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ORIGINAL RESEARCH

Parental Perspectives on Childhood Vaccination: Analysing Knowledge and Attitudes Among Families in Tabuk, Saudi Arabia

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Purpose: To ascertain the knowledge and attitudes of parents on childhood vaccination in Tabuk, Saudi Arabia, as well as their perceived barriers to vaccination.

Patients and Methods: Three hundred and thirty parents were selected in this cross-sectional study by convenience sampling from the parents who attended several primary healthcare facilities to vaccinate their children. A pre-made questionnaire was used, which included the sociodemographic characteristics and questions about the parents' knowledge, attitude toward childhood vaccination, and compliance with vaccination according to the immunization schedule. The associations between the research variables were evaluated using chi-square, the Pearson correlation, and multiple binary logistic regression.

Results: Among the parents studied, 66.1% had adequate knowledge of childhood vaccination, and 55.5% held positive attitudes toward it. The significant associated factors for adequate knowledge and positive attitude were the age from 30 to <40 (OR: 2.6 and 2.3, P<0.05), increasing education level (OR: 2.1 and 1.7, P<0.05), and work related to the health sector (OR: 2.7 and 4.4, P<0.05). The examined parents' attitude score increased significantly with the high level of knowledge score ($r = 0.603$, $P < 0.001$). Among the parents studied, 62.9% adhered to the childhood immunization schedule. In contrast, the most common perceived barriers for those who did not comply were the illness of a family member (36.7%), the child's sickness (32.8%), or being busy on vaccination day (31.4%).

Conclusion: Around half of the parents in this study had a positive attitude and understood the significance of vaccination. Nevertheless, the contributory factors of insufficient knowledge and attitude, like lower levels of education and advanced age, should be handled through health education initiatives to raise their awareness and motivate them to complete their children's vaccination.

Keywords: childhood vaccination, parents, knowledge, attitude, immunization barriers

Introduction

Vaccination is one of the key strategies for preventing pediatric diseases, which has contributed to a 24% global decrease in the death rate for children under five.[1] The primary aim of vaccination is to stimulate the immune system's response against infection and stop the development of serious diseases in childhood by ensuring adequate immunization coverage.[2]

The World Health Organization (WHO) has advised against delays or disruptions in immunization services. Despite this recommendation and the efforts of the Ministry of Health to inform the population, it was discovered that 26% of parents in Saudi Arabia did not vaccinate their children on schedule following the national immunization guidelines under normal circumstances.[3]

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The Saudi national immunization program began in 1979, initially focusing on diphtheria, tetanus, and pertussis (DTP) and later expanding to include other vaccines. Vaccination is mandatory for school entry, contributing to high coverage rates (98% for DTP and MMR in 2019).[4] This school requirement can be an effective strategy for ensuring high immunization rates.[5]

The primary and most important individuals who make decisions about children's health are their parents. They are the only ones who can drive and significantly promote the implementation of full immunization programs and higher compliance rates. They can experience "vaccine hesitancy", which is the reluctance or postponement of receiving vaccinations, even in the presence of immunization services.[6] There are several reasons for this, such as socioeconomic or religious beliefs, a lack of confidence in the healthcare system, worries about the safety of the vaccines, and their possible relation to the development of other diseases like autism.[7–9] It is believed that concerns regarding vaccinations are one of the primary reasons for their underutilization. A prior study carried out in Jeddah, Saudi Arabia, found a link between vaccine hesitancy and parents' awareness.[10]

Due to the lack of awareness, many parents underestimate the danger of diseases while overestimating vaccine risks.[8] A study conducted in Saudi Arabia by Alaamri et al found that 43% of participants expressed some concern about the safety of childhood vaccine doses, while another 43% were somewhat worried about the effectiveness of these doses in preventing diseases.[11]

Even in cases with high vaccination coverage, assessing parental knowledge and attitude about vaccinations is greatly important, as they affect their children's vaccination status. The presence of any parental misconceptions or uncertainties may represent a possible future obstacle to obtaining widespread vaccine adoption and adherence. Also, this can be considered as a part of proactive action by authorities, tailoring long-term interventions to improve the uptake, maintain the high vaccination coverage, and prevent outbreaks.[12] Many studies in Saudi Arabia explored knowledge, attitudes, and practices regarding childhood vaccination among parents, but showed a wide discrepancy in results between different regions. To the best of our knowledge, this is the first study in Tabuk City, Saudi Arabia, to determine parental knowledge and attitude about childhood vaccination as well as address their perceived barriers to vaccination.

Materials and Methods

Study Design and Setting

The study was cross-sectional and took place in Tabuk, Saudi Arabia, over three months, from the end of December 2024 to the end of March 2025.

Participants

Sample Size Calculation

It was calculated by the OpenEpi online calculator, version 3, based on a 95% confidence interval, 80% power, and a prior study by Alshammari et al (2021)[7] in Riyadh, KSA, which indicated that 73.3% of the parents knew a lot about childhood vaccinations. The estimated sample size was 301 parents, and 10% was added for failure to respond; hence, there will be 330 parents in all.

