

Research Article

Vaccines to Prevent or Treatment to Recover: Immunisation Compliance Among Caregivers of Infants Aged 0–18 Months in Pager Cell, Northern Uganda

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Abstract

Routine childhood immunisation is a critical public health intervention for preventing vaccine-preventable diseases and reducing under-five mortality, yet adherence and completion remain sub-optimal in many low-resource settings, including Northern Uganda. This study examined immunisation adherence and compliance among mothers and caregivers of children aged 0–18 months in Pager Cell, Kitgum Municipality, using a P-factors analytical framework that considers provider and parental factors, procedures and practices, policy and programme influences, and political–contextual determinants. A cross-sectional analytical mixed-methods design was used, collecting data from 323 caregivers through structured questionnaires, child health card reviews, and key informant inputs. Quantitative data were analysed using descriptive statistics, while qualitative findings were thematically analysed within the P-factors framework. Results showed that full immunisation coverage was below national targets, with significant drop-out between early and later vaccine doses, influenced by caregiver knowledge and trust, health facility operational practices, programme implementation gaps, and broader political and infrastructural constraints. Overall, the findings demonstrate that immunisation adherence in Northern Uganda is shaped by interconnected individual providers and parental factors, health system procedure and practices, programme policy, and politico-contextual factors, highlighting the usefulness of the P-factors framework for understanding and improving routine immunisation performance in low-resource and post-conflict settings.

Keywords

Immunisation Adherence, Vaccine Compliance, Expanded Programme on Immunisation, P-factors, Uganda

1. Introduction

Immunisation remains one of the most effective population-level interventions for preventing vaccine-preventable diseases and reducing avoidable childhood mortality. Its benefits extend beyond individual protection to include herd immunity, reduced health system burden, and long-term socioeconomic

gains. Nevertheless, routine immunisation coverage has shown signs of stagnation and reversal in several low- and middle-income countries, exposing persistent vulnerabilities within immunisation delivery systems [9, 26].

In Uganda, routine childhood immunisation is implemented

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through the Expanded Programme on Immunisation (EPI). Despite longstanding policy commitment, national coverage indicators continue to fall short of the World Health Organization's recommended threshold for population-level protection. Subnational disparities remain pronounced, particularly in regions affected by historical conflict, infrastructure deficits, and health system fragility, such as Northern Uganda [3, 11, 16].

Existing research on immunisation uptake has largely prioritised caregiver-level explanations, emphasising knowledge, attitudes, beliefs, and perceptions [2, 4]. These studies frequently apply behavioural frameworks such as the Health Belief Model or the 3Cs model of confidence, complacency, and convenience [7, 13, 15, 21]. While these approaches have advanced understanding of vaccine decision-making, they insufficiently account for health system processes, programme implementation dynamics, and political-contextual constraints that shape adherence in resource-constrained settings [8, 24].

This study therefore applies a P-factors analytical framework, which conceptualises immunisation adherence and compliance as the product of interacting determinants across four domains: provider and parental factors, procedures and practices, policy and programme factors, and political-contextual influences. This framework enables a systems-oriented analysis of immunisation behaviour that extends beyond individual choice to encompass structural and governance conditions [3, 5].

2. Methods

2.1. Study Design and Setting

A cross-sectional analytical mixed-methods study was conducted in Pager Cell, Kitgum Municipality, Northern Uganda. The area is predominantly peri-urban and is characterised by limited health infrastructure, variable service availability, and populations affected by historical displacement.

2.2. Study Population and Sampling

The study population comprised mothers and primary caregivers of children aged 0–18 months who had initiated routine immunisation services between January and December 2021. A sample size of 323 respondents was determined using a single-population proportion formula. Participants were selected through systematic household sampling.

2.3. Data Collection

Data were collected using:

- 1) Structured questionnaires assessing socio-demographic characteristics, immunisation knowledge, attitudes, and practices.
- 2) Child health card reviews to verify immunisation status.
- 3) Key informant inputs from health workers and community leaders to contextualise findings.

2.4. Data Analysis

Quantitative data were analysed using SPSS version 26 and summarised using frequencies and proportions. Qualitative data were coded and analysed thematically according to the four P-factor domains illustrated in the conceptual framework.

2.5. Ethical Considerations

Ethical approval was obtained from the Sechenov University Institutional Ethics Review Committee and relevant local authorities in Kitgum Municipality. Written informed consent was obtained from all participants prior to data collection.

