

Welfare Impact of the Lady Health Workers Programme in Pakistan

SHUJAAT FAROOQ, DURR-E-NAYAB, and G. M. ARIF

1. INTRODUCTION

With the year 2015 fast approaching, Pakistan is not likely to achieve most of the health targets set in the Millennium Development Goals [Pakistan (2010)]. High levels of child and maternal mortality and child malnutrition are among the major health challenges facing the country. Along with this enhanced vulnerability for children and women there is also an economic divide in the society because these health challenges are more profound for the poor segment of the population than for the better off. Another divide is between the rural and urban populations due to concentration of health facilities in urban centres of the country. The high cost of dealing with health issues adversely affects the poor and rural population, lowering their productivity and limiting their lifetime achievements. Without substantially improved health outcomes it is impossible to break out of the cycle of poverty [OECD (2003)].

The government of Pakistan has taken several initiatives to improve the health status of the population, particularly women and children, and the Lady Health Workers (LHW)¹ programme is one such initiative. The LHW programme was launched in 1994 with the core objective of reducing poverty by providing essential primary health care services to people at large and hence also improving the national health indicators. The programme also envisaged to contribute to the overall health sector goals of improvement in maternal, new-born and child health, provision of family planning services, and integration of other vertical health promotion programmes.

The performance of the LHW programme was evaluated by the Oxford Policy Management (OPM) in 1999 and 2008-09. According to their 1999 report, the LHW programme has had a positive impact on the health outcomes in its catchments areas.

Shujaat Farooq <shjt_farooq@yahoo.com> is Assistant Professor at the Pakistan Institute of Development Economics, Islamabad. Durr-e-Nayab <dnayab@gmail.com> is Chief of Research at the Pakistan Institute of Development Economics, Islamabad. G. M. Arif <gmarif@pide.org.pk> is Joint Director at the Pakistan Institute of Development Economics, Islamabad.

¹LHWs provide primary healthcare services, including disease prevention, cure and rehabilitative services, and family planning, in rural areas and urban slums, with more than 75 percent of the population served by LHWs living in rural areas. LHWs reside in the locality they serve and their homes are called health houses. Each LHW covers approximately 200 houses, which is an average of over 1200 individuals. LHWs are supposed to visit each household in their assigned area at least once a month. Each LHW is attached to a government health facility, from which they receive training, a small allowance, and medical supplies. Provincial and district coordinators monitor and supervise the LHWs. The average annual salary of LHWs is \$343 who are not allowed to engage in other paid activities. 110,000 currently deployed. Target is 150,000.

These outcomes include childhood vaccination rates, reversible methods of contraception (especially in rural areas), antenatal services, provision of iron tablets to pregnant women, child growth monitoring and control of childhood diarrhoea among the lower income and poor households. The OPM 2008-09 evaluation report stated that the LHWs have played a substantial role in preventive and promotive care and in delivering some of the basic curative care to the communities, along with providing referral to emergency and tertiary care [OPM (2009)].

The evaluations of the LHW programme, however, did not carry out an in-depth analysis of the distributional impact of the programme. Health and poverty nexus is well documented and the literature shows that a family's wellbeing is strongly tied to the physical health of its members (WHO, 2003). An effective intervention in the health sector improves the delivery of health services, which impacts positively the health status of a population. This improvement in the health status affects the well-being of the people by enabling them to take benefit of the available economic opportunities more efficiently.

The present paper aims to: analyse whether the LHWs serve the poor and the vulnerable disproportionately; examine the contribution of the LHW programme in improving child and maternal health; and analyse the poverty reduction impact of the LHW programme. To achieve these objectives the paper is organised into five sections. The next section presents a very brief review of the health and poverty situation in Pakistan. It also outlines the main features of the LHW initiative. The data source and methodology used in the paper are discussed in section 3 followed by investigating whether the LHW programme has served the poor disproportionately in section 4. The health seeking behaviour of the beneficiaries (women visited by the LHWs) and non-beneficiaries (women not visited by the LHWs) is examined in section 5. Section 6 explores the impact of the LHW programme on the health outcomes of women and children and their poverty status. The final section presents the conclusions of the study and draws some policy recommendations.

2. HEALTH, POVERTY AND THE LHW INITIATIVE: A BRIEF REVIEW

Child and maternal health are considered important summary indicators of the development of a country. MDGs 4 and 5 are related to child and maternal health. Goal 4 is to reduce child mortality while goal 5 is to improve maternal health. Pakistan has made some improvements in the indicators related to these goals but the progress remains slow and unsatisfactory. Table 1 presents data on child and maternal health indicators, covering the 1990-91 to 2008-09 period along with the MDG targets for 2015. Pakistan lags behind in achieving the goals for two important indicators of child health. The first goal is to reduce under-five mortality to 52 deaths per 1000 by 2015 from its current level of 94 deaths per 1000. The second goal is reduction in infant mortality to 40 deaths per 1000 live births from the current level of 75 deaths per 1000 live births. It seems difficult to attain both these goals by 2015. The performance for immunisation of children and reduction in diarrhoea cases can, however, be considered satisfactory (Table 1). The performance of indicators related to maternal health shows that while Pakistan has made significant progress in reducing maternal mortality from 533 maternal deaths

Table 1

The Performance of Health Sector and Poverty Situation in Pakistan

Indicators	1990-91	2001-02	2004-05	2005-06	2006-07	2007-08	2010-11	MDG Target 2015
Poverty incidence	26.1	34.5	23.9	22.3	n/a	17.2	12.4 ^a	13
MDG indicators related to reducing infant and child mortality								
<5 mortality							89	
Infant mortality rate	117	n/a	n/a	n/a	94	n/a	(2012-13)	52
Proportion of fully immunized children (12-23 months)	102	77	77	76	75	n/a	66 (2014)	40
Proportion of 1 year children immunized against measles	75	53	77	71	76	73	81	>90
Proportion <5 suffered from diarrhoea	80	57	78	76	77	76	82	>90
Proportion <5 suffered from diarrhoea	26	12	14	12	11	10	11	<10
MDG indicators related to improve maternal health								
Maternal Mortality Ratio*	533	350	400	380	276	n/a	260	140
Proportion of skilled birth attendance	18	40	48	35	37	40	47	>90
Contraceptive prevalence rate							35	
Total fertility rate	12	28	n/a	n/a	29.6	30.2	(2012-13)	55
Proportion made at least 1 antenatal check-up (for births in last 3 years)	5.4	n/a	n/a	n/a	4.1	3.85	3.6	2.1
	15	35	50	52	53	56	58	100

Source: Government of Pakistan (2010), Pakistan Millennium Development Goals Report, Planning Commission, GOP, Islamabad.

Note: * – MMR estimates, like in most other places similar to Pakistan, are very uncertain, with a wide range of error.

a: These figures may be considered interim indication of poverty situation in the country, according to the Pakistan Economic Survey 2013-14.

per 100,000 live births in 1990-91 to 276 in 2006-07 (Table 1), the achievement of the target of 140 by 2015 seems difficult in such a short time. Similarly, despite an improvement in the proportion of women using contraceptives, receiving antenatal care services and delivering by skilled birth attendants, the progress is slow in achieving the targets set for the year 2015. A considerable decline in total fertility rate from 5.4 in 1990-91 to 3.8 in 2008-09 is not sufficient to achieve the target of replacement level fertility (2.1 births per women) by 2015.

