Assessment of Parent's Attitude, Knowledge and Practices Regarding Their Child Vaccination

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Abstract

Vaccination plays a crucial role in primary healthcare services, serving as a cornerstone in the inhibition and regulation of communicable disease outbreaks. In the realm of child health, vaccines contribute to a significant reduction, estimated at 2-3 million deaths annually, caused by infectious diseases. To regulate the parents' attitudes, knowledge, and practices regarding their child's vaccination. A Cross-sectional study design was used to conduct the study at Padhana village. A sample size of 171 participants was recruited. A convenient sampling technique was used in this research for the nurses. A self-administered questionnaire was used to collect the data. SPSS Version 25 was used to analyse the data. The result of the study showed that the majority of 152 (88.9%) parents had a moderate attitude towards vaccination. About 134 (78.4%) had moderate attitudes towards vaccination and 133 (77.8%) parents had competent practices. The study concluded that the majority of parents had a moderate level of attitude and knowledge towards vaccination. The majority of parents had competent practices regarding the vaccination of children.

Keywords: Parents; Attitude; Knowledge; Practices; Child Vaccination

Introduction

Vaccination is a cornerstone of primary healthcare, and crucial for preventing infectious disease outbreaks. It is estimated that vaccines prevent 2-3 million deaths annually among children due to infectious diseases (Nassar et al., 2023). The World Health Organization (WHO) emphasizes the importance of childhood vaccination as part of its strategy to combat vaccine-preventable diseases (Almutairi et al., 2021). Despite the WHO's Global Vaccine Action Plan aiming for a world free from such diseases by 2020, global vaccination coverage of 90% remains unachieved, especially in developing countries (Sell, 2019).

Vaccination remains a cornerstone of primary healthcare, pivotal in preventing infectious disease outbreaks. Over the past five decades, global immunization initiatives have saved at least 154 million lives, with the Expanded Programme on Immunization (EPI) contributing significantly to this achievement. However, recent data indicates a concerning stall in immunization coverage. In 2023, only 84% of children worldwide received the third dose of the vaccine against diphtheria, tetanus, and pertussis (DTP), leaving 2.7 million additional children un- and under-vaccinated compared to pre-pandemic levels in 2019.

This decline in vaccination rates has led to a resurgence of vaccine-preventable diseases. In the United States, measles cases have surged past 700 as of April 2025, more than doubling the total seen in 2024, with Texas reporting the majority at 541 cases across 22 counties. Similarly,

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Pakistan, one of the last two polio-endemic countries, reported 41 cases of wild poliovirus across 71 districts as of October 2024, a significant increase from previous years.
The World Health Organization (WHO) emphasizes the importance of childhood vaccination as a key strategy in combating these vaccine-preventable diseases. Despite the WHO's Global Vaccine Action Plan aiming for a world free from such diseases by 2020, achieving 90% global vaccination coverage has not been met, particularly in developing countries. This shortfall underscores the need for renewed efforts to strengthen immunization programs and address the factors contributing to vaccine hesitancy and access barriers.

Problem Statement

The study "Assessment of Parents' Attitude, Knowledge, and Practice Regarding Their Child Vaccination" investigates parents' attitudes, knowledge levels, and practices regarding childhood vaccinations. It aims to understand parents' perceptions and engagement with vaccination programs, focusing on safety, efficacy, accuracy of information, and compliance with vaccination schedules. This understanding is crucial for developing targeted interventions and educational initiatives to improve vaccination rates and ensure community children's well-being.

Objectives of Study

1. To determine the parents' attitude regarding their child's vaccination
2. To assess the parents' knowledge regarding their child's vaccination
3. To examine the parents' practices regarding their child's vaccination

Significance

Beginning in the neonatal stage, vaccination programs aid in the development of infants' immunity against infectious illnesses. These programs focus on the first 24 months of life in various Middle Eastern countries (Mantel & Cherian, 2020). The parents' attitudes and understanding regarding immunisations are crucial to the success of these programs. Nonetheless, inconsistent opinions regarding vaccination are frequently caused by false information and cultural ideas (Lindstrand et al., 2021). Understanding parents' vaccination-related knowledge, attitudes, and practices (KAPs) requires consideration of factors such parental age, education, and family income (Olayinka et al., 2022). Misconceptions and negative attitudes can cause vaccination delays, which raises the prevalence of diseases that can be prevented by vaccination (Nyasulu et al., 2023).

