

# Childhood vaccination hesitancy in Saudi Arabia: are we still facing a problem?

## A narrative review

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### ABSTRACT

تعد اللقاحات أحد التدخلات الصحية الحاسمة للوقاية من الأمراض. ومع ذلك، فقد برز التردد بشأن التطعيمات باعتباره مصدر قلق ملحًا على الصحة العامة. الهدف من هذه المراجعة هو التعرف على مدى انتشار وأسباب التردد في تطعيم الأطفال في المملكة العربية السعودية. تم عمل مراجعة سردية، ومسح العديد من قواعد البيانات، بما في ذلك PubMed، وPubMed Central، وScopus، وGoogle Scholar، والمجلات الإقليمية ذات الصلة. لاختيار الدراسات المتعلقة بانتشار وأسباب التردد في التطعيمات. بعد إزالة الدراسات المكررة وفحص مدى ملاءمة الدراسات والتي تسمح بالوصول إلى النص الكامل. استوفت 18 مقالة بحثية معايير الاختيار النهائية. أظهر انتشار عزوف الوالدين عن التطعيم في المملكة العربية السعودية تباينًا كبيرًا؛ تتراوح بين 3.1-72.2%. المخاوف بشأن الآثار الجانبية للتطعيم ظهر كسبب رئيسي للتردد في تلقي التطعيم. وخلصت المراجعة إلى أن العديد من الوالدين ما زالوا يترددون في تطعيم أطفالهم. وهم يعتقدون أن الآثار الضارة المحتملة للتطعيم تفوق الفوائد الوقائية ضد الأمراض.

Vaccination is a crucial public health intervention for infection prevention. Yet, vaccine hesitation has emerged as a pressing public health concern. The objective of this review is to identify the widespread and causes of vaccine hesitancy prevalence among parents of children in Saudi Arabia. A narrative review, surveying several databases, including PubMed, PubMed Central, Scopus, Google Scholar, and relevant regional journals. We selected studies related to vaccine hesitancy prevalence and causes after removing duplicates and screening for relevance and access to full text. A total of 18 articles met the final selection criteria.

The prevalence of parental vaccination reluctance in Saudi Arabia shown significant variability; ranging from 3.1-72.2%. Concerns regarding vaccine side effects appeared as the foremost reason for vaccine hesitancy. The review concluded that numerous Saudi Arabian parents still hesitate to vaccinate their children. They believe the potential adverse effects of vaccination outweigh the protective benefits against diseases.

**Keywords:** vaccine hesitancy, parents, vaccine-preventable diseases, Saudi Arabia

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Immunization is considered a cost-effective method for reducing illness-related deaths and diseases. However, vaccine hesitancy threatens this effort and overall public health globally.<sup>1</sup> The World Health Organization's (WHO) strategic advisory group of experts on immunization defines vaccine hesitancy as "a delay in acceptance or refusal of vaccines despite the availability of vaccination services".<sup>2</sup>

Vaccine acceptance is a complex topic that depends on various factors, including location, time, social status, and community.<sup>3-6</sup> Various reasons contribute to hesitancy towards vaccines - past vaccination experiences, concerns regarding safety and side effects, doubts regarding the vaccine's efficacy, mistrust in the healthcare system, and questions regarding government funding for vaccinations. Since children are more prone to contracting infectious diseases due to their undeveloped immune systems and lack of exposure, it underscores the importance of child immunization.<sup>7-9</sup> Therefore, many countries administer immunization programs against common infectious diseases in children. However, children under 12 are currently ineligible for vaccinations, and vaccine hesitancy and rejection are prevalent issues in multiple countries. Convincing parents to vaccinate their children often proves challenging due to health concerns.<sup>10</sup>