Table 1 also presents data on poverty trends and the MDG target for 2015. If we look at the findings of the PPHS we see a fluctuating trend in poverty incidence, with poverty decreasing during the period 2001 to 2004 and increasing in 2010 from what it was in 2004 [Arif and Shujaat (2014)]. This concurs with the erratic poverty trends shown in Pakistan during the last five decades. While the poverty was very high in the 1960s (40 percent), it declined in the 1970s, and the declining trends continued in the 1980s, reaching to a level of only 18 percent in 1987-88. Poverty, however, began to rise again in early 1990s till the beginning of the new millennium when the headcount ratio was about 35 percent. In addition to the decline in economic growth the inflows of foreign remittances, which are believed to be one of the major factors reducing poverty during the 1970s and 1980s, also declined markedly during the 1990s. There was a sharp decline in poverty during the first half of the last decade, from 34.5 percent in 2000-01 to 22.3 percent in 2005-06. This declining trend continued and poverty dropped to a low level of 12.4 percent in 2010-11² (Table 1). In recent times the economy of Pakistan has been facing severe challenges with a declining rate of economic growth, double-digit

²However, this figure has been reported in the 2013-14 Pakistan Economic Survey as an interim indication of poverty situation in the country.

inflation—particularly food inflation, power shortage, soaring oil prices and poor law and order situation. But the inflows of foreign remittances, which played a major role in poverty decline in the past, have increased to more than US\$ 10 billion per annum. Irrespective of the poverty estimates for the more recent period, historical trends show instability in poverty reduction.

The strategy of poverty reduction in Pakistan on the one hand has focused on sustained high economic growth and on the other hand it gives equal importance to income transfers as well as investment in human capital by improving health and education indicators. In health sector initiatives³ the LHW programme is unique in terms of its objectives, coverage and provision of services to women and children. The core objective of the programme is reduction in poverty by providing essential primary health care services to mothers, new-borns and also to improve child health, provision of family planning services, and integration of other vertical health promotion programmes. It began with the strength of a little over 30,000 LHWs in the mid-1990s and over the years it has expanded to a strength of over 100,000 LHWs currently deployed in all districts of the country. The selection criteria for a LHW include: female should preferably be married; be permanent resident of the area for which she is recruited; has minimum 8 years of schooling preferably matriculate; should be between 20 to 50 years; preference will be given to women with past experience in community development and willingness to carry out the services from home. Rural areas and the communities living in urban slums across the entire country are the targeted areas/communities of the LHW programme. The coverage of LHW programme is reported as 83 percent in 2008-09, according to the 2013-14 Pakistan Economic Survey. Although a large number of LHWs are stationed in each district of the country, the programme, however, does not exist in hard to reach areas of some districts. The main constraints for non-coverage are non-functional health facilities and unavailability of women meeting the selection criteria set for recruitment as LHWs [Pakistan (2011)].

The LHWs provide services to communities at their doorstep. They also act as a liaison between a community and the formal health system and ensure support from NGOs and other departments. The LHWs coordinate with other maternal and health care providers (i.e. midwives, traditional birth attendants and local health facility) in the community for appropriate antenatal and postnatal services. The LHWs are also responsible for making nutritional interventions such as anaemia control, growth monitoring, accessing common risk factors causing malnutrition and nutritional counselling. LHWs also provide treatment for common diseases, for which they are provided with inexpensive drug kits.

3. DATA AND METHODOLOGY

This study adopts a mixed approach by combining qualitative and quantitative methods to accomplish its objectives. The main reason for combining these approaches is

³The health programme includes Expanded Programme on Immunisation, AIDS Control Programme, Malaria Control Programme, National T.B. Control Programme, National Programme for Family Planning and Primary Health Care, National Programme for Prevention and Control of Blindness, National Maternal Newborn and Child Health Programme, Cancer Treatment Program, Drug Abuse, Dengue Epidemic and Control Program and Food and Nutrition Programmes [Pakistan (2012)].

that the latter is best suited to measure levels and changes brought by an intervention and for drawing inferences from observed statistical relations between those changes and other covariates. The quantitative analysis is, however, less effective in understanding processes—that is, the mechanisms by which a particular intervention triggers a series of events that ultimately result in the observed impact.⁴ For the quantitative part the study uses a multipurpose panel dataset generated by the Pakistan Institute of Development Economics (PIDE) in August-December, 2010, named as the Pakistan Panel Household Survey (PPHS) covering both rural and urban areas in 16 districts of the country. The districts are: Attock, Hafizabad, Faisalabad, Vehari, Bahawalpur and Muzaffargarh in Punjab; Badin, Mirpur Khas, Nawabshah and Larkana in Sindh; Dir, Mardan and Lakki Marwat in Khyber Pakhtunkhwa (KP); and Loralai, Khuzdar and Gwadar in Balochistan. The 2010 PPHS is the third round of the panel survey. The first and second rounds, named as the Pakistan Rural Household Survey (PRHS), were carried out in 2001 and 2004 respectively only in rural areas [for more details see Nayab and Arif (2014)]. A health module was included in 2001 and 2010 rounds of the panel survey. This study has used these two datasets; but for the impact analysis, it has relied primarily on the 2010 PPHS.⁵

The units of analysis are the ever married women in the reproductive ages (15-49 years) and children under-five in the survey sample as they mainly comprise the target population of the LHW programme. In the 2010 PPHS as well as in the 2001 round, women in the sampled households were asked whether their household was visited by an LHW in three months preceding the survey and if yes what was the frequency of her visit. Based on LHW visits, two methods have been adopted to divide the sampled women and children into two broad categories: the beneficiaries, and the non-beneficiaries. The first method uses the household level data where the beneficiaries are those households that were visited by the LHWs during the reference period; and the non-beneficiaries include those households that were not visited by the LHWs. The second method relates to the village level LHW visits where the beneficiaries are those villages where LHWs on average have visited 20 percent or more of the households during the reference period; and the non-beneficiaries are those villages where on average less than 20 percent of the households were visited by the LHWs. The PPHS 2010 survey did not have the relevant community level information and since LHWs are deployed at the village level the second method was devised to overcome this shortcoming.

Using the household and village level visits of LHWs, the quantitative analysis is carried out in three steps. First, it examines whether the LHWs serve the poor more than the rich. For this purpose a simple analysis of calculating the proportions of beneficiaries (women) by income quintile and the level of their educational attainment is carried out. A multivariate analysis is also carried out with a binary dependent variable—the beneficiaries (or visited by LHWs=1) and non-beneficiaries (not visited=0):

$$P(X_i) = \text{Prob}(D_i = 1 | X_i) = E(D | X_i) \dots \dots \dots \dots \dots \quad (1)$$

⁴Vijayendren Rao and Michael Woolcock; Integrating Qualitative and Quantitative Approaches in Programme Evaluation.

⁵For the sample size, see Appendix Table 1.

Where

$$P(X_i) = F(h(X_i))$$

$F(h(X_i))$ can be the normal or the logistic cumulative distribution

$D_i = 1$ if beneficiary and 0 otherwise (non-beneficiary)

X_i is a vector of pre-treatment characteristics.

The second step relates to the investigation of the health seeking behaviour of the beneficiary and non-beneficiary women, focusing on the use of contraceptives, antenatal care, place of delivery of last birth, and child immunisation. Lastly, in the third step the paper estimates the impact of the LHW programme on maternal and child health related indicators and poverty level by the method of propensity-score matching (PSM) developed by Rosenbaum and Rubin (1983).

However, it is not straightforward to compute the welfare impact of the LHW programme for the non-beneficiary sample. Taking the mean outcome of the non-beneficiary women as an approximation is not advisable as the beneficiaries and non-beneficiaries usually differ in socio-economic characteristics even in the absence of the programme, and such a process could lead to a selection bias [Kopeinig (2008)]. The PSM is one of the possible solutions to solve this selection bias problem with the idea to find a comparison group that looks like the beneficiary group in all aspects except one - the comparison group does not benefit from the programme [Ravallion (2003)].

In the PSM analysis, the beneficiaries of the LHW programme (women as well as children) are the “treated units” while the non-beneficiaries are “non-treated units”. Beneficiaries are matched to the non-beneficiaries on the basis of the propensity score by meeting the two conditions. The first condition is the balancing of pre-treatment variables given the propensity score, if $p(X)$ is the propensity score, then;

$$D_i = X_i | p(X_i). \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (2)$$

If the balancing hypothesis is satisfied, the pre-treatment characteristics must be the same for both the beneficiary and non-beneficiary groups. In other words, for a given propensity score, exposure to benefit (or treatment) is a randomised experiment and, therefore, beneficiary and non-beneficiary should be on average observationally identical. The second condition is the un-confoundedness given the propensity score. Suppose that assignment to beneficiaries is un-confounded i.e.

$$\begin{aligned} Y_{1i}, Y_{0i} &= D_i | X_i \\ &= D_i | p(X_i). \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \end{aligned} \quad (3)$$

When the assignment to beneficiaries is un-confounded conditional on the variables before benefit (or treatment), assignment to beneficiaries is un-confounded given the propensity score.