Sampling Technique

In order to satisfy the participation requirements, a convenience sample was obtained from the parents who went to various primary healthcare facilities to vaccinate their children.

Inclusion and Exclusion Criteria

The eligible participants were the parents who attended several primary healthcare facilities to vaccinate their children and had at least one kid, were willing to give their informed consent to participate in the study, or could read, comprehend, and complete the study survey in Arabic. Those who do not live in the designated geographic area (Tabuk City) or who are not the children's primary guardians (such as neighbors or family) will be excluded.

Research Tools

After receiving permission to use the valid questionnaire from a prior study of a similar nature,[7] it was given to the participants. It had a Cronbach alpha greater than 0.7 for the knowledge and attitude scores. The first section of the

questionnaire assessed the parents' sociodemographic information, including their age, gender, place of residence, level of education, occupation, and number of children. It also collected data on the sources of their information about vaccinations, offering four options: from friends and family, social media, doctors, or attending a health session. Ten statements on a three-point Likert scale, with the choices being "I do not know", "No", and "Yes", made up the second section, which assessed their understanding of childhood vaccinations. The code one was assigned to the right response and zero to the incorrect response. Then, the third segment was composed of 10 questions about the parents' opinions on childhood immunizations using a five-point Likert scale ranging from strongly agree to disagree strongly. The median for knowledge and attitude total scores was used as the cutoff criterion to divide scores into inadequate knowledge or negative attitude (<50%) and adequate knowledge or positive attitude (≥50%). Lastly, yes/no questions about parents' compliance with childhood vaccination and their perceived obstacles to vaccination were asked.

Ethics Approval and Consent to Participate

"All procedures carried out in studies involving human participants were following the 1964 Helsinki Declaration and its subsequent amendments or comparable ethical standards". The University of Tabuk's Local Research Ethics Committee (LREC) in Tabuk, Saudi Arabia, granted ethical approval for the study with reference number UT-486-265-2024. An anonymous questionnaire was used to collect data; each participant was asked for their informed consent on the first page of the questionnaire, which also included a description of the study's goal and a confirmatory statement about the confidentiality of the data gathered.

Statistical Analysis

Statistical package for social sciences (SPSS) version 23.0 was used to analyze the data. The quantitative and qualitative variables were described using descriptive statistics by mean, standard deviation (SD), and percentages. The Chi-square test was used to examine the relationship between parents' sociodemographic (the independent factors) and their knowledge and attitude scores (dependent variables). When cells with expected value less than 5, Fisher's exact probability test was applied. To determine the factors associated with parents' knowledge and attitudes on vaccinations, multiple binary logistic regression was conducted with the "enter" method, as a model selection technique. The relationship between attitude and total knowledge scores was examined using the Pearson correlation coefficient. A p-value of less than 0.05 was regarded as statistically significant.

Results

Three hundred and thirty parents were included in this study. Their age ranged from 20 to 60 years old, with 79.7% of them being between 30 and less than 50 years old. 80.3% were mothers, and 94.5% lived in Tabuk City. Regarding the educational level, the majority (73.9%) were at the university level. 42.4% of the studied parents had more than three children. 89.4% of them worked in occupations not related to the health sector. Most of them (71.2%) received information about childhood vaccination from family and friends, while others learned from doctors or attended health sessions or social media (14.2%, 9.7%, or 4.8%, respectively) [Table 1].

Of the 330 parents who participated in the study, 218 (66.1%) had adequate knowledge about children's vaccination when their scores were categorized using the median [Table 1].

When compared to parents with inadequate information, the parents with acceptable knowledge were between the ages of 30 and 40 (56.9% versus 45.5%; P<0.05). On the other hand, fewer parents in the 20–30 age range had sufficient knowledge (11.0% versus 23.2%; P<0.05). Additionally, all illiterate parents had an inadequate level of knowledge, and 80.3% of those with adequate knowledge had a university education compared to 61.6% of those with inadequate knowledge. Compared to parents who did not work in the health sector, those who did had better adequate knowledge (13.3% versus 5.4%; P<0.05). In contrast to parents who had inadequate knowledge, the parents who knew enough about childhood vaccinations were more likely to get information from doctors and health sessions (17.9% and 11.9% versus 7.1% and 5.4%, respectively) than from friends and family (64.2% versus 84.8%, P<0.05) [Table 1].

By classifying the parents' attitude scores using the median, the study revealed that 183 (55.5%) of the 330 parents had a positive attitude [Table 2].

