Analysis of Potential Factors Influencing EPI Implementation in Punjab, Pakistan

Shahzad Amir
Ain ul Momina Sonia Omer
Sulsabeel Iftikhar
Rizwan Ullah Siddiqui
Sadia Jamal

Immunization is one of the most cost-effective interventions of Public Health in reducing global child morbidity, mortality and lifetime disabilities. Despite immunization programme being in place for decades and significant improvement in immunization services and administrative coverage,cases of communicable diseases are still occurring and epidemics of Vaccine Preventable Disease (VPDs)continue to take place. This is a clear indication that certain factors are being overlooked in implementation.This is descriptive study in whichcausal design has been used to assess relationship between Human Resource (HR) Factorsincluding workload, employee motivation and supportive supervision. It also looks into factors related to infrastructure; vaccine availability, vaccine storage, vaccine transportation andadministration factorssuch as public awareness, policy and trainings byExpanded Programme on Immunization (EPI) implementation in District Okara of Punjab Province.The data was collected from 271 employees of Department of Primary & Secondary Healthcare, Punjab involved in EPI Okara.Likert scale five-point option questionnaire was employed for data collection of targeted individuals. Responses of all respondents have been entered in SPSS and analyzed statistically.Results revealed that HR, Infrastructure and Administration factors have significant association with EPI implementation. Infrastructure can bringabout a major change in EPI implementation with beta

value of 0.438 comparatively with significance level of 0.000.Thus, with effective tacklingof these factorswe can have motivated employees, better immunization planning and a sense of enhanced ownership among community members whichcan help us achieve the goals of EPI Programme - to immunize every child to reduce morbidity, mortality and disability.

Background of the study

Immunization is the number one Public Health intervention that saves 2.5 million deaths every year around the globe(WHO, 2019). Before the inception of the immunization programmes, infectious diseases like Measles, Diphtheria, Smallpox and Pertussis were leading causes of child mortality worldwide. WHO launched immunization programme globally back in 1974 with the aim to reduce child mortality, morbidity and permanent disability(Waisbord & Larson, 2005). Despite the global improvement in vaccine coverage that has seen 84% of children around the world receiving this life-saving intervention, 10 million children in low and middle level countries (LMICs)continue to die before reaching age of five(WHO, 2014). In Pakistan, a very large annual cohort of about 5 million infants that require vaccination stay deprived and suffer due to inefficiencies of our health system. This Programme was launched in Pakistan in 1978.Pakistan is multicultural and multilingual country and in order to achieve 90% standard and 80% minimum administrative coverage of vaccinationin each District is a serious challenge that requires implementation of the policy framework and effective area specific decision making. In Pakistan, Punjab Province has made tremendous efforts to achieve desiredcoverage, but despite all these efforts the number of cases of VPDsstayed on the rise and often leads to outbreaks and epidemics, Moreover,the infant mortality rate is stagnant which raises question on our decades of efforts put into improving immunization services. Recent rise in Poliocases in Pakistan is forcing the concerned authorities to form and implement a policy of targeted coverage of immunization activities and fulfilling the deficiencies in respective outreach areas. There are several factors associated with immunization that affects Programme efficacy including public awareness about vaccination(Kazi, 2013), health priorities, distance from home to health facility, fear of injections, schedule of immunization, missed population of children during immunization drives, behavior of immunization personnel, silent refusals, anti-vaccination myths and rumors, anti-vaccination videos etc.It is thus essential that we study and

unearth these less known factors and address them to achieve desired outcomes.This study is focusing on factors associated with implementation aspects of the EPI Programme including human resource, infrastructure and administrative components. The Programme can yield desired results by taking into account the factors identified by this study.

Objectives of the study

To evaluate the impact of HR factors on EPI implementation in Okara, Pakistan

To analyze the impact of infrastructure factors on EPI implementation in Okara, Pakistan

To study the impact of administrative factors on EPI implementation in Okara, Pakistan

Methods and materials

Study design

"Causal relationship" study design used foridentification of cause and effect relation between HR, Infrastructure, Administration factors and EPI implementation.

Research population

The employees of Primary & Secondary Healthcare Department who are involved in EPI Programme in District Okara of Punjab Province were the target population including Lady Health Workers (LHWs), Lady Health Supervisors (LHSs), School Health and Nutrition Supervisors (SNHS), Lady Health Visitors (LHVs), Vaccinators and others.

Sampling Size and sampling techniques

Convenient sampling also known as availability sampling technique was used to collect the survey response. Present research has targeted the sample size of 271 respondentsby using formula keeping 90% confidence level, 0.5 standard deviation, and a margin of error (confidence interval) of +/- 5%.

