ORIGINAL ARTICLE
# EFFECTIVENESS OF COMMUNITY SERVICE MODEL FOR INCREASING ROUTINE IMMUNIZATION COVERAGE AT PRIMARY HEALTHCARE FACILITIES IN A RURAL DISTRICT OF PAKISTAN: A QUASI-EXPERIMENTAL STUDY

**Zulfiqar Ali, Sathirakorn Pongpanich, Ramesh Kumar\***

College of Public Health Sciences Chulalongkorn University-Thailand, *Health Services Academy Islamabad-Pakistan

**Background**: In Pakistan Routine Immunization coverage has been reported to be significantly low due to multiple factors that results in high number of deaths in children under 5. This study was conducted to assess the effectiveness of integrating Community Services to improve Routine immunization coverage in rural district of Pakistan. **Methods**: A quasi-experimental study with control and intervention arms was conducted in government Basic Health unit's catchment population of Panjgur by interviewing household head/Fathers. Total 234 household head including fathers were interviewed during this baseline survey. Community service model was used for to increase routine immunization coverage at catchment area of Basic Health unit (BHU) in intervention group while routine services were given in control BHU. **Results**: 230 parents completed the questionnaire during the end line after three months of intervention. There were no significant differences found between two groups at baseline but after the intervention, there was statistically significance difference (<0.05) between both group's knowledge and practices regarding routine immunization. Moreover, there was no statistically significant difference in control group reported (>0.05) after the intervention period. Overall immunization status after intervention where fully immunization status in intervention group after intervention was 88.8% as compared to control group after intervention was 13.6% for partial immunization status in intervention group after intervention was 11.1% as compared to control group after intervention was 81.1 for the Non-Immunization status in intervention group after intervention was 0% as compared to control group after intervention was 5.1%. **Conclusions**: Community Service Model has significantly improved the Knowledge & Practices among households/parents of children under 5 in the intervention arm.
**Keywords**: Immunization status, Knowledge, Practices, Assessment, Vaccination, Primary health care and basic health units

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## INTRODUCTION

Pakistan is rapidly growing country with population exceeding 180 million and majority is living in rural areas. Pakistan has a widespread health care–delivery structure consisting of a mix of both private and public sectors. The public sector provides preventive services in the form of vertical programs. Basic Health Units (BHUs) are continuously providing the immunization services to the population with in their catchment area. However, people are not getting their children fully immunized due to multiple factors such as illiteracy, inaccessibility, lack of awareness, social and cultural stigma. Low coverage of immunizations has remained a big challenge that result in high morbidity, and mortality among under 5 years children. Most of the surveys have shown that the meager resources spent by the government on health care services are reason for poor vaccine coverage in the country.[1]

The Human Development Report 2013 has mentioned that the literacy rate in community is 58 percent which is very far from the international figures and that might be one of the factors for low vaccine coverage in public.[2] However, the health education is a vital element of all the health programs by the Government through educating and to aware the communities.[3] The expected total coverage for a completely immunized child ranges from 56–88% with substantial difference between provinces.[4]

Nearly half, 44 percent of Pakistani land allocated for Balochistan province with low population but their immunization status in children age 12–23 given BCG at birth was reported 35%. This low coverage is due to decrease knowledge related to immunization on preventable diseases in local population, poor performance at primary health care level, services inequity, low public demand, insecurity and vaccine resistance. However, the natural disasters, conflicts and low government stewardship have negatively influenced

the routine Immunization activities in the country.[5] Literature suggested that interventions could improve the routine immunization.[6] Hence, this community services model (CSM) intervention has been conducted for improving the knowledge and practices of house hold/fathers of under five children living in rural Pakistan.

## MATERIAL AND METHODS

Quasi-experimental study in two basic Health Units Tasp and Esai located at Panjgur district of Balochistan Pakistan was conducted in June to December 2014. District Panjgur is one of the rural are of the province with low coverage of routine immunization. Population is providing health services to patients from Iran as well, as the border is only 54 kilometers from Chitkan town.[5] Pre-testing and piloting of tool was conducted to check the reliability and internal consistency by asking the questions to house hold heads/fathers (20 parents). However, the validity of tool was measured through a known-group validity technique.[7]