Although Saudi Arabia's healthcare system has made great progress, vaccine hesitancy continues to hinder

the achievement of optimal immunization coverage. Since 1984, the nation has implemented comprehensive immunization policies, reducing child mortality and morbidity rates caused by vaccine-preventable diseases (VPDs).<sup>11</sup> However, like other developing countries, Saudi Arabia faces challenges ensuring that every child receives complete vaccination due to limited access for healthcare within remote and rural areas, societal stigmas, and low parental literacy rates.<sup>12,13</sup> Understanding the reasons for parents' hesitation towards vaccines is crucial for developing effective interventions as, in some areas, up to 20% of children lack all recommended vaccinations.<sup>14</sup>

In order to safeguard their children from VPDs, parents need to have a solid understanding of immunizations and a positive attitude towards these practices.<sup>15</sup> Various factors contribute to low immunization compliance; such reasons include parental mistrust of paediatricians, concerns on side effects, anti-government sentiment, and religious beliefs.<sup>16-18</sup>

Furthermore, factors like governmental distrust, absence of insurance, perceiving diseases as irrelevant, and doubts on vaccine effectiveness significantly impact immunization non-compliance.<sup>19</sup> In a vast nation like Saudi Arabia, socioeconomic and geographical variables may further explain differing immunization rates across regions.<sup>20</sup>

This review examines vaccine reluctance among Saudi Arabian parents. It highlights its occurrence and the contributing factors to guide public health initiatives and policy-making. The study seeks to evaluate the prevalence of vaccine reluctance, identify the underlying reasons behind it, and examine possible measures to tackle and alleviate this problem. By comprehending the factors contributing to vaccine hesitancy, the study seeks to offer significant insights for policymakers, healthcare providers, and public health authorities to develop targeted strategies aimed at improving vaccination acceptance and coverage rates among children in Saudi Arabia.

**Literature search strategy.** A literature review was carried out to explore vaccine hesitancy among parents in Saudi Arabia. Electronic databases, including Scopus, PubMed, and regional journals, were systematically searched with the following search terms: “vaccine

hesitancy”, “parental attitudes”, “immunization”, and “Saudi Arabia”. Boolean operators (AND, OR) were used to combine search terms effectively. The search strategy aimed to identify relevant studies on parental attitudes towards childhood vaccination in Saudi Arabia. Appropriate “field tags” and “truncation items” as well as “Mesh words” were used to search the literature. Only sources from 2010-2023 were included. This time frame for inclusion of sources was selected to ensure relevance and currency of the literature. This period encompasses the most recent developments and trends in vaccine hesitancy research in Saudi Arabia, providing a current understanding of the issue.

Gray literature sources, such as reports, conference proceedings, and theses, were not considered in this review. While these sources can provide valuable insights, focusing solely on peer-reviewed literature ensured a higher level of rigor and quality in the included studies.

We included studies that analyzed Saudi Arabian parents' views on childhood vaccination, reasons for reluctance, and associated factors. Both quantitative and qualitative research were considered. However, we excluded articles addressing vaccine hesitancy in different age groups, populations, or regions, as well as those focusing on hesitancy towards a specific vaccine, these were excluded to maintain consistency and focus.

**Reporting guidelines.** The review adheres to the “Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)” guidelines for transparent reporting. The flowchart presented in **Figure 1** outlines the selection process of articles for review, enhancing transparency and reproducibility of the study methodology.

**Quality assessment.** This narrative review did not specifically assess the quality of the included research. However, the selection of studies was based on their connection to the study question as well as the reliability of the publications in which they appeared. Future systematic reviews may include quality evaluation methods like the “Newcastle-Ottawa Scale for observational studies and the Critical Appraisal Skills Programme (CASP)” checklist for qualitative research.

**Data extraction and synthesis.** We extracted information from the chosen studies, including study design, sample size, demographics, vaccine hesitancy prevalence, and key themes of parental concerns. We included both quantitative and qualitative data to offer a comprehensive understanding of vaccine hesitancy in Saudi Arabia. This synthesis involved grouping data into common themes and finding patterns to gain significant insights.

