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Parental Knowledge Levels, Attitudes, and Practices Regarding Childhood Vaccination: A Cross-Sectional Study in Riyadh City, Saudi Arabia

Abdullah Saleh Al Saleh

College of Medicine, King Saud bin Abdulaziz University for Health Sciences, Riyadh, Saudi Arabia

Abstract: ***Background: The widespread availability and use of vaccines have tremendously reduced morbidity, mortality, and health care costs associated with infectious diseases among children. However, some misconceptions about vaccination prevent some parents from vaccinating their children. This misconception is primarily due to a lack of knowledge and awareness regarding childhood vaccination. Objective: The goal of the present study is to evaluate parents' knowledge levels and attitudes toward the vaccination of their children in Riyadh city, Saudi Arabia. Method: A cross-sectional study was conducted at the National Guard Comprehensive Specialized Clinic in Riyadh, Saudi Arabia. The study population consisted of 517 parents-child pairs attending the Well Baby Clinic. Data was collected by direct interview using a predesigned questionnaire. Results: Of the 517 parents in this study, 374 (72.3%) had good knowledge of childhood immunization. Their age and number of children were significantly associated with having good knowledge. Almost all parents (500, 96.8%) exhibited positive attitudes. Conclusion: Parents have good knowledge and positive attitudes toward child immunization. However, a few misconceptions require more education.***

Keywords: parents, knowledge, attitude, childhood immunization

1. Introduction

The widespread availability and use of vaccines have tremendously reduced morbidity, mortality, and health care costs associated with infectious diseases and have improved patients' quality of life worldwide [1, 2]. Globally, childhood vaccination prevents 2 million mortalities per year [3]. Immunization plays a vital role in preventing affliction, illness, and mortality from diseases or infections that can be prevented by immunization, including measles, diarrhea, diphtheria, pertussis, pneumonia, polio, tetanus, rubella, and rotavirus [4]. Parents' knowledge, attitude, and practices influence their decision-making on their children's compliance with regularly required vaccinations; however, surprisingly, the Centers for Disease Control and Prevention (CDC) reported a negative parental attitude toward the programs in place for childhood vaccinations. Furthermore, some parents believe a strong association exists between decreased fertility and the polio vaccine [5]. In Saudi Arabia, despite the health authorities' best attempts to rid Saudi Arabia of pertussis, tetanus, measles, diphtheria, and polio, many healthcare providers face obstacles from concerned parents about the efficiency, necessity, and safety of childhood vaccination [6]. Parents' concerns about the efficacy, safety, and potential side effects have led to poor compliance with childhood vaccination schedules. Thus, the knowledge, attitudes, and practices of parents toward immunization were investigated in the current study.

2. Methods

This cross-sectional study was conducted at the National Guard Comprehensive Specialized Clinic in Riyadh, Saudi Arabia, on children aged between 2months and 6yearsold and their parents attending the Well Baby Clinic of the Institute. Parents were briefed with an information sheet explaining the aim of the study, voluntary participation, and assuring their identities would be kept anonymous and confidential. After obtaining their informed consent, a purpose-designed, structured questionnaire was used to collect data from the parents. The response rate was 100%. The study period was from 1st April 2022 to 30th April2022. A total of 517 children and their parents were enrolled in this study. The questionnaire used to collect data consisted of two parts. Part one comprised socio-demographic details, and Part two comprised parents' knowledge and attitude-based questions. The questions were formulated based on questions and answers published by the Ministry of Health Saudi Arabia. Data were processed using the Statistical Package for Social Science (SPSS, version 20). Descriptive statistics were used to describe all variables. Association between dependent variables (knowledge and attitudes) and independent ones (parent's demographics) were tested using the chi-square test. P-values less than 0.05 were considered statistically significant.

