Pakistan’s Community-based Lady Health Workers (LHWs): Change Agents for Child Health?

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Abstract

Background: In Pakistan’s high child mortality context, a large-scale Lady Health Worker (LHW) Program raises the need to look at whether LHWs are delivering their key mandate as agents of change for child health. This study examines the quantity and quality of LHW interactions with mothers for child health and their impact on mothers' knowledge and child health practices.

Methods: 1,968 mothers of children <2 years (n=1,968) were interviewed through a cross-sectional survey in two rural districts of Pakistan focusing on immunization, nutrition, and early child illness. Data on frequency of LHW’s visits; services provided, specific services related to routine immunization (RI), nutrition and child illness, and maternal knowledge and practices were analyzed using median values for continuous variables and counts and percentages for categorical data.

Results: Monthly visits by LHW were reported by only 63% of LHW covered households. During LHW monthly encounters, Oral Polio drops administration was most frequently reported (77%), followed by RI (59%), breastfeeding counseling (20%), child illness management advice (18%), growth monitoring (9.5%), while none reported receiving hygiene counseling. Although LHWs were reported to be the main information source for child health; limited impact of LHW-mother interaction was seen on maternal knowledge and practices: 76% mothers reported receiving ORS packets from LHWs but only 27% knew of correct usage, only 34% washed hands before feeding children, less than a third could correctly recall early signs of pneumonia and awareness of Vaccine Preventable Diseases other than Polio ranged from 42%-9% only.

Conclusion: Although LHWs are main information source for child health services but infrequent, poor quality household encounters indicate ineffective delivery on the key mandate of community-based child health. Policy debate instead of focusing on scaling up or downsizing the program, should prioritize quality and supervision to improve value for money of a critical community resource.

Keywords: child health, community health workers, Pakistan, performance

1. Introduction

In several Low Middle Income Countries (LMICs), community health workers (CHWs) are the first point of contact for the community to access health services. Their foremost purpose has been the provision of frontline advice, treatment and referral for childhood illness, under-nutrition, maternal care, malaria and HIV treatment (Gilmore & McAuliffe, 2013; Brenner et al., 2011; Mambulu-Chikankheni, Eyles, & Ditlopo, 2018; Uganda, 2016). In countries having weak health systems, long distances, underserved populations and patriarchal societies, the deployment of CHWs has been argued to reduce barriers to healthcare. Within the area of child health, the pivotal role of CHWs is for increasing community uptake of evidence based preventive and promotive practices to reduce child mortality as well as contribute to early recognition and referral so that childhood diseases can be dealt with timely at health facilities. While there is a spate of evidence on CHW programs contributing to improving community health outcomes (Hafeez et al., 2011), much of this comes from the controlled settings of randomized trials or discrete projects providing well-funded and supervised CHW interventions (Horwood et al., 2017; Memon et al., 2015). There is less conclusive evidence on impact of mainstream CHW programs.

Pakistan’s Lady Health Worker (LHW) Programme, is one of the largest and longest standing CHW program in the
world. Established in 1994 as a flagship program by the late Prime Minister Benazir Bhutto it has a workforce of more than 110,000 Lady Health Workers (LHWs) (Nina Zhu, 2014), covering approximately 50% of the population forming the backbone of Pakistan’s primary care delivery at the village level and referrals back to government health facilities. National policy targets propose doubling of numbers with 100% coverage in rural areas by 2025 (Management, 2009). Females with up to 8 years of schooling are recruited from targeted villages, trained and paid a monthly stipend starting from $110 (PKR 17000-Basic Pay Scale-5) (Report, 2018) to deliver maternal, child health and family planning services in low income rural and peri-urban areas of Pakistan. Each LHW serves a 1000-1500 population or approximately 200 households. LHWs are provided with 15 months of training- 3 months classroom and 12 months field-based, field checks by Lady Health Supervisors of each cluster of 15-20 LHWs (Hafeez et al., 2011), monthly basic supplies, and undergo a week of reporting at the nearest government primary care clinic. The program requires LHW is to maintain records of all eligible households having a child less than 5 years age or a pregnant woman, conduction of monthly visits for preventive and promotive care, provision of community-based counseling sessions, timely referrals to health facilities and update of birth and death record.