Methodology

This study assesses parents' KAPs regarding childhood vaccinations in Pakistan and identifies factors influencing their compliance with the National Immunization Program (NIP). A mixed-methods approach will include surveys and interviews to gather quantitative and qualitative data.

Results: The expected outcomes include a deeper understanding of the KAPs of parents concerning childhood vaccinations. The findings will identify barriers to compliance, highlight socio-demographic influences, and reveal common misconceptions.

Conclusion: The study underscores the significant role of parental knowledge and attitudes in vaccination practices. Understanding these factors is vital for developing effective public health interventions aimed at increasing vaccination rates.

Recommendations: To enhance childhood vaccination rates, it is recommended that targeted educational programs be developed, communication channels between healthcare providers and parents be strengthened, and further research be conducted to adapt strategies as needed.

Literature Review

The imperative role of vaccinations in safeguarding children from preventable diseases has long been recognized as a cornerstone of public health. As the global community grapples with ongoing challenges in disease prevention and outbreaks, the assessment of parents' attitudes, knowledge, and practices regarding their child's vaccination emerges as a crucial focus of research. This literature review aims to delve into existing studies that explore the multifaceted aspects of parental attitudes, knowledge, and practices concerning childhood vaccinations. By exploratory the existing physique of literature, this research pursues to classify trends, gaps, and key factors influencing parental decision-making processes related to child vaccination. The insights garnered from this literature review will contribute to a comprehensive understanding of the dynamics surrounding parental involvement in vaccination, thereby informing targeted interventions and public health strategies to enhance immunization rates and overall child health outcomes.

A community-based cross-sectional learning was carried out in Wadla Woreda, North East Ethiopia, to evaluate parents' attitudes, practices, and knowledge about baby vaccinations as well as the factors that affect these features. The study employed a stratified sampling technique and utilized an interviewer-administered structured questionnaire. Findings revealed that 65.1%, 57.3%, and 55.3% of parents demonstrated good knowledge, a favourable attitude, and appropriate practices concerning toddler inoculation, correspondingly. Statistical associations were observed, with factors such as parental educational status, urban residency, frequency of immunization services received, and waiting time influencing parental knowledge. Additionally, parental education, relationship to the child, and prior knowledge of infant immunization were linked to a favourable attitude. Practice was significantly associated with parental education, knowledge about infant immunization, and shorter waiting times. To improve parents' knowledge, attitudes, and behaviours about vaccination and diseases that can be prevented by vaccination, the study suggests focused health education and promotion initiatives (GebreEyesus et al., 2021).

During the COVID-19 pandemic, a descriptive cross-sectional study was carried out in Indonesia to examine parents' vaccination practices, attitudes, and knowledge. Approximately 276 parents participated in the study. According to the survey, the average ratings of parents on their vaccination practices, attitudes, and knowledge for children were 3.59 (0.97) out of 5, 7.22 (1.30) out of 9, and 3.93 (0.31) out of 4. The knowledge scores of university graduates were higher than those of high school seniors (p-value <0.05). Overall, during the COVID-19 pandemic in Indonesia, there was a positive link between participants' knowledge and attitude, knowledge and practice, and attitude and practice towards childhood immunisation (Sinuraya et al., 2022).

In order to evaluate mothers' knowledge, attitudes, and practices about childhood vaccinations over the first five years of their children's lives, a descriptive cross-sectional study was carried out in Saudi Arabia. According to the study, the practice score was 80.5%, the attitude score was 89.1%, and the knowledge score was 86%. Mothers' vaccination-related knowledge, attitudes, and practices did not significantly correlate with their sociodemographic traits ($p > 0.05$). The findings showed that, possibly as a result of their greater educational attainment, the Saudi moms in the sample exhibited sound immunisation practices, positive attitudes, and good understanding. To improve mothers' practices in handling vaccine problems, the study suggests using a variety of educational techniques (Almutairi et al., 2021).

In order to determine the factors impacting parents' knowledge, attitudes, and practices about childhood vaccinations, a descriptive cross-sectional study was carried out in Jordan. The study recruited 1477 people and split Jordan into three regions using a stratified sample technique. The findings showed that while parents are sufficiently aware of the significance of vaccinations (78.7%), they are not as well-informed on side effects (57.5%) and

contraindications (61.8%). While 83% of respondents had negative opinions about vaccine safety, 97% of respondents had positive opinions on the National Immunisation Program. The study suggests the need for enhanced educational interventions by nurses, particularly targeting parents with lower education levels and those residing in rural areas, to improve overall knowledge about children's vaccination (Nassar et al., 2023).