3. Results

3.1. Parents' demographic characteristics

All 517 parents invited to participate responded and were interviewed for a response and completion rate of 100%. Based on the participants' demographic profiles, 374 (72.3%) were females, and 143 (27.7%) were males. The majority of the participants, 233 (45%), belonged to the age group of 31-40 years, followed by the age group 21-30 years (35.2%), then the age group more than 41 years was 85 (16.4%), and the least was17 (3.3%) less than 20 years. Regarding the number of the children, almost two-thirds (331, 64%) had 2-3 children, while 116 (22.4%) had 4-5 children, followed by 43 (8.3%) with one child, and 27 (5.2%) had six or more children. For their level of education, 353 (68.2%) parents had a bachelor's degree, 124 (24%) finished secondary school, 24 (4.6%) had

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studied at a higher level, and 16 (3%) finished intermediate school or less.57.4%of the parents were employed. Table 1 shows the parents' socio-demographic characteristics.

Table 1: Socio-demographic characteristics of the parents (N = 517)

Characteristics	n (%)
Sex	
Male	143 (27.7%)
Female	374 (72.3%)
Age (years)	
≤ 20	17 (3.3%)
21 - 30	182 (35.2%)
31 - 40	233 (45%)
≥ 41	85 (16.4%)
Number of Children	
1	43 (8.3%)
2 - 3	331 (64%)
4 - 5	116 (22.4%)
≥ 6	27 (5.2%)
Education Level	
≤Intermediate	16 (3%)
Secondary	124 (24%)
Bachelor	353 (68.2%)
Higher studies	24 (4.6%)
Employment Status	
Has a job	297 (57.4%)
Does not have a job	220 (42.6)

3.2. Parents' knowledge regarding childhood immunization

All 517 (100%) of the parents were aware of the role of routine vaccination in protecting children from infectious diseases and their complications, and 448 (86.6%) knew that the first vaccination dose is given at birth.506 parents (97.9 %) knew that most of the diseases against which children are vaccinated occur during the first year of life. Around 242 (47%) parents knew that administering two or more doses of the same vaccine is essential to establishing immunity in children. Nearly half of the parents, 286 (55%), knew that providing more than one vaccine simultaneously has no negative impacts on a child's immunity. Most of the parents, 473 (91%), reported that it is important to vaccinate children during immunization campaigns.290 parents (56%) thought it is important to vaccinate children against seasonal influenza. Almost three-quarters of the parents (374, 72%) knew that there is no relationship between vaccination and autism.209 (40%) parents thought that common colds, ear infections, and diarrhea are contraindications for vaccination. Table 2 summarizes the data collected on parents' knowledge of childhood immunization in detail.

Table 2: Parents' knowledge regarding childhood immunization

Knowledge Items	Yes	No	Don't Know
Routine vaccination protects children from infectious diseases and their complications	517 (100%)	0	0
First dose of vaccination is given at birth	448 (86.6%)	66 (12.8%)	3 (0.6%)
Most diseases against which children are vaccinated occur during the first years of life	506 (97.9)	0	11 (2.1%)
Multi-doses of the same vaccine given at intervals are important for child immunity	242 (46.8%)	99 (19.2%)	176 (34%)
More than one vaccine at the same time has no negative impacts on child immunity	286 (55.3%)	63 (12.2%)	168 (32.5%)
Is it important to vaccinate children during immunization campaigns	473 (91.5%)	29 (5.6%)	15 (2.9%)
It is recommended to vaccinate children against seasonal influenza	290 (56.1%)	106 (20.5%)	121 (23.4%)
Immunization can cause autism	19 (3.7%)	374 (72.3%)	124 (24%)
Common colds, ear infections, and diarrhea are not contraindications for vaccination	209 (40.4%)	198 (38.3%)	110 (21.3%)

3.3. Parents' attitudes toward childhood immunization

All of the parents (517, 100%) agreed that child immunization is essential, and the majority considered immunization to be helpful and safe, 462 (89.7%) and 506 (97.9%), respectively. Some of the parents, 55 (10%), were unsure if immunization is forbidden in Islam. Moreover, 308 (59.6%) of the parents were unsure if an immunized child became infected with the disease they were vaccinated against. All parents (517, 100%) knew that compliance with the immunization schedule is essential and that immunization keeps the child healthy. Table 3 summarizes the data collected on parents' attitudes toward childhood immunization in detail.

