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RESEARCH ARTICLE

THE ATTITUDE OF PARENTS REGARDING THEIR CHILD IMMUNIZATION IN LAHORE, PAKISTAN

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Abstract

Background: Many parents harbor negative views about vaccine-preventable diseases (VPD) and hold misunderstandings about the ingredients, side effects, and efficacy of vaccines. The resurgence of diseases preventable by vaccines was believed to be primarily due to insufficient childhood vaccination practices. The study aimed to assess parental attitude towards their children's vaccinations.
Methods: The present study is a multi-centered, cross sectional observational study to evaluate the attitude of the parents regarding their child immunization in Lahore, Pakistan. Quantitative research methodology involving validated questionnaires and research tools were utilized in order to evaluate the attitude of the parents regarding their child immunization. A total of 353 parents belonging to urban and rural areas of Lahore having children of different ages were recruited for the present study.
Results: Out of 353 parents surveyed, majority of the study subject were mothers (56.1%) with age 25-29 years (30%). Majority of the parents (70.3%) were observed to have negative attitude while only 29.7% of the respondents presented positive attitude at baseline. It is observed that the occupation, no of children, residency, living class and health care providers in respondent family shows highly significant statistical association ($p<0.001$) with patient attitude regarding their child immunization.
Conclusions: The present study concludes that the parents showing negative attitude do not get their children vaccinated. They feel that it is a formality and they find it hectic to take their children to vaccination centers for immunizations. The immunization status was also significantly influenced by sociodemographic factors. In order to achieve positive attitude, efforts should be made to tell them benefits of vaccination and by changing their thinking about side effects of vaccine by educating them about the beneficial effects of vaccines and its safety.
Keywords: Parents, attitude, child immunization, demographics, vaccine-preventable diseases.

INTRODUCTION

Children play a crucial role in the development of a nation and paying attention to their health is as important as the development of future assets. For the proper development of children, immunization plays a key role[1]. By the administration of vaccines, we can protect our children from the world's most infectious diseases and it is the most efficient, safe and easy process[2]. It protects society from harmful diseases by reducing the spread of disease[3]. As a protective health action, it plays a crucial role in the lives of children by protecting them from childhood diseases[1].

Vaccinating children against infectious diseases that affect them as youngsters is one of the most affordable public health initiatives worldwide[2]. In Pakistan, OPV/BCG is administered at birth, along with three doses of Hepatitis B/OPV/DPT at 6, 10, and 14 weeks of age, and the measles vaccine at 9 and 15 months of age as part of the Expanded Program on Immunization (EPI)[3]. The Heamophilus influenzae type B vaccine is currently included in Pakistan's three doses of the DPT/Hepatitis B vaccine[2]. In Pakistan, only 59–73%

of children between the ages of 12 and 23 months receive all three doses of the DPT/Hepatitis B vaccine, indicating that poor immunization rates persist despite recent efforts[1]. Therefore, innovative, affordable solutions that can be integrated into Pakistan's current healthcare system are needed[2].

As biological agents, vaccines are divided into the following classes: subunit vaccines, conjugated polysaccharide vaccines, inactivated viral vaccines, live, attenuated bacterial vaccines, recombinant vaccines, combination vaccines, and live, attenuated viral vaccines[3].Vaccine development must take these factors into account because vaccine storage necessitates appropriate conditions, each of which has unique stability difficulties[3]. The safety and effectiveness of the vaccination are hampered by these stability issues, and the vaccine's potency cannot be restored[2]. Light, radiation, temperature changes, environmental changes, reactions with the container or other mixture ingredients, and light all contribute to the instability of vaccines[1]. Even when ideal circumstances are met during manufacture, vaccination potency may decrease with time[4].