Table 1 The Relationship Between Knowledge Score Categories and Sociodemographic Characteristics of the Studied Parents in Tabuk, Saudi Arabia, 2024–2025

Parameter	Total Studied Parents (n=330)	The Knowledge Score Categories		P value
		Adequate (n=218)	Inadequate (n=112)	
Age (year)				
20 - <30	50 (15.2%)	24 (11.0%)	26 (23.2%)	0.02*
30 - <40	175 (53.0%)	124 (56.9%)	51 (45.5%)	
40- <50	88 (26.7%)	60 (27.5%)	28 (25.0%)	
≥50	17 (5.2%)	10 (4.6%)	7 (6.3%)	
Gender				
Male	65 (19.7%)	42 (19.3%)	23 (20.5%)	0.78
Female	265 (80.3%)	176 (80.7%)	89 (79.5%)	
Residence				
Tabuk city	312 (94.5%)	206 (94.5%)	106 (94.6%)	0.95
Around Tabuk city	18 (5.5%)	12 (5.5%)	6 (5.4%)	
Education level				
Illiterate	4 (1.2%)	0 (0.0%)	4 (3.6%)	<0.001*
Primary	17 (5.2%)	2 (0.9%)	15 (13.4%)	
Intermediate	12 (3.6%)	5 (2.3%)	7 (6.3%)	
Secondary	53 (16.1%)	36 (16.7%)	17 (15.2%)	
University	244 (73.9%)	175 (80.3%)	69 (61.6%)	
The number of children				
one	61 (18.5%)	41 (18.8%)	20 (17.9%)	0.87
2–3	129 (39.1%)	83 (38.1%)	46 (41.1%)	
> 3	140 (42.4%)	94 (43.1%)	46 (41.1%)	
Occupation				
Related to the health sector	35 (10.6%)	29 (13.3%)	6 (5.4%)	0.03*
Not related to the health sector	295 (89.4%)	189 (86.7%)	106 (94.6%)	
The source of information about childhood vaccination				
Doctors	47 (14.2%)	39 (17.9%)	8 (7.1%)	0.002*
Attendance at the health session	32 (9.7%)	26 (11.9%)	6 (5.4%)	
Family and friends	235 (71.2%)	140 (64.2%)	95 (84.8%)	
Social media or the internet	16 (4.8%)	13 (6.0%)	3 (2.7%)	

Note: *Significant difference.

Table 2 The Relationship Between Attitude Score Categories and Sociodemographic Characteristics of the Studied Parents in Tabuk, Saudi Arabia, 2024–2025

Parameter	The Attitude Score Categories		P Value
	Positive (n=183)	Negative (n=147)	
Age (year)			
20 - <30	21 (11.5%)	29 (19.7%)	0.02*
30 - <40	110 (60.1%)	65 (44.2%)	
40- <50	45 (24.6%)	43 (29.3%)	
≥50	7 (3.8%)	10 (6.8%)	
Gender			
Male	36 (19.7%)	29 (19.7%)	0.99
Female	147 (80.3%)	118 (80.3%)	

(*Continued*)

Table 2 (Continued).

Parameter	The Attitude Score Categories		P Value
	Positive (n=183)	Negative (n=147)	
Residence			
Tabuk city	172 (94.0%)	140 (95.2%)	0.62
Around Tabuk city	11 (6.0%)	7 (4.8%)	
Education level			
Illiterate	1 (0.5%)	3 (2.0%)	0.001*
Primary	5 (2.7%)	12 (8.2%)	
Intermediate	2 (1.1%)	10 (6.8%)	
Secondary	25 (13.7%)	28 (19.0%)	
University	150 (82.0%)	94 (63.9%)	
The number of children			
one	32 (17.5%)	29 (19.7%)	0.46
2–3	77 (42.1%)	52 (35.4%)	
> 3	74 (40.4%)	66 (44.9%)	
Occupation			
Related to the health sector	29 (15.8%)	6 (4.1%)	0.001*
Not related to the health sector	154 (84.2%)	141 (95.9%)	
The source of information about childhood vaccination			
Doctors	37 (20.2%)	10 (6.8%)	<0.001*
Attendance at the health session	30 (16.4%)	2 (1.4%)	
Family and friends	108 (59.0%)	127 (86.4%)	
Social media or the internet	8 (4.4%)	8 (5.4%)	

Note: *Significant difference.

Parents who had a positive attitude were more likely to be between the ages of 30 and 40 than parents who had a negative attitude (60.1% versus 44.2%; P<0.05), and fewer were older than 50 (3.8% versus 6.8%; P<0.05). While 82.0% of parents with a positive attitude had a university degree, 63.9% of parents with a negative attitude had this degree (P<0.05). Parents who worked in the medical field showed more positive attitudes than those who had negative attitudes (15.8% compared to 4.1%; P<0.05), as did parents who learned about children's vaccinations from medical professionals and health sessions (20.2% and 16.4% versus 6.8% and 1.4%, respectively). On the other hand, more people with negative attitudes got their knowledge from friends and family than those with positive attitudes (86.4% versus 59.0%, P<0.05) [Table 2].