Research variables

Independent variables include HR factors, infrastructure and administration and dependent variable includes EPI implementation.

Tools for data collection

A semi structured questionnaire was used as an instrument to record the response of the participants.Likert scale five-point option was used in the questionnaire for specified objectives of the study from strongly agree to strongly disagree. The first section of the questionnaire includes basic demographic information of respondents, the second part include 21 questions with above stated Likert scale. For each question the respondent needs to evaluate and grade any one among the available 5 options.

Data analysis techniques

The collected responses were entered in SPSS V22 for statistical inferences.The internal consistency of the scale was confirmed by using reliability test of implemented tool. After this, sampling adequacy was determined. Descriptive statistics were used to determine frequency distribution and percentages of the demographic factors. Pearson correlation values were used for analysis of the relationship between dependent and independent variables. The variance of change was determined by using regression analysis in SPSS.

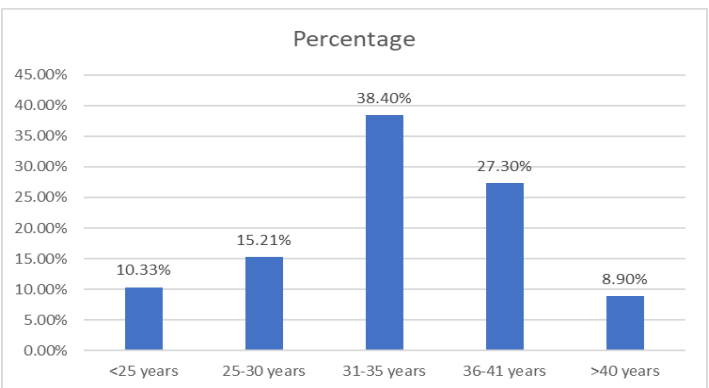
Results

Reliability test

In order to confirm internal consistency about the study instruments against each stated scale the Reliability Test has been processed. In thisstudy all values against stated factors are more than 0.700 which confirms internal consistency of the study instruments. Cronbach's value of HR was 0.729, infrastructure was 0 .742, administration was0.772 and EPI implementation was found to be 0.730.

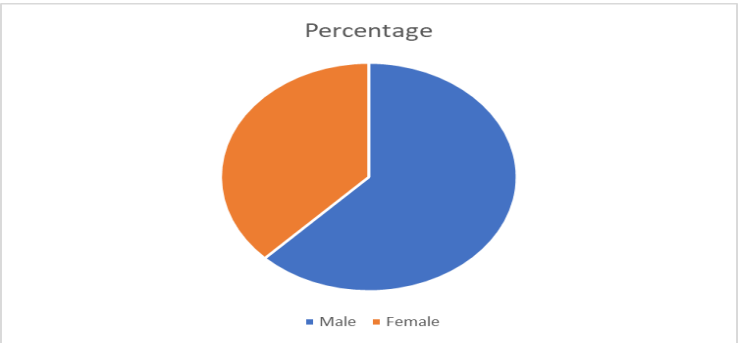
Frequency distribution

Figure 1.1 Age of respondents



In this study, multi age respondents have been involved. The maximum responses have been collected from the participants with age of 30-35 years who were 104 (38.4%),the participants with agerange of 35-40 yearswere 74 (27.3%)and participants with age more than 40 year were 24 (8.9%).

Figure 1.2Gender of respondents



There were 169 (62.4%) male and 102 (37.6%)femalerespondents in the study.This lesser participation from female respondents is due to reduced availability of women in the targeted region.

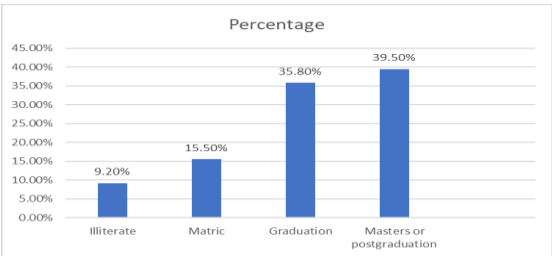


Figure 1.3 Qualification of the respondents

This study was undertaken from the individuals with varied educational backgrounds and skill levels.25 (9.2%)of the respondents were illiterate (This group comprised Sanitary Patrol workers, these are sanitary workers who provide assistance to vaccinators), 42 (15.5%) were having matric level educational status(mainly vaccinators), 97 (35.8%) had graduationlevel of education and 107 (39.5%) of the participants hadmasters and postgraduate level of education.