In Pakistan’s high child mortality context, where U5 years mortality rate of 75 per 1000 live births (National Institute of Population Studies (NIPS) 2019) is far behind the Sustainable Development Goal (SGD) target of 25 per 1000 live births, LHW based interventions can be critical in accelerating the reducing of <5 years mortality. Diarrhea and pneumonia remain one of the top preventable causes of deaths in under-five children in Pakistan (National Institute of Population Studies (NIPS) 2013; National Institute of Population Studies (NIPS) 2019), whereas lack of infant and young child feeding (IYCF), poor hygiene and incomplete immunizations are associated as key underlying drivers (Bhutta et al., 2008; Walker et al., 2013). LHWs monthly routine includes essential child health tasks of counseling on routine immunization, provision of intramuscular vaccines in certain provinces, early recognition and referral of childhood illnesses, growth monitoring, de-worming, counseling on breastfeeding and infant feeding, counseling on handwashing, hygiene and clean drinking water (Hafeez et al., 2011).

However, 25 years since the start of this program, questions are emerging whether to simply push on for extension of LHWs in remaining under-covered areas or look more critically at making this program more impactful. The last programme evaluation conducted more than a decade ago in 2009, documented improvements in LHW covered areas over non-covered areas, but highlighted gaps in monitoring and supervision putting the program at risk of poor quality of delivery (Management, 2009). Since then there have been major policy developments impacting the LHW program. LHWs had a special status in the initial years as community representatives paid a monthly stipend in recognition and handling of pneumonia and diarrhea, maternal knowledge and practices related to essential

2. Methodology
2.1 Study Design and Setting
A descriptive cross-sectional study was undertaken comprising of household structured interviews of mothers of <2 years children residing in LHW covered areas in two underserved rural districts of Pakistan. A structured questionnaire was administered to mothers living in LHW served household for more than 6 months. Data was collected on frequency of LHW visits to household, child health services provided during LHW visits, mothers’ recognition and handling of pneumonia and diarrhea, maternal knowledge and practices related to essential
prevalence of reports of a common child illness in children under two years of age. Diarrhea prevalence of 23% in <2 years children was used in the determination of sample size. A sample of 1718 eligible households was calculated based on 80% power and 5% level of significance to detect reporting of diarrhea, factoring in 90% response rate and a design effect of 1.5 over LHW versus non-LHW covered area.

2.3 Sampling

Districts are administratively divided into union councils comprising approximately of 10,000 populations. Multi-stage cluster sampling approach was used to enroll eligible households. In the first stage, 12 union councils served by LHWs were randomly selected across the 2 districts, comprising 6 union councils in each district. In the next stage, each of the sampled union council was broken down into sampling units of 1000 population served by LHWs and 200 sampling units. 200 units were randomly selected from the total listing. In the third stage, 10 eligible households were systematically sampled from each of the 200 units to achieve a sample size of 2000 households. An eligible household was one having at least one child of age less than 5 years and served by the LHW for at least 6 months. From the first eligible household, every fifth household was selected and until 10 eligible households were sampled from one cluster (Figure 1).

2.4 Data Collection

The interview tool was comprised of 4 sections: i) socio-demographic household information; ii) particulars of child <2 years of age including birth and child illness; iii) LHW’s quantity and quality of visits; iv) maternal knowledge and practice of essential child health services prided by LHWs. Responses could be given in a combination of multiple choices and open-ended response formats. The tool was pretrained in 5% of the sample size prior to being finalized. Household interviews in the local language were carried out by 4 trained research assistants, supervised by a field supervisor and overseen by a field manager. The same team conducted interviews across both districts to maintain consistency. The completed questionnaires were daily verified by the field supervisor for completeness and errors, while 10% of the filled forms were randomly picked for checking by the field manager. All checked forms were sent to the central data management unit for double entry of data, using EpiData software version 3.1. Data was entered on a real-time basis and a statistician checked the quality of the entry and supervised data editing. Data set was analyzed using SPSS software version 19. The mothers’ and LHW characteristics were described using median values and interquartile ranges (IQR) for continuous variables and
counts and percentages for categorical data. Differences and proportions were tested using a chi-square test.