One of the best and most affordable ways to increase a child's chances of survival is vaccination[2]. Every nation in the world has an immunization program to provide specific vaccines to the intended recipients, with a concentration on pregnant women, young children, and newborns as they are particularly vulnerable to diseases that can be prevented with vaccinations[3]. There are vaccinations against at least 27 causal agents, and many more are the focus of ongoing research into vaccine development[4]. A few chosen antigens against diphtheria, pertussis, tetanus, poliomyelitis, measles, and hepatitis B are included in vaccination programs in the majority of the world's countries, while the exact quantity of antigens in each program varies from nation to nation[2]. In 1798, the smallpox vaccine—the first ever—was discovered[1]. The smallpox virus has been eradicated from the earth, which is the most notable accomplishment of these endeavors[5]. The advantages of vaccination are not reaching many children who are most at risk of the diseases that these vaccines can prevent, despite the fact that immunization is a proven, cost-effective preventive measure[4]. Most children who are not vaccinated against these diseases reside in underdeveloped nations[6].

Millions of lives have been saved and numerous illnesses connected to kids have been largely avoided because to vaccinations[3]. Between the middle of the 1960s and 2015, vaccinations against viruses that cause the measles, mumps, rubella, chickenpox, and hepatitis A were created from suitable cell culture substrates and saved the lives of well over 10 million people[2]. However, due mostly to a lack of availability to necessary pediatric immunizations, 1.5 million children under the age of five still pass away each year from diseases that can be prevented by vaccination[7]. Conversely, major diseases that have killed hundreds of millions of people over the past few centuries, like polio, smallpox, and rabies, are mostly under control thanks to the availability of secure and reliable preventive vaccinations[6]. .According to WHO estimates, the existing immunizations prevent 2-3 million deaths globally each year[4]. According to WHO estimates, the existing immunizations prevent 2-3 million deaths globally each year,about 40 years ago, smallpox was officially eradicated in 2011, rinderpest, an animal-borne virus, became the second infection to be declared eradicated[3]. Due to widespread vaccination campaigns that began in the 1960s and more recently, more potent single antigen vaccines or different combination vaccinations that contain the inactivated polio virus, remarkable strides have been achieved toward the eradication of polio[6]. It is anticipated that polio will be the second contagious human virus to be completely eradicated[8].

New vaccinations, including those against the human immunodeficiency virus (HIV) and tuberculosis (TB), may target adolescents as their core routine demographic[3]. The World Health Organization recommends immunizing children between the ages of 11 and 12 against Neisseria meningitidis, Bordetella pertussis, and HPV[2]. Furthermore, those who have not previously had a catch-up vaccine against measles, mumps, rubella, varicella, hepatitis B, or polio should do so in compliance with recent WHO standards[9].

Vaccination is a crucial component of primary health care services that aid in the prevention and management of infectious disease outbreaks[4]. Immunizations lower the annual death toll from infectious diseases in children by two to three million[6]. The WHO's Action Plan, a framework it established, aims to eradicate vaccine-preventable diseases by 2020; sadly, most children worldwide, particularly in developing nations, did not meet the goal global immunization coverage of 90%, as a result, childhood vaccination is one of the WHO's strategies for lowering the rate of vaccine-preventable diseases, child mortality and morbidity, and medical expenses associated with infectious diseases and all of these strategies may ensure that children have a higher quality of life[10].

Pakistani immunization initiatives have faced challenges from low coverage, vaccine reluctance, and false religious information[4].

Parents often have concerns about vaccinations, which causes them to refuse or put off getting simple immunizations[6]. This issue is known as “vaccine hesitancy”. According to a poll, 77% of parents expressed reluctance regarding one or more of their children's vaccinations[4]. One of the causes is that some vaccinations have contraindications, and vaccine misconceptions have unnecessarily caused delays in vaccine administration[11]. Conversely, individuals who had not had vaccines expressed greater worry about the vaccine's unidentified, long-term negative effects than the illness it was intended to prevent[5].

Many moms had the view that it was not always feasible to prevent illness[2]. However, studies show that parents who have completed more schooling have a considerable understanding and knowledge about vaccines[5]. With the use of currently available vaccinations, the cost of morbidity, mortality, and healthcare associated with contracting an infectious disease has decreased dramatically[9]. One of the main

factors influencing the success of immunizations is parental attitudes[12].