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A standardized extraction form was used to extract and compile the required data from chosen studies included study design, sample size, demographics, vaccine hesitancy prevalence, and key themes of parental concerns. From this strategy, future reviews may also benefit from employing a standardized extraction form to ensure consistency and completeness in data extraction.

Bias mitigation strategies were employed throughout the review process. This included systematic search strategies, clear inclusion and exclusion criteria, and transparent reporting of the selection process. Additionally, ethical considerations were addressed by focusing on studies with appropriate informed consent and ethical approval.

**Ethical considerations.** In compliance with ethical guidelines, the review focused on studies that obtained informed consent and ethical approval. Emphasizing participants' rights and confidentiality, studies without appropriate ethical supervision were eliminated.

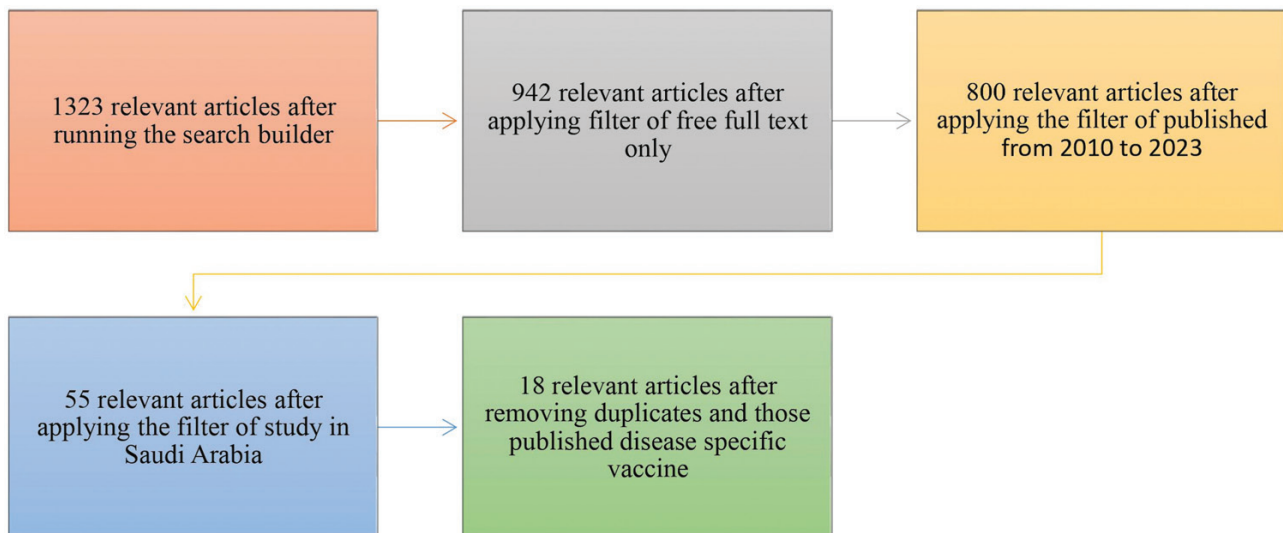
**Literature review.** We carried out a thorough review of 18 research articles that met the selection criteria. These articles discussed vaccine hesitancy among parents concerning their children's vaccinations. The results from multiple studies across different regions of Saudi Arabia show a complex picture of parental vaccine hesitancy. Despite differing times and methodologies, these studies uniformly underscore the concerns and elements swaying parental attitudes towards childhood vaccination. **Table 1** presents each study's key findings and publication year.

The articles reviewed for this study reveal a significant variation in vaccine hesitancy, from as low as 3.1% in a 2023 study to a high of 72.2% in a 2022 study (**Figure 2**).

Among parents, the most prevalent factors causing vaccine hesitancy are pertaining to having fears of side effects and doubt regarding vaccines efficacy. Fear of potential adverse effects is a major driver of this hesitancy, often coupled with concerns over the safety and effectiveness of vaccines. Misinformation, especially spreading via social media, significantly contributes to these worries. Factors like age, education level, income, and religious beliefs can also affect vaccine acceptance, underscoring the importance of personalized intervention strategies.

