

Research Article

Immunisation knowledge and practices among mothers attending a paediatric clinic in Karachi, Pakistan

Saadia Gul¹, Rehana Khalil^{2*}

¹Department of Community Medicine, Baqai Medical University, Karachi, Pakistan

²Department of Family and Community Medicine, Unaizah College of Medicine, Qassim University, Saudi Arabia

Received: 07 May 2016

Accepted: 04 June 2016

*Correspondence:

Dr. Rehana Khalil,

E-mail: rehana.noman@ucm.edu.sa

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ABSTRACT

Background: Universal immunization against major vaccine-preventable diseases is one of the most cost-effective means of reducing under-five child morbidity and mortality. Yet 1.5 million children die every year from vaccine preventable diseases. Lack of information and knowledge, and fear of vaccine adverse effects among the mothers is a major barrier to vaccination coverage. Objectives of the study were to assess the knowledge of mothers about EPI (Expanded Programme on Immunization) and their infant's vaccination status. Socio-demographic factors associated with mothers' knowledge and the children's immunisation status were also assessed.

Methods: A cross-sectional survey was conducted in a tertiary care hospital in Karachi. 165 mothers with at least one child between 1-2 years were interviewed to assess their knowledge and attitudes towards EPI vaccination. Infant's immunisation status was also assessed through mothers' recall.

Results: The proportion of mothers who could name the EPI diseases were as follows; Tuberculosis (26%), Diphtheria (25.2%), Pertussis (5.4%), Tetanus (4.2%), Measles (57.5%), Polio (66.7%) and Hepatitis B (26.6%). 62% children had completed all the vaccine doses. Mothers' education was found to be positively associated with a child's immunisation status. The most common barriers to complete immunisation were domestic work and distance to the health centre. Healthcare providers were the mothers' main source of information regarding vaccination.

Conclusions: Mothers' knowledge about EPI vaccination was quite low but the vaccination rate was good. Factors associated with a child's vaccination status included mothers' educational level, and place of delivery. Distance to the health facility was a major barrier to getting complete vaccination. Healthcare providers need to communicate more effectively with mothers regarding childhood vaccination.

Keywords: Immunisation, Polio, Vaccination, EPI

INTRODUCTION

Universal immunization against major vaccine-preventable diseases is one of the most cost-effective means of reducing under-five child morbidity and mortality.¹ Globally 1.5 million children die every year from vaccine preventable diseases, and most of these deaths occur in the developing countries.² 18.7 million children around the world do not get any vaccination. More than 60% of these children reside in only ten countries; Pakistan being one of them.² Pakistan is a

developing country with a high Infant mortality rate of 74 deaths per 1000 live births, and under-five child mortality rate of 89 deaths per 1000 live births.³ Both these can be reduced through age appropriate immunisation coverage. The Expanded Program on Immunization (EPI) was initiated in Pakistan in 1978. Currently the EPI program covers for tuberculosis, diphtheria, pertussis, tetanus, polio, hepatitis B, measles and meningitis.³ BCG is given at birth or at first clinical contact; DPT (diphtheria, pertussis, tetanus) and polio (OPV)doses are given at 6,10, and 14 weeks after birth; and measles vaccine is

given soon after the infant is 9 months old.⁴ A fully immunised child is one who has received one dose of BCG, three doses each of OPV and DPT, and one dose of measles vaccine before reaching one year of age.³ According to the latest Pakistan Demographic and Health Survey, only 54% of children younger than 23 months were fully immunised, while 5% did not get any vaccination at all.³ (PDHS, 2012-13) This is despite the fact that the scheduled immunisation vaccines are provided free of cost at a majority of government run health facilities. Lack of information and knowledge, and fear of vaccine adverse effects among the mothers and communities at large is a major barrier to vaccination coverage.^{4,5}

Previous research has reported that there is a need to create awareness among the public regarding the vaccine preventable diseases and the importance of childhood immunisation.⁶ People need to actively seek their child's vaccination and reach the local health centres to increase vaccination coverage.¹ Mothers' knowledge, attitude and practices are a very important factor that influences a child's immunisation during the first year of life.⁷ Randomised controlled trials done in Pakistan have shown that educational interventions to create awareness about immunisation and vaccine preventable diseases among mothers improved vaccination coverage.^{6,8} Since mothers are the primary caregivers to the child, interventions targeted towards them can prove more effective.¹ The main objective of present study was to assess the mothers' knowledge, attitude and practices regarding immunization and to determine factors associated with a child's immunization status.