Table 1.1 Correlation test

		HR	Infrastructure	Administration	EPI Implementation
HR	Pearson Correlation	1	.807**	.844**	.819**
	Sig. (2-tailed)		.000	.000	.000
	N	271	271	271	271
Infrastructure	Pearson Correlation	.807**	1	.854**	.854**
	Sig. (2-tailed)	.000		.000	.000
	N	271	271	271	271
Administration	Pearson Correlation	.844**	.854**	1	.834**
	Sig. (2-tailed)	.000	.000		.000
	N	271	271	271	271
EPI Implementation	Pearson Correlation	.819**	.854**	.834**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	271	271	271	271

The output value of correlation has been indicated by Pearson correlation. In above table of correlation results there is 82 percent relationship between HR issues and EPI implementation. 85% relationship between Infrastructure and EPI Implementations, 83% relationship exists between Administration and EPI implementation whereas the level of significance among all factors are two tailed with significance value of .000.

Regression analysis

In the table model summary, value of R-square has been shown as 78.9% which is indication the all three independent variables are making change in dependent variable with 79% ratio.

Table 1.2 ANOVAof Regression

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	**Regression**	135.438	3	45.146	332.347	.000[b]
	Residual	36.269	267	.136		
	Total	171.708	270			

a. Dependent Variable: EPI Implementation

b. Predictors: (Constant), Administration, HR, Infrastructure

Table 1.3 Coefficients of Regression

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	**(Constant)**	.043	.123		.349	.728
	HR	.286	.058	.272	4.932	.000
	Infrastructure	.448	.058	.438	7.706	.000
	Administration	.239	.065	.230	3.679	.000

a. Dependent Variable: EPI Implementation

In ANOVA table it has shown that there is significant regression equation is forming with effective F value as (3, 270) = 332.34 whereas significance of overall model is less than 0.05. In table of coefficients, the value of standardized beta is showing the results against each variable in the model that depicts the change factors for dependent variable in the model. Value of beta for HR, infrastructure and administrative issues are 0.272,0.438 and 0.230 respectively. In above table of coefficients there is increased t statistics, as all variable are showing results of T-statistics higher than 2 which shows a significant change in the effective model. Lastly, significance level has shown against each independent variable with value less than 0.05 showing excellent significance of each variable in the model. Hence, it was found that all three factors including HR,infrastructure and administration are playing significant role inaffecting EPI implementation and without considering these factors there will be deficient implementation of EPI in targeted areas. It has been resulted that there is significant

association of HR issues, Infrastructure and Administration issues with the EPI implementations.

Discussion

HR factors have significant association with EPI implementation.

The study reveals that HR factors including employee motivation, workload and supportive supervision have significant association with EPI implementation. Statistical results showed that there is significant value of change in beta as 0.272 with significance level of 0.000 showing that HR factors are highly associated with EPI implementation in targeted areas of study.

EPI Programme should launch professional developmental initiatives, flexible working schedules, essential and steady supply of vaccines and effective communication between the hierarchies can enhance the effectiveness of the EPI workers.It has also been observed that excessive workload resulted inviolation of cold chain of vaccines andlead to vaccines losing their efficacy. Over work also caused the EPI workers to lose their temper when dealing with public. This adversely affects the outcomes of EPI Programme. Shortage of staff also is a leading issue affecting implementations of EPI Programme.Moreover, the excessive workload can potentially result in absenteeism of service providers leading to delays or absolute missed immunization opportunities(Gallagher, Erio, Baisley, Lees, & Watson-Jones, 2018; Mothiba & Tladi, 2016; Weldegebriel, Ejigu, Weldegebreal, & Woldie, 2016).

Supervision in a supportive mannercontributes positively in the implementation of EPI strategies as it encourages the staffs to work with enhanced interests. Researchers have repeatedly asserted that if supervisors help the staff, this unites the workforce and they tend to work with dedication and poor supervision can be damaging to the Programme. It has been observed that that poor management of human resource result in poor results in immunization coverage(Masud & Navaratne, 2012; Mwendwa, McAuliffe, Uduma, Masanja, & Mollel, 2017).

Infrastructure factors have significant association with EPI implementation.

Results of this study have showed that infrastructure factors are very important for implementing EPI in an effective way. Statistical results showed that thechange in beta for infrastructural factors is 0.438 along with significance level of 0.000 which shows that infrastructural issues are significantly associated with EPI implementation.

Research suggest that major reason of lack of immunization is deficient stocks of vaccines(Favin, Steinglass, Fields, Banerjee, & Sawhney, 2012). Results of this study have also shown that poor logistic arrangements and lack of financial resources results in disproportionate distribution and availability of vaccines.Similar issues were observed in Kenya and Somalia and lead to poor immunization coverage.Research points out that when parents have to travel far and wait for long durations to get their children vaccinated they tend to not come back for follow up vaccines (Averhoff, 2012; Clellend, Henriques, Knopp, & Wilson, 2010; Glatman-Freedman & Nichols, 2012). These are some of the prime reasons for children missing their vaccination routine.