Surprisingly, the demographic between 30-39 years showed a higher hesitancy towards vaccination, suggesting some generational factors at play. Information sources also played a crucial role, with social media being a troublesome medium. In one study, up to 40% of parents who used social media for vaccine information showed increased hesitancy.

Despite these concerns, a notable percentage of parents, ranging from 83.4-89.3%, recognized the safety and effectiveness of vaccines within Saudi Arabia's policy-making framework. This observation underscores the intricate relationship between awareness and acceptance. Notably, the coronavirus disease-19 (COVID-19) pandemic had a significant impact on vaccine beliefs, with over half of the parents admitting that it influenced their perspectives regarding the importance of vaccinations.



**Figure 1** - Flowchart of selection of articles for review.

**Table 1** - Summary of the research articles included in the review (N=18).

Authors	Design of the study	Place of study	Sample size	Prevalence of vaccine hesitancy	Factors influencing vaccine hesitancy
Alzaharani et al <sup>21</sup>	Cross sectional		301	40.0%	Worries regarding adverse reactions, believing that vaccines are unsafe, and believing that fewer shots are required.
Rehman et al <sup>22</sup>	Cross sectional		1478	51.6%	Vaccines would affect their kids' ability to conceive or reach puberty.
Iqbal et al <sup>23</sup>	Cross sectional	Central Saudi Arabia	1507	34.4%	Fear of adverse consequences.
Majzoub et al <sup>24</sup>	Cross sectional	Eastern Province	399	35.0%	Fear of adverse effects, scepticism regarding vaccine efficacy, exposure to harmful information on the vaccine.
Ashour et al <sup>25</sup>	Cross sectional	Riyadh	293	Positive: 78.0% vaccinated	Delayed vaccination until mandatory (40.0%), concerns on side effects (unknown percentage), perception of need for the vaccine.
Alhuzaimi et al <sup>26</sup>	Cross sectional	Saudi Arabia	873	High acceptance (96.9%)	Inadequate information on vaccine safety (48.0%) and side effects concerns and fears (49.0%).
Almuqbil et al <sup>27</sup>	Cross sectional	Riyadh	699	33.0% hesitant, 25.0% undecided	Apprehensions over adverse reactions (31.4%), an absence of safety information (31.2%), and data from social media (24.3%).
Albaker et al <sup>28</sup>	Cross sectional	Saudi Arabia	90	18.8% extremely confident	Physician factors: confidence in vaccine-specific knowledge (18.8%), communication skills (22.2%), challenges in vaccine discussions.
Almalki et al <sup>29</sup>	Cross sectional	All regions	4135	61.9%	Parents had views that the vaccination had limited benefits or was hazardous.
Almansour et al <sup>30</sup>	Cross sectional		500	42.2%	Fear of adverse consequences.
Alaamri et al <sup>31</sup>	Descriptive observational mixed method	Saudi Arabia	2030	Low hesitancy (91% agreement)	Emotional, cultural, social, spiritual, and political aspects; lack of information; and misinformation.
Aedh et al <sup>32</sup>	Cross sectional	Riyadh	464	72.2% hesitancy	Demographic factors: age, education, income, occupation; concerns on side effects, lack of safety data, social media influence.
Khatatbeh et al <sup>33</sup>	Cross sectional (multi country survey)	Saudi Arabia, Qatar, Iraq, Jordan, Kuwait, Lebanon, Palestine, and the United Arab Emirates	3744	Positive: 32% vaccinated	The primary concern (32.5%) is vaccine safety. Factors to consider include the age of the parents, their educational background, their work, vaccination status, and whether they have had a previous COVID-19 infection.
Aldakhil et al <sup>34</sup>	Cross sectional	Not specified	270	24.31% hesitant	Concerns on side effects (50.0%)
Alnasser et al <sup>35</sup>	Cross sectional	Riyadh	119	31% reluctant to get vaccinated	Familiarity with vaccine hesitancy (66.0%), lack of formal training (68.0%), and negative attitudes toward hesitant parents (65.0%)
Alsubaie et al <sup>36</sup>	Cross sectional	Saudi Arabia	500	20.0%	Fear of adverse reactions and doubts on the efficacy of vaccination.
Albarakati et al <sup>37</sup>	Cross sectional		100	31.3%	Vaccine shortages in primary care settings, anxiety regarding side effects and vaccine safety, and congested immunization schedules.
Alqahtani et al <sup>38</sup>	Cross sectional	Aseer Region	796	3.9% non-adherent	The majority of individuals expressed side effects concerns (93.8%), hold the idea that immunizations are not entirely safe (84.4%), and believe that less vaccines are necessary (78.1%).