There were 200 participants in a cross-sectional study that evaluated postpartum moms' attitudes and knowledge on vaccination. Using the chi-square test, the results showed statistically significant correlations between vaccine knowledge scores and age, occupation, and education ($p = .031$, $p = .021$, and $p = .013$, respectively). Mothers' knowledge of vaccinations did not significantly correlate with their ethnicity, job status, or delivery method. Attitudes on children vaccination were associated with the occupation, age, and level of education of mothers. More than two-thirds of the moms showed favourable attitudes, even though more than half of them had strong vaccine knowledge levels. The study found that the primary causes of vaccine resistance in Malaysia are religious misconceptions and autism fear (Balbir Singh et al., 2019).

The primary causes of vaccine resistance in Malaysia were found to be religious misunderstandings and autism anxiety. The "Assessment of Parents' Attitude, Knowledge, and Practice Regarding Their Child Vaccination" study's gap analysis highlights the need for a more thorough comprehension of the variables affecting parents' views, particularly during the epidemic.

Gap Analysis

The gap analysis for the study on "Assessment of Parents' Attitude, Knowledge, and Practice Regarding Their Child Vaccination" reveals the need for a deeper understanding of factors influencing parents' attitudes, especially during the pandemic. Further investigation is required to analyse specific educational and workplace elements impacting parental knowledge and practices. Additionally, exploring the nature and strength of correlations between knowledge, attitudes, and practices is essential. The study suggests using multiple educational methods for managing vaccination complications, but details on content and efficacy are lacking. Addressing these gaps will contribute to more targeted interventions for enhancing child vaccination outcomes

Materials and Methods

Study Design

Padhana hamlet served as the study's subjects and was the site of a quantitative, descriptive, cross-sectional correlation investigation.

Sample and Setting

The study used an expedient sampler procedure to collect data from a population of 171 with a five percent margin of error. The subsequent standards were used to determine the sample extent: age range of 20 to 50, parents, both male and female, and willingness to give informed consent, and those not willing to participate. Exclusion criteria included those not willing to participate or having any psychological disorder.

The study used a cross-sectional research design, selecting a representative sample of undergraduate students and obtaining informed consent. A structured questionnaire was administered through survey. The data collection tools included a demographic data tool, an attitude questionnaire, a knowledge questionnaire, and a practice questionnaire. The demographic survey gathered data on number of children, age, gender, and educational attainment. The attitude questionnaire measured participants' attitudes towards vaccination using a 3 point Likert scale. The knowledge questionnaire assessed parents' awareness of child

vaccination, with 12 questions and a total score of 0 to 12. The practice questionnaire assessed parents' practices regarding child vaccination, with 4 questions and a total score of 0 to 4. The tools were found to be trustworthy, possessing a gratified cogency catalog of 0.801, content validity index of 0,789, and gratified legitimacy catalog of 0.79 respectively. The attitude, knowledge, and practices tools were found to be reliable, with a reliability coefficient of 0.84, 0.801, and 0.78 respectively. The study's reliability was confirmed by the content validity index and the reliability of the attitude, knowledge, and practices tools.

Ethical Considerations

- Inscribed conversant consent was obtained from all individuals.
- All data and information gathered was kept strictly secret.
- Contestants was kept anonymous during the study.
- The participants were informed that there are no drawbacks or hazards to the study during the effective intervention of external ventricular drain care guidelines on nursing practice and patient issues.
- They were told that they might leave the study at any time

Data Analysis Procedure

The most recent version of the Statistical Package for Social Sciences (SPSS) 25 was used to analyses the statistics. Frequencies and percentages were premeditated for participant knowledge, attitude, and practice score as well as demographic characteristics. The mean and standard deviation were calculated for the knowledge score.

Results

This chapter includes results related to demographic characteristics, knowledge, attitude, and practices of parents regarding vaccination.

Table 1: Demographic characteristic of Parents

Variable	Categories	Frequency	Percentage
Age	21-30	107	62.6
	31-40	64	37.4
Education Level	Primary School	66	38.6
	Secondary School	32	18.7
	College	73	42.7
No of Children	1	33	19.3
	2	40	23.4
	>2	98	57.3

Table 1 describes the demographic characteristics of the parents who participated in the study, reveals that 62.6% of parents are aged 21-30, with 37.4% aged 31-40. Education levels range from 38.6% to 42.7%, and the number of children varies from 19.3% to 57.3%.