Using the Equation 1, first the propensity scores are calculated through the logistic regression and then the *Average Treatment on the Treated* (ATT) effects based on the propensity scores (Rosenbaum and Rubin, 1983) are estimated as:

$$\begin{aligned} ATT &= E(Y_{1i} - Y_{0i}) \\ &= E(ATE | D_i = 1) \\ &= E[Y_{1i} | D_i = 1] - E[Y_{0i} | D_i = 1] \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \end{aligned} \quad (4)$$

Where:

Y_{1i} is the potential outcome if the individual is treated (beneficiary), and
 Y_{0i} is the potential outcome if the individual is not treated (non-beneficiary).

In order to make the working sample comparable, it has been restricted to only those units with probabilities that lie within the region known as the common support, that is, the area where there are enough of both, control and treatment observations, to proceed with comparison [Dehejia (2005)]. The PSM method has been applied on the PPHS 2010 micro dataset to analyse the impact of the LHW programme on maternal and child health and poverty. For poverty impact of the LHW programme, the consumption approach has been used by inflating the official poverty line for 2010.⁶

A qualitative analysis was carried out to complement the quantitative analysis of the present study. For this purpose fieldwork was conducted in 10 localities of 8 selected districts of Pakistan covering all the provinces. To cover the regional differences as much as possible districts were selected to include the variations that may exist in the functioning of the LHWs across the country. Only rural areas were selected for the qualitative part of the study on the premise that the LHWs programme is mainly rural based and has a more important role to play in the rural areas than in urban areas. The selected districts were: Attock (North Punjab), Hafizabad (Central Punjab), Rajanpur (South Punjab), Mardan and Swabi (KP), Turbat (Balochistan) and Badin and Mirpur Khas (Sindh). The qualitative analysis is focused on four main areas of investigation regarding the LHWs programme including coverage; delivery; advocacy; and hindrances/suggestions for improvement.

Two villages from each of the above mentioned districts were selected, one having an LHW programme and the other being without it. The latter was selected for the sake of comparison and to see how the absence of the programme affected the community. The qualitative information used in each of the selected villages is as follows:

- (1) Villages with LHW Programme
- (2) Focus group of women (beneficiary/non-beneficiary)
- (3) Interview with LHWs
- (4) Villages without LHW Programme

(1) Focus Group of Women

Interviewers from the local areas, knowing local languages, were hired to conduct both the FDGs and aforementioned interviews. Their minimum qualification was masters and preference was given to those who had previous field experience, especially to those who had the knowledge of the LHW programme. Two one-day workshops were conducted in Islamabad and Karachi to train the interviewers for the fieldwork. Interviewers from Punjab and KP were given training in Islamabad while those working in Sindh and Balochistan were trained in Karachi. The main purpose of the qualitative fieldwork and its questions was explained to the interviewers during the training. They were also made to understand the functioning of the programme and the interview

⁶The 2010 PPHS has a comprehensive consumption expenditure module. For more detail, see Arif and Farooq (2012).

techniques used in the field. The field notes were analysed for this study by the authors themselves (see guides used in the field in Annex 2).

4. HAS THE LHW PROGRAMME SERVED THE POOR DISPROPORTIONATELY?

Table 2 sets out the data on the proportion of women visited by the LHWs by quintile. It shows that the LHWs are certainly not covering only the poor. As can be seen from Table 2, 50 percent of the poorest women (quintile1) reported visit by an LHW as compared to 54 percent of the 5th (richest) quintile. From these figures it might be inferred that the LHWs do not select their clients on the basis of their wealth or economic status. This notion, however, is negated when we look at the figures broken down by urban-rural residence. While the LHWs reach out more to the poor (59 percent) than to the rich (44 percent) households in the urban areas, the trend is reversed for the rural areas (see Table 2). Regarding the level of educational attainment, Table 2 shows that in rural areas, LHWs visit slightly more the literate and educated women, but, in urban areas more illiterate women are visited by the LHWs than the literate/educated women, though the difference is small.

Table 2

Proportion of Beneficiary Women in 2001 and 2010 (%)

Quintile	PPHS 2010			PRHS 2001
	Total	Urban	Rural	Rural Only
Q1	50.2	59.3	47.0	13.2
Q2	53.3	41.2	58.7	15.1
Q3	55.7	54.6	56.2	14.9
Q4	53.9	54.5	53.6	21.8
Q5	54.0	44.1	57.0	21.4
Level of Educational Attainment				
No education	52.2	53.0	51.9	16.1
Primary	60.8	48.5	67.8	25.7
Middle	58.3	50.0	65.4	27.7
Secondary	57.1	49.2	64.8	27.1
Higher	55.1	51.6	59.2	28.6
All	53.7	51.8	54.4	17.5

Source: Authors' computation from the micro datasets of 2001 (PRHS) and 2010 PPHS.

The socio-demographic and economic characteristics at village level are given in the appendix, as Annex 3, in which the villages have been divided into four categories according to the percentage of households visited by LHWs. The four categories are based on the proportion of households visited by LHWs in a village. The categories are: not visited by LHW; below 20 percent of the households visited; below 50 percent of the households visited; and 50 percent and above households visited. Except for the number of children in the household there is no consistent pattern of LHWs' allocation at the village level at the various cut-off points, as can be seen by the trend shown by average literacy, household size, poverty, landless and livestock less households in a village (Annex 3).

The results of the multivariate analysis (logistic regression) using the equation 1, where the dependent variable is 1 for the beneficiaries and 0 for the non-beneficiaries, are presented in Table 3. In model 1, the beneficiaries' status is defined at individual level where the dependent variable is 1 if ever married women in the reproductive ages (15-49 years) are visited by the LHWs in three months preceding the survey and 0 otherwise. In model 2, the beneficiaries' status is defined at village level where the dependent variable is 1 if 20 percent or above of the households in a village are visited by the LHWs and 0 otherwise. Model 1 shows that the LHWs are more likely to visit women aged 26-35 years and less likely to visit those who have passed their prime reproductive ages (i.e. 36-49 years) compared to women in the reference category of 15-25 years. This variable is not significant in model 2. The literacy level of the women and that of the head of the household are not statistically significant regarding visits by the LHWs in model 1, but model 2 shows that literate women are significantly less likely to be visited by LHWs (Table 3). On the contrary, the household size has a significant positive impact on the LHWs' visits as an increase of one member in the household raises the probability of an LHW visit by 1.05 times in both the models. In model 1, the presence of a child has a positive and statistically significant impact on the LHW's visit- an important finding with reference to the influence of the LHW programme on women and child health (Table 3).

Table 3

Determinants of Lady Health Workers' Visits—Odd Ratio

Correlates	Model 1		Model 2	
	Odd Ratio	Std. Error	Odd Ratio	Std. Error
Age of Woman (15-25 as reference)				
26-35	1.154**	0.098	1.041	0.158
36-49	0.781*	0.070	1.039	0.165
Literacy of woman (yes=1)	0.955	0.080	0.759**	0.110
Literacy of household head (literate=1)	0.957	0.067	0.979	0.129
Household size	1.047*	0.009	1.046*	0.016
Presence of a child (yes=1)	1.301*	0.160	1.403	0.338
Sex of household head (male=1)	1.361**	0.248	1.212	0.386
Land owned (acres)	0.997	0.003	0.986*	0.005
Large animals owned (numbers)	1.065*	0.014	1.150*	0.039
Small animals owned (numbers)	0.993	0.009	0.945*	0.013
Structure of House (Katcha as reference)				
Pacca	1.064	0.097	0.551*	0.095
Mix	1.212*	0.114	1.628*	0.307
Region (urban=1)	1.178**	0.100	0.488*	0.070
Province (Punjab as reference)				
Sindh (yes=1)	1.985*	0.165	8.372*	2.046
KP ((yes=1)	1.771*	0.184	2.229*	0.496
Balochistan (yes=1)	0.089*	0.015	0.014*	0.003
LR chi2 (12)	816.44		1949.5 (16)	
Log likelihood	-2683.85		-1021.6017	
Pseudo R ²	0.13		0.4883	
N	4,515		4,517	

Source: Authors' computation from the micro datasets of 2010 PPHS.

