

## EVALUATION OF VACCINE ADHERENCE AND ROLE OF A CLINICAL PHARMACIST IN PAEDIATRIC VACCINATION

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### ABSTRACT

**Background:** Immunization is one of the decisive factors in preventing various life threatening diseases. Vaccines have thrived as one of the most successful healthy intervention on that have diminished the occurrence of various infectious diseases and improved the quality of life in the population. Although the vaccine coverage has been gradually increasing, the average total immunization coverage is far less than desired outcome. **Objective:** The objective of our study were to enhance the quantity of vaccine delivered in the paediatric care setting, to improve Awareness of vaccination at community level by a more active involvement of clinical pharmacist on vaccination errors and missed opportunities in paediatric care setting, to analyse the extent of knowledge, attitude and practice of parents to minimize vaccination errors and avoid vaccine misconception thereby improving vaccine adherence. **Results:** It is a prospective observational study was conducted on 253 paediatric subjects upto 3years of age for a period of six months in a secondary care hospital, Hyderabad. The study was divided into Pre- intervention and post-intervention phases and was performed using a KAP questionnaire. The socio- demographic details were collected by using data collection form and their knowledge, Attitude and practice levels were assessed by using KAP questionnaire regarding child vaccination. Out of 253 subjects were enrolled in the study, the percentage distribution of the respondents age showed that the age group of 25-29 were predominant. The respondents with single child were observed to be more with a frequency of 132 out of 253 who received complete awareness about vaccination. Majority of the respondents were under graduates which was the main reason for lack of knowledge on immunization. Of the total 253 study population, male child were 128(50.50%) and female child were 125(49.40%). In the study, the majority of the children were neonates (103) which is 40.71%. majority of children were immunized with polio (75.49%) and least was varicella (3.55%). Of the total population, delayed or missed vaccine was 72 out of 253 i.e. 28.40% which was observed in both the genders. Missed vaccine opportunities were mostly observed for PCV, Rotavirus, and MMR. **Conclusion:** This study lead to optimal disease prevention through vaccination in multiple population groups while maintaining high levels of Safety and the clinical pharmacist's interventions certainly will be helpful in providing education on immunization and improving immunization rates in the underdeveloped and developing countries. KAP questionnaire can be used in future researches on immunization and allow for better understanding of relation between mothers knowledge and immunization of children.

**KEYWORDS:** Immunization, life threatening diseases, misconceptions, vaccination adherence.

### I. INTRODUCTION

Immunization is the process whereby an individual becomes immune against an infectious disease either by natural contact with an infectious agent or by

vaccination. Although immunity against an infectious disease may not be complete, people who are immunized or vaccinated are more likely to resist to an infection.<sup>[1]</sup> Vaccines are biological preparations containing one or more active and relatively harmless antigens. These are

obtained by attenuating or inactivating microorganisms which cause infectious diseases.<sup>[2]</sup> Vaccines immunize body by inducing effector mechanisms capable of rapidly inhibiting replicating pathogens or by inhibiting the toxic components. The immune effectors are mainly generated by B-Lymphocytes which bind with toxin or pathogen.<sup>[3]</sup> Moreover, potential effectors are cytotoxic CD8+ cells and T-lymphocytes which limit the spread of infection by targeting infected cells or secreting specific anti-viral cytokines and CD4+ cells and T-helper (TH) lymphocytes. The TH cells protect through cytokine production and provide support to the generation and maintenance of B cells and CD8+, T-cell responses. T-Helper cells were initially subdivided on the basis of cytokine production of interferon- $\gamma$  or interleukin-4 into T-Helper1 cells (TH1) and T-Helper 2 cells (TH 2) respectively.<sup>[4]</sup> vaccine –induced CD4 TH cells are follicular T-Helper (TFH) cells which are specially furnished and positioned in the lymph nodes to help potent B-cells activation and differentiation into antibody-secreting cells.<sup>[5]</sup> T-helper 17 (TH17) cells are crucial in defending against extra cellular bacteria which colonize the skin, mucosa conscripting neutrophils and thus promoting local inflammation.<sup>[6],[7],[8],[9]</sup> Between 1990 and 2015, the WHO Millennium Development Goal (MDG), aimed to reduce Child mortality rate by implementing robust strategies as national and global Expanded Programs for Immunization (EPI).<sup>[10],[11]</sup> Poliomyelitis in particular, is one of the infectious diseases targeted for eradication.<sup>[12]</sup> The small pox vaccine has eradicated a disease which was responsible for centuries of out breaks and had 30% fatality rate.<sup>[13]</sup> Polio, which caused physical disability can still be observed in some before the vaccine is developed in 1955. Common childhood diseases are now rarely observed and even ear infections may soon be prevented by vaccination. The widespread success of vaccinations has erudite effect on reducing mortality from childhood diseases.<sup>[12]</sup>