Difference in the immunization status of children was assumed 20% after the intervention with 0.05 alpha and 80% power for sample size, 234 households Heads/fathers were selected for this interventional study. The district has two tehsils Panjgur, and Gowargo, tehsil panjgur was selected randomly for the intervention arm and tehsil Gowargo as control arm. Within each tehsil union councils were randomly selected, and in the last stage villages among each UC are again randomly selected. Each village was considered as a cluster to approach households. Finally, 117 households from intervention and 117 from control BHU were interviewed during this study after taking the written consent and approval from administration was sought before to start the data collection. First house was selected randomly in the village followed by every 7th house through systematic sampling. This study was approved from research ethics committee of Health Bridge Consultants Foundation Pakistan. Data was collected by trained collectors asking questions to household heads/fathers through a guided structured and adapted instrument translated in Urdu. District Health Management information cell Data collectors were no affiliation with the study BHUs. Two measurements, one at baseline and second after three month intervention were taken and compared the knowledge and practices of households regarding immunization with in both BHUs. Although the response rate was 94% but 16 households; 7 from intervention and 9 from control were lost to follow up due to their personal engagements.

Data analysis was done by using the SPSS - 16 in this study.[8] The effect of outcomes of interest (knowledge and practices) in the analysis was calculated by using the chi-square test for categorical variables and *t*-test for continuous variables. The effectiveness of CSM model in the groups and across the groups were calculated by using the paired and unpaired *t* test. Study outcome was improved practices of households about routine immunization (No=0, Yes=1). There were 13 statements for knowledge and 5 for practices and 23 for immunization status; mean score were calculated and grouped in levels. Baseline was conducted before the intervention and end line was conducted after 6 months period.

In Pakistan and all over the world many studies have been conducted to increase immunization status of children less than five years age through Health Education involving the Household mothers, grandmothers and, Married females with or without children. Another study shows that only females are not responsible for proper routine immunization practice of under five children in rural population living the catchment areas of the basic health units.[9]

Hence, dedicated and intensive education of house hold head/father and trainings of staff with the leadership of medical officer can positively influence their immunization practices of under five children in BHU. CSM included continuous education and refresher of the house hold head/father for three months duration in the intervention BHU only. Total 10 health education sessions with one hour duration each after one week interval were planned followed by 12 weekly refreshers sessions. CSM was based on the literature review mainly of WHO and modified from the previous behavioural change theories models. This community service model was comprised on regular health awareness sessions, meetings, distribution of information brochures and reminder service for the household/fathers of under 5 years children on immunization. This model was directed to increase under five children adherence on routine immunization services in a BHU level setting to provide focused RI (routine immunization) to the Parents, Increase knowledge and awareness through RI Education, Improve service quality related to RI service and Integrating community and Basic Health Unit service through Health Staff. Moreover, behavioural model developed by Andersen in analysing patient utilization of healthcare services has also been reviewed to develop this CSM.[10]
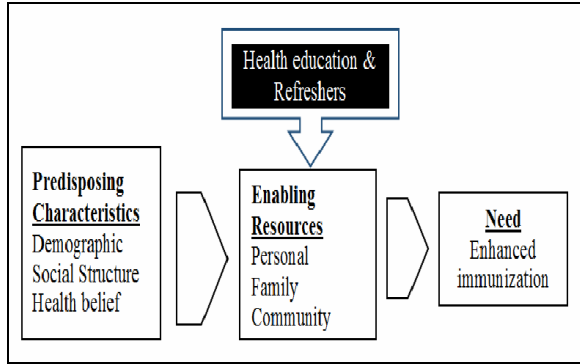
**Figure-1: Utilization of health care services through community service model**

## RESULTS

The socio demographic information like income level of education, household members, number of children, under-five children and sex of children were not significantly different in both groups. Concerning the income of household head, nearly half had income between 10000 to 20,000 Pakistan rupees per month. Above one third of household heads qualification is of High School that is 10 years of education. Regarding the house hold members 66.2% of houses had more than five person per and 33.8% of houses had less than five members per house. Regarding number of children 50.9% had more the then four years old and 49.1% had less than 3 years old age (Table-1).