METHODS

Study Design and Study Subjects

A multi-centered, cross sectional observational study was conducted to evaluate the attitude of the parents regarding their child immunization in Lahore, Pakistan. Quantitative research methodology involving validated questionnaires and research tools were utilized in order to evaluate the attitude of the parents regarding their child immunization. The data for this research project was collected from parents of Lahore, Punjab. Study population was 353 parents (convenient sampling technique) belonging to urban and rural areas of Lahore having children of different ages. Population was recruited for this study from Lahore. The population from which data was collected belongs to the urban and rural areas of Lahore.

A signed questionnaire was provided, and data was collected after consent to participate. The incomplete responses were excluded from the final study. Ethical approval from Institutional Ethical Review Board and Bio-Ethical Committee (BEC) of Lahore University of Biological and Applied Sciences was attained before recruiting study subjects for the current project.

Inclusion and exclusion criteria

The inclusion criteria for this research included parents from different areas of Lahore, Pakistan who willingly participated in the current study by signing the questionnaire. However, the parents whose children were above 4 years and were not included in the current immunizations were excluded. The parents who did not provide consent to voluntarily participate in study were also excluded.

Questionnaire

The questionnaire was divided into different sections regarding demographic factors and attitude of parents regarding child immunization. The demographic section involved information on age of parents and child, relationship of parents with child, gender of child, occupation of parents, number of children, living class, residency, marital status, religion and healthcare provider in family. The attitude section involved information about parent's advising vaccination to others benefits of vaccine, necessity of vaccine program, importance of regular vaccine, either they feel it is hectic or not, approach to vaccination centers, treatment of side effects after vaccination, concern of fever after vaccination, either vaccination increases immunity or not and they take it formally or informally.

The questionnaire was designed after an extensive literature review of the published research. After developing each question was reviewed to ensure it aligned precisely with our objectives. Afterwards, content validity was attained by sending it to 3 academicians who were experts, as the result of their suggestions the questionnaire was modified and face validated by checking on a small number of respondents. The pilot study was conducted on a small number of parents and Cronbach's alpha value of 0.76 was obtained for attitude questions. The first part of the questionnaire contained demographic information of the parents, followed by 10 attitude questions. The cut off points were decided on 60% scores for appropriate attitude.

Statistical analysis

The data collected from the study subjects was analyzed and interpreted by using SPSS v21, IBM. Descriptive and inferential statistics were applied to summarize the variables. Categorical variables were presented as frequencies and percentages. To find factors regarding associations between independent variables, chi square tests (Pearson chi square) were applied and where assumptions of chi-square analysis requirements were not met, Fisher exact tests were applied to calculate *p*-values, *p*-values less than 0.05 were considered as statistically significant values.

RESULTS

The current study recruited 353 parents from different private and government hospitals. Demographic characteristics of the study subjects are mentioned in Table 1. The study was conducted to assess the attitude of parents regarding their child immunization. The respondents were asked to provide information about the time utilized for immunization. Most of the parents had to wait for about less than 15 mins i.e. 48.4% and time spent on their child immunization were less than 15 min i.e. 53.8% to get their child immunized as mentioned in Table 2. The attitude of parents regarding their child immunization stating that majority of the parents have inappropriate negative attitude (70.3%), graphically represented in Figure 1.

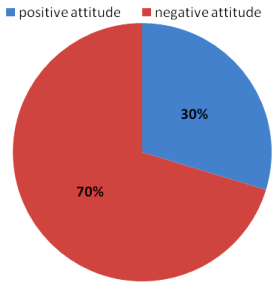

Figure 1: Attitude of parents regarding their child immunization.

The parent's attitude regarding advising vaccination to others was 33.1% positive and 66.9% negative. Parent's attitude regarding benefits of vaccines, vaccination of their all children, importance of regular vaccination and hectic process of vaccines was 65.2%, 66.9%, 64.0% and 76.1% negative. The parent's attitude about the approach to the vaccination center was 34.6% positive and 65.4% negative, as mentioned in Table 3. Table 4 provides the association of demographics variables with parent's attitude. It was observed through statistical analysis that the occupation, no of children, residency, living class and health care providers in respondent families shows highly significant statistical association ($p<0.001$) with parent's attitude regarding their child immunization.