Table 2: Parents Attitude Towards Vaccination

Statements	Beneficial F (%)	No beneficial F (%)	I don't know F (%)
What do you think about vaccination benefits?	128(74.9%)	17 (9.9%)	26(15.2)
What do you feel when vaccinating your child?	133 (77.8%)	17 (9.9%)	21 (21.3)
Are you in favor of obligatory vaccination programs designed by the health authorities?	133 (77,8%)	29 (17%)	9 (5.3)
Will your advice your relatives and family to immunize their child	134 (77.8%)	20 (11.7%)	17 (9.9%)

Table 2 provides a comprehensive overview of parents' attitudes towards vaccination, 74.9% of respondents are positive about vaccine benefits, 77.8% believe vaccination is beneficial for their child, and 77.8% think it's beneficial to advise relatives and family.

Table 3: Overall Attitude of Parents towards Vaccination

Patient Attitude	Frequency	Percentage
Poor Attitude	19	11.1
Moderate Attitude	152	88.9

Table 3 presents the overall attitude of parents towards vaccination, categorized into two groups: The study found that 42.1% of parents had a poor attitude towards vaccination, while 57.9% had a moderate attitude, indicating a significant distribution of parental attitudes.

Figure 1:Total Attitude of parents

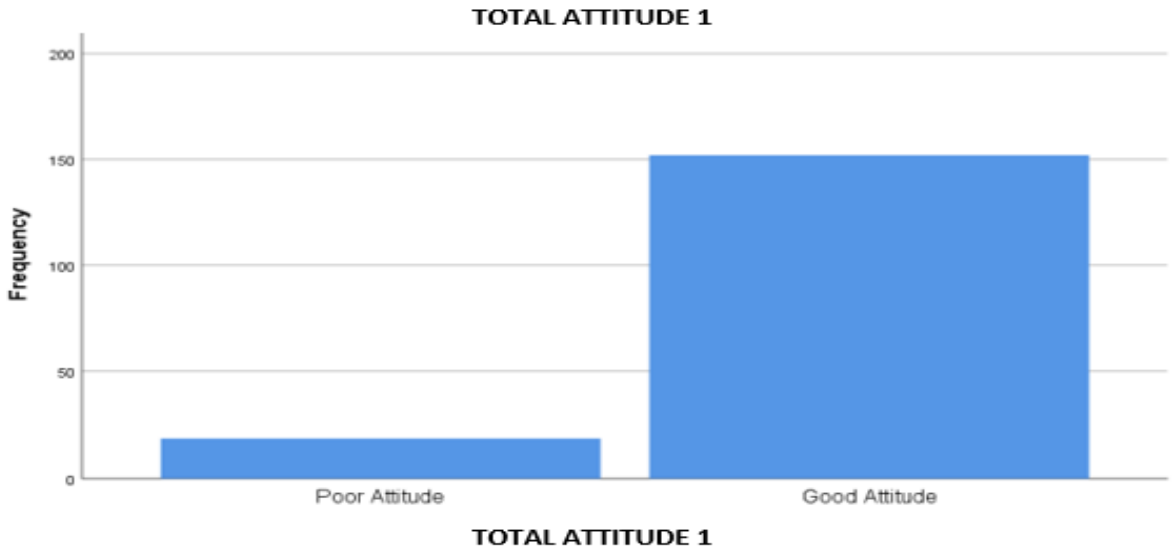

Table 4: Knowledge of Parents towards Vaccination

Statements	No F(%)	Yes F (%)
Have you given your children the obligatory vaccines	9 (5.3)	162 (94.7)
Vaccination is very important for children from the first day of birth	9 (5.3)	162 (94.7)
Vaccination prevent infectious disease	8 (5.3)	163(94.7)
Vaccination decreases the rates of mortality and disabilities	10 (5.8)	161(94.2)
Vaccination could maintain child health	28 (16.4)	143(83.6)
Diphtheria, Tetanus and pertussis could be controlled by vaccination	29 (17)	142(83)
Hepatitis B virus could be prevented by vaccination	28 (16.4)	143(83.6)
The childhood vaccines could control Measles	19 (11.1)	152(88.9)
Malnutrition, low fever and diarrhea are not contraindications for vaccination	16 (9.4)	155(90.6)
Some vaccines are associated with fever and pain	21 (12.3)	150(87.7)
Vaccination could result in convulsions and skin rash	129(75.4)	42 (24.6)
Even healthy child need vaccination	28(16.4)	143(83.6)