* significant at 5 percent, ** significant at 10 percent.

The effect of land ownership (in acres) and livestock (in numbers) on an LHW visit is mixed in both the models as the impact of only large animal is significant in model 1 but both the land and livestock are statistically significant in model 2. Cemented structure (*pacca*) of houses show a significant negative association with the visit of an LHW only in model 1 whereas houses with mixed structure have a positive relationship with the LHW visits in both the models, as can be seen in Table 3. The significant coefficient of urban or rural residence shows that women in urban areas are more likely to be visited by LHWs compared to the rural women in both models. Relative to the reference category (the non-beneficiary women in Punjab), the women of two provinces, Sindh and KP, are more likely to be visited by LHWs while the women in Balochistan are less likely to be visited (see Table 3). Based on this multivariate analysis, it can be safely concluded that women are not generally selected by LHWs on the basis of their economic status as they tend to serve all women and children, and there are no major differences in the results of two models.

The findings conform to the qualitative research carried out to complement the quantitative data. In-depth and focus group interviews (FGD) done in all three districts of Punjab, namely Attock, Hafizabad and Rajanpur, show that the LHW programme is serving people of all segments of the population whether they are poor or non-poor. However, most of the people who approach the LHWs themselves for consultancy or medicine are poor as the affordability factor is a major issue for them while seeking medical assistance. In Sindh and KP a similar trend was found among the beneficiaries of the LHWs visits—LHWs in these provinces provided services irrespective of beneficiaries' economic standing. Beneficiaries in both districts of Sindh (Badin and Mirpur Khas) and KP (Mardan and Swabi) mentioned that the LHWs of their areas give equal importance to all the people. From the standpoint of both beneficiaries and LHWs, in the district Turbat of Balochistan, the programme is mainly targeting poor people. The unanimous view of the interviewed LHWs was that for them everyone was equal and they are there to serve everyone, whether they are poor or rich.

4. HEALTH SEEKING BEHAVIOUR OF BENEFICIARIES AND NON-BENEFICIARIES

Has the LHW programme influenced the health seeking behaviour of women? The two rounds of the panel data, carried out in 2001 and 2010, include a comprehensive health module, which includes the use of contraception by married women, antenatal care during the last pregnancy, and the use of ORS for diarrhoea among children. The use of contraceptives among the beneficiary and non-beneficiary women is reported in Table 4, which also shows information on the proportion of women using modern methods of contraception. Overall, 35 percent of the sampled women reported using 'any method' for contraception. There is a difference between rural and urban areas. More urban women use contraceptives than their rural counterparts. Difference can also be seen in the contraceptive behaviour of the beneficiary and non-beneficiary women. The beneficiary women have a CPR of 39 percent while non-beneficiary women have CPR of 32 percent. This difference, however, according to data presented in Table 3, is mainly in rural areas where the contraceptive prevalence rate is 37 percent among the beneficiary women as compared to 27 percent among the non-beneficiary women. The use of modern methods

is also higher among the beneficiary women than among the non-beneficiary women, particularly in rural areas. There is a marked improvement in the CPR from 2001 to 2010 period showing a positive contribution of LHWs in the use of family planning practices (Table 4).

Table 4

The Contraceptive Prevalence Rate by Status of LHW Visit and Region (%)

Contraception	PPHS 2010		PRHS 2001	
	Urban	Rural	Total	Rural Only
Beneficiaries (Visited by LHW)				
Using contraceptives	41.6	37.2	38.5	29.3
Using modern method	26.8	23.8	24.6	14.3
Non-beneficiaries (No one Visited)				
Using contraceptives	40.8	26.9	31.5	17.7
Using modern method	28.9	16.0	19.8	10.4

Source: Authors' computation from the micro datasets of 2001 PRHS and 2010 PPHS.

The data on antenatal care are presented in Table 5 for two periods, 2001 and 2010. As compared to three-quarters of the beneficiary women in 2010, two-thirds of the non-beneficiary women received antenatal care during the last birth, indicating positive impact of LHW programme on women's health. The impact, however, is evident only in rural areas. Irrespective of the LHW visit, approximately 80 percent of urban women received antenatal care during the last birth. There is an improvement among the beneficiary women between 2001 and 2010 in rural areas in receiving antenatal care and a decline in giving birth at home while there is no corresponding increase among the non-beneficiaries women. There is a modest increase between 2001 and 2010 in the proportion of beneficiary women who received tetanus injection during the last pregnancy whereas a considerable decline has been witnessed among the non-beneficiary women.

Table 5

Women Receiving Antenatal Care during the Last Pregnancy by Status of LHW Visit and Region (%)

Antenatal Care	2010		2001	
	Urban	Rural	Total	Rural Only
Beneficiaries (Visited by LHW)				
Received antenatal care	78.9	73.9	75.2	61.7
Received TT injections	83.9	83.4	83.5	80.6
Delivered at home	32.3	49.9	45.0	65.0
(Non-beneficiary) Not Visited				
Received antenatal care	81.3	61.3	66.7	50.8
Received TT injections	69.0	46.8	54.1	66.1
Delivered at home	48.4	66.1	60.2	69.6

Source: Authors' computation from the micro datasets of 2001 PRHS and 2010 PPHS.

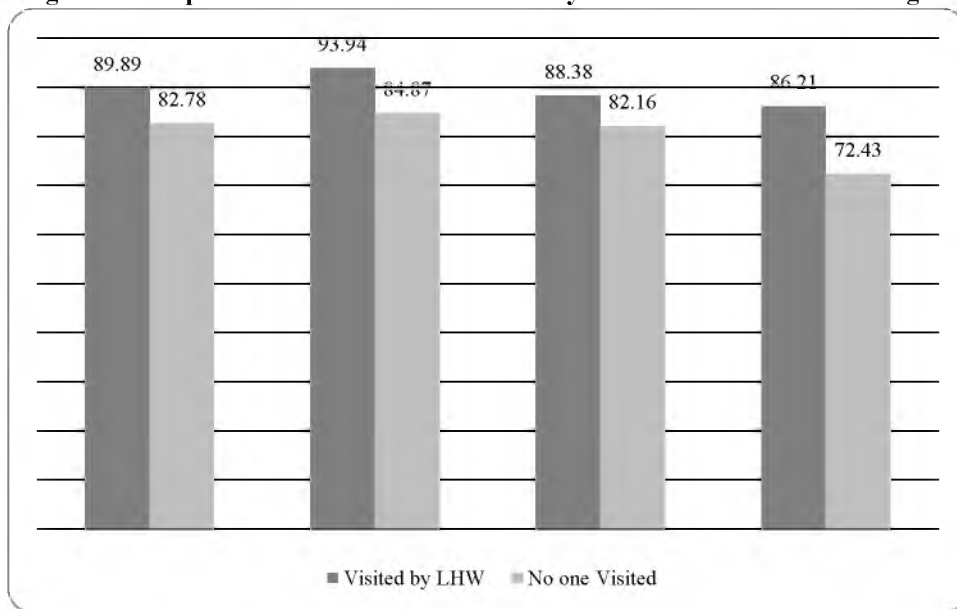
No major difference is found in the incidence of illness and diarrhoea between children belonging to beneficiary and non-beneficiary women (Table 6). However, in case of diarrhoea the use of ORS was higher among the former than the latter. The use of traditional medicines during diarrhoea illness was higher among children living in non-beneficiary households. Child immunisation is universal but it is slightly higher among the children of the beneficiary women than among the children of the non-beneficiary women (Figure 1). In the 2010 PPHS, while examining the health seeking behaviour during the illness of children, the respondents were also asked about the first health service provider consulted for treatment. The role of LHWs was negligible in such consultation because LHWs may not be authorised to prescribe medicine but may advise for the treatment of some diseases like diarrhoea.