### Role of Clinical Pharmacist in Vaccination

As per the American society of Health-system pharmacists (ASHP) Guidelines, pharmacists have a major role in disease prevention by advocating and administering vaccines. These are the activities of pharmacy practice consistent with the preventive aspects of pharmaceutical care since many decades. Many countries grant legal authority of pharmacists to administer vaccine after achieving the proficiency in all aspects of vaccine administration. But in India, pharmacists play a major role in storage and transportation rather than vaccine administration Public awareness of vaccine safety has been increased through internet, television and other media. To maintain and improve the public confidence in national immunization programmes, all health care professionals (HCP) should be aware of vaccine errors to respond to the public about the safety of vaccines which conserves the integrity of the immunization programme. As pharmacists are the easily accessible HCPs in the community, they are

capable of taking the initiative of monitoring various aspects of vaccinations. The pharmacists maintain relatedness between the patient and his/her other health care professionals in primary health care settings and thus can monitor various aspects of immunization increasing the vaccine adherence. The aim and objectives of the study is to monitor various aspects of vaccination, thereby improving patients education, adherence and avoidance of any misconceptions regarding vaccines in secondary care hospitals. To enhance the quantity of vaccine delivered in pediatric care settings and To improve the awareness of vaccinations at community level To determine the attitude of parents towards vaccination errors and avoid misconceptions regarding vaccination, thereby improving vaccine adherence.

## II. MATERIALS AND METHODS

**Study Design:** This is Prospective observational study in the department of pediatric in Vijay Marie secondary care Hospital in Khairtabad, Hyderabad. This study is designed to examine various aspects of vaccination in 253 patients. The time taken to gather and analyze the data was 6 months i.e. from August 2018 to January 2019. We have included Pediatric subjects of both the genders up to 3 years who are on vaccination and excluded premature and comorbid babies.

### Collection of Data

Data was collected using a self-structured questionnaire adopted from the World Health Organization with sections on socio-demography, knowledge, attitude and perception towards childhood immunization. The data entry form was used to incorporate in-patient and outpatient details along with pre-intervention and post intervention KAP Questionnaire. Face to face exit interview method was used and responses were recorded. The study was carried out in two phases: Phase I (pre intervention study) and Phase-II (post-intervention study).

**Phase-I:** The method used for the study was the convenience sampling technique. The study was planned with a total number of 253 respondents to obtain information on immunization. Informed consent was obtained from each subject after explaining the purpose of study. Information on the place of birth of child, educational status and occupation and age of mother, their address and monthly income, child immunization history were collected. Details type and dose of vaccine administered were collected from the subjects. All the information was recorded in the KAP Questionnaire which consists of two parts. The first part contained parental socio-demographic data and the second part consists of 25 questions regarding knowledge, attitude, and perception. All these questions were “yes/no/don’t know” answer format. Respondents got scores based on their answers: yes (1), no (0) and don’t know (0). The OPD and IPD departments were visited daily by the project team as per schedule.

**Phase-II:** In Post-intervention study the respondents were counselled on immunization using patient information leaflets which contains information regarding vaccines and again interviewed to collect the data in the post-intervention KAP questionnaire. Post-intervention KAP questionnaire contains same parts as that of pre-intervention questionnaire.

**Data evaluation:** The data collected from pre and post intervention study were evaluated by calculating the scores obtained by each subject. The data collected from all the subjects were evaluated by using SPSS-STATISTICAL PACKAGE OF SOCIAL SCIENCE SOFTWARE. A significant difference in the pre and post intervention score indicates success of the study. To measure the KAP difference before and after the counselling paired T test was used. The statistical significance was assessed at 5% level of significance.

### III. RESULTS AND DISCUSSION

The pharmacist's contribution to patient care through education and counselling is an approach to improve patient's quality of life. There are several misconceptions, ignorance and inadequacy of knowledge in relation to vaccines among the parents of children. Therefore, this study was undertaken to assess the knowledge, attitude and practice on paediatric immunization and to provide clear information and improve their knowledge, attitude and perception. Face-to-face interviews and case sheets were the source of data. Informed consent from the respondents was obtained before and only those children who satisfied the inclusion criteria were included in the study. Respondents' knowledge about the child's immunization was initially assessed by using pre-intervention questionnaire and after providing the appropriate information, the improvement in the parent's knowledge level on immunization was assessed using post-intervention questionnaire.

The study was conducted from August 2018 to January 2019. A total of 253 patients were enrolled in the study. Most of the respondents involved in study were in the age group of 25-29 years, which may be due to the regional issues where early marriages are common responders with single child were 132(52.10%), 2 children were 90(35%), 3 children were 26(10.20%) 4 children were 4(1.58%) and with 5 children was only 1(0.39%) respondent. The respondents with single child were observed to be more with a frequency of 132 out of 253 who received complete awareness about vaccination. This shows that majority of people are having single child than the past. Women are becoming mothers at older ages now than in the past. Today the mean age at first birth is 25, compared to 21.4 in 1970 (Mathews & Hamilton 2009). Women who did not complete high school are much more likely to have at least four sets of grandchildren than are women with more schooling (Seltzer & Yahirun 2013).