Table 4, The study evaluates parental knowledge about vaccination, finding that 94.7% of parents recognize the status of vaccination from birth and its role in averting infectious diseases. 94.2% understand vaccination reduces mortality and disabilities, while 83-89% are aware of its benefits. However, 75.4% believe vaccination can cause convulsions and skin rash, and 83.6% agree that healthy children need vaccination.

Table 5: Overall knowledge of parents

Patient Knowledge	Frequency	Percentage
Poor Knowledge	37	21.6
Average Knowledge	134	78.4

Table 5 shows that 21.6% of parents have average knowledge about vaccination, while 78.4% have average knowledge, indicating a majority of parents have good understanding.

Figure 2:Total Knowledge of parents

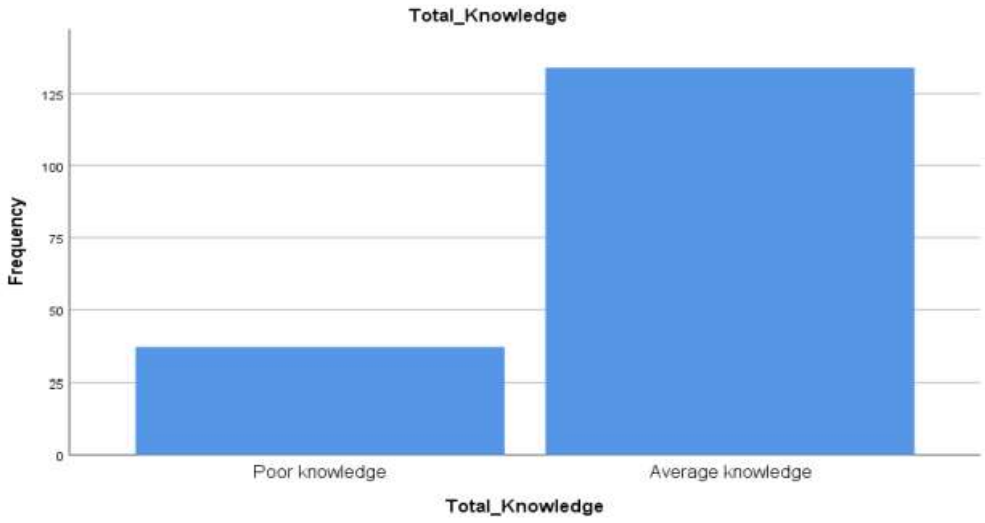

Table 6: Practices of Parents towards Vaccination

Statements	No F(%)	Yes F (%)
Do you follow the obligatory vaccination program?	22(12.9)	149(87.1)
Will you search other available vaccines for your child?	168 (98.2)	3 (1.8)
Will you accomplish swelling by cold compress?	14 (8.2)	157(91.8)
Will you use an aesthetics for swelling and pain after vaccination	39(22.8)	132(77.2)

Table 6 shows that 87.1% of parents follow the mandatory vaccination program, 98.2% actively search for alternative vaccines, and 91.8% manage post-vaccination swelling with cold compresses and analgesics.

Table 7: Overall Practices of Parents

Patient Practices	Frequency	Percentage
Incomplete Practices	38	22.2
Competent Practices	133	77.8

Table 7 evaluates the vaccination practices of parents through a series of statements, indicating their responses with corresponding frequencies and percentages. The data reveals that a significant majority of parents (77.8%) have competent practices and 22.2% had incompetent practices.

Figure 3: Total Practices of parents

Discussion

This section discusses parents' knowledge, attitudes, and practices towards immunising their children. This chapter focusses on comparing the findings of the current study with those of earlier and ongoing investigations.

