for a probability model. In satisfying these requirements, an estimation problem has been created because P_i is nonlinear not only in X but also in the β 's. this means that one cannot use OLS procedure to estimate the parameters. Here P_i is the probability of being mismatch is given by;

$$P_i = \frac{1}{1+\exp(-Z_i)}$$

And 1- P_i is the probability of not being mismatch is given by;

$$1 - P_i = \frac{1}{1+\exp(Z_i)}$$

Therefore, we can write

$$\frac{P_i}{1-P_i} = \frac{1+\exp(Z_i)}{1+\exp(-Z_i)} \qquad (2)$$

P_i /(1-P_i) is the odds ratio in favor of being mismatch i.e. the ratio of the probability that a child will be vaccinated to the probability that it will not be vaccinated. Taking the natural log of equation 2 will give us;

$$L_i = \ln \left[P_i / (1 - P_i) \right] = Z_i = \beta_1 + \beta_2 X_i$$

That is the log of the odds ratio is not only linear in X, but also linear in the parameters. L is called the Logit. The following equation has been estimated to find out the determinants of vaccination status;

$$VC_i = \delta_0 + \delta_1 I_i + \delta_2 HH_i + \delta_3 RG_i + \varepsilon_i \qquad (3)$$

Where the dependent variable VC_i represents the corresponding level of vaccination status for child i, while on the right hand sides, I_i is the vector of independent variables measuring individual characteristics for child i. vector HH_i measures the household characteristics while the vector RG_i measures the regional characteristics.

4. Preventive Health Care Results: Incidences and Determinants

4.1 Univariate and Bi-variate analysis

Table 1 presents a dismal picture of poor heath status of children especially among the girls. Based on information obtained from vaccination card or as reported by the mothers, the results show that 47.3 percent of children aged 12-23 months are fully vaccinated leaving more than half of the children not fully protected against infectious diseases in the year 2006-07. This rate (47.3%) shows the rising trend of immunization coverage with an increase of 12 percentage points; the previous level of coverage was 35 percent in 1990-91. However, the pace of coverage is low and it is likely that Pakistan would not achieve the universal child immunization target by the year 2015, one of the targets of the MDGs.

Across the gender, table table 1 shows that about 44 percent of girl children are fully immunized as compared to the 50 percent of boys, reflecting a meager picture in girls. The detailed breakdown of coverage for each vaccination also shows a similar trend with less vaccinations received by girls than boys. Overall, Polio vaccinations have much higher coverage rates than the others which is largly due to the heavy publicity compaigns by the government of Pakistan and the door step services during the past few years. On the other hand, measles have not only lower coverage rates for both boys (63.1percent) and girls (56.1percent) but also indicate a significant gender gap in the provision of measles vaccine. Similarly, BCG has also a lower coverage rate with boys having an edge over girls in coverage of BCG (82.2% vs. 78.2%).

The last column of table 1 portrates the ratio of girls to boys which is less than one in all the eight vaccination, thus reflecting the disadvantage in vaccination provision of the girl children. Many studies have considered the sex of the child as one of the key determinant of immunization. These results are consistent with the other studies of South Asia (Hazarika, 2000; Mishra et al., 2004; Pande, 2003; Pande and Yazbek, 2003).

Table 1: Percentage of Children Aged 12-23 Months, According to Vaccination Status and Type of Vaccines by Sex of the Child, Pakistan, 2006-07.

Vaccination Status	Percentage vaccinated (weighted)			
	Boys	**Girls**	**Total**	**Girls/Boys**
Percentage fully vaccinated*	49.8	44.3	47.3[3]	0.88
Percentage ever vaccinated	93.6	92.0	92.8	0.98
No vaccination	5.1	7.1	6.0	1.39**
Has vaccination card	24.0	23.6	23.8	0.98
Type of Vaccines				
BCG	82.2	78.2	80.3	0.95
DPT 1	77.1	71.9	74.7	0.93
DPT 2	69.9	62.2	66.4	0.88
DPT 3	61.6	55.4	58.7	0.89
Polio 0	59.4	52.8	56.3	0.88
Polio 1	93.4	92.4	92.9	0.98
Polio 2	91.2	90.0	90.6	0.98
Polio 3	84.5	81.7	83.2	0.96
Hepatitis B1***	73.9	67.7	71.0	0.91
Hepatitis B2	67.3	60.0	64.0	0.89
Hepatitis B3	59.9	54.2	57.1	0.90
Measles	63.1	56.1	59.9	0.88
Total (N)	**816**	**706**	**1522**	

*Information obtained from card or mothers report.