Administrative factors have significant association with EPI implementation.

Results of this study have shown that administrativefactors are important for implementing EPI in an effective manner. Statistical results showed that the change in beta for administrative factors is 0.230 along with significance level of 0.000. This depicts that the role of administrative factors is significantly associated with EPI implementation. Researchers have highlighted that creating awareness about the benefits of immunizationis the most effective tool for increasingdemands for uptake of vaccines.

Health workers are the lynchpin of any immunization programme.There is direneed of effective communication between client and health workers. This help assuage any misgivings of parents regarding vaccines and helps parents adhere to advised vaccination schedules.

Social determinants such as socio-economic status of parents have a direct effect on immunization seeking behavior. Families falling within higher socioeconomic bracket are more likely to get their children vaccinated in comparison to children of parents with limited economic means(Amin et al., 2013; Glatman-Freedman & Nichols, 2012; Ophori, Tula, Azih, Okojie, & Ikpo, 2014).

Conclusion

The statistical results show that there is significant association between HR, infrastructure, administrative factors and EPI implementation. These three factors must be considered during planning phase.Effective planning will result in desired coverage of immunization and thus help achieve the goals and objectives of the EPI Programme - to immunize every child to reduce morbidity, mortality and permanent disability.

Ethical consideration

The proposal was reviewed and approved by the Research and Ethics Board of University of the Punjab, Pakistan. The District Health Authority Okara was informed via an official letter for intended work from the University of Punjab in order to get permission to perform the study. Then the participants were informed regarding the importance of the research, the confidentiality of the data, and written consent was obtained from each participant before starting data collection.

Notes and References

Amin, R., De Oliveira, T. J. C. R., Da Cunha, M., Brown, T. W., Favin, M., & Cappelier, K. (2013). Factors limiting immunization coverage in urban Dili, Timor-Leste. *Global health: Science and practice, 1*(3), 417-427.

Averhoff, C. (2012). Gardasil versus GAVI: Challenges to Implementing Hpv vaccines in developing countries.

Clellend, D., Henriques, J., Knopp, A., & Wilson, Z. (2010). *Using distributed energy infrastructure for rural health care services: Design of a mobile health vaccine refrigeration technology in rural kenya.* Paper presented at the 2010 IEEE Systems and Information Engineering Design Symposium.

Favin, M., Steinglass, R., Fields, R., Banerjee, K., & Sawhney, M. (2012). Why children are not vaccinated: a review of the grey literature. *International health, 4*(4), 229-238.

Gallagher, K. E., Erio, T., Baisley, K., Lees, S., & Watson-Jones, D. (2018). The impact of a human papillomavirus (HPV) vaccination campaign on routine primary health service provision and health workers in Tanzania: a controlled before and after study. *BMC health services research, 18*(1), 173.

Glatman-Freedman, A., & Nichols, K. (2012). The effect of social determinants on immunization programs. *Human vaccines & immunotherapeutics, 8*(3), 293-301.

Kazi, A. N. (2013). Measles epidemic exposes inadequate vaccination coverage in Pakistan: British Medical Journal Publishing Group.

Masud, T., & Navaratne, K. V. (2012). The expanded program on immunization in Pakistan: recommendations for improving performance.

Mothiba, T. M., & Tladi, F. M. (2016). Challenges faced by professional nurses when implementing the Expanded Programme on Immunisation at rural clinics in Capricorn District, Limpopo. *African journal of primary health care & family medicine, 8*(2), 1-5.

Mwendwa, P., McAuliffe, E., Uduma, O., Masanja, H., & Mollel, H. (2017). The impact of supportive supervision on the implementation of HRM processes; A mixed-methods study in Tanzania. *Health Systems and Policy Research, 4*(1).

Ophori, E. A., Tula, M. Y., Azih, A. V., Okojie, R., & Ikpo, P. E. (2014). Current trends of immunization in Nigeria: prospect and challenges. *Tropical medicine and health, 42*(2), 67-75.

Waisbord, S., & Larson, H. (2005). Why invest in communication for immunization? Evidence and lessons learned.

Weldegebriel, Z., Ejigu, Y., Weldegebreal, F., & Woldie, M. (2016). Motivation of health workers and associated factors in public hospitals of West Amhara, Northwest Ethiopia. *Patient preference and adherence, 10*, 159.

WHO. (2014). Health topics: Immunization- Global health observatory data.

WHO. (2019). Health topics: Immunization.