

A MIXED-METHODS INVESTIGATION INTO BARRIERS TO ROUTINE IMMUNIZATION IN THE PERI-URBAN SLUMS OF BAHAWALPUR, PAKISTAN: A STUDY FROM LINCOLN UNIVERSITY COLLEGE MALAYSIA

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Abstract

Background: Child immunization is a cornerstone of public health, designed to protect children from vaccine-preventable diseases and reduce child mortality rates.

OBJECTIVE: To investigation into barriers to routine immunization in the peri-urban slums of Bahawalpur, Pakistan

MATERIAL AND METHODS: The study setting was the Lincoln University College Malaysia. Data was collected from the EPI department of 21 UC'S of Bahawalpur. The study completed approximately 18 months. The study targeted population of study was the parents of the children and CEO Health and WHO Representative interview regarding immunization experience to the different EPI Centers of 21UC'S of District Bahawalpur Pakistan. The data was analyzed by the Nvivo software.

Semi-structured interviews were conducted with two key informants: a World Health Organization (WHO) Representative and the Chief Executive Officer (CEO) of Health. With informed consent, all interviews were taken in Urdu and subsequently transcribed verbatim in English. In instances where Urdu idioms or expressions were used, bilingual researchers translated these into English, ensuring semantic accuracy and cultural equivalence. To maintain data integrity, transcripts were cross-verified with the original audio recordings for accuracy. An inductive approach was employed for coding and thematic analysis. Quantitative data enter and analysed in SPSS 26 Version.

RESULTS: The deficiencies in the infrastructure, such as the poor maintenance of the cold chain, the irregular training of the personnel and the lack of mechanisms for the sending of messages of the result, have come to light in this investigation. Suggestions include making people more conscious of these programmes by way of targeted training sessions, using mobile vaccination units, updating the health infrastructures, and engaging the community to help solve problems of misinformation and of the logistics involved. The 60(21.5%) were Male in the study who visited EPI Center and 218(78.4%) were female in the

study. Of those surveyed, 54.7 percent attested that their most recent child had received all recommended EPI vaccinations, whereas 27.0 percent had not. The percentage of respondents who did not arrange routine medical exams for their children was 52.2%, while just 27.3% did. While 8.6 percent did not take their children to the doctor when they were ill, 28.4 percent did. 12.2 percent had not had a vaccination, whereas 79.9 percent reported that their most recent child had.

CONCLUSION: Many community members lacked accurate knowledge about vaccines, leading to fear and hesitancy. Deep-rooted cultural norms and religious concerns significantly influenced vaccine acceptance. Geographic and logistical barriers, including limited healthcare access in rural areas, hindered immunization efforts. Distrust toward medical authorities and government programs reduced public compliance. Effective education campaigns and culturally sensitive outreach were identified as essential to improving vaccination uptake.

INTRODUCTION

Addressing these challenges is essential for expanding vaccine coverage and improving public health outcomes. Child immunization is a cornerstone of public health, designed to protect children from vaccine-preventable diseases and reduce child mortality rates¹. WHO established the Expanded Program on Immunization (EPI) 1974, to confirm that all children get accessibility to vaccination. Across the globe, disparities in both vaccine availability and acceptance present ongoing challenges. In low- and middle-income countries, structural barriers such as weak healthcare infrastructure, inadequate cold chain facilities, and a limited number of skilled health workers hinder effective immunization efforts (Gavi, the Vaccine Alliance, 2022). Even in wealthier nations, vaccine hesitancy has become a major concern. According to the WHO Strategic Advisory Group of Experts (SAGE), vaccine hesitancy is defined as the "delay in acceptance or refusal of vaccines despite availability of vaccination services" (WHO, 2019). Immunization remains one of the most effective and economical strategies for preventing infectious diseases and lowering mortality rates, particularly among children (World Health Organization [WHO], 2023). Despite the well-established benefits of vaccines, a significant number of children globally are still either unvaccinated or only partially vaccinated. This contributes to the resurgence of diseases that are otherwise preventable, such as measles, diphtheria, and polio. The gap in immunization coverage is not solely due to a lack of vaccine availability but is also shaped by various public health challenges. These