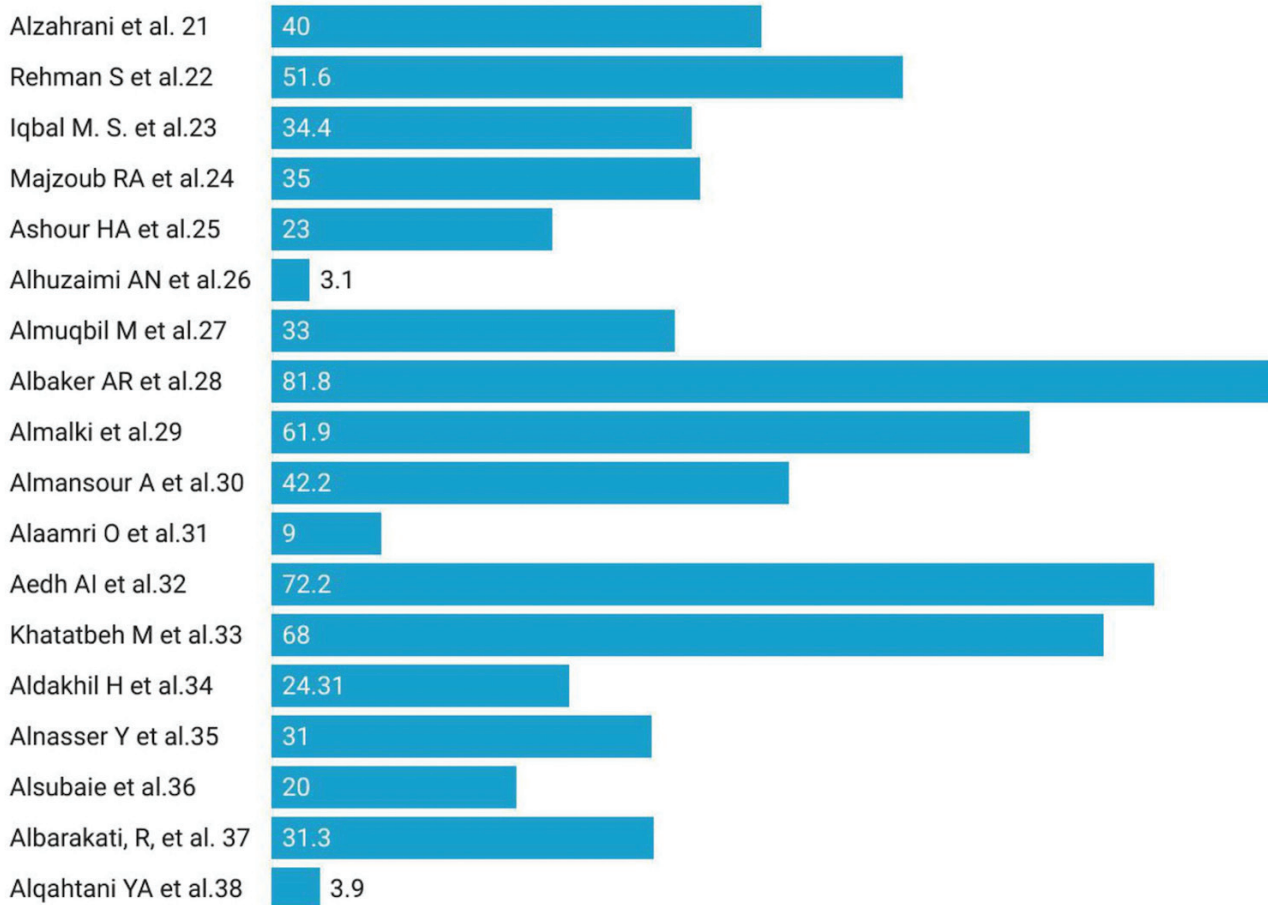
Common reasons for vaccine hesitancy include concerns on side effects, which studies have found range from 40%-93.8%.