Educational status of respondents indicated that Majority of the respondents were under graduates which was the main reason for lack of knowledge regarding immunization because of that most of them don't know about the diseases for which their child is being immunized and also many mothers don't know the timings of vaccination (Table.1). Mothers attending the counselling session were categorized according to their occupational status and it was found that housewives were majority which is 62.80% and 37.15% were working (Table.2). This information was collected to assess the level of understanding of parents and its impact on child immunization. During the study out of 253 study population, male children found were 128(50.50%) and female children found were 125(49.40%) and majority of the children were neonates (103) which is 40.71%.

**Table.1: Education level of respondents.**

Education level	Frequency	Percentage
Primary	14	5.50%
Matriculation	97	38.30%
Graduation	105	41.50%
Post- graduation	37	14.60%
<b>Total</b>	<b>253</b>	<b>100%</b>

**Table.2: Occupational Status of respondents.**

Occupational status	Frequency	Percentage
House – wife	159	62.80%
Working	94	37.15%
<b>Total</b>	<b>253</b>	<b>100%</b>

Immunization status showed that A majority of children were immunized with polio (75.49%) and least was varicella(3.55%) but the major challenge was that most of them were unaware about importance of immunization and its role in child health. During the study out of the total population, delayed or missed vaccine was 72 out of 253 i.e. 28.40% which was observed in both the genders. Missed vaccine opportunities were mostly observed for PCV, Rotavirus, MMR.

**Table 3: knowledge oriented questions (KAP STUDY).**

KNOWLEDGE ORIENTED QUESTIONS	PRE (n=253)		POST (n=203)	
	YES	NO	YES	NO
1. Are you aware of vaccine preventable diseases?	127	126	187	16
2. Is lack of Immunization a risk factor ?	220	33	190	13
3. Do you think immunization is the most effective way for preventing various life threatening diseases?	226	27	184	19
4. Do you consider only few vaccines are important?	83	171	28	175

**Table 4: Comparison of Knowledge intervention scores.**

KAP DOMAIN	N(203)	MEAN SCORE		STD DEVIATION		P VALUE
		BEFORE	AFTER	BEFORE	AFTER	
KNOWLEDGE						
K1	203	1.5074	1.2414	±0.50118	±0.42898	0.03011 (S)
K2	203	1.1182	1.2463	±0.32367	±0.43192	0.03032 (S)
K3	203	1.0739	1.2069	±0.26224	±0.40608	0.02850 (S)
K4	203	1.6798	1.5911	±0.46771	±0.49284	0.03459 (S)
Polio	203	1.2217	1.1872	±0.41640	±0.39103	0.02744 (S)
BCG	203	1.7734	1.1823	±0.41967	±0.38702	0.02716 (S)
Hep a&b	203	1.8473	1.1970	±0.36060	±0.39875	0.02799 (S)
DTP	203	1.9113	1.2167	±0.28497	±0.41305	0.02899 (S)
Rotavirus	203	1.8522	1.2365	±0.35576	±0.42595	0.02990 (S)
MMR	203	1.9261	1.2365	±0.26224	±0.42595	0.02990 (S)
Hib	203	1.9655	1.2315	±0.18292	±0.42285	0.02968 (S)
PCV	203	1.9064	1.2365	±0.29199	±0.42595	0.02990 (S)
HPV	203	1.9606	1.2266	±0.19505	±0.41967	0.02945 (S)
Influenza	203	1.9064	1.2266	±0.29199	±0.41967	0.02945 (S)

Pre(253) and post(203)-intervention scores were compared which showed that respondents knowledge (Table 3 and 4), attitude and practice towards immunization is improved after counselling. SPSS test was used as a statistical tool to analyse the pre and post intervention scores and it was found to be significant ( $p < 0.05$ ) rejecting the null hypothesis. The mean and standard deviation of vaccine administered are conventional. The effect of patient counseling on KAP of vaccination to the respondents showed a momentous improvement.

#### IV. CONCLUSION

This study goes out as a wakeup call for all policy makers and healthcare providers, in that, providing the resources for immunization alone is a job which is half done and that health education is also an essential component that can go a long way in improving the prevailing scenario of immunization in the country. Hence, efforts should be focused on improving them. Besides educating them about vaccines to improve their knowledge. It was therefore suggested that proper health education and health promotion interventions be taken as measures to improve knowledge, attitude and perception of respondents towards immunization as a disease prevention tool. This study concludes that the clinical pharmacist's interventions certainly will be helpful in providing education on immunization and improving immunization rates in the underdeveloped and

developing countries. KAP questionnaire can be used in future researches on immunization and allow for better understanding of relation between mothers knowledge and immunization of children.

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