3. Results

3.1. Immunisation Adherence and Compliance

Of the 323 children assessed, fewer than three-quarters had completed age-appropriate immunisation schedules. A substantial proportion were either partially immunised or had defaulted before completing the recommended doses. Drop-out was most pronounced between early infant vaccines and subsequent doses, indicating challenges in continuity of care rather than initial service access.

3.2. Provider and Parental Factors

A high proportion of caregivers demonstrated incomplete knowledge of immunisation schedules and expressed concerns regarding vaccine safety. Reports of limited counselling and negative provider interactions were common. These factors were frequently cited in association with missed or delayed immunisation appointments, suggesting a meaningful relationship between caregiver-provider interaction and adherence behaviour.

3.3. Procedures and Practices

Health facility operational constraints were consistently reported. Long waiting times, inconsistent clinic schedules, and intermittent vaccine stock-outs were identified as key procedural barriers. Notably, these constraints affected service utilisation even among caregivers who reported positive attitudes towards immunisation, indicating that favourable perceptions alone were insufficient to ensure completion.

3.4. Policy, Programme, and Political Factors

At the programme level, gaps in outreach coverage, supervision, and service integration were commonly reported. Political and infrastructural challenges, including poor road networks and perceived inequities in resource allocation, further constrained access. These factors collectively suggest that im-

munisation adherence is sensitive to both programme performance and broader governance conditions.

4. Discussion

This study examined immunisation adherence and compliance among children aged 0–18 months in Northern Uganda using a P-factors framework. The findings indicate that immunisation behaviour is shaped by interacting determinants operating across individual, health system, programme, and political levels, consistent with systems-thinking approaches to public health.

4.1. Provider and Parental Factors

Provider and parental factors emerged as key proximal determinants of immunisation adherence. Caregiver knowledge gaps, fear of adverse events, and mistrust in health workers have been widely reported in similar settings [1, 5, 7, 25]. This study further demonstrates that the quality of provider–client interaction, particularly communication and counselling, plays a decisive role in reinforcing or undermining vaccine acceptance [15].

4.2. Procedures and Practices

Procedures and practices within health facilities mediated the translation of caregiver intention into actual service utilisation [14]. Long waiting times, inconsistent service hours, and inadequate counselling reduced adherence even among motivated caregivers [18]. These findings underscore the importance of service organisation, reliability, and perceived quality in sustaining routine immunisation uptake [10, 12].

4.3. Policy and Programme Factors

At the programme level, weaknesses in outreach implementation, supervision, and financing limited-service reach and continuity [19, 20]. The findings highlight the gap between policy formulation and effective programme implementation and emphasise that immunisation performance depends on operational capacity rather than policy existence alone [4, 8].

4.4. Political and Contextual Factors

Political and contextual factors functioned as distal yet powerful determinants of immunisation adherence [11]. Poor infrastructure, population mobility, and perceptions of political neglect constrained physical access to services and weakened trust in public health institutions [22, 23]. By incorporating these factors, the P-factors framework situates immunisation adherence within the broader political economy of health [17, 23].

4.5. Integrative Interpretation of the P-Factors Framework

The findings demonstrate that immunisation adherence depends on the synergistic functioning of all P-factor domains. Weakness in any domain undermines the overall immunisation pathway, reinforcing the need for integrated, multi-level interventions [6, 17, 20].

5. Conclusion

This study demonstrates that immunisation adherence and compliance among children aged 0–18 months in Northern Uganda are shaped by interacting P-factors spanning individual, health system, programme, and political domains. The findings support the hypothesis that demand-side interventions alone are insufficient to achieve optimal immunisation coverage without concurrent improvements in service delivery practices, programme implementation, and political commitment.

The P-factors framework contributes theoretically by extending conventional behavioural models through the explicit integration of procedural, policy, and political determinants. This integrated approach provides a more comprehensive explanation of immunisation behaviour in low-resource and post-conflict settings and offers a transferable analytical tool for future immunisation research and programme design.

Abbreviations

3CS	Confidence, Complacency, and Convenience
EPI	Expanded Programme on Immunisation
MOH	Ministry of Health
P-Factors	Provider and Parental, Policy and Programs, Procedure and Practices, Political factors
SPSS	Statistical Packages for Social Sciences
UNICEF	Unite for Children
WHO	World Health Organization

Author Contributions

Abacha Omara Geoffrey: Conceptualization, Methodology, Investigation, Data curation, Formal Analysis, Project administration, Resources, Validation, Visualization, Writing – original draft, Writing – review & editing

Conflicts of Interest

The study didn't seek for funding from any external source; project execution was purely from the authors personal contribution. Similarly, the Authors declares no conflict of interest during this study.

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