Table 1: Demographics characteristics of study subjects (N=353).

S.N.	Variables	Categories	Frequency (%)
1	Parent age	15-19	20 (5.7)
		20-24	46 (13.0)
		25-29	106 (30.0)
		30-34	88 (24.9)
		35-39	93 (26.3)
2	Child age	< 1 Month	17 (4.8)
		1-4 Month	47 (13.3)
		5-8 Month	83 (23.5)
		9-12 Month	67 (19.0)
		> 1 Year	139 (39.4)
3	Relationship with child	Mother	198 (56.1)
		Father	152 (43.1)
		Guardian	3 (0.8)
4	Gender of child	Male	182 (51.6)
		Female	171 (48.4)
5	Occupation	Health care provider	119 (33.7)
		Non- health care provider	234 (66.3)
6	No of children	1-2	111 (31.4)
		3-4	196 (55.5)
		5-6	46 (13.0)
7	Residency	Rural area	234 (66.3)
		Urban area	119 (33.7)
8	Living class	Lower class	46 (13.0)
		Middle class	196 (55.5)
		Upper class	111 (31.4)
9	Marital status	Married	306 (86.7)
		Divorced	35 (9.9)
		Widow	12 (3.4)
10	Religion	Muslim	330 (93.5)
		Non-Muslim	23 (6.5)
11	Health care professional in your family	Yes	119 (33.7)
		No	234 (66.3)

DISCUSSION

Parental attitude towards vaccination is a major factor in their children immunization coverage[1]. Childhood vaccination has a greatest impact on the prevention of various childhood infections[7]. Despite of largest immunization program, rate of mortality under the age of five is very high and despite of lot of efforts, target coverage has not been achieved[7]. For the assessment of parents' attitude towards the coverage of their children immunization, the present study was conducted among parents.

Table 2: Time utilized for immunization.

S.N.	Variables	Categories	N (%)
1	Waiting time before immunization process	< 15 mins	171 (48.4)
		15-29 mins	149 (42.2)
		30-60 mins	22 (6.2)
		>60 mins	11 (3.2)
2	Time spent on immunization	< 15 mins	190 (53.8)
		5-10 mins	158 (44.8)
		>10 mins	5 (1.4)

Various factors are involved in parents' poor attitude towards immunizations. These factors include consumption of time in this procedure, side effects related to vaccination, fear of side effects, inadequate knowledge of parents, number of children, age, and occupation, lack of access to vaccination centers and lack of trust in parents about vaccination.

Current study was conducted among 343 parents, 29.7% (105 out of 343) showed a positive attitude towards vaccination while 70.3% (248 out of 343) showed a negative attitude of parents. The present study results were contradictory to the research conducted in Georgia, in which parents showed positive attitude[14].

The parents' attitude relating to advising vaccination to others was 33.1% positive and 66.9% negative. Only 34.8% parents think that there are any benefits of vaccination and 65.2% parents think vaccination has no benefits. Parents were asked about what they think should all parents get their children vaccinated and results were only 33.1% positive with 66.9% negative results. 36% parents think that regular vaccination is important for their children while 64% did not. Only 32.9% parents think that vaccination is not a hectic process because they think that for the health of their children, they can do anything but still 67.1% parents think vaccination is a hectic process. 33.7% parents think that if vaccination is causing side effects, it's not a big issue. These side effects should be treated and on the other hand 66.3% parents think side effects did not require treatment. Vaccination has a major effect that it increases immunity of children but study shows only 30.3% parents think the same with 69.7% negative results. 32.6% parents think that vaccination is not a formality and they do it keenly for their children's health but 67.4% parents think it's a formality.

Table 3: Response of parents regarding attitude questions.

