

HOUSEHOLD PREDICTORS OF IMMUNIZATION COVERAGE IN PAKISTAN

Background

The total estimated coverage for a fully immunized child varies between 56-88% across the different provinces in Pakistan and is differently reported in various surveys. While measurement of coverage in surveys varies due to the way the question about vaccination is asked¹, the widest and the most commonly used survey employed to measure and report coverage is the Pakistan Social and Living Measurement Survey², conducted annually by the Pakistan Bureau of Statistics. In this brief, we look at predictors of immunization coverage at the household level based on the PSLM survey of 2010-11. This brief therefore builds on the assessment of contribution of infrastructure that was discussed previously³.

Methodology

Data from the PSLM 2010-11 survey were used in binary logistic regressions model to predict what factors contribute to either **fully immunized children** or **completely not immunized children**. Household and familial factors were used as predictors as described in the table below.

The total sample of children under age 2 years is 12506 children/households (PSLM 2010-11). Out of those 80% are fully immunized, 17% are partially immunized and 3% have not been immunized at all.

Children who have completed all requisite doses of BCG, DPT, Polio and Measles 1 vaccination are defined **fully immunized** (N=9973). Those who have received at least one dose of these vaccines but not all are defined as **partially immunized** (N=2181). Those who have not received any vaccine at all are defined as **not immunized** (N=352).

The differences between immunization coverage of children can be better understood through the tables below. The first 4 columns describe simple attributes of different characteristics. Since these associations can sometimes interact, these interactions were studied using multiple regression models to identify independent predictors of immunization of children with respect to their father and mother's education, province, region, wealth index and distance of health facility from home

SALIENT POINTS

- The main household factors that predict full coverage of immunization of children are 1) education of both parents, 2) urban residence, 3) living close to a health facility and 4) being from Punjab, Khyber Pakhtunkhwa or Sindh provinces
- Children who are completely missed during routine immunization belong to the same communities as fully immunized children but have exactly the opposite characteristics described above suggesting that they are more marginalized members of the same communities.
- Increasing immunization rates would require involvement of parents and households in immunization actively as opposed to being the passive recipient of a government run process as is the practice currently
- Better efforts to include marginalized households may include completely non-immunized children into immunization programs.

SUMMARY OF PREDICTORS OF IMMUNIZATION

	Immunization Status				AOR for Full Immunization AOR (LL - UL)
	Full %	Partial %	None %	Total %	
Wealth Index					
Poorest	19	19	17	19	0.60 (0.49 - 0.72)
Poor	21	38	34	25	0.57 (0.47 - 0.68)
Middle	20	25	23	21	0.67 (0.55 - 0.80)
Rich	20	10	14	18	1.05 (0.86 - 1.28)
Richer	20	7	12	18	1.00
Fathers education					
Illiterate	35	56	52	39	0.59 (0.52 - 0.66)
Primary	17	17	20	17	0.79 (0.68 - 0.91)
Above primary	48	26	28	44	1.00
Mothers education					
Illiterate	66	92	84	71	0.35 (0.27 - 0.44)
Primary	12	4	9	11	0.57 (0.43 - 0.76)
Above primary	21	3	7	18	1.00
Province					
Punjab	43	13	37	38	4.07 (3.53 - 4.70)
Khyber Pakhtunkhwa	18	21	11	18	2.12 (1.84 - 2.44)
Sindh	26	32	14	27	1.52 (1.34 - 1.73)
Balochistan	13	34	38	17	1.00
Region					
Urban	35	13	23	30	1.36 (1.18 - 1.57)
Rural	65	87	77	70	1
Distance to Health clinic or hospital (in minutes)					
0-14	48	21	30	43	3.54 (2.95 - 4.25)
15-29	27	23	24	27	2.96 (2.48 - 3.52)
30-44	16	28	15	18	2.02 (1.69 - 2.40)
44-59	4	11	14	6	1.39 (1.12 - 1.73)
60+	4	16	17	7	1.00

(last column). Multiple regressions allow studying the impact of each of the factors independent of the effects by other factors and therefore give a more accurate picture of predictors.

Results

Household factors that were explored include: level of education of parents, affluence, provincial or rural/urban residence and distance from a health facility.

In simple comparisons (first 4 columns) it appears that there is no influence of wealth but full immunization is more associated with mother's (but not father's) literacy, residence in Punjab, rural residence and living close to a health facility.

We had initially hypothesized that children that are completely missed during immunization activities may be drastically different in terms of parents' education, poverty or distance to facilities from other children as a reason for their being missed in these activities. In the first look (first 4 columns of the table) this does not seem to be the case and completely non-immunized children appear to have similar household characteristics compared to other children, suggesting that they are part of the same communities and are not drastically different.

However, since many of these factors can influence each other, the same differences were explored in multiple regression models for fully immunized and completely not immunized children to separate out interactions of influences of these household characteristics.

In the **multiple regression models** the picture that emerges is somewhat different. **Full immunization** of a child is clearly associated with higher wealth of the household, both father and mother's education, residence in Punjab, Sindh or Khyber Pakhtunkhwa, urban residence and living close to a health facility. The model had an R^2 of 0.237 suggesting that it is reasonably robust in explaining the phenomenon of full immunization.

As opposed to the simple associations discussed above, in the multiple regression model (not shown), **complete non-immunization** is associated with the same factors as full immunization but the associations are the opposite so that complete non-immunization is associated with poverty, parental illiteracy, residence in Balochistan, rural residence and living far from a health facility.

Conclusion:

These findings suggest that increased parental involvement (suggested from their education and affluence), ease of access to facilities (or conversely the ease with which an outreach team can reach a child's home) and living in a province where public sector

services are more effective, increase a child's chance of receiving full immunization.

We also found that children who are completely missed by immunization activities are not unique children that live outside the normal society but rather are within the communities but have exactly the opposite the characteristics than those that receive full immunization. Since these factors such as poverty, parents low level of education, rural residence and living further away from health facilities suggest a level of marginalization, it may be that better efforts of reaching out to more marginalized children may include these children into immunization efforts.

References:

- 1 Research and Development Solutions Policy Brief #10: Validating measures of immunization coverage: Lessons from international experience. June 2012. resdev.org/files/policy_brief/10/Policy%20brief%2010%20-%20Validation%20of%20Immunization%20Literature.pdf
- 2 Pakistan Bureau of Statistics. Pakistan Social and Living Measurement Survey. <http://www.pbs.gov.pk/content/pakistan-social-and-living-standards-measurement>
- 3 Research and Development Solutions Policy Brief #11: Role of infrastructure in EPI. July 2012. http://resdev.org/files/policy_brief/11/11.pdf

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For Comments and Information please contact:



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resdev.org/policy_briefs
Phone: +92 51 843 6878

Dr. Ayesha Khan ayesha@resdev.org
Dr. Adnan Khan adnan@resdev.org