

## Improving Vaccination Status of Children under Five through Health Education

### Introduction

The morbidity and mortality due to vaccine preventable diseases is still very high in many developing countries of the world. The top five killers in children under five include perinatal conditions (20%), respiratory infections (18%), diarrhoeal diseases (17%), vaccine preventable diseases (15%) and malaria (7%).<sup>1</sup> The condition is similar in Pakistan resulting in high morbidity and mortality. The under 5 mortality is 109/ 1000 live births ranking Pakistan as 43 below India (54) and Bangladesh (58) according to UNICEF.<sup>2</sup> Immunization is the most cost-effective and highest-impact health intervention that reduces hospitalization and treatment costs through prevention.<sup>3,4</sup>

Expanded programme on Immunization (EPI) was launched in Pakistan in 1978 with support from WHO and UNICEF.<sup>6</sup> The proportion of the world's children immunized against the major vaccine-preventable diseases has increased from 20% in 1980 to over 80% in 1996, preventing more than 2.8 million children deaths annually.<sup>5,6</sup> Despite the successes of EPI, such as eradication of small pox, many vaccine preventable diseases remain prevalent in the developing world relating to 20 to 35% of all deaths in children under five.<sup>7</sup>

Despite the government's efforts and the EPI functioning for nearly 25 years in Pakistan, the vaccination status of children under 5 is still unsatisfactory. Utilization is higher when vaccination centers are easily accessible, have minimal administrative barriers and provide good quality care.<sup>8,9</sup> Studies have shown that fixed immunization clinics often fail to reach those children who are at highest risk, i.e. those who fail to attend the health centers.<sup>10-12</sup>

The objective of this study was to improve awareness and knowledge of mothers regarding vaccine preventable diseases and to improve the immunization status of children under five through health education messages by medical students.

### Methods

The undergraduate medical students visit assigned families in Sikanderabad, a squatter settlement

adjacent to Ziauddin Medical University. After taking verbal consent from the head of the household, students uncover the problems faced by the families, find solutions within their capacity and conduct health education activities.

Houses were selected through random sampling; block-I being intervention area and block-V non-intervention area. Both the groups were matched for socioeconomic status and access to vaccination services provided at Primary Health Care Center in the area.

Baseline data regarding immunization was collected from married women of reproductive age who had at least one child. After identifying gaps in knowledge and practices, pre-tested health education messages were delivered to study subjects twice at an interval of six months and non-immunized children were vaccinated. A follow-up study was done after four years to compare the vaccination status of children under 5 in the intervention and non-intervention houses.

In addition to the demographic variables, items that were considered in measuring mothers' knowledge, attitude and practice towards vaccine-preventable diseases are given in Table 1.

Data entry and analysis was done using Epi-Info version 6.04b. Chi-square and test of proportions, at significance level  $\alpha = 0.05$  were performed.

### Results

The baseline survey of the area was done in 1998. A total of 110 houses were selected from block I and 207 houses from block V. In block I [intervention area], 84% houses and in block V [non-intervention area] only 65% houses responded. In the follow-up survey in 2002, 83% houses each in block I and V were contacted.

There was an increase in the percentage of mothers having their last child vaccinated from 74% to 94% in block

Table 1. Items for measuring mothers' knowledge, attitude and practice regarding vaccination.

#### Knowledge

awareness that the child should have been immunized  
age at which vaccination is initiated

name of the diseases for which EPI vaccines are given  
 need for measles vaccine administration if the child had already  
 suffered from measles before nine months of age

Attitude and practice

availability of immunization card  
 immunization status of children under five  
 reason for not vaccinating the child  
 place from where vaccination is preferred

I (p<0.001) and from 74% to 90% in block V (p=0.001). Another important aspect of the survey was the mothers' perception regarding the keeping of immunization cards. In the follow-up study, no significant difference was seen for producing immunization cards for the youngest child in block I (p=0.47), whereas in block V, 61% mothers had immunization cards in 2002 versus 43% for the baseline survey (p=0.003).

A comparison between mothers with children upto one year and over one year was done with respect to production of immunization card as shown in Table 2.

Regarding the utilization of the PHC center for Table 2. Immunization card present for the last child by age 0-1 year and over 1 year

Year	Block	Age	Card	%	1998	Card	%	2002	p-value
I		<1 year	27 / 45	(60)	25 / 36	(69)	0.19		
		>1 year	19 / 58	(33)	26 / 57	(46)	0.08		
				p=0.006			p=0.02		
V		<1 year	21 / 46	(46)	42 / 61	(69)	0.008		
		>1 year	18 / 78	(23)	39 / 84	(46)	0.001		
				p=0.009			p=0.007		

vaccination, an increase of 22% (52% vs 30%) in block I (p=0.003) and 19% (32% vs 13%) in block V (p=0.001) was observed; a difference was also seen between the two blocks (p=0.001).

Mothers' knowledge regarding the age when first vaccine is administered to the child, increased in the follow-up from 60% to 76.5% (p<0.01) in block I and from 50% to 62% in block V. A significant difference was noted for the knowledge of mothers regarding the age at first vaccination of their children between the two blocks (p=0.001). The responses to the question regarding the need for immunization included "prevents diseases / doctor's advice / not important and others". A significant increase of 15% (76% vs 61%) in block I (p=0.01) and 18% (79% vs 61%) in block V (p=0.001) was seen for the response that "immunization prevents diseases".