In terms of binary logistic regression, those between the ages of 30 and <40 and 40 and <50 had considerably higher adequate knowledge, with 2.6 (OR with 95% CI: 2.6 with 1.3–5, P<0.05) and 2.3 (OR with 95% CI: 2.3 with 1.1–4.7, P<0.05) years, respectively. University-educated parents were twice as knowledgeable (OR with 95% CI: 2.1 with 1.6–2.8, P<0.05), and those who worked in the medical field were 2.7 times more knowledgeable (OR with 95% CI: 2.7 with 1.1–6.7, P<0.05). However, those between the ages of 30 and under 40 (OR with 95% CI: 2.3 with 1.2–4.4, P<0.05) and those with a university education (OR with 95% CI: 1.7 with 1.3–2.3, P<0.05) exhibited a statistically significant positive attitude and were about twice as positive as others. The positive attitude of those working in the medical field was four times higher than that of those in other occupations (OR with 95% CI: 4.4 with 1.7–10.9, P<0.05). Additionally, parents who received information about vaccinations from doctors were 15 times more likely to have a positive attitude (OR with 95% CI: 15 with 2.6–85, P<0.05) and from health sessions approximately four times (OR with 95% CI: 3.7 with 1.1–12.3, P<0.05) [Table 3].

In this research, the higher the level of knowledge score among the studied parents, the greater their attitude score ($r = 0.603$, $P < 0.05$) [Table 4].

Table 3 Multiple Binary Logistic Regression to Detect Associated Factors of Good Knowledge and Attitude Scores Among the Studied Parents in Tabuk, Saudi Arabia, 2024–2025

Parameter	The Knowledge Categories			The Attitude Categories		
	β	OR (95% CI)	P value	β	OR (95% CI)	P value
Age (year)						
20 - <30 (ref.)						
30 - <40	0.96	2.6 (1.3–5.0)	0.003*	0.84	2.3 (1.2–4.4)	0.009*
40- <50	0.84	2.3 (1.1–4.7)	0.02*	0.36	21.4 (0.71–2.9)	0.30
≥50	0.43	1.5 (0.51–4.7)	0.44	–0.03	0.96 (0.31–2.9)	0.95
Education level						
Below university (ref.)						
University	0.76	2.1 (1.6–2.8)	<0.001*	0.54	1.7 (1.3–2.3)	<0.001*
The occupation						
Related to the health sector	0.99	2.7 (1.1–6.7)	0.03*	1.48	4.4 (1.7–10.9)	0.001*
Not related to the health sector (ref.)						
The source of information about childhood vaccination						
Doctors						
Attendance at the health session	0.01	1 (0.21–4.6)	0.99	2.7	15 (2.6–85)	0.002*
Family and friends	0.11	0.87 (0.25–4.8)	0.87	1.3	3.7 (1.1–12.3)	0.03*
Social media or the internet (ref.)	–1.1	0.34 (0.09–1.2)	0.09	–0.16	0.85 (0.31–2.3)	0.75

Note: *Significant level.
Abbreviations: β, Beta; OR, odds ratio; CI, confidence interval, ref., reference.

Table 4 The Correlation Between Knowledge and Attitude Scores of the Studied Parents in Tabuk, Saudi Arabia, 2024–2025

	Total Studied Parents (n=330)	
	The Knowledge Score	The Attitude Score
Mean±SD	5.9±1.9	37.1±4.4
Median	6	37
Correlation coefficient r (P value)	0.603 (<0.001*)	

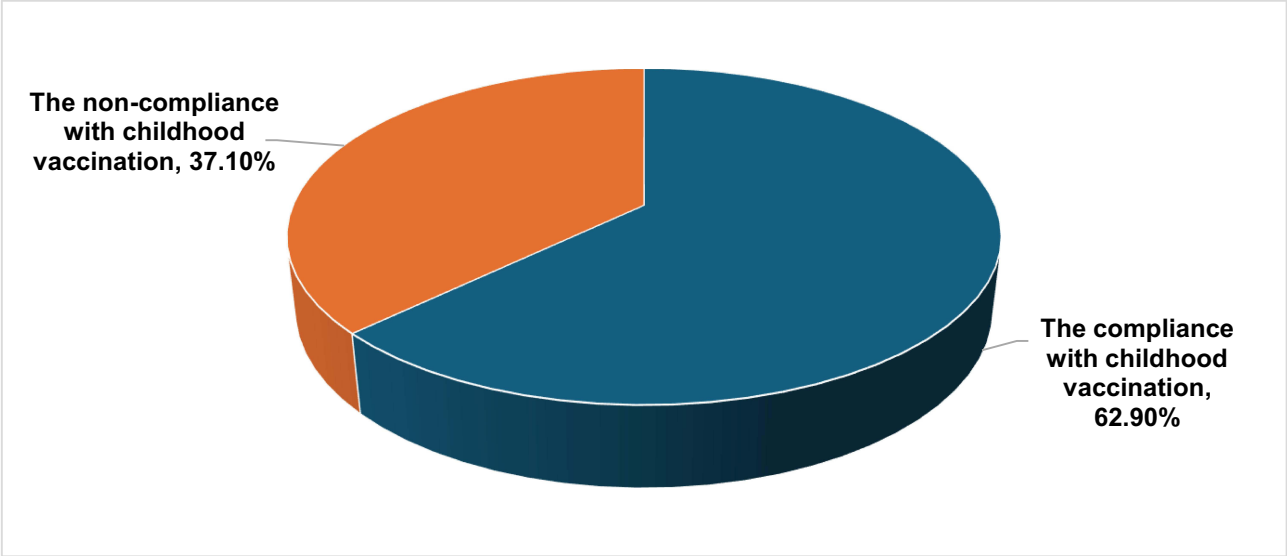
Note: *Significant level.
Abbreviations: SD, Standard Deviation.