** Ratio greater than one for no vaccination shows female disadvantage.

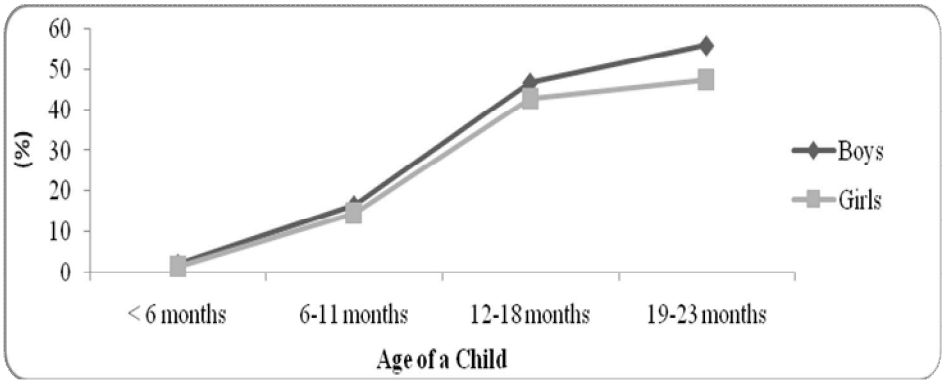
*** The Hepatitis B vaccination is recently initiated and should also be given to the child before he/she reaches the age of one year.

Source: Calculated from PDHS, 2006-07

As pointed by Arnold, Choe and Roy (1998) that the other demographic and socio-economic factors also influence the gender differentials in immunization status of children. Child's age has also been considered an important factor for receiving vaccinations as it should be started soon after child's birth and completed during the first year of the life. As shown in figure 1 that the age has a positive association with the complete vaccination. However, the rising gap between boys and girls by age is also apparent where boys are relatively more immunized than the girls at all age brackets, is consistent to the earlier findings (Gupta, Jain, and Singh, 1978; Sharma and Sharma, 1991). The increased gender gap in vaccination beyond one year of age is a reflective of the neglect of health care needs of girl children by the parents.

[3] It includes BCG, measles and three doses each of DPT and Polio vaccine (excluding Polio 0 and three doses of hepatitis B vaccine)

Figure 1: Complete Vaccination (%) by Age and Gender of a Child.



Source: Calculated from PDHS 2006-07

Birth order has also been considered as an important variable to explain gender differentials in health care. It is expected that higher birth order children are usually given lesser attention in terms of health care, especially in case of girl children. Table 2 shows that an increase in birth order increases the discrimination against girls in complete immunization status. For example, for birth order of 4+ children, about 38 percent of girls are fully immunized as compared to 42 percent boys. Moreover, the gender differential in complete vaccination is more among those children who are not breastfed (52 % boys vs. 46% girls), while no such difference between boys and girls exists for those who are breastfed. It implies that mothers who breastfed their children are comparatively more aware and know the importance of breastfeeding and child vaccination for good health and survival of children.

Table 2: Distribution of the Completely Immunized Children (12-23 months) by Child Characteristics and Gender.

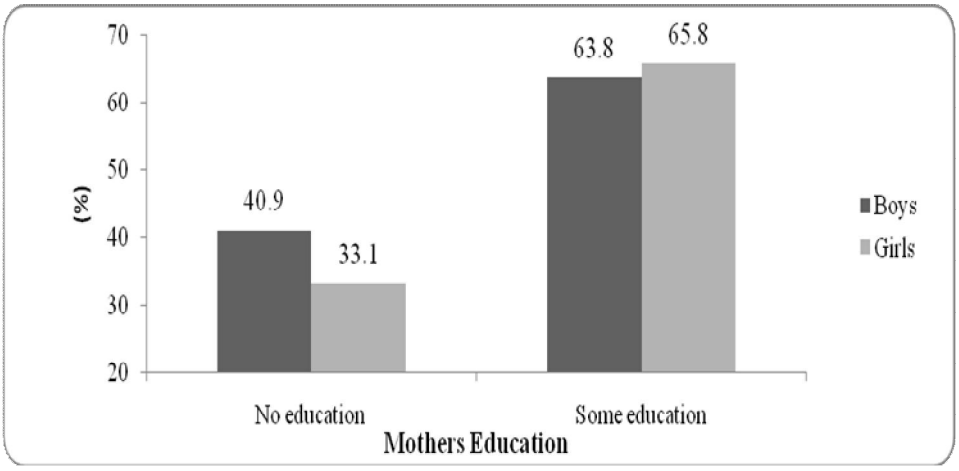
Child Characteristics	Boys	Girls	Total
Child's Birth Order			
1	47.7	47.5	47.6
2	47.9	44.2	45.9
3	47.0	44.0	45.5
4+	42.1	37.9	40.1
Child Ever Breastfed			
No	52.0	46.0	49.3
Yes	44.6	42.4	43.6