Response to knowledge of diseases against which immunization is done showed an increase of 18% (65% vs 47%) in block I (p=0.006) and 11% (67% vs 56%) in block V (p=0.04) with regards to naming of

the diseases. Most of the mothers were able to identify Polio and Measles. Inquiry from mothers whether their child needed Measles vaccine even if he had suffered from measles was also taken. An increase of 22% (53% vs 31%) in block I (p=0.001) and 14% (43% vs 29%) in block V (p=0.007) was noted for the correct response.

The immunization status of children under five was marked as immunized/appropriate for age (I/AA), partially immunized (PI) or unimmunized (UI) (figures 1 and 2). The complete/appropriate for age immunization status increased in block I from 46.5% to 75% after the intervention (p<0.005), no difference could be seen in block V (p=0.16). In the follow-up survey a difference was seen in the vaccination status between the two blocks (p=0.001).

The administration of BCG and Polio vaccines show a remarkable increase in both the blocks while DPT and Table 3. Immunization status of children under five.

Vaccines	Year	Block	1998		2002		p-value
			n	Vacc %	n	Vacc %	
BCG		I	189	130 (69)	160	149 (93)	<0.005
		V	164	119 (73)	247	201 (81)	0.02
OPV 3		I	180	83 (46)	150	126 (84)	<0.005
		V	159	81 (51)	239	156 (65)	0.002
DPT 3		I	180	83 (46)	150	116 (77)	<0.005
		V	159	81 (51)	239	134 (56)	0.16
Measles		I	160	82 (51)	134	99 (74)	<0.005
		V	136	78 (57)	215	125 (58)	0.44

A change in "n" is noted for each dose of vaccine. Those not appropriate for the next dose of Polio and DPT were subtracted from the total number of children each time the percentage was calculated. For measles, children at least nine months old were considered.

Measles vaccines administration increased only in the intervention area. Comparing the two blocks, a difference was noted in BCG (p=0.001) and measles (p=0.003) vaccination status (Table 3).

## Discussion

The EPI vaccination coverage rates in the intervention group are higher than the national coverage for EPI: BCG (95% vs 78%), Polio (84% vs 58%), DPT (77% vs 56%) and Measles (74% vs 54%).<sup>2</sup> Comparing the rates with the desired universal coverage (BCG 85%, polio 89%, DPT 90% and measles 94%), the campaign needs to continue to reach the target.<sup>13</sup>

Studies from other parts of the world have identified reasons for delay or non-immunization of children. The influence of elderly in the house, side effects of the vaccines, misconceptions regarding vaccination, missed opportunities, lack of information, socio-demographic characteristics, socioeconomic factors, sickness of the child and the vaccine not available were found to be the

major reasons.14-18

Studies done in Pakistan show that delay in immunization or non-immunization was associated with low socioeconomic status, maternal illiteracy, and lack of mothers' knowledge on vaccine preventable diseases covered by EPI.19-21

The reasons for not immunizing the child as given by mothers in this study are consistent with studies done in Pakistan and other parts of the world. No relationship between maternal education and the immunization status of children was found in this study which is probably due to the general low level of female literacy in this community.

Most of the children vaccinated were initially taken to the hospitals, government centers or other clinics for vaccination. After the awareness of the program at the center, the utilization of services at the PHC center for vaccination increased in both the blocks. A study done in India showed that educating one mother would educate others too. This is defined, as the spillover effect of information. This might be the reason for increase in service utilization by residents of the non-intervention area.22

Immunization coverage is a key indicator of access to and utilization of immunization services. The immunization service was accepted almost by all the families visited. Studies have shown that increasing maternal knowledge regarding vaccines improve immunization status.23,24 Our study has also shown that immunization coverage increased in the intervention area but at the same time reflects the inadequacy of current health education strategy. Involvement of motivated mothers, community activists and local physicians is necessary to reinforce knowledge and influence practices.25,26

## Conclusion

This study involved undergraduate medical students in improving the health status of the community residing in a squatter settlement where the literacy rate is low. Similar programmes can be incorporated not only in the undergraduate curriculum of other medical colleges but other health personnel can also be involved for improving the health status of the communities. Educated people of the area, the National Health Workers employed by the government and mass media can play a role. This will decrease the burden on the government and the load on tertiary care hospitals can be transferred to the primary health care centers

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of mothers regarding immunization.

**Results:** A total of 110 houses from block I and 207 houses from block V were selected. An increase of 22% (52% vs 30%) in block-I ( $p=0.003$ ) and 19% (32% vs 13%) increase in block V was seen in the utilization of PHC Center for vaccination ( $p=0.001$ ). Mothers' knowledge regarding the age when first vaccine is administered to the child, increased in the follow-up from 60% to 76.5% ( $p<0.01$ ) in block I and from 50% to 62% in block V. The immunization status increased significantly in block I from 46.5% to 75% after the intervention ( $p<0.005$ ), no significant difference could be seen in block V ( $p=0.16$ ). In the follow-up survey a significant difference was seen in the vaccination status between the two blocks ( $p=0.001$ ).

**Conclusion:** The health education messages significantly increased the vaccination status of children under 5 in the intervention area (JPMA 54:610;2004).

## Abstract

**Objective:** To improve awareness and knowledge of mothers regarding vaccine preventable diseases and the immunization status of children under five through health education messages by medical students, at Gulshan-e-Sikanderabad, a squatter settlement adjacent to Ziauddin Medical University, Karachi.

**Methods:** The undergraduate medical students' visit families in the squatter settlement. This study compared the effect of intervention by medical students on vaccination status of children under five in the intervention households versus those without intervention. A baseline study was done in 1998 and a follow-up study was done after four years to assess the differences in knowledge and practices