The percentage of participants who complied with the immunization schedule was 62.9% [Figure 1a]. Their perceived obstacles to immunization were the child's illness (32.8%), a family member's sickness (36.7%), being occupied on the day of vaccination (31.4%), fear regarding the side effects of the vaccine (21.9%), or being unaware of the next dose (6.8%) [Figure 1b].

Discussion

As a cost-effective intervention for promoting children's health, vaccination has been recognized as one of the most significant public health accomplishments, lowering morbidity and mortality from related vaccine-preventable diseases.[13] Increasing the vaccine coverage rate and parents' adherence to the vaccination schedule depends heavily on parental awareness and attitude toward childhood vaccinations, which will be reflected in the long-term incidence and prevalence of major childhood infectious diseases.[12] The purpose of this study was to ascertain the knowledge and attitudes of parents in Tabuk, Saudi Arabia, about childhood vaccinations as well as address their perceived barriers to vaccination.

a) The compliance with childhood vaccination among the studied parents



b) The perceived barriers to vaccination among the studied parents

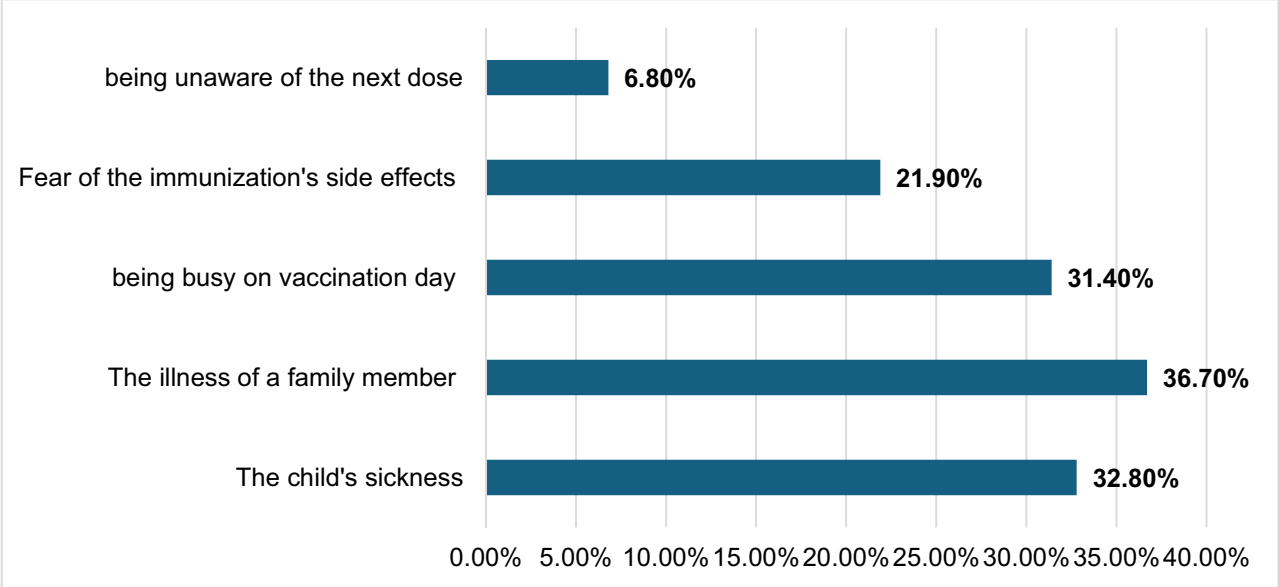


Figure 1 The compliance with childhood vaccination and the perceived barriers to vaccination among the studied parents in Tabuk, Saudi Arabia, 2024–2025.

The current study's findings indicate that 66% of participants knew adequately about vaccinations for their children. The results are greater than those of research in Indonesia,[14] where only roughly half of the participants had adequate knowledge, but they are nearly consistent with similar studies carried out in Malaysia,[15] Cyprus,[16] Rwanda,[17] and Saudi Arabia.[7,10,11,18] Even though we would prefer to find higher levels of parental knowledge, the reported medium-degree level of knowledge is more important and preferable than being unaware of the health advantages of vaccinations in preventing infectious diseases in children, which is linked to low vaccination coverage rates.[19] Also, the study's findings are an important reflection of the policies and practices that Saudi Arabia's Ministry of Health has put in place concerning the country's immunization program in recent years.