Rendering to the fallouts of the current study, most contestants had a moderate attitude on vaccination. The findings of the study "Assessment of Parents' Perceptions of Childhood Immunisation: A Cross-Sectional Study from Pakistan" are consistent with this conclusion. by (Hussain et al., 2021), which also reported that the majority of participants had a moderate attitude towards vaccination. Similarly (Bukhsh et al., 2018) found that most parents had a positive attitude towards vaccination. Additionally, research by (Saeed & Hashmi, 2021) supported these findings, reporting that the majority of parents held a positive attitude towards vaccination. Consistent with these studies, a study conducted in Multan by (Ijaz et al., 2019) revealed that 92% of parents had a positive attitude towards vaccination. These consistent findings across various studies suggest that while many parents recognize the importance of vaccination, there remains a significant portion who may still harbour moderate reservations, possibly due to concerns about vaccine safety, misinformation, or lack of comprehensive understanding. Furthermore, a study conducted at Pak Emirates Military Hospital Rawalpindi by (Ateeq et al., 2022) also supported this finding. These consistent findings across various

studies suggest that while many parents recognize the importance of vaccination, there remains a significant portion who may still moderate reservations, possibly due to concerns about vaccine safety, misinformation, or lack of comprehensive understanding.

In terms of parents' knowledge about vaccination, the current study unveiled that the majority exhibited average level of children's vaccination. This observation resonates with the findings of Ateeq et al. (2022), who similarly noted an average level of knowledge among patients, with 2390% demonstrating proficiency in vaccination-related matters. Additionally, Hussain et al. (2021) corroborated these findings, reporting a strong grasp of vaccination concepts among their study participants.

Conversely, a study conducted in Nawab Shah Karachi by Memon et al. highlighted a concerning trend of poor knowledge among participants regarding vaccination for their children. This discrepancy underscores the regional variations or disparities in vaccination awareness and emphasizes the need for targeted educational interventions in certain areas to bridge knowledge gaps and improve vaccination uptake.

Furthermore, Sinuraya et al. (2022) echoed similar concerns, identifying widespread deficiencies in parental knowledge regarding vaccination. Such findings underscore the critical importance of comprehensive understanding among parents, as it not only empowers them to brand conversant verdict sound their children's healthiness but also fosters trust in vaccination programs and healthcare providers.

By juxtaposing these studies, it becomes evident that while some regions or populations exhibit strong knowledge and positive attitudes towards vaccination, others face challenges characterized by inadequate awareness and misconceptions. Addressing these disparities through targeted educational campaigns, community engagement, and healthcare initiatives can contribute significantly to improving vaccination coverage and ultimately safeguarding public health.

The current study's findings regarding the commendable vaccination practices among the majority of parents had competent practices. Ateeq et al. (2022) also noted positive practices among a significant proportion of patients, indicating a proactive approach towards vaccination. This consistency across studies underscores a widespread commitment among parents to ensure their children receive timely and appropriate vaccinations.

Moreover, Hussain et al. (2021) documented similar positive practices among parents, suggesting a growing trend towards responsible vaccination behaviours. These findings may reflect increasing awareness campaigns, improved access to healthcare services, and strengthened vaccination infrastructure, all contributing factors to enhanced parental engagement in vaccination practices.

The fallouts of the current study are unswerving with those of earlier studies, suggesting that parents continue to adopt healthy vaccination habits over time. This consistency points to a persistent effort on the part of communities and healthcare authorities to support vaccination as a key component of preventive healthcare. It also emphasises how successful continuing education programs are at equipping parents with the material and gears they necessity to variety astute verdicts apropos their kids' health.

The findings of the current study reveal that while many parents exhibit positive vaccination practices, there are still significant barriers that affect their knowledge and attitudes towards immunization. A moderate attitude towards vaccination was observed, likely influenced by concerns about vaccine safety, misinformation, and a lack of comprehensive understanding. Misinformation circulating through social media and local networks can amplify fears, and in regions with limited access to healthcare professionals or educational resources, these concerns are not adequately addressed (Hussain et al., 2021). Additionally, cultural or historical mistrust of healthcare systems may further contribute to hesitancy (Saeed & Hashmi, 2021). Despite these challenges, positive vaccination practices are often encouraged by community norms,

increased awareness through vaccination campaigns, and the visible benefits of immunization, such as the prevention of disease outbreaks (Ijaz et al., 2019).