**Table-1: Socio-demographic characteristics of the participants (n=234)**

| | | Intervention | | Control | | Total | | *p*-Value |
|---|---|---|---|---|---|---|---|---|
| | | n= 117 | (%) | n=117 | (%) | n= 234 | (%) | |
| **Income in PKR** | ≤10000 | 21 | 17.9% | 19 | 16.2% | 40 | 17.1 | 0.798 |
| | 10001–20000 | 50 | 42.7% | 47 | 40.2% | 97 | 41.1 | |
| | ≥20001 | 46 | 39.3% | 51 | 43.6% | 97 | 41.1 | |
| **Education** | No education | 29 | 24.8% | 34 | 29.1% | 63 | 26.9 | 0.753 |
| | High School | 65 | 55.6% | 60 | 51.3% | 125 | 53.4 | |
| | Graduation | 18 | 15.4% | 20 | 17.1% | 38 | 16.2 | |
| | Above Graduation | 5 | 4.3% | 3 | 2.6% | 8 | 3.4 | |
| **Household members** | ≤5 | 78 | 66.7% | 77 | 65.8% | 155 | 66.2 | 0.890 |
| | >5 | 39 | 33.3% | 40 | 34.2% | 79 | 33.8 | |
| **Number of children** | ≤3 | 57 | 48.7% | 58 | 49.6% | 115 | 49.1 | 0.896 |
| | >4 | 60 | 51.3% | 59 | 50.4% | 119 | 50.9 | |
| **Under-five children** | 1 Child in family | 113 | 96.6% | 105 | 89.7% | 218 | 93.20 | 0.038 |
| | 2 Childs in family | 4 | 3.4% | 12 | 10.3% | 16 | 6.8 | |
| **Sex of Children** | Male | 55 | 47.0% | 53 | 45.3% | 108 | 46.2 | 0.793 |
| | Female | 62 | 53.0% | 64 | 54.7% | 126 | 53.8 | |

**Table-2: Percentage of Knowledge and practices of subjects regarding routine immunization.**

| # | Statements | Intervention | | Control | | Total | | *p*-Value |
|---|---|---|---|---|---|---|---|---|
| | | n | (%) | n | (%) | n | (%) | |
| **Knowledge of Health in General** | | | | | | | | |
| 1 | Opinion on child health | 16 | 13.7 | 15 | 12.8 | 31 | 13.2 | .847 |
| 2 | Understanding of main health problems for under-five children | 82 | 70.1 | 85 | 72.6 | 167 | 71.4 | .664 |
| 3 | Choice of treatment | 33 | 28.2 | 33 | 28.2 | 66 | 28.2 | 1.000 |
| 4 | Reason child becomes unwell | 5 | 4.3 | 11 | 9.4 | 16 | 6.8 | .120 |
| 5 | Heard of immunization | 89 | 76.1 | 80 | 68.4 | 169 | 72.2 | .189 |
| 6 | Know any disease eradicated from Pakistan | 30 | 25.6 | 30 | 25.6 | 60 | 25.6 | 1.000 |
| **Knowledge on Immunization** | | | | | | | | |
| 7 | Prevention of vaccine preventable diseases | 37 | 31.6 | 36 | 30.8 | 73 | 31.2 | .888 |
| 8 | Understanding of social factors | 70 | 70.1 | 75 | 70.6 | 145 | 71.4 | .664 |
| 9 | Vaccine schedule for disease in Pakistan | 106 | 90.6% | 102 | 87.1% | 223 | 95.3% | .001 |
| 10 | Role of vaccination for health | 46 | 39.3% | 45 | 38.5% | 91 | 38.9% | .893 |
| 11 | Children with preventive diseases | 22 | 18.8% | 23 | 19.7% | 45 | 19.2% | .868 |
| 12 | Gender difference in Vaccination | 21 | 17.9% | 15 | 12.8% | 36 | 15.4% | .277 |
| 13 | Available Nearest centre | 99 | 84.6% | 101 | 86.3% | 200 | 85.5% | .711 |
| **Practice on Immunization** | | | | | | | | |
| 1 | Last Dose Source | 37 | 31.6% | 28 | 23.9% | 65 | 27.8% | .189 |
| 2 | Know Vaccination place Missed children | 92 | 78.6% | 92 | 78.6% | 184 | 78.6% | 1.000 |
| 3 | Choice of Health care Facility | 74 | 63.2% | 65 | 55.6% | 139 | 59.4% | .231 |
| 4 | Option on Non availability of vaccine | 2 | 1.7% | 2 | 1.7% | 4 | 1.7% | 1.000 |
| 5 | Help of Vaccination team | 100 | 8.55% | 96 | 82.1% | 196 | 83.8% | .478 |