2.5 Ethical Considerations

Approval on study proposal, data collection and tool review was taken from the Ethical Review Committee (ERC) of Aga Khan University (AKU) (5413-CHS-ERC-18). Authorization to carry out the survey was obtained from the district health offices and deputy commissioners of SB and TMK respectively. Eligible mothers were invited to participate in the survey based on written informed consent and no monetary or other incentives were provided. A unique identification number was assigned to eligible participants at the time of recruitment to maintain anonymity during data entry, analysis and reporting.

3. Results

3.1 Socio-Demographic Characteristics

A total of 2004 females were interviewed comprising 95% of mothers and 5% of female caregivers when mother was unavailable. The profile of the households is typical of a rural, Pakistani population: 55% of the mothers were illiterate, 11% had completed primary school and 135 had completed high school. Occupation of father of U2 children was mainly daily wages: 56% worked on daily wages whereas 21% ran small business and remaining were in salaried jobs. Ethnic background of half of the participants was Sindhi: 53% population spoke Sindhi as the first language, followed by 13% Seraiki, 11% Punjabi, 10% Urdu, 10% hindko/pashto.

3.2 Services Delivered by LHWs During Visits

All households (98%) had been visited by LHW in the last 3 months, but only 63% reported regular monthly visits. The most frequently provided service was oral Polio drops administration reported by 77% of households (Table 1). Routine immunization were reported considerably less by 59% of households. Other child health services were even less commonly reported: Breastfeeding advice (20%); child illness management (18%), growth monitoring only 10%, whereas hygiene counseling was not reported by any household. Participant mothers also asked about provision of maternal care services by LHW during visits: 40% mothers reported being counseled on ANC during last pregnancy; 30% reported PNC counseling by LHW and 37% reported being advised on family planning.

Table 1. Services provided during LHW household visits

| Indicator                                 | n=1968 | Percent |
|-------------------------------------------|--------|---------|
| Percentage of households visited by LHWs once a month | 1241   | 63%     |
| Child health services provided by LHWs during HH visits | n=1968 |         |
| Polio drops only                          | 1525   | 77%     |
| Breast feeding counseling                 | 392    | 20%     |
| Child illness management                  | 363    | 18%     |
| Growth monitoring                         | 194    | 10%     |
| Hygiene Counseling                        | 1      | 0%      |
| Maternal care services provided by LHWs during HH visits | n=1968 |         |
| ANC checkup                               | 785    | 40%     |
| Contraceptive methods                     | 720    | 37%     |
| PNC checkup                               | 586    | 30%     |

3.3 Routine Childhood Immunization

Nearly two-third of the households (67%) reported that LHWs as the source of information for routine childhood immunization whereas doctors (16%), vaccinators (12%), media (2.6%) were minor sources and civil society organizations were hardly reported (0.25%) (Table 2). 31% of mothers reported being counseled by LHWs during monthly home visits, whereas others obtained information from LHWs during visits to health house or sessions/chance encounters.

For close to half of the households (59%), the LHW was also the provider of routine childhood vaccinations while the remaining had children immunized by vaccinators or at health facilities. Most of the children (53%) in the households that received childhood vaccinations from LHWs reported vaccinations being provided during
monthly home visits.
Awareness on specific vaccine preventable diseases was highly variable with 59% reporting awareness of Polio whereas awareness of other VPDs was much lower ranging between of 42% - 9%. 42% of mothers were aware of BCG, 31% of measles while Penta and Pneumococcal awareness was very low limited to 24% and 23% respectively. A sizeable number of respondents (26%) were not aware of any VPD.