include misinformation, cultural resistance, logistical issues, and systemic limitations within healthcare services (MacDonald, 2015). This reluctance is often driven by a combination of complacency, perceived lack of necessity, doubts about vaccine safety, and mistrust in health systems—issues frequently exacerbated by misinformation. Community-level factors play a significant role in shaping attitudes toward vaccination. Misconceptions about vaccine safety, cultural and religious beliefs, and low health literacy can all deter individuals from seeking immunization services (Larson et al., 2016). In rural and underserved regions, additional barriers such as language differences, gender-related constraints, and lack of reliable information contribute to vaccine hesitancy. Effective public health policy is vital in addressing these challenges and ensuring that vaccines reach all segments of the population equitably. National immunization initiatives must extend beyond the logistics of vaccine delivery to include community engagement, clear and transparent communication, and efforts to rebuild trust between healthcare providers and the public. Measures such as mobile clinics, outreach by community health workers, and vaccination drives in schools have proven effective in reaching marginalized populations (UNICEF, 2022). Partnering with trusted community figures—including local leaders, religious authorities, and civil society organizations—can also help generate local support and acceptance for vaccination programs. Practical challenges, including limited transportation options, long distances to clinics,

and inconvenient service hours, also impede access to vaccination (Olumide et al., 2021). Tackling these issues requires comprehensive strategies that incorporate education, community involvement, and supportive health policies.

This research examines the public health challenges associated with immunization and highlights practical approaches to addressing obstacles at the community level. By analyzing the interplay between public awareness, cultural attitudes, accessibility, and health policy, public health professionals and decision-makers can design more effective interventions. Strengthening trust, improving vaccine access, and countering misinformation are essential steps toward achieving widespread immunization and protecting future generations from preventable diseases.

MATERIAL AND METHOD

The descriptive cross sectional research study design was observed in this study. The study setting was the Lincoln University College Malaysia. Data was collected from the EPI department of 21 UC'S of Bahawalpur. The study completed approximately 18 months. The study targeted population of study was the parents of the children and CEO Health and WHO Representative interview regarding immunization experience to the different EPI Centers of 21UC'S of District Bahawalpur Pakistan. The data was analyzed by the Nvivo software.

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Two independent coders initially reviewed a subset of transcripts to become familiar with the data and identify preliminary codes. Examples of these open

codes included: vaccine stockouts, community distrust, staff absenteeism, policy rigidity.

Related open codes were grouped into broader conceptual categories such as: Supply Chain Challenges, Human Resource Constraints, Communication Gaps, Policy-Implementation Disconnects. Core themes were derived by integrating and refining axial codes. The final thematic framework included: (e.g., frequency of vaccine stockouts, disruptions in cold-chain systems, delays in vaccine ordering and delivery). Human Resources and Training (e.g., inadequate staffing, limited training under the Expanded Program on Immunization (EPI), high staff turnover). Community Engagement and Trust (e.g., rumors and misinformation about vaccine side effects, low health literacy, cultural or religious resistance). Administrative and Policy Barriers, (e.g., bureaucratic delays in fund disbursement, lack of local input in policy design, gaps in reporting and monitoring systems), Thematic Interpretation and Comparative Analysis, To explore regional differences and contextual insights, responses from health officials in Bahawalpur were compared with those from Islamabad using the constant comparison method. This approach allowed for the identification of both shared and region-specific challenges.

In addition, qualitative themes were integrated with quantitative survey findings to enrich interpretation. For instance, the qualitative insight regarding "inadequate outreach services" contextualized the quantitative result showing that 48% of caregivers reported "long travel time" as a barrier to immunization.

By employing a cyclical and comparative approach, the analysis captured both overarching patterns and local nuances, offering a dynamic understanding of the systemic and contextual barriers affecting healthcare service delivery and immunization uptake across different regions. The quantitative data entered and analyzed in spss 26 version.

RESULTS

Thematic Findings and Ethical Considerations

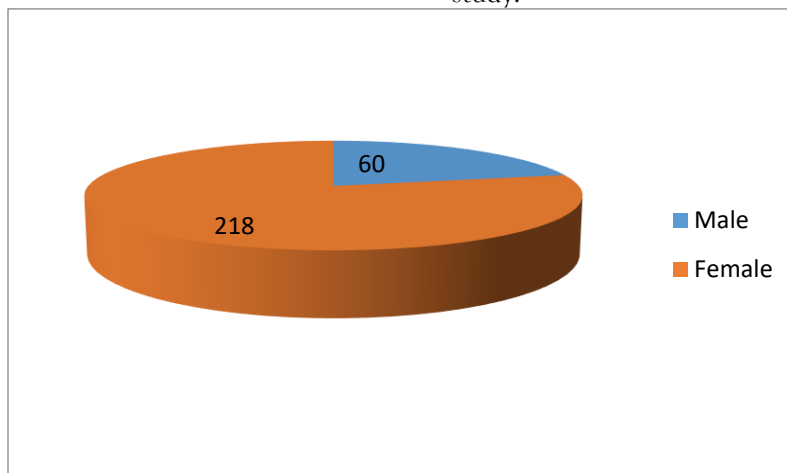
Theme 1: Health officials consistently highlighted significant operational barriers that hinder effective immunization program implementation. These included administrative inefficiencies, inadequate