Table 6
Use of ORS for Diarrhoea by Status of LHW Visit and Region

ORS	2010		2001	
	Total	Urban	Rural	Rural Only
Beneficiary (Visited by LHW)				
ORS	51.08	61.22	48.35	51.32
Home-made fluids	9.09	4.08	10.44	3.95
Medicines	29	18.37	31.87	30.26
Traditional Medicine	5.63	8.16	4.95	5.26
None of the above	5.19	8.16	4.4	9.21
Total	100	100	100	100
Non-beneficiary (No one Visited)				
ORS	42.74	53.85	41.35	44.71
Home-made fluids	6.84	7.69	6.73	6.83
Medicines	29.91	1	29.81	37.54
Traditional Medicine	11.97	7.69	12.5	7.85
None of the above	8.55	0	9.62	3.07
Total	100	100	100	100

Source: Authors' computation from the micro datasets of 2001 PRHS and 2010 PPHS.

The qualitative part of the study supports the findings of the household survey data and gives more information about variations across the provinces. When the LHWs were interviewed regarding the kind of services they offer, they said that they were performing all the services that were part of their duties and responsibilities including family planning services, child vaccination, advice on ORS making, antenatal care, and basic information about hygiene. Some of the LHWs in Hafizabad and Attock districts said that they give a practical demonstration if the community does not understand their verbal explanation, particularly in the case of ORS making.

Figure 1. Proportion of Children Immunized by Status of LHW Visit and Region

In general women were satisfied with these services. This satisfaction, however, was not universal as some women also showed dissatisfaction for the services of the LHWs in their areas, as one woman complained:

“Whenever she visits us she asks about family planning services, or that if any woman is pregnant here? She does not tell us anything else”.

(A women in FGD held in Attock district).

The FGDs held in areas with no LHW programme came up with interesting results. There was almost a consensus that women want the LHW programme in their villages. The non-beneficiaries mentioned that they have to go to private clinics for check-ups, but that is not feasible for them as private facilities are expensive. They reported that their children also do not get proper vaccination, as the polio vaccination teams do not visit their village frequently. Women in such areas had to opt for traditional birth attendants (dais) for deliveries, and also seek family planning services from them which are not always safe.

In Sindh, the LHWs reported a gradual change in the behaviour of the local residents regarding maternal and child care, including vaccination. The interviewed LHWs in Badin and Mirpur Khas districts reported to be carrying out vaccination programme for children along with telling the community about hygiene, family planning and maternal health. They were satisfied with the changing attitude of the people, like one of the LHW in Mirpur Khas said,

“They used to resist getting vaccinated but the community agrees to get their children immunised now. Pregnant women are also now ready to get vaccinated. It is our success and it is because of us that this change is coming.”

(An LHW in district Badin, Sindh)

Mixed results were found for the two districts of KP included in the qualitative part of this study regarding the functioning of the LHW programme. In district Swabi, the community shows a positive response with the majority of the women satisfied with its functioning. Among the most reported services delivered by the LHWs are registration of pregnant women and new-born babies; frequent visits to expectant women; and EPI vaccination. Since the LHWs reside in the villages, people have access to them in time of need at their homes. In district Mardan, however, the response in the FGD show that the community was not very satisfied with the way the LHW programme was functioning. According to the participants of the FGD, the LHWs of the area were not regular in their visits. One respondent told that, *“She is not performing her duty well, the last time she visited us is one year ago”*. The LHWs of the two districts of KP were also interviewed to know about the services they were providing, and were found to narrate almost all the duties assigned to them on paper. Regarding their irregular visits to some of the areas they blamed the social milieu of the villages for it. They said that female mobility is not easy in KP and in some areas it is tougher than others.

“There are lots of problems in this area as people of this area are not very cooperative. My in-laws do not allow me to visit community on regular basis to deliver all the services I am supposed to offer to the households. Women can, however, visit me in my home if they are in need. They do come often for family planning methods and medicines”.

(An LHW in district Mardan, Khyber Pakhtunkhwa)

In Balochistan, the vaccination of children against polio is one of the major services delivered by LHWs. They perform their duties efficiently and regularly and people report no complaints regarding this task. Women in the district of Turbat complain that the LHW does not provide them with any medicine. LHWs, on the other hand, reported that they are not getting medicine supplies and people blame them for that. Moreover they perceive that the LHWs are giving these medicines to their relatives and friends only. One woman in the FGD said:

“She does not provide us with medicines. Whenever we go to her she only has family planning pills and iron tablets and nothing else”.

(A woman in the FGD in district Turbat, Balochistan)

When women were asked about their accessibility to the LHWs, they said that LHWs were accessible in their homes as well, even if they did not visit, but they prefer going to the Rural Health Centre in that case as the LHWs do not have medicine supplies at homes. The women argued that if they have to go far to get medicines they can see a doctor there as well.

Based on the above discussion one can conclude that the coverage of the LHW programme is satisfactory and its scope is wide in terms of advice for the health improvement of women and children. Regional differences are, however, evident as the performance of the Programme in Punjab and Sindh was reported to be better than in KP and Balochistan. Security is one of the reasons for relatively poor performance in these two provinces, along with the erratic supply of medicines hindering the success of the programme. The qualitative study of the areas without an LHW shows the need for enhancing the coverage of the programme to all rural areas.

5. IMPACT ANALYSIS OF THE LHW PROGRAMME

For the impact analysis of the LHW programme, three sets of variables related to the reproductive health of women, child health and poverty status have been selected. The use of contraceptives, antenatal care, vaccination (TT injection) and place of delivery represents women's health outcomes while child immunization, illness, and infant and child mortality are used for child health. The official poverty line is used to see the welfare impact of the LHW programme.

Following the methodology given in Section 3, the propensity scores and ATT effect are estimated by both the methods, which are beneficiaries' status at the individual level and beneficiaries' status at the village level. The results of equation 1 have been discussed in the previous section, showing that women are not selected by the LHWs on the basis of their economic status, rather the coverage seems to be universal within the target areas.

The results of Equation 4 are presented in Tables 7-9 with ATT parameters under three measures, namely Nearest Neighbour (NN) Matching, Kernel Matching, and Stratification Matching. The NN method matches each treated unit (beneficiaries) with the controlled unit (non-beneficiaries) that has the closest propensity score. The method is usually applied with replacement in the control units. In the second step, the difference of each pair of matched units is computed and finally the ATT is obtained as the average of all these differences.⁷ In the Kernel and Local Linear methods, all the treated units (beneficiaries) are matched with a weighted average of all non-treated units (non-beneficiaries) using the weights which are inversely proportional to the distance between the propensity scores of treated (beneficiaries) and non-treated (non-beneficiaries). The stratification matching method consists of dividing the range of variation of the propensity score in a set of intervals (strata) such that within each interval the treated (beneficiaries) and non-treated (non-beneficiaries) units have the same propensity score on average [(Rosenbaum and Rubin, (1983)]. Both types of standard errors, analytical and bootstrapped have been reported in Tables 7-9, however, the Kernel matching method does not estimate the standard error by default.

5.1. Impact of LHWs Programme on Women's Health

Table 7 presents the impact of the LHW programme on women's health outcomes. The welfare impact has been calculated at the individual and village levels. Table 7 shows that the ATT impact on the use of contraceptives is only statistically significant at the individual level by Kernel method with a welfare gain of 2.5 percent. This positive effect reflects the contribution of the LHW programme in enhancing the use of contraceptives by married women. As discussed earlier, this is one of the focus areas for the LHWs, and even in the FGDs some of the participant women complained about over emphasis of the LHWs on contraceptive use.

⁷ The NN method may face the risk of bad matches if the closest neighbour is far away. Such risk can be avoided by imposing a tolerance level on the maximum propensity score distance (caliper). Hence, caliper matching is one form of imposing a common support condition where bad matches can be avoided and the matching quality rises. However, if fewer matches can be performed, the variance of the estimates increases [Caliendo and Kopeining (2008); Smith and Todd (2005)].