It's documented that children's immunization status is significantly impacted by parents' attitudes.[20] The results of this study showed that slightly more than half of the participants had a positive attitude. This acceptable attitude is

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thought to be a reflection of the level of adequate knowledge. This is consistent with other comparable investigations.[7,21,22]

Parents' attitudes toward vaccinating their children and their level of knowledge were found to be significantly positively correlated in this study. It demonstrates that the commitment to getting their children vaccinated increases with their level of knowledge. A research study in Malaysia reported a similar finding.[15]

The participating parents, who were middle-aged, had significantly adequate knowledge and positive attitudes toward vaccination. This is similar to a study conducted in Saudi Arabia,[7] while contradictory to the study conducted in Malaysia,[15] which found parents with younger age groups had higher knowledge and better attitudes. The difference between the studies' results may be due to differences in the characteristics of the participants as well as the abundance of vaccination centers and easy and free access to vaccination services in Saudi Arabia.

It was proposed that mothers' academic standing had a major impact on their decisions to vaccinate their children.[15] As demonstrated by the current study, the majority of parents with higher levels of knowledge and attitude held a university degree. This is consistent with previous similar studies carried out in Rwanda,[17] Saudi Arabia,[18] and Malaysia,[21] but it differs from another study conducted in Malaysia that discovered no significant association between parents' educational backgrounds and the decision to vaccinate their children.[23] This might be because parents with higher education levels are more likely than parents with lower education levels to be health literate, to recognize, understand, and apply health-related information, and to recognize the importance of children's vaccinations and appropriate medical procedures.[24]

Parents who worked in occupations related to the healthcare sector had significantly higher levels of adequate knowledge and positive attitudes regarding vaccination compared to those who did not work in healthcare. This is comparable to an investigation conducted in Malaysia, in which the medical professionals' opinions and attitudes toward vaccines were more favorable than non-healthcare professionals.[21] The present finding is important, as healthcare workers are the key to the success of the healthcare system in improving population health in any community; if they have inaccurate knowledge about vaccinations, this can lead to vaccine hesitancy and a negative attitude toward vaccinations among the public.[25–27]

Our findings reflect the assumption that parents' knowledge and subsequent attitude and behavior are primarily based on the proficiency of medical professionals who recommend and advise the immunizations.[28] The majority of parents with higher levels of knowledge and attitudes significantly get their trusted information on vaccinations from their children's doctors and health personnel and health sessions, emphasizing the healthcare providers' ability to influence parental knowledge and choices and reassure them about the safety of vaccines. Our results are in line with those of several earlier investigations.[16,29,30] These highlight how important doctors are in providing up-to-date, evidence-based vaccine information and helping parents decide whether to vaccinate their children.

A prior study in Jordan found that mothers who got their immunization information from medical personnel knew more about vaccinations than mothers who got their information from other sources, such as websites, mass media, friends, and family. Other sources can provide inaccurate information, which will create a negative attitude and eventually result in the underutilization of vaccinations.[31]

More than half of the parents who took part in the study were complied to the vaccine schedule, which is consistent with other studies.[32,33] Nonetheless, the Ministry of Health's contribution is clear in the fact that childhood vaccinations are accessible without requiring payment or transportation. There were still some instances of non-compliance brought on by a lack of awareness or a negative attitude, such as not knowing the timetable or being afraid of its negative effects. This is consistent with another study conducted in Saudi Arabia by Bin Alamir (2024), who discovered that the main obstacle to vaccination compliance was vaccine hesitancy.[34] The same findings were seen in other studies conducted in Iraq[32] and India,[33] but there were other explanations, such as vaccination unavailability, travel difficulties, or budgetary constraints.

Strengths and Limitations

This study is, as far as we are aware, the first research that provides insightful information about parents' awareness and attitude toward childhood vaccinations in Tabuk, Saudi Arabia, and their perceived vaccination barriers, which can guide future investigations and programs. However, some limitations were recognized; since this study was cross-sectional, it's

difficult to conclude the causal relationships between various underlying factors and parents' knowledge or attitudes. Additionally, selection bias may cause the odds ratio (OR) to not accurately reflect the true prevalence ratio (PR). Multivariate analysis, which is used to control for confounding, was attempted to be used to overcome this and assist in minimizing these constraints by adjusting for potential confounders. Among the limitations of this study is that the results cannot be generalized to all Saudi Arabian parents because of the convenience sampling method and the fact that it was conducted in just one Saudi Arabian city.

Practical Implications

There are numerous significant implications of this study. Ministry of Health and policymakers should create a vaccination communication plan targeting parents who exhibit low knowledge attitude levels reflected in their practice regarding vaccine utilization, considering the factors that contribute to these situations, to maintain and increase the immunization rate. Open communication between physicians and parents will help to raise understanding about vaccine safety and the significance of immunization by eliminating vaccine myths and rumors, clearing up false information, and scientifically addressing vaccine safety concerns. Such approaches aim to build confidence in children's vaccination. The Ministry of Health requires new, more advanced communication methods, such as social media and social marketing technologies, and an internet channel could be initiated to be used by nurses and other medical professionals to spread accurate information and emphasize the advantages of vaccination on the national level.