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Table 3: Parents' attitudes toward childhood immunization

Attitude Items	Strongly Agree	Strongly Disagree	Not Sure
Child immunization is important	517 (100%)	0	0
Immunization is more beneficial than harmful	462 (89.4%)	35 (6.7%)	20 (3.8%)
Vaccines for child immunization are safe	506 (97.9%)	0	11 (2.1%)
Child immunization is prohibited in religion	0	462 (89.4%)	55 (10.6%)
Immunizations are associated with side effects	495 (95.7%)	10 (1.9%)	12 (2.3%)
Child can become infected after immunization with the disease/s against which he/she was vaccinated	15 (2.9%)	194 (37.5%)	308 (59.6%)
Compliance to immunization schedule is important	517 (100%)	0	0
Immunization keeps your child healthy	517 (100%)	0	0

Table 4 shows that 374 (72.3%) parents had good knowledge levels regarding immunization. The results revealed that parents' age and the number of children were significantly associated with immunization knowledge. Furthermore, 500 (96.8%) parents exhibited positive attitudes toward immunization, with no significant demographic factor related to their attitudes toward vaccination.

Table 4: Association between demographic characteristics, knowledge, and attitudes on vaccination

Characteristics	Knowledge on Vaccination			Attitudes on Vaccination		
	Good 374 (72.3%)	Poor 143 (27.7%)	*p-Value*	Positive 500 (96.8%)	Negative 17 (3.2%)	*p-Value*
Sex						
Male	103 (27.5%)	40 (28%)	0.921	138 (27.6%)	5 (29.4%)	0.869
Female	271 (72.5%)	103 (72%)		362 (72.4%)	12 (70.6%)	
Age (years)						
≤ 20	12 (3.2%)	5 (3.5%)		16 (3.2%)	1 (5.9%)	
21-30	134 (35.8%)	48 (33.6%)	0.003	176 (35.2%)	6 (35.3%)	0.995
31-40	180 (48.2%)	53 (37%)		226 (45.2%	7 (41.2%)	
≥ 41	48 (12.8%)	37 (25.9%)		82 (16.4%)	3 (17.6%)	
Number of Children						
1	25 (6.6%)	18 (12.6%)		42 (8.4%)	1 (5.9%)	
2-3	251 (67.1%)	80 (55.9%)	0.048	320 (64%)	11 (64.7%)	0.985
4-5	78 (20.9%)	38 (26.6%)		112 (22.4%)	4 (23.5%)	
≥ 6	20 (5.3%)	7 (4.9%)		26 (5.2%)	1 (5.9%)	
Employment						
Yes	218 (58.2%)	79 (55.2%)	0.531	287 (57.4%)	10 (59%)	0.907
No	156 (41.8%)	64 (44.8%)		213 (42.6%)	7 (41%)	
Education Level						
Intermediate school or less	10 (2.7%)	6 (4.2%)		15 (3%)	1 (5.9%)	
Secondary	85 (22.7%)	39 (27.2%)	0.064	120 (24%)	3 (17.6%)	0.475
Bachelor	266 (71.1%)	87 (60.8%)		342 (68.4)	11 (64.7%)	
Higher studies	13 (3.5%)	11 (7.8%)		23 (4.6%)	2 (11.7%)	

3.4. Parents' sources of information regarding vaccination

Parents' awareness of the purpose of immunization was mainly from health professionals (453, 87%), followed by internet/social media (43, 8.3%), and then friends/relatives (20, 3.9%). Table 5 summarizes the parents' sources of information regarding vaccination.