**Understanding and insight.** The advantages of vaccines are generally well-understood, though some research does not provide this data. Knowledge regarding particular vaccines, such as COVID-19, fluctuates. Some research shows a positive attitude and substantial knowledge, while other reports emphasize safety concerns due to insufficient data (Table 2).

The COVID-19 pandemic significantly impacted vaccine beliefs, with over half the parents acknowledging its influence on their perceptions of vaccination importance.

**Research insights and existing gaps.** Vaccine hesitancy is the act of being hesitant or refusing to receive vaccinations, even when vaccines are readily available. This continues to be a significant global issue. In Saudi Arabia, the most common traits among hesitant parents are low educational levels, scepticism on the scientific





**Figure 2** - Graphical presentation of the prevalence of parental vaccine hesitancy in Saudi Arabia based on several studies.<sup>21-38</sup>

evidence supporting vaccines, and insufficient health education. Various studies have investigated the causes behind this reluctance in different population groups.<sup>30</sup> The primary global barrier to vaccine acceptance is indeed vaccine hesitancy. Factors contributing to this reluctance include past experiences with vaccination, concerns on side effects, doubts on safety and efficacy, trust in the healthcare system, and the availability of free vaccines from the government.<sup>39</sup>

In a separate investigation by Rehman et al,<sup>22</sup> it was found that out of 1,478 participants, 40% believed children were more susceptible to vaccines than adults. Contrastingly, 38% expressed no concerns. Approximately 13% of children in the study sample had not received any vaccinations. More than 50% of respondents expressed reluctance on child vaccination, while only approximately 35% were willing. Furthermore, only 16% thought vaccinations could alter their children's DNA. Women serving in the healthcare sector and those with higher educational

qualifications exhibited increased odds ratios. This study concludes that effective parent education programs promoting healthcare knowledge should be established and implemented. This could serve as viable input in formulating strategies to mitigate barriers in ongoing immunization initiatives, potentially immunizing more children and curbing the pandemic's adverse impacts. Parents frequently show concern on vaccination safety and potential side effects. The alleged correlation between Mumps, Measles, and Rubella (MMR) immunizations and autism has significantly contributed to vaccine reluctance in the past, generating a considerable amount of anxiety.

In a study carried out by Alsubaie et al,<sup>36</sup> 500 parents were surveyed. Among them, 20% expressed reservations on vaccinating their children. It was found that parents with higher levels of education exhibited a greater tendency to show this hesitancy ( $p < 0.001$ ). Furthermore, among the parents reluctant to vaccinate, 36% had not fully vaccinated their children