*Weighted percentage.
Note: Total includes 719 completely immunized children.
Source: Calculated from PDHS 2006-07

Figure 2 shows that educated mothers are also less likely to discriminate against girls over health care practices. The complete immunization is in the favor of boys among the

illiterate mothers while it is in the favor of girls where the mothers have some sort of literacy. Our results are in agreement that "education enhances knowledge about effective ways to prevent, recognize, and treat childhood illnesses" [(Cleland, 1989, p.17) cited in Streatfield et al, 1990]. .

Figure 2: Complete Immunization (%), by Mothers Education and Gender of a Child.



Source: Calculated from PDHS 2006-07

Regarding the other mother characteristics, the female headship also shows a positive association with child's complete immunization status (table 3). The structure of family type shows the higher percentage of completely immunization in the joint families than the nuclear families. 36.5 percent of girls who living in nuclear families are completely immunized as compared to the 43.1 percent boys. In joint families, this ratio is 53.1 percent in boys and 48.5 percent in girls with less gender difference as compared to the nuclear families. These results suggest that the impact of multiple care takers on girls' health is positive. These findings are consistent with the previous study on the effect of family type on gender differentials in immunization status of children in Pakistan (Ali, 2000).

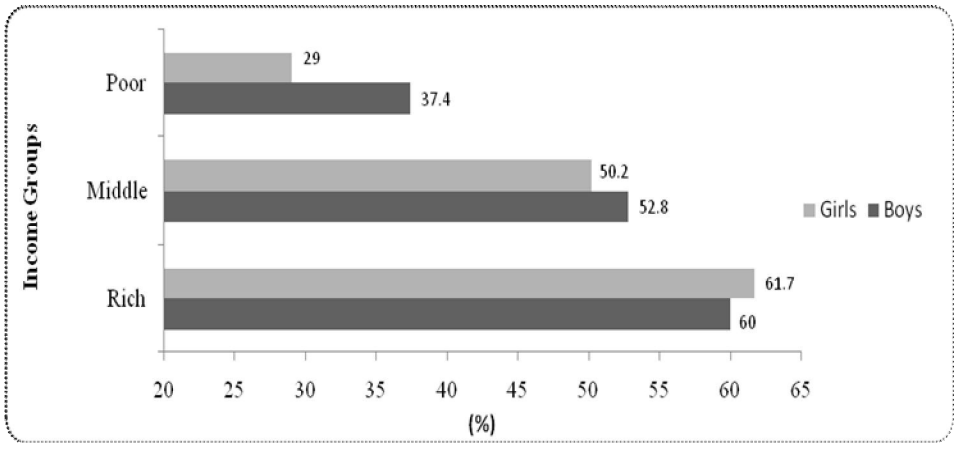
Table 3:Distribution of the Completely Immunized Children (12-23 months) by Background Characteristics of Mothers and Gender

Characteristics of Mothers	Boys	Girls	Total
Household Headship			
Male	49.2	43.9	45.6
Female	56.6	49.8	53.7
Family Type			
Nuclear	43.1	36.5	39.8
Joint	53.1	48.5	50.5

*Weighted percentage.
Note: Total includes 719 completely immunized children
Source: Calculated from PDHS 2006-07

The socio-economic status (SES) of a household is an important determinant of child health utilization. Since the poor households have fewer resources, therefore they usually tend to spend more on boys as compared to girls implying that poorer households have traditional attitudes and they consider that sons will give return to them in old age while daughters would move to husband's home after marriage. A similar scenario is evident in figure 3 where differentials against girls can be seen among poor households (income quintiles), but with an increase in income the girls disadvantage decreases in complete immunization in rich households. These results are supported by some other studies for India (Jatrana, 2003; Pande, 2003).

Figure 3: Complete Immunization (%), by Wealth Quintiles and Gender of a Child



Source: Calculated from PDHS 2006-07

Regarding the family size, table 4 shows the positive impact of household size on girls complete immunization status. It implies that when more members of the household are available in the household, there is relatively easier provision of health care services for children when required. Similarly access to media (TV and radio) is also an important in terms of availability of knowledge and source of information regarding child health care.

As shown in table 4, a significant gender gap exists between boys (40%) and girls (30.2%) in complete vaccination coverage for those households which have no access to media. However, on the other hand, gender differentials in immunization status almost disappear in those households where the access to media is existing.

