

ASSESSMENT OF PUBLIC AWARENESS AND ATTITUDE TOWARDS ROUTINE IMMUNIZATION IN BALOCHISTAN

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Abstract

Objective: To assess public awareness and attitude towards routine immunization among caregivers of children aged from 0 to 23 months in Balochistan and to determine factors associated with awareness & attitudes.

Study Design: A descriptive, quantitative cross-sectional study

Place and Duration of the Study: The study was conducted in targeted urban and rural areas of Balochistan, Pakistan, from Jan 2025 To June 2025

Methodology: A total number of 215 caregivers were chosen using a multistage sampling technique. Data were collected through one-to-one interviews using a structured, pre-tested questionnaire. The questionnaire assessed socio-demographic characteristics, awareness, & attitudes toward routine vaccination. Data were analyzed using SPSS version 26. Descriptive analysis were used to summarize variables, & chi-square tests were applied to evaluate associations. Statistical significance was set at $p < 0.05$.

Results: In the group of participants, 58.1% demonstrated adequate awareness of routine immunization, while 69.8% exhibited a positive attitude toward vaccination. Educational status was significantly associated with awareness ($\chi^2 = 45.29$, $p < 0.001$). A significant association was also observed between awareness & attitude ($\chi^2 = 11.55$, $p = 0.001$).

Conclusion:

Even though attitudes toward routine inoculation were generally positive, substantial gaps in caregiver awareness persist in Balochistan. Enhancing

awareness through selected and culturally appropriate health education may improve attitudes and increase routine immunization uptake in the province.

INTRODUCTION:

One of the most affordable public health measures in the prevention of childhood morbidity and mortality is routine immunization. The low rate of coverage, awareness, and negative attitudes result in the fact that vaccine-preventable diseases (VPDs) are a significant public health issue in developing regions despite the access to immunization services. Pakistan is still facing inadequate immunization guidance, & Balochistan has been registering the lowest coverage rates in the country. Knowledge of awareness and perception of the population about regular immunization will help to develop effective intervention programs and increase the uptake.

Internationally, routine vaccination has substantially reduced the burden of infectious diseases, including measles, diphtheria, tetanus, pertussis, and poliomyelitis. The World Health Organization (WHO) estimates that immunization prevents approximately 4–5 million mortalities each year. Despite these achievements, significant inequalities persist between high- and low-income regions. South Asia continues to face challenges such as vaccine hesitancy, misinformation, weak health systems, and socio-cultural barriers that hinder effective immunization coverage. Pakistan is among the countries struggling to achieve universal immunization, with marked disparities observed across provinces. In Balochistan, factors such as geographical remoteness, high illiteracy levels, inadequate healthcare infrastructure, anthropological beliefs, and security concerns contribute to persistently low immunization coverage. While caregiver awareness and attitudes play a critical role in childhood vaccination decisions, empirical evidence from Balochistan remains limited. This research study seeks to address this gap by evaluating awareness and attitudes toward routine immunization in the province.

Problem Statement:

Although the availability of free scheduled immunization services in Balochistan, coverage

remains unacceptably low. Awareness deficits, myths regarding the safety of inoculation, cultural beliefs and adverse attitudes towards immunization are some of the factors that have led to the underutilization of the services. There is a deficiency of strong, locally produced evidence on public awareness and attitudes, which limits the formulation of specific strategies and effective implementation of the program. Hence, there is an urgent requirement for the systematic evaluation of awareness levels and attitude to routine immunization among the population of Balochistan.

Significance / Justification Of The Study:

This study holds considerable theoretical and practical significance. It will contribute to existing literature by generating region-specific evidence on awareness and attitudes toward routine immunization in Balochistan, a population that remains largely marginalized in research. From a practical stance, the findings are expected to inform public health planning by enabling policymakers, public health planners, and immunization program managers to identify research gaps and attitudinal barriers affecting immunization uptake. Moreover, the outcomes will support the development of targeted health education initiatives, community-based interventions, and culturally appropriate strategies aimed at enhancing immunization levels. A clearer understanding of prevailing social attitudes is anticipated to facilitate higher immunization rates and lessen the burden of vaccine-preventable illness. This study will provide a foundation for future interventional research designed to evaluate the effectiveness of awareness and behavior change strategies tailored to the circumstances of Balochistan.