funding, and delays in vaccine supply chains. Such challenges were particularly pronounced in rural settings like Bahawalpur, where insufficient transport infrastructure and bureaucratic slowdowns disrupted outreach activities. One health official from Bahawalpur noted, "Sometimes we don't receive the supplies on time, and without those, the outreach sessions have to be postponed or canceled."

Theme 2:

A major finding was the limited success of community engagement strategies, especially in regions marked by low literacy levels or deep-seated mistrust toward public health initiatives. Health officials described a lack of culturally tailored outreach efforts and sporadic collaboration with local leaders, both of which are vital for building community trust.

Theme 3:



Another critical theme that emerged was the limited capacity of the health workforce. Participants frequently mentioned understaffing, burnout, and lack of continuous professional development as major concerns. These issues directly affected service quality and consistency.

Theme 4.

Collectively, these five themes provide a comprehensive understanding of the multifaceted barriers to effective vaccine delivery. When paired with quantitative findings—such as the statistic that 48% of caregivers reported "long travel time" as a barrier—the qualitative data offered valuable contextual background. For example, insights into "inadequate outreach services" clarified why such long travel distances persisted.

The 60(21.5%) were Male in the study who visited EPI Center and 218(78.4%) were female in the study.

Barriers of Vaccinations

Variable	Yes		No	
Do you have your child's EPI vaccination record?	252	90.6	26	9.4
Have all of your children completed the EPI vaccination course?	134	48.2	98	35.3
Is the last child fully vaccinated with the EPI vaccines?	152	54.7	75	27.0
Do you schedule regular medical checkups for your child?	76	27.3	145	52.2
Where do you take your child for medical attention when they are sick?	79	28.4	24	8.6
Is your last child vaccinated?	222	79.9	34	12.2
Are you confident in the competence of vaccination staff?	0	0.0	278	100.0
Have you seen a healthcare provider for antenatal care?	120	43.2	107	38.5
Have you seen a doctor or nurse for postnatal care?	112	40.3	116	41.7
Would you rather have your children vaccinated at a private clinic or hospital?	94	33.8	153	55.0

Did you get your child vaccinated soon after they were born?	206	74.1	49	17.6
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The majority of those surveyed (90.6%) said they had their child's EPI vaccination record, whilst 9.4% said they didn't. In contrast to 35.3 percent who said their children had not finished the EPI immunization course, less than half (48.2 percent) said all of their children had. Of those surveyed, 54.7 percent attested that their most recent child had received all recommended EPI vaccinations, whereas 27.0 percent had not. The percentage of respondents who did not arrange routine medical exams for their children was 52.2%, while just 27.3% did. While 8.6 percent did not take their children to the doctor when they were ill, 28.4 percent did. 12.2 percent had not had a vaccination, whereas 79.9 percent reported that their most recent child had. While none of the respondents (0.0 percent) had any doubts about the immunization staff's competence, 10% did. Visits for prenatal care were reported.

Ethical Considerations

This study was conducted in accordance with ethical standards, with approval granted by the Institutional Review Board of the Lincoln University College Malaysia. All participants were assured of the confidentiality and anonymity of their responses. They were also informed of their right to withdraw from the study at any point without any consequence. All data collected was used exclusively for academic purposes.

Informed Consent

Prior to participation, informed consent was obtained from all individuals involved in the study. This included health officials responsible for immunization programs in Bahawalpur. Participants were fully briefed on the study's objectives, their voluntary participation, the confidentiality of their responses, and the exclusive use of data for academic research. Only those who provided verbal or written consent were included in the final analysis.