METHODS

A cross-sectional survey was undertaken at the Paediatric outpatient clinic of a Tertiary Care Hospital in Karachi. All mothers accompanying children attending the paediatric outpatient clinic at the hospital comprised the study population. The study was conducted from May 2013 till August 2013. The sample size was calculated on the basis that the immunisation rate reported in the 2007-08 PDHS was 47%. Therefore, for a confidence level of 99% and an acceptable margin of error at 10%, the sample size required was 165. Convenience sampling was used to include women with at least one child aged between 1 and 2 years. A pretested structured questionnaire was used to elicit information about Immunization status, the mothers' knowledge of EPI diseases, and any perceived barriers to vaccinate the child.

Ethical consideration

The Research Ethics committee of Baqai Medical University's Institute of Health Sciences provided ethical approval for the study. A verbal informed consent was obtained before interviewing the participant. The participants were assured of absolute confidentiality regarding the information they gave.

RESULTS

Table 1 shows the demographic profile of the study participants.

Table 1: Sociodemographic characteristics of the participants (n=165).

Variable	Groups	Count	Percentage
Age	15-19 years	2	1.2
	20-24 years	41	24.8
	25-29 years	57	34.5
	30-34 years	52	31.5
	35-39years	11	6.7
	>40 years	2	1.2
Education Level	Illiterate	41	24.8
	Primary or lower	50	30.3
	Secondary or above	74	44.8
Family Income/month	<Rs. 5000	6	3.6
	Rs5000-10,0000	75	45.4
	Rs11000-15000	53	32.1
	Rs16000-20000	16	9.7
	>20000	15	9.1
Place of delivery	Healthcare facility	134	81.2
	Home	31	18.7
Occupation	Housewife	151	91.5
	Working	14	8.5

A total of 165 women were interviewed. Majority (90%) of the women were aged between 20 and 34 years. Education level of 30% mothers was primary or less. One fourth of the participants were illiterate. Family income per month reported by majority (77%) of the interviewees ranged between 5,000 and 15000 rupees (USD60-180). Only 8.5% women were working mothers.

Table 2: Immunisation coverage reported among children (n=165).

Vaccine received	Number	Percentage
BCG	145	87.8
DPT1 and OPV1	144	87.2
DPT2 and OPV2	132	80
DPT3 and OPV3	125	75.7
Measles	107	64.8
All doses completed	102	61.8

62% children had been fully immunised. Coverage rate for BCG and the first dose of DPT and OPV was about 88%. The proportion of children who had received three doses each of DPT and OPV was 76%, while 65% infants

had received measles vaccine. 3% children had not received any vaccination at all (Table 2).

Table 3: EPI diseases named by the participants.

Disease	No. of participants who named it	% age of participants who named it
Polio	110	66.7
Measles	95	57.5
Hepatitis B	44	26.6
Tuberculosis	43	26
Diphtheria	41	24.8
Pertussis	9	5.4
Tetanus	7	4.2

97% mothers were in favour of immunisation and believed that vaccines protect the child from diseases, but none of the mothers could name all of the EPI diseases (Table 3). The highest number (66.7%) of women named polio. None of the participants was aware of the complete immunisation schedule for childhood vaccination.

Table 4: Immunisation status of child and EPI disease knowledge in relation to the mother’s education level.

Variable	Mothers’ education level		Odd’s Ratio	95% C.I. ¹	p-value
	Secondary or Higher (n=74)	Primary or Lower (n=91)			
Complete immunisation	54 (73%)	48 (52.7%)	2.41	1.2–4.6	< 0.01
Named more 3 or more EPI diseases	44 (59.4%)	15 (16.4%)	7.6	3.6–15	<0.001