Table 5: Parents' sources of information regarding vaccination

Source	n (%)
Health professionals	453 (87.6%)
Internet/social media	43 (8.3%)
Friends/relatives	20 (3.9%)
Books	1 (0.2%)
Television	0
Journals	0

4. Discussion

Parental knowledge of childhood immunization is crucial for increasing vaccination coverage and compliance with the schedule [7]. Based on the findings described here, the majority of the respondents showed good knowledge regarding childhood vaccinations role in protecting children against infectious diseases and their complications. These findings were consistent with those reported in low, middle, and high-income countries worldwide [8-10]. Given that poor/inadequate parental knowledge of the health benefits of vaccines in protecting children against infectious diseases is associated with low parental confidence and vaccination coverage rates [11,

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12], this finding is a crucial quality metric of the positive impact of the immunization program on public health in Saudi Arabia.

Most vaccines in the immunization schedule need two or more doses to develop a sufficient and persistent antibody response. To produce an adequate and permanent antibody response, the CDC asserts that most vaccines require several doses [13]. The parents enrolled in the present study knew the importance of multi-dose vaccines for boosting children's immunity. This result aligns with reports from previous studies in Malaysia and Saudi Arabia [7, 14]. Moreover, 40% of parents considered vaccination contraindicated during common colds, ear infections, and diarrhea. The guide for contraindications to childhood vaccination indicated that misconceptions about contraindications might delay vaccination and expose children to avoidable health risks [15].

Although several systematic reviews emphasize that there is no scientific link between the measles, mumps, and rubella (MMR) vaccine and autism [16-18], the unfounded yet highly popularized association between this vaccine and autism remains still negatively impacts vaccine uptake worldwide [16]. Some of our study respondents either believed that childhood vaccines could cause autism (3.7%) or had no information about this debate (24%), despite knowing that multi-doses boost the immune response of children. This is a shared global dilemma, prevalent even in developed countries [19]. The influence of media coverage on the link between the MMR vaccine and autism based on a single retracted study received considerable public attention and caused vaccination rates to fall in many countries [20]. Therefore, vigorous monitoring and evaluation of the internet and social media and formal education campaigns are warranted to prevent the dissemination of misleading information about vaccines' side effects from non-medical sources.

Recent recommendations in the United States emphasize immunizing all children with influenza vaccines from six months to 19years of age, particularly children under the age of five or with chronic illnesses [21]. Nearly 56% of the parents in this study knew that immunizing children against seasonal influenza is beneficial. Parents would be interested in vaccinating their children if educated about the essential role of children in communicating the infection in families and in public and the economic burden and health effects of contracting influenza.

In the present study, the majority of the parents agreed that vaccination is safe and essential to keep their children healthy and was strongly convinced that vaccination benefits exceed their harms. Several studies reported similar results from different countries [6, 7, 18].

This study showed that some respondents (10%) were unsure if vaccination is prohibited by religion. It is important to note that vaccination is consonant with the objectives of the Islamic religion and concepts, as declared by the Muslim religious scholars in the Islamic Organization for Medical Sciences. Pseudo-beliefs about the status of vaccines jeopardize the safety of children individually and expose communities as a whole [22].

Almost all parents (95%) believed that vaccination is associated with adverse effects. Common local reactions like pain, redness, and swelling at the vaccine injection site and other systematic responses, including fever, irritability, drowsiness, and rash, may be associated with immunization. Tagbo et al. showed that 20% of the mothers queried would not continue immunization if their child suffered any adverse effects [23]. Therefore, parents' education about these side effects is imperative.

This study was conducted in a single city in Saudi Arabia; hence, the findings cannot be generalized to Saudi parents throughout the entire country.

5. Conclusion

This study revealed adequate knowledge levels and positive attitudes among the parents in Riyadh, Saudi Arabia, concerning childhood vaccination. Continuous educational awareness campaigns are desirable to promote parents' understanding of immunization programs in the city.

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