DISCUSSION:

Misinformation and vaccine-related myths are a growing concern, especially in urban areas. Unverified claims linking vaccines to conditions such as autism, infertility, or even death are widely circulated on social media platforms. These

falsehoods tend to spread rapidly, particularly among groups that, while formally educated, lack adequate health literacy. In Bahawalpur, misinformation primarily stems from local rumors, influential community figures, and a lack of credible, science-based messaging from health authorities. The absence of culturally relevant and consistent health communication further exacerbates the problem (Hao Q, and et,al 2024).

Trusted religious and community leaders play a crucial role in conveying accurate and culturally acceptable health information. Their endorsement can significantly enhance public trust and counteract false narratives surrounding immunization (Sobe LE. And et,al). However, in such as slums and peri-urban zones, vaccine skepticism remains widespread. Many parents continue to believe that vaccines may cause infertility, severe side effects, or lifelong disabilities. These misconceptions are often propagated by community leaders, religious groups, and social media, contributing to persistent vaccine hesitancy (Kassa E, and et,al 2024).

Although mobility and access to healthcare services are generally more feasible in Bahawalpur, significant gender inequalities and access disparities persist—particularly among marginalized urban populations and displaced communities (Aldahmashi FM, and et,al 2024). These challenges necessitate targeted interventions focused on empowering women and addressing household- and community-level inequities that influence immunization uptake (Herrera-Restrepo O, and et,al 2024).

Accessibility challenges also remain a significant barrier in remote regions of Bahawalpur. Many villages are located far from healthcare facilities, and during the monsoon season, flooding and road blockages can make travel virtually impossible. These geographic constraints hinder both families' access to immunization centers and mobile teams' ability to reach underserved areas—especially in the absence of sufficient logistical support and strategic planning (Kassa E, and et,al 2024).

Bahawalpur is generally less affected by logistical shortcomings, its informal and suburban communities often fall outside the scope of formal healthcare delivery. These underserved areas are not adequately integrated into national immunization

programs, making them susceptible to disease outbreaks (Simonetti V, and et,al 2024).

In many areas of Bahawalpur and the informal settlements of territory, women often lack autonomy in making health-related decisions for their families. Typically, the decision to vaccinate children lies with male heads of household, such as fathers or elder male relatives. When these individuals are disengaged or poorly informed, immunization is frequently delayed or omitted (Horiuchi H, and et,al 2024).

Collectively, these systemic and sociocultural barriers contribute to suboptimal immunization coverage, leaving children vulnerable to vaccine-preventable diseases (VPDs) such as measles, diphtheria, and polio. In Bahawalpur, recent VPD cases have been directly linked to low vaccination rates in specific communities. These outbreaks not only endanger unvaccinated children but also place additional strain on healthcare providers (Altayyar S, and et,al 2024).

Despite broader immunization coverage in south punjab, recurring annual measles outbreaks highlight gaps in service delivery among certain population groups. The impact of such diseases extends beyond the immediate illness children often suffer from poor nutritional outcomes, stunted growth, prolonged school absenteeism, and long-term developmental delays. Additionally, affected families face emotional and financial burdens that could have been avoided through timely immunization (Kassa E, and et,al 2024).

Many parents struggle to vaccinate their kids because of socioeconomic reasons. Many families in Bahawalpur, facing poverty and living in the countryside, are more concerned about getting enough food than with medical check-ups. Working families often rely on what they earn daily which may make bringing a child to the health facility unattainable.

Similarly, other expenses not connected to immunization, for instance travel, time lost at work or fears over lengthy waiting, play a role in limiting access to immunizations services for families in Bahawalpur. Even though it is possible to get vaccines for free from the government, the required out-of-pocket spending still keeps some

people from getting them. (Altayyar S, and et,al 2024).

Effective immunization programs depend a lot on the performance and strength of the health system. The health facilities in Bahawalpur have insufficient staffing, fail to provide enough resources and are not well run. Electricity problems and lack of good refrigerators mean that the cold chain is mostly broken, hurting the potency of vaccines. In addition, the shortage of educated health workers in remote communities makes it difficult to give vaccines quickly and fully. If children are unvaccinated, their illnesses often need higher levels of medical care, including time spent in hospital for treatment. This puts more stress on the public health system which is already working very hard. Handling emergencies for outbreaks means less money, time and effort can be spent on regular and preventive care. Gender-related issues can affect whether people are able to get vaccines. Many mothers want to give their children the vaccine, yet they feel they do not have enough control. Women are also restricted in their movement which makes it hard for them to get to healthcare centers, particularly when traditional beliefs keep women from traveling alone. (Altayyar S, and et,al 2024)

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