**Table-3**: Effectiveness of intervention on Knowledge and Practices among parents of under-five children

| Intervention group | | | *p*-value | Control group | | *p*-value |
|---|---|---|---|---|---|---|
| **Knowledge on Immunization** | | | | | | |
| Low | 10 (76.9%) | 80 (76.9%) | 0.007 | 79 (78.2%) | 11 (68.8%) | 0.404 |
| High | 3 (23.1%) | 24 (23.15%) | | 22 (21.8%) | 5 (31.2%) | |
| **Practice on Immunization** | | | | | | |
| Bad | 11 (84.6%) | 89 (85.6%) | 0.001 | 87 (86.1%) | 13 (81.2%) | 0.606 |
| Good | 2 (15.4%) | 15 (14.4%) | | 14 (13.9%) | 3 (18.8%) | |

Table-2 represents the percentage of subject who answered correctly to Knowledge and practice items concerning routine immunization , last dose , knowing the vaccination places, Option on Non availability of vaccine and towards routine immunization and on different variables were determined between control and intervention. However, it was observed that there was no statistically significant difference in both groups.

Comparing knowledge and practices about routine immunization within groups and across groups, at baseline and after the intervention to see the effectiveness of the CSM Model. Table-2 shows the significance difference between Knowledge and Practices among parents of under-five children at baseline which was non-significant. That means both groups were at same level prior to start the study.

Knowledge was assessed by calculating their mean score of responses and finally grouped in two levels; high knowledge was reported if mean score is above 10 and low knowledge was reported if mean score is less than 9. Similarly, for practices, two groups; bad and good were included. Table-3 shows knowledge and practices on RI among house hold/father was low before intervention and high after the intervention.

## DISCUSSION

Majority of the House hold heads participated in the study from both control and intervention Populations were belong to young and middle age group and there were no any statistically difference in the age has been shown with in two groups. It was found that majority of the House hold fathers of children under five were working in private sectors. This study observed that knowledge and practices towards routine immunization among under five children was partial in both setting. There are some important gaps need to be strengthened especially in rural setting. The results of study indicate that there is lack of understanding about routine immunization among study participants. Thus there is need of critical level of public awareness in district Panjgur, especially among Father of child under 5 years to decrease burden of preventable diseases. Similar studies shows that the knowledge of households of child under 5

years of age was very poor and needs education intervention for to rapid improve the coverage.[11] Other studies were also in the opinion that low literacy was found as big constraints for the poor immunization status in rural community. However, household education is more important for betterment of good health of their child and to understand the importance of vaccination for their kids.[12] Immunization status in the rural areas could be enhanced through the health education sessions and awareness of households/ fathers of the children. A prospective community-based intervention study from Karachi Pakistan had also proved that health education for mothers of child would positively improve the health of their child by building their knowledge about health.[13] The current study sought to evaluate knowledge and practice of population and Immunization Status of under-five children. Result of this study observed partial knowledge and practice towards routine immunization. Study with similar findings shows that to focus the mother's education is very difficult in the rural community but different messages should be disseminated to achieve a better results.[14] Disease could not be controlled without education of house hold and mothers and their practices would never be changed without proper knowledge on the child vaccination.[15] Health education and awareness is very important to achieve improved vaccination level in the community especially for mothers of first child.[16] There are multiple reasons have been found through different implementation research from accessibility to non-availability of vaccine in the health centres.[17] Intervention through health education could improve the immunization level in the children under five years and research suggested that around thirty nine percent in immunization coverage could only be increased by health education message intervention.[18] Program in Pakistan is providing immunization to the children under five age at their homes and giving them messages on the benefits of immunization.[19] Messages on health educations were significantly increased the immunization status of children under 5 in the rural areas of Pakistan proved during an interventional study.[11] This model has been statistically proved that the regular education, social mobilization, facilitation, mass communication, lobbying, can increase the knowledge of fathers in

the intervention population. However, there were no any change have been reported in the control population.[19]

## CONCLUSION

Study has concluded that knowledge and practices among Household heads of less than 5 years children regarding immunization could be enhanced through CSM intervention at community level. Such model should become a regular feature of all BHUs and their surrounding communities for reducing the preventable diseases by vaccinating their child.

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## AUTHOR'S CONTRIBUTION

ZA conceptualize the study design and developed model. SP supervised the study and gave their feedback on paper. RK drafted paper and data analysed.

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**Address for Correspondence:**
**Ramesh Kumar,** Assistant Professor, Health Services Academy Islamabad-Pakistan
**Cell:** +92 300 937 7486
**Email:** drramesh1978@gmail.com