¹Confidence Interval

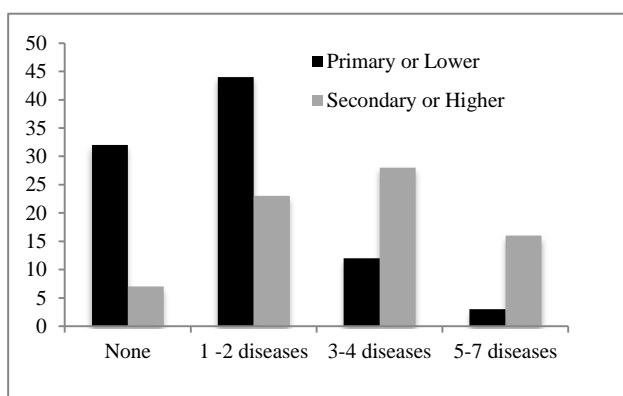


Figure 1: EPI disease knowledge and Education level of the participants.

Maternal education level was found to be positively associated with the child’s immunisation status, and this association was found to be significant. Children of mothers with a secondary or higher level of education were 2.4 times more likely to be fully immunised as

compared to mothers with a lower level of education (Table 4). EPI disease knowledge was also much better among mothers with an education level of secondary or higher, with an odd’s ratio of 7.6 (Table 4). 60% of mothers with a secondary or higher level of education could name 3 or more EPI diseases as compared to 17% mothers whose education level was primary or lower (Figure 1).

Table 5: Reasons reported for incomplete immunization.

Reason	Percentage
Domestic work	55%
Immunisation centre not available nearby	40%
Health staff absent	18%
Vaccine was not available at the centre	24%
Lack of escort	10%
Child got fever from the previous vaccine	12%

A child's immunisation coverage varied with the place of delivery. For those who delivered at home, only 47% of the infants had received BCG, DPT1 and OPV1, whereas only 20% of them were fully immunised. Women who had delivered at a private health facility reported that they were referred to a government vaccination centre, as the vaccination services were not available. The women reported various reasons they perceived as barriers for not completing their child's vaccination (Table 5). More than half the women quoted domestic work as a reason for not getting time to vaccinate the child. Whereas 40% complained that the health centre was too far from their homes.

When asked about the main source of information regarding their child's vaccination, more than half the women quoted the healthcare workers as their primary source of information (Table 6).

Table 6: Mothers' sources of information (n=165).

Source	Frequency	Percentage
Family / Friends	43	26
Healthcare providers	90	54.5
Media	32	19.4

None of the women had the child's vaccination card at the time of the interview. However, 60% of them reported that they had the child's vaccination card at home.

DISCUSSION

Present study findings reveal that although most of the mothers interviewed were not aware of all the EPI diseases, but immunisation rate reported was not as poor as their knowledge. Similar studies done in Pakistan and India, have also reported that despite the mothers' poor knowledge of vaccine preventable diseases, the immunisation rate was better.^{7,9,10} The highest number of mothers named polio. Other studies in Pakistan have reported the same.^{7,11} This is probably due to the media campaigns and door-to-door SNDs. These can be used as an opportunity to educate mothers about other vaccine preventable diseases as well.

The proportion of completely immunised children was higher for our study as compared to the 54% found by PDHS 2012-13. The reason may be that our survey was conducted at a health facility in an urban area. However, this rate is still quite low than the desired goal. Although the coverage rate for BCG and the first doses of DPT and OPV was 88% among the children, there was a drop out of 12% between the first and third dose. PDHS (2012-13) also reported a drop out rate of 14% between the first and third dose of DPT. The dropout rate between DPT1 and DPT3 is a strong predictor for the performance of the EPI service.¹² The dropout rate between BCG and measles was even higher. Other studies have reported the same.^{13,14} It shows that despite access to health centres, children miss

out on subsequent vaccines. The higher dropout rate for measles may be due to the longer time interval between DPT3 and the measles vaccine.¹³ Researchers suggest that the mothers need reminders at each visit to bring the child for the next vaccine.¹² A study in Kenya found that mothers who received advice about next vaccination date were 3 times more likely to get their children fully immunised.¹⁵

The most commonly quoted reasons for not getting immunization or incomplete immunisation were either non-availability of a health facility or long distance to the health centre. As 77% mothers in our study belonged to low socioeconomic group, it would probably be difficult for them to afford transportation to a faraway health centre. So even when the vaccines are provided free of cost, accessibility may still be a problem. Hasan et al.⁴ and Masud and Navaratne also observed that distance to vaccination centres is a major barrier to complete vaccination.⁵

Many mothers quoted domestic work as a barrier, while some mothers did not get the next vaccine for their child because of the side effects of the previous dose. Tagbo et al have reported similar findings from urban Nigeria.¹⁶ Home visiting or mobile vaccination services can be helpful in such communities. There is a need to educate the mothers about the effects of the vaccines and their benefits, as well as the importance of completing their child's immunisation schedule.

