RESEARCH ANALYSIS DOCUMENTATION

Childhood Immunization in Isanlu and Lokoja, Kogi State: Data Analysis

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Statistical analysis · Cross-tabulation · Chi-square · Multinomial logistic regression

408	2	4	3
caregivers surveyed	Local Government Areas: rural and urban	research objectives	outcomes: complete, partial, none

Method and design only. The findings belong to the study's author and are not reproduced here.

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01 THE STORY BEHIND THE STUDY

> *Imagine two mothers, one in a town and one in a village, each with a baby due for the same vaccines. One lives close to a clinic and one does not. One has read about vaccines and one has heard rumours.*
>
> *If the vaccination record of the village child is better or worse than the town child's, why? Distance, cost, belief, schooling, or something else?*

The study compares childhood immunization coverage between rural Isanlu and urban Lokoja in Kogi State, and asks which characteristics of the caregiver and which barriers explain whether a child is fully, partly or not at all immunized.

02 WORDS USED IN THIS DOCUMENT

Word	What it means
Immunization coverage	The share of children who have received the vaccines due for their age.
Complete, partial, none	The three outcomes: all due doses, some of them, or none.
Caregiver	The parent or guardian who answered the survey for the child.
KAP	Knowledge, attitudes and practices: what caregivers know about vaccines, how they feel about them, and what they do.
Cross-tabulation	A table that counts two things together, such as location and immunization outcome.
Chi-square test	A test of whether two categories are linked more than chance would explain.
Multinomial logistic regression	A model for an outcome with three or more unordered levels. It estimates how each factor changes the odds of one outcome compared with another.

Word	What it means
Odds ratio	How many times more (or less) likely one outcome is in one group compared with another. 1 means no difference.

03 WHAT THE STUDY ASKS

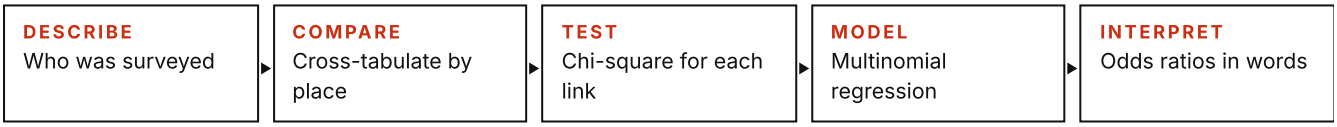
Objective	What it sets out to find
1	The prevalence of complete, partial and non-immunization among children in Isanlu and in Lokoja.
2	How the barriers to immunization (distance, cost, cultural beliefs and others) differ between the rural and urban settings.
3	Whether the caregiver's age, education and occupation are associated with the child's immunization status.
4	How caregivers' knowledge, attitudes and practices influence whether immunization is completed.

04 THE SAMPLE

Caregivers of immunizable children in two Local Government Areas of Kogi State were surveyed: 190 in rural Isanlu and 218 in urban Lokoja, 408 in all. The caregiver's age, sex, education and occupation were recorded, together with the child's age and sex.

The two places were chosen to contrast a rural and an urban setting. The comparison is between these two LGAs, so it should not be read as a picture of the whole state.

05 HOW THE ANALYSIS WAS PLANNED



Objective	Method	Why this method
Profile of caregivers and children	Frequency tables by place	Shows who is in each sample before anything is compared
1: coverage	Cross-tabulation of outcome by place and by child's age group	The outcome has three categories and the comparison is between groups
2: barriers	Share of caregivers naming each barrier, by place	Each barrier is a yes or no answer, so a share per place is the clearest comparison
3: socio-demographics	Multinomial logistic regression with odds ratios	The outcome has three levels, so an ordinary logistic regression cannot be used
4: knowledge, attitudes, practices	Likelihood ratio tests in the same model	Shows which of the three KAP components adds to the model

06 HOW A MULTINOMIAL MODEL IS READ

HOW IT IS READ, STEP BY STEP

1. Choose one outcome as the reference, for example complete immunization.
2. The model compares each other outcome (partial, none) with the reference, one comparison each.

3. For every factor it gives an odds ratio: above 1 means more likely than the reference, below 1 means less likely.
4. A confidence interval and a p-value say how much that ratio could be due to chance.
5. Read the result in words, factor by factor, and say clearly that it is an association and not a cause.

> **An everyday example.** Suppose, for illustration only, that the odds ratio for caregivers with tertiary education is 0.5 for the no-immunization outcome. That means such caregivers have half the odds of having a child with no immunization, compared with caregivers without that education. These numbers are invented to show the reading. They are not from the study.

07 CHECKS TO APPLY WHEN READING THE RESULTS

- Look at the number of caregivers behind every percentage, so that a share is never read without its base.
- Watch for cells with few caregivers, because a chi-square test is weak when expected counts are small.
- Compare the tables with the written reading line by line, so that every sentence matches a table.
- Read the place comparison with care: the two LGAs differ in the sex and education of the caregivers, so some of the difference between places may reflect who answered.

08 LIMITS OF THE DESIGN

The study covers two LGAs and cannot represent Kogi State. Immunization status relies on what the caregiver reports, unless a card was seen. The samples differ in the caregivers' sex and education, which should be allowed for when the two places are compared.

09 OUTPUTS

A data analysis chapter with descriptive tables, cross-tabulations, a barriers figure, a multinomial regression and likelihood ratio tests, with a written interpretation of each table.

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