Table 7 also shows a positive and significant ATT impact of the LHW programme on the antenatal care under all the three measures in method 1 and two measures in method 2. Compared to the non-treated units (non-beneficiary women) the treated units (beneficiary women) enjoy a positive impact of 17.7 to 21.9 percentage points in method 1 and 8.3 to 12 percentage points in method 2. Both bivariate analysis and the FGDs show positive contribution of the LHWs in antenatal care, particularly in rural areas. The third column in Table 7 shows the results about vaccination during the last pregnancy. The significant impact of the LHW programme on this variable shows a positive gain through both the methods and welfare measures, ranging from 10.6 percent to 22.9 percent.

Table 7
Average Treatment Effects of the LHW Programme on the Reproductive Health of Women Aged 15–49 Years

Method	Contraceptive Use (Yes=1)	Antenatal Care (Yes=1)	TT Injections (Yes=1)	Place of Delivery (Hospital=1)
Method 1 (at individual level)				
Nearest Neighbour				
ATT	0.027	0.219	0.135	0.070
N. Treated	2548	2548	2548	2548
N. Control	1037	503	309	308
Standard Error	0.018	0.030	0.035	0.037
t-stat	1.474	7.246	3.883	1.895
St. Error Bootstrap	0.022	0.035	0.040	0.044
t-stat	1.223	6.276	3.347	1.608
Kernel				
ATT	0.025	0.177	0.126	0.030
N. Treated	2548	2548	2548	2548
N. Control	1945	1945	1945	1945
St. Error Bootstrap	0.014	0.026	0.031	0.032
t-stat	1.711	6.710	4.037	0.326
Stratification				
ATT	0.020	0.187	0.131	0.004
N. Treated	2548	2548	2548	2548
N. Control	1947	1947	1947	1947
Standard Error	0.014	0.017	0.016	0.018
t-stat	1.432	10.994	8.332	0.238
St. Error Bootstrap	0.014	0.022	0.026	0.038
t-stat	1.381	8.428	5.064	0.111
Method 2 (at village level)				
Nearest Neighbour				
ATT	0.058	0.077	0.229	-0.005
N. Treated	3788	3788	3788	3788
N. Control	285	145	118	118
St. Error Bootstrap	0.064	0.122	0.107	0.110
t-stat	0.904	0.633	2.137	-0.046
Kernel				
ATT	0.025	0.083	0.117	0.090
N. Treated	3788	3788	3788	3788
N. Control	724	724	724	724
St. Error Bootstrap	0.036	0.046	0.063	0.088
t-stat	0.687	1.80	1.851	1.028
Stratification				
ATT	0.006	0.120	0.106	0.048
N. Treated	3788	3788	3788	3788
N. Control	724	724	724	724
St. Error Bootstrap	0.046	0.068	0.061	0.133
t-stat	0.132	1.756	1.736	0.360

Source: Authors' computation from the micro datasets of 2010 PPHS.

However, the impact of the LHW programme on delivery in a hospital is not statistically significant under all the three measures of ATT. This probably reflects that the financial inability of the sampled women to deliver in a hospital or impracticability of the distance involved to travel to a hospital could be an obstacle. Preference of the women themselves to deliver at home instead of at a health facility can not be ruled out. These findings of the PSM analysis as well as the qualitative analysis suggest that the LHWs have created goodwill in their target areas and women do trust them for seeking advice regarding different health issues.

5.2. Impact of LHW Programme on Child Health

The ATT effect of the LHW programme on the child health indicators is computed on the basis of estimated propensity scores using the logit regression (giving code 1 to children belonging to households and villages visited by LHWs and 0 otherwise in model 3 and model 4, respectively). The regression results presented in Table 8 do not show any systematic preference for the LHWs, and the region and province dummies seem to be the major differentiating factors. Children in Sindh and KP provinces are more likely to be visited by LHWs than children in Punjab while the likelihood of LHW visits reduces for the province of Balochistan.

Table 8

Determinants of Lady Health Worker Visits—Odd Ratio

Correlates	Model 3		Model 4	
	Odd Ratio	Std. Error	Odd Ratio	Std. Error
Sex of child (male=1)	1.049	0.085	0.973	0.120
Number of children at home	0.921*	0.037	0.993	0.061
Sex of household head (male=1)	1.316	0.312	0.189*	0.138
Education of household head (in years)	1.010	0.009	1.018	0.014
Number of married women in the household	0.917	0.066	0.875	0.106
Household size	1.040*	0.016	1.072*	0.024
Land ownership (acres)	0.998	0.004	0.992**	0.004
Large animals owned (numbers)	1.023**	0.013	1.088*	0.023
Small animals owned (numbers)	1.008	0.012	0.964*	0.013
Structure of House (<i>Katcha</i> as reference)				
<i>Pacca</i>	1.214**	0.131	0.529*	0.086
Mix	1.381*	0.161	3.115*	0.641
Region (urban=1)	1.521*	0.167	0.716*	0.103
Province (Punjab as reference)				
Sindh (yes=1)	1.971*	0.190	6.088*	1.166
KP (yes=1)	4.523*	0.766	1.000	—
Balochistan (yes=1)	0.019*	0.007	0.010*	0.002
LR chi2	711.1 (15)		1929.68 (14)	
Log likelihood	-1808.1813		-938.60784	
Pseudo R ²	0.164		0.507	
N	3,333		3,893	

Source: Authors' computation from the micro datasets of 2010 PPHS.

* significant at 5 percent, ** significant at 10 percent.

Table 9 presents the ATT effect of LHW programme on the child health indicators by both the methods; at individual level and at village level. The beneficiary children are more likely to be vaccinated than the non-beneficiary children as indicated by all three measures of ATT and by both methods. Child immunization campaigns comprise a major work load for the LHWs nationwide. Because of their local residence and good practices parents of the area seem to be relatively more willing to immunise their children. The presence of LHW has a negative effect on child illness but only under the stratification measure of ATT. Under other two measures—Kernel and NN, the effect is not statistically significant.

Table 9

Average Treatment Effects of Propensity Score Matching on Child Health Indicators

Measures/ATT	Immunization			
	Received (Yes=1)	Child Illness (Yes=1)	Infant Mortality (Yes=1)	Child Mortality (Yes=1)
Method 1 (at Individual Level)				
Nearest Neighbour				
ATT	0.066	-0.013	-0.001	-0.001
N. Treated	2157	2157	2157	2157
N. Control	643	642	650	650
Standard Error	0.025	0.031	0.001	0.001
t-stat	2.609	-0.411	-1.424	-1.424
St. Error Bootstrap	0.020	0.036	0.001	0.001
t-stat	3.290	-0.352	-1.288	-1.469
Kernel				
ATT	0.072	-0.025	-0.001	-0.001
N. Treated	2157	2157	2157	2157
N. Control	1166	1166	1166	1166
St. Error Bootstrap	0.015	0.021	0.001	0.001
t-stat	4.690	-1.163	-1.230	-1.360
Stratification				
ATT	0.063	-0.042	-0.001	-0.001
N. Treated	2157	2157	2157	2157
N. Control	2141	2141	2141	2141
Standard Error	0.015	0.021	0.001	0.001
t-stat	4.172	-1.980	-1.396	-1.396
St. Error Bootstrap	0.015	0.019	0.001	0.001
t-stat	4.275	-2.203	-1.263	-1.258
Method 2 (at Village Level)				
Nearest Neighbour				
ATT	0.121	-0.025	-0.001	-0.001
N. Treated	3146	3146	3146	3146
N. Control	244	246	262	262
St. Error Bootstrap	0.053	0.063	0.001	0.001
t-stat	2.283	-0.390	-1.111	-1.290
Kernel				
ATT	0.103	0.034	-0.001	-0.001
N. Treated	3146	3146	3146	3146
N. Control	677	677	677	677
St. Error Bootstrap	0.038	0.040	0.001	0.000
t-stat	2.726	0.845	-1.147	-1.315
Stratification				
ATT	0.135	0.019	-0.001	-0.001
N. Treated	3138	3138	3138	3138
N. Control	685	685	685	685
St. Error Bootstrap	0.056	0.047	0.000	0.000
t-stat	2.386	0.411	-1.169	-1.194