S. N.	Questions	Yes- N (%)	No- N (%)
1	Have you ever advised vaccination to others?	117 (33.1)	236 (66.9)
2	Do you think there are any benefits of vaccines?	123 (34.8)	230 (65.2)
3	Do you think that all parents should get their child vaccinated?	117 (33.1)	236 (66.9)
4	Do you think regular vaccination is important?	127 (36.0)	226 (64.0)
5	Do you think vaccination is not a hectic process?	116 (32.9)	237 (67.1)
6	Do you think the approach to vaccination centers is feasible?	122 (34.6)	231 (65.4)
7	Do you think vaccination side effects require treatment?	119 (33.7)	234 (66.3)
8	Do you think fever after vaccination is not dangerous?	109 (30.9)	244 (69.1)
9	Do you think vaccination increases immunity?	107 (30.3)	246 (69.7)
10	Do you think vaccination is not a formality?	115 (32.6)	238 (67.4)

Low education background might be the reason for the negative attitude of parents regarding their child immunization[15,16]. Timing and results of immunization has an influence on parents' attitude towards vaccination. The present study shows that nearly 48.4% of parents say that they have to wait 15 minutes before the procedure of immunization and 42.2% of parents say that they have to wait almost half an hour before the immunization process. Similar long waiting times has been reported as a hurdle in the studies conducted in Colombia and the USA[17].

In almost majority of children, it is seen that they get fever after vaccination and in the present study, 30.9% parents think that it is not dangerous while still 69.1% parents think it is dangerous. . This means that they have concerns about vaccination[18]. The results are similar to the research conducted in the UK in which the majority of parents have major concerns about the vaccination program offered by the government[19].

Access to vaccination centers is also a major factor towards children immunization coverage programs. Approach to vaccination centers was feasible only among 34.6% of parents while the remaining 65.4% did not have this access[20]. In some of the Eastern countries such as China and India, females have less access to vaccination centers as compared to males[21]. A study was conducted in China that showed similar results. Factors influencing the routine immunization status of children aged 2-3 years in China[21].

Table 4: Association of demographic variables with parental attitude towards child immunizations.

S. N.	Variables	Categories	Attitude		*p*-value	η^2
			Positive	Negative		
1	Parent Age	15-19	4 (20.0%)	16 (80.0%)	0.252	-
		20-24	18 (39.1%)	28 (60.9%)		
		25-29	28 (26.4%)	78 (73.6%)		
		30-34	31 (35.2%)	57 (64.8%)		
		35-39	24 (25.8%)	69 (74.2%)		
2	Child Age	< 1 Month	3 (17.6%)	14 (82.4%)	0.781	-
		1-4 Month	15 (31.9%)	32 (68.1%)		
		5-8 Month	26 (31.3%)	57 (68.7%)		
		9-12 Month	18 (26.9%)	49 (73.1%)		
		> 1 Year	43 (30.9%)	96 (69.1%)		
3	Relationship with Child	Mother	59 (29.8%)	139 (70.2%)	0.367	-
		Father	44 (28.9%)	108 (71.1%)		
		Guardian	2 (66.7%)	1 (33.3%)		
4	Gender of Child	Male	53 (29.1%)	129 (70.9%)	0.791	-
		Female	52 (30.4%)	119 (69.6%)		
5	Occupation	Healthcare professional	97 (81.5%)	22 (18.5%)	<0.001	0.808
		Non-healthcare professional	8 (3.4%)	226 (96.6%)		
6	No of Children	1-2	91 (82.0%)	20 (18.0%)	<0.001	0.674
		3-4	12 (6.1%)	184 (93.9%)		
		5-6	2 (4.3%)	44 (95.7%)		
7	Residency	Rural area	8 (3.4%)	226 (96.6%)	<0.001	0.808
		Urban area	97 (81.5%)	22 (18.5%)		
8	Living Class	Lower class	2 (4.3%)	44 (95.7%)	<0.001	0.674
		Middle class	12 (6.1%)	184 (93.9%)		
		Upper class	91 (82.0%)	20 (18.0%)		
9	Marital Status	Married	94 (30.7%)	212 (69.3%)	0.164	-
		Divorced	6 (17.1%)	29 (82.9%)		
		Widow	5 (41.7%)	7 (58.3%)		
10	Religion	Muslim	97 (29.4%)	233 (70.6%)	0.585	-
		Non-Muslim	8 (34.8%)	15 (65.2%)		
11	Healthcare professional in your family	Yes	97 (81.5%)	22 (18.5%)	<0.001	0.808
		No	8 (3.4%)	226 (96.6%)		