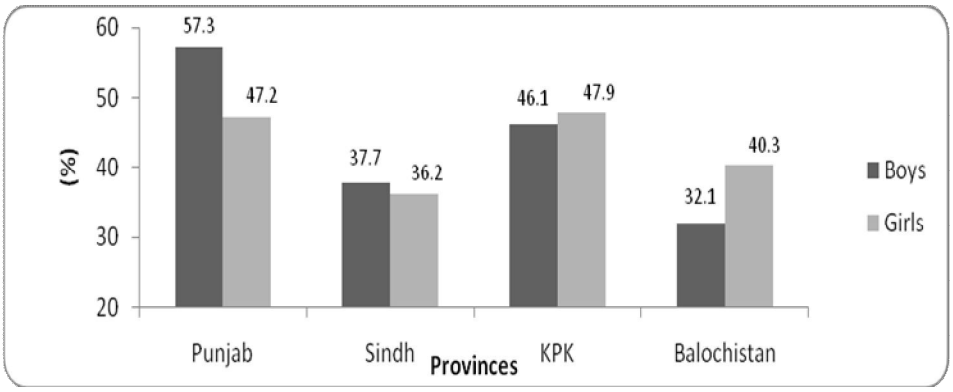
Table 4: Distribution of the Completely Immunized Children (12-23 months), by Household Characteristics and Gender

Household Characteristics	Boys	Girls	Total
Household Size			
0-5 members	47.7	39.5	43.7
6+ members	50.2	45.4	48.0
Access to Media			
No	40	30.2	35.4
Yes	54.7	52.6	53.7

*Weighted percentage.
Note: Total includes 719 completely immunized children.
Source: Calculated from PDHS 2006-07.

Regarding regional disparities over complete immunization status, the provinces Punjab and Sindh have a more coverage of boys over complete vaccination while the provinces Khyber Pakhtunkha (KPK) and Baluchistan have a more coverage of girls. In Sindh and KPK, the difference of discrimination is relatively less as compared to the other two provinces (figure 4). It might reflect the uneven government immunization campaigns and targeting as well as the local cultural factors and norms. People of these provinces are more aware and alert about the benefits of child vaccination. The provinces Punjab and KPK have a higher level of complete immunization coverage.

Figure 4: Complete Immunization (%), by Provinces and Gender of a Child



Source: Calculated from PDHS 2006-07

4.2 Preventive Health Care: A Multivariate Analysis

The previous bi-variate analysis has shown that gender differentials in child health care practices are evident when we examined in terms of selected individual, socio-demographic and economic factors. As detailed in section 3.2 and in the context of equation 3, the determinants of immunization status have been estimated by the logistic regression model to determine the net effect of predictor variables on immunization status of children. For a deeper analysis, a separate multi-variate analysis has been undertaken for boys and girls to observe whether the results differ across the gender or not.

The results presented in table 5 (Model 1) indicate that sex of the child has a significant effect on the complete immunization status as the odds of getting immunized for boys are nearly 1.5 times higher than the girls who are not immunized. Although gender appears to be significantly affecting the immunization status, the effects of predictor variables vary between boys and girls. Looking at the regression results separately for boys and girls, it has been found that with an increase in birth order, the child is less likely to be immunized as expected (as shown in model 1), but the differential effect is significant only for boys (as shown in model 2). These findings are interesting as it is expected that birth order affects girls more than boys because girls with higher birth order are likely to be unwanted and face more neglect and ignorance of parents than girls with lower birth order.

Similarly, the sex composition of elder siblings does not appear to be a strong predictor of immunization. The odds of better immunization status increase with elder siblings as compared to a child with no surviving older sibling; however, the results are significant only for one elder brother (model 1). For girls in model 3, the odds of being immunized with one or more older brothers are much lower than those with no siblings or one sister only. Boys, on the other hand in model 2 are less likely to be immunized in the presence of two or more elder sisters, but having one or more elder brothers makes significant difference in increasing their likelihood of immunization as the odds of being immunized are 5 times higher for boys with one elder brother and 7 times higher with two or more brothers. These results are somewhat similar to what we observed in our bi-variate analysis and need further probing of data.