**Table 2** - The studies carried out in different regions of Saudi Arabia on awareness among the participants.

Authors	Awareness among the participants
Alqahtani et al <sup>21</sup>	High awareness: 89.3% of respondents agreed that vaccinations are useful in maintaining the health of children, while 84.2% expressed confidence in vaccines safety and efficacy. Additionally, 83.4% of participants acknowledged the effectiveness of Saudi Arabia's immunization program according to its established schedule.
Alzahrani et al <sup>22</sup>	Influenced by COVID-19 (52.5%), sources: physicians (34.9%), online sources (27.9%), and social networking sites (16.6%).
Ashour et al <sup>25</sup>	Knowledge: 45.0% had excellent knowledge of COVID-19 vaccine, 62.0% had a positive attitude.
Almuqbil et al <sup>29</sup>	Knowledge: 45.0% excellent, 62.0% positive attitude; concerns: side effects (31.4%), lack of safety data (31.2%).
Aldakhil et al <sup>30</sup>	Importance of vaccine (79.0%), intention to vaccinate against COVID-19 (24.0%).

as recommended for their age. The prevalent concern, stated by 53% of these hesitant parents, was the safety of vaccines. The data suggests a link between children's inadequate vaccination status and parental hesitations or negative attitudes towards vaccines. The 2 dominant beliefs associated with parents' reluctance and the under-vaccination of their children were perceptions of vaccines as unnecessary and ineffective.

A study in the Aseer Region, Saudi Arabia, reported a low non-adherence rate of 3.9%, indicating a largely positive attitude towards child vaccination. However, despite the high adherence, the study noted parental vaccine hesitancy, underlining the importance of a nuanced understanding of attitudes and concerns.<sup>38</sup>

In contrast, the study that utilized the Parent Attitudes On Childhood Vaccines (PACV) questionnaire reported a median PACV score of 23.3 out of 100, signifying a heightened level of vaccine hesitancy. Particularly noteworthy was the impact of COVID-19 on parental beliefs, as over half of the parents indicated a shift in their views due to the pandemic.<sup>21</sup>

A study in the Eastern Province on the COVID-19 vaccine for children between 5-12 years old showed a satisfactory vaccination rate. However, it also underscored worries on side effects and doubts over the vaccine's efficacy, factors significantly contributing to vaccine hesitancy. The study stressed the need to tackle parental concerns on the COVID-19 vaccine.<sup>24</sup>

Almansour et al<sup>30</sup> carried out a study focused on potential COVID-19 vaccines for children under 12. They found a high degree of hesitancy, with 38.6% of participants unwilling to inoculate their children. Primary concerns included potential side effects and vaccine safety, underscoring the intricate nature of parental decision-making.

A noteworthy finding from a study carried out in Riyadh, Saudi Arabia, was the considerable hesitancy rate, with one-third of parents expressing unwillingness to vaccinate their children against COVID-19.<sup>25</sup> This

study underscored the significant influence of social media as a factor, emphasizing the importance of implementing targeted communication strategies.

Therefore, the range of studies carried out highlights the varying landscape of vaccine hesitancy in Saudi Arabia. This spectrum spans from relatively low hesitancy rates in certain cases to more pronounced concerns, particularly in the context of COVID-19 vaccination.

**Factors influencing hesitancy.** The importance of reliable sources for information, such as healthcare professionals, the internet, and social media, was underscored. Misinformation and clashing views on social media can feed vaccine hesitancy, underscoring the need for accurate, trustworthy information dissemination.<sup>15,21,24,31</sup>

The COVID-19 pandemic has had a profound influence on parental views. A recurring theme has been a shift in beliefs, heightened concerns regarding the safety of the COVID-19 vaccine, and anxiety on possible negative consequences. These factors collectively underscore the pervasive influence of the pandemic on decisions related to vaccination.<sup>27,29,33,34</sup>

Concerns on vaccine safety, particularly fear of negative effects, were often cited as key reasons for hesitation. Mistrust in the vaccine's effectiveness also fuelled reluctance. Some parents felt the immunization schedule was overwhelming, with too many vaccinations in short intervals. Tackling these safety-related fears is a crucial part of efforts to increase vaccine acceptance.<sup>23,26,27,33,34</sup>

**Demographic variables.** The studies suggested potential demographic differences in hesitation rates. Factors like parental age, education level, and socioeconomic status showed varying attitudes. This calls for customized strategies that tackle particular demographic concerns.<sup>21,32,33</sup>

Vaccine hesitancy in Saudi Arabia, like in other areas, is affected by various causes. Studies have highlighted

low educational levels, skepticism on scientific evidence supporting vaccines, and insufficient health education as common traits among hesitant parents. Additionally, concerns on vaccine safety, efficacy, and past experiences with vaccination contribute to reluctance among certain population groups.