Conclusions

More than half of the parents in the study had favorable attitudes and sufficient knowledge about children's vaccinations. These parents were middle-aged, university-educated, had occupations in the health sector, and primarily relied on doctors for information. The most common vaccine barriers among the parents surveyed were being busy on the day of the vaccination and a family member's illness.

To ascertain the relationship between parental attitudes and knowledge and children's immunization behavior, more studies are necessary. Additionally, it is recommended that further longitudinal studies be performed to prove the predictors of parents' knowledge and attitudes regarding children's vaccinations. Myths and false information about vaccines can be dispelled by collaboration between doctors, parents, public health experts, governments, and civil society. It is essential to promote awareness initiatives that highlight the importance, efficacy, and safety of childhood vaccinations.

Data Sharing Statement

Available from the corresponding author upon request.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors declare no conflict of interest.

References

1. Vassiliki P, Ioanna K, Artemis V, et al. Determinants of vaccination coverage and adherence to the Greek national immunization program among infants aged 2-24 months at the beginning of the economic crisis (2009-2011). *BMC Public Health*. 2014;14:1192. doi:10.1186/1471-2458-14-1192
2. World Health Organization (WHO). Vaccines and immunization. Available from: https://www.who.int/health-topics/vaccines-and-immunization#tab=tab_1. Accessed February 22, 2025.
3. Al-Nafeesah AS, Aldamigh AS, Almansoor BA, Al-Wutayd O, AlE'ed AA. The impact of the COVID-19 pandemic on parents' behavior toward scheduled pediatric vaccinations in Saudi Arabia. *Infect Dev Ctries*. 2021;15(8):1054–1058. doi:10.3855/jidc.13765
4. Alsubaie SS, Gosadi IM, Alsaadi BM, et al. Vaccine hesitancy among Saudi parents and its determinants. Result from the WHO SAGE working group on vaccine hesitancy survey tool. *Saudi Med J*. 2019;40(12):1242–1250. doi:10.15537/smj.2019.12.24653
5. Shaw J, Mader EM, Bennett BE, Vernyi-Kellogg OK, Yang YT, Morley CP. Immunization mandates, vaccination coverage, and exemption rates in the United States. *Open Forum Infect Dis*. 2018;5(6):ofy130. doi:10.1093/ofid/ofy130
6. Alamer F, Alamir A, AlJohani S, et al. Childhood vaccination hesitancy in Saudi Arabia: a time for action. *J Infect Public Health*. 2022;15(1):94–99. doi:10.1016/j.jiph.2021.11.009
7. Alshammari SZ, AlFayyad I, Altannir Y, Al-Tannir M. Parental awareness and attitude about childhood immunization in riyadh, saudi arabia: a cross-sectional study. *Int J Environ Res Public Health*. 2021;18(16):8455. doi:10.3390/ijerph18168455
8. Oldfield BJ, Stewart RW. Common misconceptions, advancements, and updates in pediatric vaccination administration. *South Med J*. 2016;109(1):38–41. doi:10.14423/SMJ.0000000000000399
9. Koslap-Petraco M. Vaccine hesitancy: not a new phenomenon, but a new threat. *J Am Assoc Nurse Pract*. 2019;31(11):624–626. doi:10.1097/JXX.0000000000000342
10. Alghamdi AA, Alghamdi HA. Knowledge, attitude, and practice of vaccination among parents in Jeddah City, Saudi Arabia. *Cureus*. 2023;15(7):e41721. doi:10.7759/cureus.41721
11. Alaamri O, Okmi EA, Suliman Y. Vaccine hesitancy in Saudi Arabia: a cross-sectional study. *Trop Med Infect Dis*. 2022;7(4):60. doi:10.3390/tropicalmed7040060
12. Santos CA, Costa RD, Silva JL, Santos MD, Gomes BL. Conhecimento, atitude e prática dos vacinadores sobre vacinação infantil em Teresina-PI, 2015 [Knowledge, attitude and practice on childhood immunization personnel in Teresina-PI, Brazil, 2015]. *Epidemiol Serv Saude*. 2017;26(1):133–140. doi:10.5123/S1679-49742017000100014
13. Bedford H, Elliman D. Concerns about immunisation. *BMJ*. 2000;320(7229):240–243. doi:10.1136/bmj.320.7229.240
14. Elbert B, Zainumi CM, Pujiastuti RAD, et al. Mothers' knowledge, attitude, and behavior regarding child immunization, and the association with child immunization status in Medan City during the COVID-19 pandemic. *IJID Reg*. 2023;8:S22–6. doi:10.1016/j.ijregi.2023.03.014