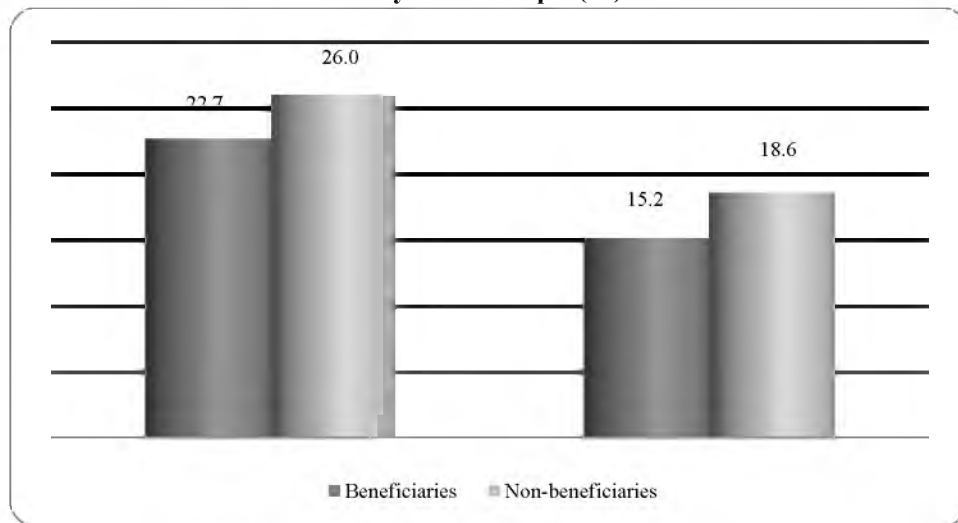
Source: Authors' computation from the micro datasets of 2001 PRHS and 2010 PPHS.

The impact of the LHW programme on infant and child mortality is not statistically significant. The incidence of diarrhoea and respiratory infection are the major causes of infant and child mortality in Pakistan. The preventive role of LHWs has surely contributed in reducing these causes of infant and mortality rate but their role has not been great enough to reduce infant and child mortality in Pakistan.

5.3. Welfare Impact of the LHW Programme

Before presenting the findings of the PSM analysis regarding the welfare impact of the LHW programme it is appropriate to discuss briefly the changes in the poverty status of the households based on the panel datasets. Figure 2 shows poverty statistics for rural and urban areas for the year 2010 and 2001 when two rounds of the panel survey were carried out. As noted earlier, this study uses the official poverty line, inflating it in the year 2010.⁸ Two points are noteworthy from this figure. First, there is no major difference between the beneficiary and non-beneficiary samples in terms of their poverty status either in 2010 or in 2001 although rural poverty among the former is slightly higher. Second, rural poverty between 2001 and 2010 period declined sharply and it happened for both the beneficiary and non-beneficiary samples. Since these simple poverty statistics are not sufficient to gauge the welfare impact of the LHW programme we adopt the PSM methodology that is well suited for the purpose.

Fig. 2. The Incidence of Poverty Among the Beneficiary and Non-beneficiary Rural Sample (%)



Source: Authors' computation from the micro-data of 2001 PRHS and 2010 PPHS.

Table 10 shows the estimated ATT on poverty status under the three measures, namely NN, Kernel and stratification. The welfare impact of the LHW programme is statistically significant under all these measures. However, the impact varies across the three measures. At individual level, it ranges from 4.1 to 5.3 percentage points with the

⁸For more detail on poverty line, see Arif and Farooq (2012).

lowest under Kernel method and highest under the NN method while at village level, the welfare impact ranges from 6.3 to 23.2 percentage points. The impact is positive; the negative signs of the three measures show that the LHW programme reduces the probability of being poor. Thus, the LHW beneficiary women (and their households as well) are less likely to be poor as compared to the non-beneficiary women who have similar characteristics.

Table 10
*Average Treatment Effects Under various Measures of Propensity Score
Matching on Poverty, PPHS 2010*

ATT	Method		
	Nearest Neighbour	Kernel	Stratification
Method 1 (at Individual Level)			
ATT	-0.053	-0.041	-0.048
N. Treated (number of observation)	2548	2548	2548
N. Control (number of observation)	1153	1945	1947
St. Error Bootstrap	0.022	0.011	0.017
t-statistics	-2.401	-3.630	-2.835
Method 2 (at Village Level)			
ATT	-0.232	-0.063	-0.114
N. Treated (number of observation)	3788	3788	3788
N. Control (number of observation)	313	724	724
St. Error Bootstrap	0.056	0.037	0.052
t-statistics	-4.110	-1.690	-2.198

Source: Authors' computation from the micro datasets of the 2010 PPHS.

One logical question which is not under the scope of this study is how the LHW programme has contributed to poverty reduction? Since the poverty measure used in the PSM analysis is based on the consumption approach the impact of the LHW programme would have been through an increase in income and consumption of the beneficiary households. The literature on health interventions and poverty suggests that an improvement in women's health can lead to their higher participation in the labour market which may in turn enhance their well-being level. Has the LHW programme contributed in enhancing female participation in the labour market? It depends on employment opportunities for women and it requires an in-depth analysis. However, the Labour Force Survey data do show an increase in female participation in the labour market from 17 percent in 2001-02 to 27 percent in 2010-11 (LFS 2012). The LHW programme could be a contributory factor through improving women health. Rural women, however, are working primarily as unpaid family helpers (LFS 2012) and may not have control over the resources earned through their engagement. Despite this, it would not be wrong to presume that women participation as family helpers may be viewed positively as it contributes to the household's strategy to ensure food security and improve household well-being.

6. CONCLUSIONS

The government of Pakistan has taken several initiatives to improve the poor health indicators in the country and the LHW programme is one of such initiatives. With an aim to reduce poverty through an improvement in the health status of population, particularly women and children, the LHWs work at the grass root level. The LHWs are recruited from the local communities to provide preventive health care services at their door step. At present they are deployed in all districts of the country and their services are available to more than half of the target population.

In order to gauge the welfare impact of the LHW initiative, the present study combines the quantitative and qualitative approaches. In the quantitative analysis the multipurpose panel datasets, PRHS-2001 and PPHS-2010, conducted by PIDE, are used. These datasets suit the quantitative analysis because they have comprehensive modules on child and maternal health and household consumption necessary for poverty estimation. They also have a comprehensive module on the performance of the LHWs. For the qualitative analysis, field work was conducted in ten rural localities of the eight selected districts of Pakistan covering all the four provinces.

The quantitative analysis of the panel datasets shows that slightly more than half of the sampled women were visited by the LHWs during three months preceding the survey. The analysis shows that the LHWs have provided their services to all segments of society irrespective of their income status. An improvement has been found in the health seeking behaviour of the beneficiary women. The qualitative analysis supported these findings.

The PSM methodology, that generates comparable samples of beneficiaries and non-beneficiaries of the LHW programme, shows that the LHW programme has a significant and positive impact on contraceptive use, antenatal care and vaccination (TT) during pregnancy. The impact of the LHW programme on child health has been evaluated by selecting four indicators, which are child immunisation, child illness, and infant and child mortality. A significant gain is observed in child vaccination and child illness. However, the LHW programme does not show a significant impact on infant and child mortality. The welfare impact of the LHW programme in terms of reduction in poverty is found to be statistically significant.

It appears from the findings of this study that the LHW programme is a pro-poor initiative. Two factors probably have played key role in its success, which are: recruitment of the LHWs from the communities where they are assigned to work, and universalization of the programme within the target areas—providing services to all women and children of the covered areas.

Considering the positive impact the LHW programme has had on its beneficiaries it is recommended that the programme may be extended to all uncovered areas as well. This was also demanded by the non-beneficiary women during the focus group discussions. Another factor that can improve the effectiveness of the programme is enhanced training of the LHWs and provision of medicines to them, especially in the provinces of KP and Balochistan. Services provided by the LHWs include family planning and antenatal and postnatal check-ups. Unfortunately, irregular and delayed supply of medicines adversely affects their functioning and creates mistrust among the LHWs and the women to whom they provide the services.