Misinformation and lack of trust in vaccines and healthcare systems are significant barriers to vaccine acceptance. Misinformation spread through social media and other platforms can lead to fears and misconceptions on vaccine safety and efficacy, undermining confidence in vaccination efforts. Addressing these issues requires targeted interventions to promote vaccine literacy and combat misinformation effectively.

#### *Implications for public health policy and practice.*

Moreover, individual beliefs and attitudes towards vaccines play a crucial role in vaccine acceptance. Cultural and religious beliefs, as well as personal experiences with vaccines or vaccine-preventable diseases, influence individuals' decision-making regarding vaccination. Effective public health policy and practice must respond to these diverse perspectives by connecting with communities to understand their worries and providing transparent and accessible facts on vaccines.

*Parental attitudes towards vaccination.* The COVID-19 pandemic has further complicated the landscape of vaccine hesitancy, particularly regarding parental attitudes towards vaccination. The heightened apprehension regarding the safety and effectiveness of COVID-19 vaccines, coupled with the rapid development and rollout of these vaccines, have intensified existing vaccine hesitancy. Parents may express heightened concerns on vaccinating their children, fearing potential side effects or long-term impacts.

Public health policy and practice must adapt to these challenges by implementing targeted strategies to build trust, improve vaccine literacy, and address misinformation. This includes fostering partnerships with trusted community leaders and organizations, engaging with communities to understand their concerns, and providing transparent and accessible information on vaccines. Additionally, addressing concerns specific to COVID-19 vaccines, such as safety and efficacy, is essential to increase vaccine acceptance and uptake.

The gathered data highlights the complex vaccine hesitancy among parents in Saudi Arabia. Despite high rates of routine childhood vaccinations, safety concerns, intensified by the COVID-19 pandemic and various information sources, feed this hesitancy.

While this study has shed light on the complex factors contributing to vaccine hesitancy, more targeted action is needed to effectively address this issue and improve immunization rates.

Specific recommendations are essential for guiding action in this area. Strategies for addressing safety concerns, combating misinformation, and promoting trust in vaccination must be implemented. This includes providing transparent and accessible information on vaccines, engaging with communities to understand their concerns, and fostering partnerships with trusted organizations to disseminate accurate information.

A strong call to action is needed to emphasize the urgency of addressing vaccine hesitancy. The potential consequences of vaccine reluctance on public health resilience cannot be understated. Failure to address vaccine hesitancy could lead to outbreaks of preventable diseases, undermining efforts to improve overall health outcomes and reduce the burden on healthcare systems.

Furthermore, addressing vaccine hesitancy has broader implications for public health resilience and achieving broader public health goals. By increasing vaccine acceptance and uptake, we can enhance community immunity, reduce the spread of vaccine-preventable diseases, and ultimately improve overall health outcomes.

*Study limitations.* Despite potential challenges like varying study methodologies and cultural biases, this review acknowledges the inherent limitations in synthesizing diverse studies. Additionally, language restrictions may have excluded some pertinent non-English publications.

In conclusion, tackling vaccine hesitancy is crucial for safeguarding public health in Saudi Arabia. It requires a multifaceted approach that involves targeted action, strong leadership, and collaboration among stakeholders. By taking decisive steps to address vaccine hesitancy, we can protect the health and well-being of our communities and build a more resilient healthcare system for the future.

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