A common reason for inability to get the infant vaccinated was non-availability of the vaccines or absence of healthcare staff at the healthcare centres. The mothers were asked to come another time. This may be difficult for parents, more so for low socioeconomic status, as each visit incurs expense. Researchers in Nigeria, and Bangladesh have also reported this problem of healthcare staff being absent.^{13,16} Such logistic problems need to be addressed by the health department to maintain sustainability of the EPI program. Work needs to be done both on the demand side and the delivery side.

Maternal education was significantly associated with the completion of child immunization. Another study done in peri-urban Karachi also found that a mother's education is significantly associated with a child's immunisation status.¹¹ PDHS (2012-13) showed a gap of 34% in immunisation coverage between children of illiterate and educated mothers. A study in Ethiopia reported that 64% of mothers with any level of education had fully vaccinated children as compared to 33% illiterate mothers.¹⁷

Place of delivery was another factor found to be associated with a child's immunisation status. Babies born in a healthcare facility were more likely to be completely vaccinated as compared to those delivered at home. Mohamud et al in Ethiopia, and Maina et al in

Kenya, both found that children born at health care institutions were twice as likely to be fully vaccinated as compared to those born at home.^{15,17} There is a need to educate the traditional birth attendants and the community at large about the importance of vaccinating the newborn.

Another important finding in our study was that private health facilities did not provide EPI services. A recent study in Pakistan also reported that private healthcare facilities do not offer routine immunisation.¹⁸ Child Immunization service in Pakistan is almost exclusively provided by the public sector and the private sector provides only about 3% of the vaccines.⁴ There is a need for integration between private and public Health services to make these vaccines more accessible.

It is worth noting that none of the mothers was carrying her child's immunisation card, even where they had one made. This shows a gap in the mothers' knowledge on one hand and lack of education provision on the part of the healthcare providers on the other. Shoma et al also reported that none of the mothers had the child's immunisation card at the time of the interview.¹³ Mothers must be instructed to bring the child's immunisation card with them whenever they take their children to health facilities for any purpose. This can be an opportunity to check the child's immunization status and update it, if required.

Our study found that the health care providers predominantly drove the knowledge of immunization. Previous research in Pakistan also found that the health care providers are the main source of information to the mothers.^{7,11} Studies from India and Bangladesh also reported that the majority of mothers learned about vaccination from the healthcare staff.^{10,13} The role of health care staff in educating the mothers and caregivers on childhood immunisation needs to be strengthened further.

Only 3% of the mothers were not in favour of immunization, as they believed it to be harmful to the child. This attitude, however less, indicates a gap in the mothers' knowledge and lacunae in the uptake of vaccination. These need further investigation and must be addressed. Qualitative studies are required to explore the cultural beliefs and practices in depth.

CONCLUSION

The mothers' knowledge about EPI diseases and vaccination schedule was poor. Complete immunisation rate among the children was low, and there was a high dropout rate between subsequent vaccines. A child's immunisation status depended on the mothers' education level and the place of delivery. The barriers faced to get complete vaccination included lack of a health facility, distance to vaccination centre, absence of vaccinators and unavailability of vaccines. The healthcare providers were

the main source of information regarding vaccination. Healthcare providers need to be more effectively involved in educating the mothers about EPI diseases and schedule. Multipronged actions are required to increase immunisation rate in Pakistan, these include creating awareness, strengthening the EPI services, and improving the level of female education.

Limitations

Children's immunization status was assessed by mother's recall so it may be subject to bias. Since the study was conducted in only one hospital in an urban area, the results may not be generalizable to the whole country.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the institutional ethics committee

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Cite this article as: Gul S, Khalil R. Immunisation knowledge and practices among mothers attending a paediatric clinic in Karachi, Pakistan. *Int J Adv Med* 2016;3:656-61.