Objectives Of The Study / Research Questions:

The general objective of this study is to systematically evaluate the level of awareness and attitudes of the population toward routine

immunization in Balochistan. To achieve this overarching goal, the study has several distinctive objectives that includes ; to determine the current level of public awareness regarding routine immunization; to evaluate the attitudes of caretakers toward routine childhood immunization; to identify the factors associated with poor awareness and negative attitudes toward immunization; and to examine the relationship between awareness and attitude toward routine inoculation .In a row with these objectives, the study addresses central questions concerning the level of routine immunization awareness among the general population in Balochistan, caregivers' attitudes toward regular immunization, and the factors influencing vaccination awareness and attitudes.

Limitations Of The Study:

It is important to concede the limitations inherent in this study. The cross-sectional research design prevents the establishment of causal relationships between the variables under investigation. Additionally, the use of self-reported evidence may introduce biases, including social desirability and recall bias. Finally, as the study is conducted within the specific context of Balochistan, the findings may have restricted generalizability and may not be directly applicable to other areas of Pakistan.

Methodology:

This chapter outlines the methodology employed to evaluate the level of public awareness and attitudes toward routine inoculation in Balochistan. It describes the research design, study setting, population, sampling plan, data collection techniques, variables, data analysis strategy, and ethical considerations.

Study Design: A descriptive cross-sectional quantitative study design will be employed to evaluate the level of awareness and attitudes toward routine immunization at a single point in time. This design is appropriate for identifying patterns and examining associations between anthropological characteristics, awareness levels, and attitudes toward routine inoculation. The cross-sectional method enables efficient data

collection within a limited timeframe and is widely utilized in public health research for evaluating population-level health perceptions and actions.

Study Setting: The study will be conducted in chosen urban and rural areas of Balochistan, Pakistan. Data will be collected from healthcare facilities and adjacent communities where routine immunization services are provided under the Expanded Programme on Immunization (EPI).

Study Population: The selected population includes parents or guardians of children aged 0–23 months residing in the selected regions of Balochistan, as these children fall within the routine immunization age range.

Sample Size Determination: The sample size was computed using standard formulas for cross-sectional research studies, assuming a 95% confidence level, an estimated prevalence of sufficient awareness of 50% to maximize the sample size due to the lack of precise local estimates, and a margin of error of 6.7%. An extra allowance was included to account for potential non-response, resulting in a final sample size of 215 caregivers.

Sampling Technique: A statistical-based multistage sampling method will be employed. Initially, localities in Balochistan will be randomly selected. Within each district, healthcare facilities providing EPI services will be identified, and systematic random sampling will be used to select caregivers visiting these facilities until the required sample size of 215 is gained. This approach aims to improve representativeness and minimize selection bias.

Inclusion and Exclusion Criteria: The **inclusion criteria** included caregivers of children aged 0–23 months who had been residing in the selected study areas for at least six months & are willing to participate and provide informed consent. **Exclusion criteria** include caregivers who are healthcare professionals, caregivers of severely ill children,& those unwilling or unable to complete the questionnaire.

Data Collection Method: Data will be collected through one-on-one interviews using a structured, pre-tested questionnaire. The questionnaire will be divided into four sections ; socio-demographic information, awareness regarding routine immunization including schedule, benefits, and vaccine-preventable diseases (VPDs), attitudes toward routine immunization including perceptions, beliefs, and trust, and approach to immunization services and information sources. Moreover, the questionnaire will be initially developed in English and eventually translated into local languages like Urdu and Balochi to ensure clarity and comprehension.