In view the complaints of women at some of the study sites about irregularity in the LHWs' visits, an effective supervision mechanism is critical. Such a mechanism can help improve the service delivery at the grass root level, further enhancing the positive impact the programme has made. In order to sustain gains made by the programme it should be made an integral component of the district health system operating in the framework of Primary Health Care (PHC) and MNCH programme. It will also help in formalising the service structure of the LHWs, which is one of their long standing demands. Likewise, integration with the PHC system will not only strengthen the LHW programme but also help the recipients through a better referral system. As a result everyone will benefit—the LHWs, the people and the health delivery system at large.

APPENDIX

Annex 1

Households Covered in PRHS 2001 and PPHS 2010

Provinces	PRHS 2001 (Rural only)	PPHS 2010		
		Rural	Urban	Total
Pakistan	2721	2800	1342	4142
Punjab	1071	1221	657	1878
Sindh	808	852	359	1211
KP	447	435	166	601
Balochistan	395	292	160	452

Annex 2

Guide for Focus Group Discussion of Beneficiary Women/Non-beneficiary Women in Area Having LHW Programme

- Knowledge about the program and source of knowledge- after an LHW visited or before? If before, from whom/where?
- Frequency of LHW's visit.
- Any factors that hinder their visits... weather/males/elders/any other.
- Coverage of LHWs. Do they visit every household or the ones only having women and children? Do you feel they are more inclined to visit a certain kind of household than others (poor/vulnerable)?
- Kind of messages they give. (infant/child health/immunisation/boiling water/nutrition/antenatal care/contraception/hand washing/hygiene/diarrhoea).
- Ease in understanding their given advice. Practicality in following their advice and satisfaction level regarding it.
- Impact of their advice—any improvements in family health.
- Access to LHWs—ever approached them in case someone was ill in the household or waited for their visit.
- For those who are not visited- have they ever tried making LHWs visit them and reasons for non-visit in case they did not come to their household.

Interview Guide for the Focus Group not having LHW Programme

- In the absence of LHWs, their source of fulfilling health needs, including antenatal care/delivery/contraception.
- Any trouble accessing the health care service.
- Assess the contraception/immunisation rates, and who/where are deliveries taking place.
- Questions judging their knowledge about hygiene/nutrition/boiling water/diarrhoea/ immunisation.
- Their knowledge about the LHW and MNCH programmes and desire to have it in their village as well.

Interview Guide for LHWs

- Criteria to select the households they pick to visit.
- Frequency/regularity of the visits.
- Any hindrance in performing their duties.
- Access to the community when not visiting their homes themselves.
- Kind of advice given to the women they visit, and the method of conveying the message—only verbally for do a demonstration as well.
- Availability of equipment/skills needed to perform their job.
- Satisfaction with their working conditions.
- Perception about their performance
- Suggestions for improvement

Annex 3

Average Socio-demographic and Economic Characteristics at Village Level by the Status of LHW Visit

Characteristics	No visit			<20% visit			<50 % visit			50 and above % visit		
	Overall	Rural only	Urban only	Overall	Rural only	Urban only	Overall	Rural only	Urban only	Overall	Rural only	Urban only
Literacy of Head (%)	38.6	16.1	59.9	37.2	18.7	56	41.7	33.6	57.3	45.3	43.1	50.5
Household Size (numbers)	7.4	8.6	6.3	7.1	8	6.3	7	7.3	6.4	7.9	8.1	7.4
Married Female (15–49) in household (%)	16.8	16.4	17.1	17.2	17	17.4	17.4	17.6	17.1	16.5	17.1	15.1
Children (under 5) in household (%)	7.4	7.1	7.7	7.6	7.7	7.4	8.7	9.4	7.5	9.3	9.9	8.1
Poverty (%)	20.7	23.4	17.2	16.7	18.8	13.9	21	24.6	13.2	20.6	21.3	18.8
Landless Households (%)	–	48.2	–	–	52.9	–	–	61.4	–	–	52.1	–
Livestock less Households (%)	–	34.4	–	–	33	–	–	39	–	–	29.3	–
Number of Villages	31	17	14	44	24	20	86	54	32	129	87	42

Source: Authors' computation from the micro datasets of 2010 PPHS.

REFERENCES

- Ajakaiye, O. and G. Mwabu (2007) The Demand for Reproductive Health Services: An Application of Control Function Approach. Paper presented to the 12th Annual Conference of the African Econometric Society. University of Cape Town, South Africa.
- Arif, G. M. and Shujaat Farooq (2011) Poverty Inequality and Unemployment in Pakistan. Background study for IDB group MCPS Document for Pakistan. Dhul-Qa'dah 1432H.
- Caliendo, Marco and Marco Kopeinig (2008) Some Practical Guidance for the Implementation of Propensity Score Matching. *Journal of Economic Survey* 22:1, 31–72.
- Dehejia, Rajeev (2005) Practical Propensity Score Matching: A Reply to Smith and Todd. *Journal of Econometrics* 125, 355–364.
- Hafeez, A., B. K. Mohamud, M. R. Shiekh, S. A. I. Shah, and R. Jooma (2011) Lady Health Workers Programme in Pakistan: Challenges, Achievements and the Way Forward. *Journal Pakistan Medical Association* 61:3, 210–215.
- Heckman, J. and J. Smith (1999) The Pre-programme Earnings Dip and the Determinants of Participation in a Social Programme: Implications for Simple Programme Evaluation Strategies. *Economic Journal* 109:457, 313–348.
- Ministry of Health (2011) www.mnch.gov.pk/dp.php last retrieved on March 2011.
- Ministry of Health (2011) www.mnch.gov.pk/strategies.php last retrieved on March 2011.
- Nayab and G. M. Arif (2012) Pakistan Panel Household Survey: Sample Size, Attrition and Socio-demographic Dynamics. Pakistan Institute of Development Economics, Islamabad. (Poverty and Social Dynamics Paper Series, PSDPS-1).
- OPM (2009) Lady Health Worker Programme, External Evaluation of the National Programme for Family Planning and Primary Health Care, Final Report. Oxford Policy Management.
- Organisation of Economic Cooperation and Development (OECD) (2003) Poverty and Health in Developing Countries: Key Actions, Policy Brief, OECD Observer.
- Oxford Policy Management (OPM) (2002) Lady Health Worker Programme, External Evaluation of the National Programme for Family Planning and Primary Health Care, Final Report. Oxford Policy Management.
- Planning Commission Pakistan, Government of (2010) *Pakistan Millennium Development Goals Report 2010*. Islamabad: Planning Commission, Centre for Poverty Reduction and Social Policy Development Islamabad, Government of Pakistan.
- Pakistan, Government of (2011) *Economic Survey of Pakistan 2010-11*. Islamabad: (2011) Economic Advisor Wing. Government of Pakistan.
- Pakistan, Government of (2011) *Economic Survey of Pakistan 2010-12*. Islamabad: (2012) Economic Advisor Wing. Government of Pakistan.
- PC-1 (2003) National Programme for Family Planning and Primary Health Care “The Lady Health Workers Programme” 2003-2008. Government of Pakistan. Ministry of Health.
- PC-1 (2006) National Maternal Newborn and Child Health (MNCH) Programme. Government of Pakistan. Ministry of Health.

- Ravallion, Martin (2003) Assessing the Poverty Impact of an Assigned Programme. In François Bourguignon and Luiz Pereira da Silva (eds.) *The Impact of Economic Policies on Poverty and Income Distribution: Evaluation Techniques and Tools*. New York: Oxford University Press.
- Rosenbaum, Paul and Donald Rubin (1983) The Central Role of the Propensity Score in Observational Studies for Causal Effects. *Biometrika* 70, 41–55.
- Smith, J. and P. Todd (2005) Does Matching Overcome LaLonde’s Critique of Non-experimental Estimators? *Journal of Econometrics* 125:1–2, 305–353.
- United Nations (2011) *The Millennium Development Goals Report 2011*. United Nations.
- United Nations (2012) *The Millennium Development Goals Report 2012*. United Nations.
- World Bank (2011) *World Development Indicators*. Washington, D.C.
- World Health Organisation (WHO) (2003) *Poverty and Health: A Strategy for the African Region*. WHO, Regional Office for Africa, Brazzaville.