Table 2. Routine Childhood Immunization

| Source of information on routine immunization | N=1972 | Percent |
|---------------------------------------------|--------|---------|
| LHW                                         | 1321   | 67%     |
| Doctor                                      | 306    | 16%     |
| Vaccinator                                  | 227    | 12%     |
| Media                                       | 53     | 3%      |
| Civil Society Organization CSO              | 5      | 0.25%   |

| Provider of routine immunization            | N=2004 | Percent |
|---------------------------------------------|--------|---------|
| LHW (home/ LHW health house)                | 1182   | 59%     |
| Vaccination at home                         | 781    | 39%     |
| Vaccination center                          | 642    | 32%     |

RI service provided by LHW during HH visits

| Provision of routine immunization vaccination during HH visit (n=3076) | 1637 | 53% |
| Provision of counseling on Routine Immunization during HH visit (n=1972) | 620  | 31% |

Mothers Awareness of Childhood Immunizations

| BCG                                      | 826  | 42% |
| Polio                                    | 1156 | 59% |
| Measles                                  | 602  | 31% |
| Don’t know                               | 515  | 26% |
| Pentavalent                              | 481  | 24% |
| Pneumococcal                             | 448  | 23% |
| Rotavirus                                | 184  | 9%  |

3.4 Nutrition

Of the 9.5% children monitored for growth by LHWs during household visits, a third (35%) are monitored for weight and only 17% for height (Table 3). Close to two-thirds of children monitored for growth (68%) were referred by LHW to health facilities for further follow up.

Provision of advice on nutritional parameters was reported by only a third to a fifth of the mothers: 29% of mothers reported receiving weaning advice, 23% reported advice on nutritious food, and 20% reported breastfeeding advice. Only 17% of mothers had received counseling from LHWs on deworming and a mere 11% on development milestones.

Despite only a fifth of mothers having received weaning advice from LHWs at least half (51%) reported exclusively breastfeeding for 6 months. Over 20% of mothers reported introduction of other fluids before 6 months of age, hence risking childhood infections and under-nutrition. Practices for weaning were more inadequate. Weaning was practiced at the appropriate age of 6 months in only 12% of children with most mothers delaying weaning to later months.
Table 3. Nutrition

| Indicator | n=1968 | Percent |
|-----------|--------|---------|
| Growth monitoring provided by LHW during HH visit | 194 | 10% |
| Growth monitoring practices used by LHWs (%) | n=2004 | Percent |
| Weight | 696 | 35% |
| Height | 343 | 17% |
| Mid Upper Arm circumference | 53 | 3% |
| Head circumference | 43 | 2% |
| Others | 350 | 17% |
| Referral of malnourished children by LHW (n=2004) | 1363 | 68% |

Nutrition Counseling by LHWs during household visits N=1972 Percent

| Counseling | N=1972 | Percent |
|-----------|--------|---------|
| Weaning Advice | 569 | 29% |
| Nutritious food | 430 | 23% |
| Breastfeeding | 392 | 20% |
| Deworming | 338 | 17% |
| Development Milestones | 217 | 11% |

Exclusive breastfeeding practiced by mothers N =1877 Percent

| Time | N=1877 | Percent |
|------|--------|---------|
| 0-1 months | 87 | 5% |
| 2-3 months | 121 | 6% |
| 4-5 months | 195 | 10% |
| Till 6 months | 966 | 51% |
| Did not breastfeed | 84 | 4% |
| 7 and above | 418 | 22% |

Weaning initiation practiced by mothers n = 2004 Percent

| Time | n= 2004 | Percent |
|------|---------|---------|
| 0-1 months | 33 | 2% |
| 2-3 months | 73 | 4% |
| 4-5 months | 100 | 5% |
| At 6 months | 244 | 12% |
| Weaning after 6 months | 919 | 46% |
| Don’t know | 184 | 9% |

3.5 Child Illness

Child illness counseling and support was provided by LHWs in only 18% of monthly interactions with mothers. However, despite the infrequent advice, LHWs are the main provider of information on child illness detection and early management - 74% of households reported that LHWs is the source of information on recognizing and initial management of child illness, whereas doctors as source of information were reported by only 26% of households (Table 4). For the treatment of child illness, LHWs are a marginal source (3.5%), with most households accessing private providers (70%) and to lesser extent government facilities (22%).

Mothers were questioned on diarrhea and pneumonia, the two largest cause’s preventable deaths in children in Pakistan, as well as child care hygiene. Mothers did not recall being advised on hygiene for child care by LHWs during monthly interactions. Hygiene practices by mothers were poor with only 34% washing hands before feeding children, 48% reported use of boiled water for children and 32% covered food & water of children from flies & dust.