In terms of knowledge, most parents demonstrated average understanding of vaccination, which could be attributed to the uneven distribution of health education. Parents in rural or underserved areas may face difficulties accessing accurate information, leading to gaps in their understanding of vaccine schedules and benefits (Ateeq et al., 2022). Furthermore, the lack of clear communication from healthcare providers and limited healthcare infrastructure in some regions exacerbate this issue (Memon et al., 2021). However, many parents still make responsible vaccination decisions due to increased accessibility to healthcare services and vaccination programs, as well as growing awareness (Bukhsh et al., 2018). To address the remaining barriers, it is crucial to implement targeted educational campaigns and improve healthcare access, particularly in areas where misinformation and logistical obstacles hinder vaccine uptake (Sinuraya et al., 2022).

Conclusion

This study provides insights into parental attitudes, knowledge, and practices regarding vaccination. The majority of parents showed positive attitudes, with a moderate attitude prevailing. Knowledge levels were generally high, with parents demonstrating awareness of vaccination benefits and safety. Practices were also positive, with most parents adhering to obligatory vaccination programs and seeking additional vaccines for their children. Addressing knowledge gaps and promoting positive attitudes can further enhance vaccination uptake and contribute to public health efforts.

Recommendations

To enhance vaccination rates and address existing gaps, it is essential to implement targeted educational programs that focus on improving knowledge and correcting misconceptions about vaccination. Fostering community dialogue and engagement can promote positive attitudes towards vaccination, while providing easily accessible resources and information will support informed decision-making among parents. Additionally, equipping healthcare providers with the necessary skills and resources will enable them to communicate effectively with parents about vaccination. It is also vital to tailor vaccination messaging and initiatives to be culturally sensitive and inclusive. Advocacy for policies that support vaccination uptake, such as legislation mandating vaccination for school enrolment and workplace requirements, is crucial. Finally, encouraging further research to explore additional factors that influence parental attitudes and practices towards vaccination will contribute to more effective strategies in the future.

References

- Ateeq, S., Basheer, F., & Javaid, M. S. (2022). Knowledge attitude and practice towards primary immunization in Pakistani parents; A hospital based study. *Pakistan Armed Forces Medical Journal, 72*(S316-319).
- Bukhsh, A., Rehman, H., Mallhi, T. H., Ata, H., Rehman, I. U., Lee, L.-H., Goh, B.-H., & Khan, T. M. (2018). Parents' attitude, awareness and behaviour towards influenza vaccination in Pakistan. *Human Vaccines & Immunotherapeutics, 14*(6), 952-957.
- Hussain, A., Zahid, A., Malik, M., Ansari, M., Vaismoradi, M., Aslam, A., Hayat, K., Gajdács, M., & Jamshed, S. (2021). Assessment of parents' perceptions of childhood immunization: A cross-sectional study from Pakistan. *Children, 8*(12), 1007. https://doi.org/10.3390/children8121007

- Ijaz, B., Javed, R., Iqbal, S., Yousaf, R., & Raza, A. (2019). Knowledge, attitude & practices among parents living in urban areas of Multan about routine vaccination of their children under five years of age. *JNMU, 2*(1), 9-14.
- Lindstrand, A., Cherian, T., Chang-Blanc, D., Feikin, D., & O'Brien, K. L. (2021). The world of immunization: Achievements, challenges, and strategic vision for the next decade. *The Journal of Infectious Diseases, 224*(Suppl_5), S452-S467. https://doi.org/10.1093/infdis/jiab350
- Memon, M. A., Ali, M. F., Khaskheli, M. I., & Shaikh, F. M. (2021). Knowledge, attitude and practices towards childhood vaccination in Karachi, Pakistan. *Pediatrics and Therapeutics, 11*(2), 45-50.
- Nassar, O., Alshahwan, S., Alshahwan, R., Halasa, S., Alashhab, S., & Alnajar, M. (2023). Determinants of parents' knowledge, attitudes, and practices toward childhood vaccination: A national study. *The Open Nursing Journal, 17*, 56-65. https://doi.org/10.2174/1874434602317010056
- Saeed, R., & Hashmi, I. (2021). Pakistan ranks third globally with the most unvaccinated children: Is the impact of parental perception and attitude on immunization an essential contributing factor to an unsuccessful vaccination coverage? *Cureus, 13*(4), e14529. https://doi.org/10.7759/cureus.14529
- Sinuraya, R. K., Kusuma, A. S., Pardoel, Z. E., Postma, M. J., & Suwantika, A. A. (2022). Parents' knowledge, attitude, and practice on childhood vaccination during the COVID-19 pandemic in Indonesia. *Patient Preference and Adherence, 16*, 105-112. https://doi.org/10.2147/PPA.S343517