Table 5: The Determinants of Immunization of Children (12-23 months)- Logistic Regression

Covariates	Model 1 (Total)	Model 2 (Boys)	Model 3 (Girls)
	Odd Ratio	Odd Ratio	Odd Ratio
Sex of the child (boy=1)	1.473**	-	-
Birth order (1 as ref.)			
2	0.824	0.393	0.300
3	0.368	0.074*	0.362
4	0.578	0.095*	0.373
Elder surviving siblings (none as ref.)			
1 sister only	2.001	2.947	0.769
2+ sisters only	2.336	0.958	1.233
1 brother only	4.257*	5.332**	0.919
2+ brothers only	2.075	7.345**	0.325
Mixed	2.936	13.159*	0.306
Mothers' age (<20 years as ref.)			
20-34 years	3.265**	5.512*	2.688
35+ years	3.910**	6.121*	1.904
Literacy of mother (literate=1)	2.566*	1.778	3.135*
Work status of mother (work=1)	0.699	0.751	0.584
Sex of Head (male=1)	0.187**	0.401	0.327*
Access to media (yes=1)	2.337*	1.931*	2.754*
Wealth quintiles (poor as ref.)			
Middle	1.864*	1.436	2.949*
Rich	1.362*	1.870	1.132*
Provinces (Punjab as ref.)			
Sindh	0.321	0.667	0.746
Khyber Pakhtunkha	0.174	0.373	1.184
Baluchistan	0.063*	0.041*	0.075*
Constant	65.569	11.68	32.058
Log likelihood	-638.134	-303.068	-304.068
Chi-square	189.615 (25)*	129.259 (24)*	90.774 (24)*
N	1478	807	671

Source: Calculated from PDHS 2006-07

* significant at 5%, ** significant at 10%

Note: Model also includes the household size, child ever breastfed, family type and area of residence.

The odds of getting immunized are much higher among children with educated mothers compared to those who are not immunized and have illiterate mothers. However, in the case of boys, it is not significant. As education brings knowledge and rationality to mother's attitude, educated mothers tend to show less discrimination towards girls in terms of being immunized. For working mothers, children are less likely to be fully immunized than children of non-working mothers. This finding is contrary to expectation but based on the theory and empirical evidence that work affects quality and care of children in terms of time as working mothers have less time for child care. In further, the

quality of work should be explored more as the majority of women are the unpaid family helper which is not a decent work activity. Mother's age also shows a positive association with immunization status. Children of older mothers have higher odds of immunization but its effect is significant only for boys (model 2) and for the total sample. This may be because boys are considered to be a source of strengthening mothers' status and autonomy in the household so older mothers gives more attention on boy's immunization than girl's immunization.

Interestingly, children who live in male headed households are less likely to be immunized than living in female-headed households. The results are statistically significant for girls and for the total sample. It indicates the positive effect of female autonomy on child health care, particularly for daughters (Mason, 1995). Access to media also appears to be strong predictor of child's immunization status as the odds of getting immunized are twice as high for boys and 2.7 times greater for girls for households with access to media. This may be due to the knowledge and awareness which media gives to the mothers. Similarly, an increase in income increases the likelihood of being immunized. However, being non-poor is significant for girl children than boys. Across the provinces, the province Baluchistan is likely to be immunized for the both boys and girls as compared to the reference category Punjab.

5. Conclusions and Policy Implications

This study has analyzed the gender health differential where the coverage of immunization has been used as a preventive health care measure. By targeting the children of age 12-23 months, the study has found substantial sex differences in the complete immunization status of children where boys are more immunized than the girls. Individual vaccinations are also less received by girls than boys. This reflects the prevalence of greater health care provided to boys because of son preference in Pakistan and greater economic value attached to males.

Regarding the determinants of preventive health care, the various demographic characteristics including multiple siblings and higher birth order affects the immunization status with more coverage to boys. Mother's characteristics including age, literacy and her headship of the household significantly affect the complete immunization status of the children by not only improves the overall immunization status but also tends to reduce gender difference by these characteristics.

As for the socio-economic status of the household, more discrimination against girls in complete immunization has been found in poor households as compared to the rich households. Access to media has also a positive impact on immunization. Across the provinces, the variation of coverage and discrimination is also evident with more coverage in Punjab and least in Baluchistan. Based on these findings, our results suggest focusing more on the key covariates which have a positive effect on immunization coverage. Some recommendations are as follow;

First, a parallel effort is required to reduce poverty as it is an important indicator to overcome gender biasness. It would resolve not only the issue of biasness but also the issue of affordability as the higher income would naturally lead to the better investments in child health. Second, the awareness, education and empowerment of mother should be a key focus in government policies as the educated mothers tend to be less discriminatory behavior and more concerned about the betterment of their child. Third, the access to

media should also be extended more and more. It has mainly focused on the polio coverage, while the others were relatively ignored. In this case, the far-flung and poor areas should be targeted especially to overcome the regional and provincial variations. Some additional research and analysis is also required to analyze the provincial variation and sibling behavior as it might be a data problem.

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