Most households (76%) reported receiving the Oral Rehydration Solution (ORS) provision from LHWs for use
during childhood diarrhea. However only 27% of mothers had correct knowledge of ORS to be given after every loose motion during diarrhea. Less than a third of mothers could recognize key signs of pneumonia: 35% of mothers reported runny nose, 31% shortness of breath, 29% cough, 27.5% reported sounds in the chest, and only 14% mentioned increased respiratory rate.

Table 4. Early management of child illness

| Source for recognition of child illness | n=1459 | Percent |
|---------------------------------------|--------|---------|
| LHW                                   | 1079   | 74%     |
| Doctor                                | 380    | 26%     |

| Source of treatment of child illness | n=827 | Percent |
|-------------------------------------|-------|---------|
| Private provider                    | 579   | 70%     |
| Doctor                              | 380   | 42%     |
| LHW                                 | 33    | 4%      |
| ORS provided by LHW during HH visits (n=1930) | 1465 | 76% |
| ORS use during last childhood diarrheal episode by mothers | n= 2004 | Percent |
| Once                                | 54    | 3%      |
| Twice                               | 211   | 11%     |
| Thrice                              | 978   | 49%     |
| After every stool                    | 541   | 27%     |
| Other                               | 185   | 9%      |

| Infant & childcare hygiene practices by mothers | n=2004 | Percent |
| Hand washing before cooking               | 986    | 49%     |
| Hand washing after going to the toilet    | 980    | 49%     |
| Drinking boiled water                     | 971    | 48%     |
| Cover and protect drinking water          | 632    | 32%     |
| Hand washing before feeding the children  | 677    | 34%     |

| Recognition of pneumonia symptoms by mothers | Percent |
| Runny or Blocked Nose (n=1463)               | 512     | 35%     |
| Shortness of breath (n=1677)                | 520     | 31%     |
| Cough (n= 1479)                             | 414     | 28%     |
| Sound from the chest (n=1756)               | 474     | 27%     |
| Increased respiratory rate (n=1829)         | 256     | 14%     |
| Disease of lungs (n=1379)                   | 193     | 14%     |

4. Discussion

We investigated the performance of LHWs for child health in an underserved area of Pakistan exploring the frequency of LHW visits to households, services covered during encounters and maternal knowledge and practices, as related to immunizations, nutrition and early management of child illness. Our findings indicate that LHWs do not regularly carry out monthly visits and the quality of monthly encounters needs improvement. While oral Polio drops administration is the most frequent service provided however other services part of the LHW key mandate such as routine immunization, nutrition, and child illness management are infrequently offered. Whereas LHWs are the main source of information to rural households for immunization, child nutrition and dealing with child illness, it has translated into less than desirable impact on knowledge and practices of mothers, highlighting missed opportunities. Polio awareness and administration was service most frequently offered by LHWs, whereas routine immunization
counseling, defaulter checking, and provision of vaccines was carried out in just over half of monthly encounters. LHWs were reported to be main source of routine immunization information for households, however there was high level of awareness of the mothers about Polio as compared to the other VPDs, and a fourth were unaware of any VPDs, indicating weak transfer of immunization awareness and schedules. In contrast LHWs in other countries have been far more effective in provision of routine immunization counseling and defaulter tracking. A study in India reported over 84% of mothers receiving RI counseling by CHWs (Fathima et al., 2015), a study from Uganda shows that 71% of CHWs surveyed had ≥95% of children under their care on track for RI (Kuule et al., 2017), while in Kenya, CHWs helped increase vaccination among infants to 98.8% (Nzioki et al., 2017).