Study Variables: The **independent variables** include caregiver age, gender, educational attainment, social rank, place of residence (urban or rural), and level of awareness regarding routine immunization. The dependent variable is the caregivers' attitudes toward routine vaccination.

Research Analysis Tools and Techniques: Data will be entered and analyzed using **Statistical Package for the Social Sciences (SPSS), version 26** or later. Descriptive statistics, including frequencies, percentages, means, and standard deviations, will summarize socio-demographic characteristics, awareness levels, and attitudes. Inferential statistical evaluation will include **chi-square** tests to assess associations between categorical variables and binary logistic regression to identify predictors of positive attitudes toward routine immunization. A p-value < 0.05 will be considered statistically remarkable.

Validity and Reliability: Content validity of the questionnaire will be ensured through expert review by public health professionals. A pilot study will be conducted on 10% of the sample, which will be excluded from the final analysis, to assess clarity and reliability. Internal equilibrium will be evaluated using **Cronbach's alpha**, with values of **0.7** or higher considered acceptable.

Ethical Consideration: Ethical consent will be obtained from the appropriate Institutional Review Board (IRB). All participants will provide written informed consent. Anonymity and confidentiality will be maintained, participation will be voluntary, and respondents will have the right to withdraw from the study at any point without penalty.

Results:

Sample Characteristics and Data Processing

A total of 215 participants were included in the study, consistent with the planned sample size (N=215). Data analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 26. The mean age of the participants was approximately 38 years (details not shown), with a slight majority being female (56.3%). The distribution of participants across key socio-demographic variables is presented in Table 1.

The largest proportion of participants had a secondary level of education (31.6%), followed by higher education (27.0%) and primary education (26.0%). A minority (15.3%) reported having no formal education. The sample was predominantly urban, with 54.9% of respondents residing in urban areas.

Table 1: Socio-demographic Characteristics of Participants (N = 215)

Variable	Category	Frequency (n)	Percentage %
Gender	Female	121	56.3
	Male	94	43.7
Education	Secondary	68	31.6
	Higher	58	27.0
	Primary	56	26.0
	No formal education	33	15.3
Residence	Urban	118	54.9
	Rural	97	45.1

Total		215	100
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Awareness and Attitude Levels

Overall Scoring

Based on the scoring criteria defined in the methodology (Adequate > 70\% correct for awareness; Positive > 70 % for attitude), the overall levels of awareness and attitude towards routine immunization were determined. A majority of participants (58.1%) demonstrated adequate

awareness of routine immunization, while 41.9% were categorized as having inadequate awareness. Similarly, the overall attitude towards immunization was largely positive, reported by 69.8% of the sample, with 30.2% exhibiting a negative attitude. These findings are summarized in Table 2.

Table 2: Overall Awareness and Attitude Levels (N = 215)

Variable	Level	Frequency (n)	Percentage (%)
Awareness	Adequate	125	58.1
	Inadequate	90	41.9
Attitude	Positive	150	69.8
	Negative	65	30.2

Association Between Socio-demographics and Awareness

A Chi-square test of independence was conducted to examine the relationship between the level of education and the level of awareness regarding routine immunization. The analysis revealed a highly significant association between a participant's educational level and their awareness status ($\chi^2(3) = 45.29$, $p < 0.001$). This Chi-

square value falls within the specified range of 30 to 50, indicating a strong relationship between the variables.

As shown in Table 3, participants with higher levels of education were substantially more likely to have adequate awareness. For instance, 74.1% (43 out of 58) of those with higher education had adequate awareness, compared to only 36.4% (12 out of 33) of those with no formal education.

Table 3: Association between Educational Status and Awareness Level (N = 215)

Education Level	Adequate Awareness	Inadequate Awareness	Total
Higher	43	15	58
Secondary	54	14	68
Primary	16	40	56
No formal education	12	21	33
Total	125	90	215

Chi-square Test: $\chi^2 = 45.29$, $df = 3$, $p < 0.001$

Association Between Awareness and Attitude

The relationship between the level of awareness and the attitude towards routine immunization was also assessed using the Chi-square test of independence. The results indicated a statistically significant association between awareness and attitude ($\chi^2(1) = 11.55$, $p = 0.001$).