15. Makhdzir N, Rashid A, Pien LS, Zaini NH. Mothers' knowledge on immunization and the commitment to get their child immunized in a Suburban Region of Selangor, Malaysia. *Int J Care Scholars*. 2024;7:76–84. doi:10.31436/ijcs.v7i3.375
16. Kyprianidou M, Tzira E, Galanis P, Giannakou K. Knowledge of mothers regarding children's vaccinations in Cyprus: a cross-sectional study. *PLoS One*. 2021;16(9):e0257590. doi:10.1371/journal.pone.0257590
17. Mbonigaba E, Yu F, Reñosa MDC, et al. Knowledge and trust of mothers regarding childhood vaccination in Rwanda. *BMC Public Health*. 2024;24(1):1067. doi:10.1186/s12889-024-18547-1
18. Almutairi WM, Alsharif F, Khamis F, et al. Assessment of mothers' knowledge, attitudes, and practices regarding childhood vaccination during the first five years of life in Saudi Arabia. *Nurs Rep*. 2021;11(3):506–516. doi:10.3390/nursrep11030047
19. Balbir Singh HK, Badgujar VB, Yahaya RS, et al. Assessment of knowledge and attitude among postnatal mothers towards childhood vaccination in Malaysia. *Hum Vaccin Immunother*. 2019;15(11):2544–2551. doi:10.1080/21645515.2019.1612666
20. Dyda A, King C, Dey A, Leask J, Dunn AG. A systematic review of studies that measure parental vaccine attitudes and beliefs in childhood vaccination. *BMC Public Health*. 2020;20(1):1253. doi:10.1186/s12889-020-09327-8
21. Mukhtar AF, Abdul Kadir A, Mohd Noor N, Mohammad AH. Knowledge and attitude on childhood vaccination among healthcare workers in hospital Universiti Sains Malaysia. *Vaccines*. 2022;10(7):1017. doi:10.3390/vaccines10071017
22. Kumar P, Kavinprasad MA. study to assess the parent's knowledge and attitudes on childhood immunization. *Int J Commun Med Public Health*. 2018;5:4845. doi:10.18203/2394-6040.ijcmph20184582
23. Ahmad NA, Jahis R, Kuay LK, Jamaluddin R, Aris T. Primary Immunization among children in Malaysia: reasons for incomplete vaccination. *J Vaccines Vaccin*. 2017;8:358. doi:10.4172/2157-7560.1000358
24. Csima M, Podráczky J, Keresztes V, Soós E, Finánczy J. The role of parental health literacy in establishing health-promoting habits in early childhood. *Children*. 2024;11(5):576. doi:10.3390/children11050576
25. Verger P, Fressard L, Collange F, et al. Vaccine hesitancy among general practitioners and its determinants during controversies: a national cross-sectional survey in France. *EBioMedicine*. 2015;2(8):891–897. doi:10.1016/j.ebiom.2015.06.018
26. Karafillakis E, Dinca I, Apfel F, et al. Vaccine hesitancy among healthcare workers in Europe: a qualitative study. *Vaccine*. 2016;34(41):5013–5020. doi:10.1016/j.vaccine.2016.08.029
27. Elizondo-Alzola U, Carrasco G, Pinós M, L PCA, Rius C, Diez E. Vaccine hesitancy among paediatric nurses: prevalence and associated factors. *PLoS One*. 2021;16(5):e0251735. doi:10.1371/journal.pone.0251735
28. Larson Williams A, Mitrovich R, Mwananyanda L, Gill C. Maternal vaccine knowledge in low- and middle-income countries-and why it matters. *Hum Vaccin Immunother*. 2019;15(2):283–286. doi:10.1080/21645515.2018.1526589
29. Gellin BG, Maibach EW, Marcuse EK. Do parents understand immunizations? A national telephone survey. *Pediatrics*. 2000;106:1097–1102. doi:10.1542/peds.106.5.1097
30. Šeškutė M, Tamulevičienė E, Levinienė G. Knowledge and attitudes of postpartum mothers towards immunization of their children in a Lithuanian tertiary teaching hospital. *Medicina*. 2018;54(1):2. doi:10.3390/medicina54010002

31. Masadeh MM, Alzoubi KH, Al-Azzam SI, Al-Agedi HS, Abu Rashid BE, Mukattash TL. Public awareness regarding children vaccination in Jordan. *Hum Vaccin Immunother*. 2014;10(6):1762–1766. doi:10.4161/hv.28608
32. Abdullah S, Mustafa I. Knowledge and attitude of mothers about children immunization and barriers to adherence the program, in Erbil City. *Erbil J Nurs Midwifery*. 2022;5(1):51–60. doi:10.15218/ejnm.2022.06
33. Jelly P, Jeenwal N, Kumari N, et al. Knowledge, attitude, compliance and barriers of immunization among Parents' of under-five children. *Int J Africa Nurs Sci*. 2023;19:100608. doi:10.1016/j.ijans.2023.100608
34. Bin Alamir AA. Childhood vaccination hesitancy in Saudi Arabia: are we still facing a problem? *Saudi Med J*. 2024;45(6):551–559. doi:10.15537/smj.2024.45.6.2024011