Within the area of nutrition, growth monitoring and nutrition counseling are key LHW mandates, and are critical to control high stunting rates in Pakistan. Growth monitoring was carried out in less than 10% of household visits and growth-monitoring methods were not standardized. Furthermore, counseling on nutrition parameters was infrequently carried out with a third of encounters reporting weaning, nutritious food and breastfeeding, whereas very few instances of de-worming and development milestones counseling were recorded. Households’ knowledge and practices for exclusive breastfeeding and weaning were recorded to be poor. Findings from other countries such as Nepal, Mali, and Afghanistan show much higher rates of growth monitoring as well as higher rates in correctly performing growth monitoring (Amano et al., 2014; Mayhew et al., 2014; Alvarez Morán et al., 2018). The third finding from our study relates to LHWs delivery on preparing households for early detection, management and referral of child illness, as well as hygiene counseling for mothers. Our study shows that the LHWs, rather than doctors, were reported by households to be the main source of information for initial child illness detection, with subsequent management by doctors at government and private health facilities. However, frequency and quality of LHW encounters was poor. While most mothers reported receiving ORS packets from LHWs, very few knew of appropriate usage, and only few mothers could correctly recall early signs of pneumonia. Hygiene advice for child care handling, although a mandate of LHWs, was least reported during LHW encounters with households, and mothers had poor practices of hand-washing, food covering and use of boiled water. Need for support to CHWs in management of child illnesses has been reported from other countries including studies from Peru, South Africa and Uganda (Westgard, Naraine, & Villacorta, 2018; Stellenberg, Van Zyl, & Eygelaar, 2015; Wanduru et al., 2016). Despite inadequate knowledge of CHWs being a frequently reported impediment (Wilford et al., 2018; Fathima et al., 2015; Guenther et al., 2017), CHWs can deliver well under controlled supervised pilot study settings (Abdel-Aziz, Mowafy, & Galal, 2015).

Reported gaps in LHWs delivery for child health may have been due to a number of factors. We found considerable variation in the frequency of topics discussed during household visits with most emphasis on Polio. While there is high vertical accountability on Polio eradication in Pakistan led from the highest levels (Haq et al., 2019), there is fragmented and weak accountability on other preventive care aspects (Zaidi et al., 2019). It has also been argued that involvement of LHWs in frequent Polio campaigns with payment of special incentives, has detracted LHWs from providing the holistic primary healthcare to children under five (Wazir, Shaikh, & Ahmed, 2013). Other more programmatic constraints are also reported. Poor field supervisory support to the LHWs is identified as a key programme challenge in Pakistan (Management, 2009; Rabbani et al., 2016). Increasing multitasking of LHWs (Haq, Iqbal, & Rahman, 2008), inadequate training on communication (Ariff et al., 2010; Rabbani et al., 2016) are noted bottlenecks in the delivery of their basic mandate. Our findings are of value to the existing policy crossroads in Pakistan on deciding the direction ahead for the LHW program. We argue that instead of merely increasing the number of LHWs as laid out in the recent National Health Human Resource Vision of Pakistan attention is needed to plug missed opportunities for child care through high emphasis on improved frequency and quality of LHW encounters. We also argue that LHWs, even with existing sub-optimal delivery in child health care, are still the main source for health and nutrition awareness for rural underserved households, hence existing counter policy arguments to make LHWs redundant or not recruit against LHWs that are retiring (Shah, 2018), will not bring value for money, with a call for policy on capability development and supervision. Prioritization of a wider child health focus throughout the LHW program, to recapture its relevance beyond just polio program activities.

A limitation of the study is that LHW delivery has been indirectly assessed through mother interviews, whereas we did not carry out LHW interviews to assess whether there was insufficient knowledge of LHWs, inability to share knowledge with care-providers or lack of sufficient attention to the task. These are important areas for future research in the Pakistani context. Another limitation is that the sample of rural households was taken from the Sindh province of Pakistan rather than a national sample, however, given that the socio-economic background of mothers is fairly representative of other rural areas in Pakistan the lessons learned can be of value to other parts of Pakistan.

5. Conclusion
Although LHWs are main information source for child health services for households in rural underserved areas of Pakistan, but infrequent, poor quality of household encounters and weak translation into maternal knowledge and practices, indicates ineffective delivery on the key mandate of basic community-based child health services. Policy debate instead of focusing on scaling up or downsizing the program, should prioritize child health, bringing quality and supervision to improve value for money of a critical community resource.

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**Authors’ Contributions**

SZ: conceptualized, designed and supervised the study, MH led the data collection and analysis. AA provided literature review and refined the analysis: SZ, MH, AA and XG drafted the paper. All authors read and approved the final manuscript.

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**Competing Interests Statement**

The authors declare that there are no competing or potential conflicts of interest.

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