The low attitude of parents regarding children's immunization must be paid attention to improve health status and immunization coverage in Pakistan. Association of Parents attitude and demographics showed significant trends. The study showed that there was an important connection of parent's attitude with residency, number of children, occupation, and health care professionals in the family. The association of parents' practice with occupation is (p<0.001) in which health care providers showed 81.5% positive attitude and 18.5% showing negative attitude and non-health care providers show 3.4% positive attitude and 96.6% show negative attitude. Because health care providers are more aware about the immunization program along with benefits and this is the reason, they show a positive attitude.

Similarly, the number of children in a family also shows significant statistics association (p<0.001), parents having 1-2 children have 82% positive attitude and 18% negative attitude. The parents having 3-4 children show 6.1% positive attitude with 93.9% negative attitude and parents having 5-6 children show 4.3% positive attitude with 95.7% negative attitude.

The results show that parents having a smaller number of children are more active towards completeness of immunization programs and they have time or they manage time for their children as compared to parents having more number of children. The connection of parent's residency towards attitude also shows significant statistics. Parents living in rural areas show 3.4% positive attitude with 96.6% negative attitude and those living in urban areas show 81.5% positive attitude and 18.5% show negative attitude. Living class also show high statistics (p<0.001), upper class show 82% positive attitude and 18% negative attitude. Lower class showed 4.3% positive attitude and 95.7% negative attitude. Middle class show 6.1% positive attitude and 93.9% negative attitude. These results show that there is more awareness of the upper class and they also have money that they can easily spend on their children's health while lower- and middle-class people just fulfill their expenses and also upper class have more knowledge as compared to lower and middle class.

The association of parent's attitudes with health care professionals in the family also shows significant statistics (p<0.001). Families in which there are health care professionals show 81.5% positive attitude and 18.5% show negative attitude and those families who do not have health care professionals show only 3.4% positive results and 96.6% negative results. Two cross-sectional observational studies from Pakistan on oral health and Japanese encephalitis also presented results that presence of healthcare provider in immediate family greatly enhances the knowledge, attitude and practices of patients[22,23]. This may be due to the reason that families having health care professional guide them about vaccination, its schedule and how it effects their child health by increasing immunity and decreasing mortality, thus increasing child immunization coverage in families.

Limitations of study

The study was conducted in selected areas of Lahore, and selected settings, therefore, the results of this study cannot be generalized nationwide.

CONCLUSIONS AND RECOMMENDATIONS

The study highlights the urgent need for educational programs to enhance parental attitudes toward child immunization, especially in rural areas where awareness is considerably lower compared to urban regions. A significant number of parents have expressed negative attitudes toward vaccination, which are associated with various demographic factors, including education level, number of children, socioeconomic class, occupation, place of residence, and healthcare professional present in family. The study suggests that improving the availability of health education resources and correcting vaccine misconceptions are crucial measures to boost vaccination rates, ensuring improved health outcomes for children.

Further studies should be conducted in other cities of Pakistan with larger sample size to conclude these results nationwide. Awareness programs about child vaccination should be conducted to improve parents attitude.

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AUTHOR'S CONTRIBUTIONS

Shahid S, **Iqbal MZ:** conceptualized the study. **Ijaz A, Tahir MA:** data collection. **Mughal M, Fahad M:** first draft of the manuscript. **Ali M, Ayesha M:** statistical analysis. **Shakir H, Kainat A:** literature survey, critical review. All the authors participated in compiling the final manuscript and perform revisions of the manuscript.

DATA AVAILABILITY

The accompanying author can provide the empirical data that were utilized to support the study's conclusions upon request.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest

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