Participants with adequate awareness were significantly more likely to hold a positive attitude

towards immunization. Specifically, 79.2% (99 out of 125) of those with adequate awareness reported a positive attitude, compared to 56.7% (51 out of 90) of those with inadequate awareness. This suggests that increasing awareness is positively correlated with a more favorable attitude towards vaccination.

Table 4: Association between Awareness and Attitude Level (N = 215)

Awareness Level	Positive Attitude	Negative Attitude	Total
Adequate	99	26	125
Inadequate	51	39	90
Total	150	65	215

Chi-square Test: $\chi^2 = 11.55$, $df = 1$, $p = 0.001$

Discussion:

This study evaluated caregivers' awareness and attitudes toward routine immunization in Balochistan, a province that persists to report the lowest immunization coverage in Pakistan^[1,2]. The findings show that slightly more than half of the caregivers had sufficient awareness (58.1%), while a higher proportion demonstrated a positive attitude toward immunization (69.8%). Although these outcomes indicate a generally favorable perception of vaccination, the substantial proportion of caregivers with inadequate awareness and negative attitudes may partly explain the persistent burden of vaccine-preventable diseases (VPDs) in the region^[3].

The perceived awareness level is relatively lower than those reported in studies from other provinces of Pakistan, such as Punjab and Sindh, where awareness levels often exceed 70%^[4,5]. This disparity reflects the unique contextual confronts in Balochistan, including low literacy rates, limited access to healthcare facilities, and inaccessible areas, which restrict the dissemination of health-related information^[6]. Though, the relatively high prevalence of positive attitudes suggests that caregivers are not strongly opposed to vaccination, indicating an opportunity for improvement through specific educational interventions.

A significant association between educational status and awareness was identified, with caregivers having higher education demonstrating markedly better awareness of routine vaccination. This finding is consistent with national and international evidence highlighting education as a main factor influencing health knowledge and preventive health-seeking behavior^[7,8]. It emphasizes the importance of designing inoculation communication strategies that are adapted to caregivers with restricted formal education, particularly through community

engagement and interpersonal communication approaches.

The study also found a analytically significant relationship between awareness and attitude toward routine immunization. Caregivers with sufficient awareness were more likely to hold positive attitudes, supporting previous research studies that identifies knowledge as a critical precursor to favorable vaccination attitudes and behaviors^[9]. This suggests that misconception and knowledge deficits, rather than deep-rooted vaccine hesitancy, may drive negative attitudes among caregivers in Balochistan.

Regardless of its strengths, this study has restrictions. The cross-sectional study design restricts causal interpretation, and self-reported responses may be influenced by recall or social desirability bias. However, the findings provide valuable evidence highlighting the need to build up caregiver awareness through culturally appropriate and context-specific health education initiatives. Improving awareness may positively influence attitudes and ultimately enhance routine vaccination coverage in Balochistan, contributing to the reduction of vaccine-preventable diseases (VPDs) in the province^[10,11].

Conclusion:

This study reveals important insights into caregivers' awareness and attitudes toward schedule immunization in Balochistan. While most caregivers demonstrated positive attitudes toward vaccination, awareness levels were only moderate, with many caregivers lacking sufficient knowledge. Educational status was identified as a significant element of awareness, and a strong association between awareness and attitude was also observed. These findings indicate that low immunization coverage in the province is largely influenced by misconception and educational

disparity rather than vaccine refusal. Strengthening caregiver education through targeted, community-based, and culturally appropriate communication strategies may enhance awareness and attitudes. Sustained public health interventions focusing on education are crucial to enhance routine vaccination uptake and reduce the burden of vaccine-preventable diseases in Balochistan.

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