

Economic factors associated with childhood immunization coverage among children under five years at Luwero General Hospital in Luweero district. A cross-sectional study.

Sulaidah Najjuma*, Ronald Mbidde, Francisco Ssemuwemba, Hasifa Nansereko, Jane Frank Nalubega,
Immaculate Prosperia Naggulu
Mildmay Institute of Health Sciences

Page | 1 **ABSTRACT**

Background:

The study aimed to determine the economic factors associated with childhood immunization coverage among children under five years at Luwero General Hospital in Luweero district.

Methodology:

A descriptive cross-sectional study was conducted at the outpatient department of Luweero General Hospital, Uganda, among mothers and caregivers of children under five years. A sample of 96 respondents was determined using the Kish and Leslie formula and selected through simple random sampling. Data were collected using semi-structured questionnaires with both open and closed-ended questions, administered with translation support where necessary. Data were analyzed manually using tally sheets and summarized using frequencies and percentages. Ethical approval and informed consent were obtained, and data quality was ensured through pre-testing and supervision.

Results:

Most respondents were aged 25–34 years and 35–40 years (38; 39.6% each), while 20 (20.8%) were aged 15–24 years. The majority vaccinated their children before one year of age (85; 88.5%), whereas 11 (11.5%) vaccinated after one year. Regarding education, most respondents had primary education (34; 35.4%), followed by secondary education (28; 29.2%), no formal education (18; 18.8%), and tertiary education (16; 16.7%). Most respondents were Christians (66; 68.8%). More than half resided in rural areas (56; 58.3%), while 40 (41.7%) lived in urban areas. The majority were married (80; 83.3%), and farmers were the most common occupation (25; 26.0%). Regarding immunization status, 50 children (52.1%) were partially immunized, 30 (31.3%) were fully immunized, and 16 (16.6%) were not immunized. More than half (55; 57.3%) believed employment facilitated immunization, and 40 (41.7%) reported household income positively influenced completion of immunization schedules.

Conclusion:

Employment status, household income, poverty, and transport costs influenced caregivers' ability to complete childhood immunization schedules.

Recommendation:

The Government of Uganda should strengthen immunization awareness through media campaigns and community health education.

Keywords: childhood immunization, immunization status, immunization schedules.

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Corresponding author: Sulaidah Najjuma
Mildmay Institute of Health Sciences

Background

Childhood immunization remains one of the most effective public health strategies for preventing illness and death among children under five years of age. However, vaccination coverage in many low- and middle-income countries remains below recommended levels. For example, an analytical cross-sectional study conducted in the Nadowli-Kaleo District of the Upper West Region in Ghana reported that only 55.4% of children under five years had received all recommended vaccines. The study further showed that parental employment status significantly influenced immunization uptake, as parents with stable and better-paying jobs were more able to access vaccination services. In contrast, families relying on low-income or unstable occupations often experienced

financial challenges that resulted in delayed or missed immunization appointments (Kuuyi & Kogi, 2024).

Across East Africa, immunization coverage also remains suboptimal, with only about 67.4% of children reported to be fully vaccinated. Higher vaccination rates were observed in communities where households had better access to media information and higher socioeconomic status (Dires et al., 2025). Similarly, a secondary analysis involving 35 countries in sub-Saharan Africa revealed wide differences in vaccination coverage, ranging from 92.2% in Rwanda to only 42% in Ethiopia. The analysis also indicated that children from households with health insurance were approximately 13% more likely to complete their vaccination schedules compared to those without coverage (Ekholuenetale et al., 2024).

In Northern Nigeria, household economic status has also been shown to influence vaccination coverage. Children from wealthier families had higher immunization rates (38.6%) compared to those from poorer households, where only 5.0% were fully immunized (Adebawale et al., 2019). Furthermore, evidence from 34 countries in sub-Saharan Africa revealed that only 54.1% of children aged 12–23 months had completed the recommended vaccination schedule. Key challenges reported included poverty and the inability of caregivers to afford transportation to health facilities where immunization services are offered (Simon et al., 2025).

Therefore, this study aimed to determine the economic factors associated with childhood immunization coverage among children under five years at Luweero General Hospital in Luweero District.

METHODOLOGY

Study design

This study employed a descriptive cross-sectional design to determine the sociodemographic, economic, and health system-related factors that were associated with childhood immunization coverage among children under five years at Luweero General Hospital, Luweero District.

Study area

The study was conducted in the Outpatient department at Luweero General Hospital, situated in Luweero District in Uganda's Central Region, approximately 75 kilometers north of Kampala, the capital city. The district lies along the Kampala–Gulu highway, ensuring year-round road accessibility (Uganda Bureau of Statistics (UBOS), 2020). Operated by the Uganda Ministry of Health, the hospital functions as a referral center for Health Center IIs and IIs within Luweero and neighboring districts like Nakaseke and Nakasongola. It offers both preventive and curative care, with a specialized Maternal and Child Health (MCH) department, which delivers routine immunization through the Expanded Programme on Immunization (EPI) for children under five years (Ministry of Health (MOH), 2022). Geographically, the hospital is positioned at latitude 0.8336° N and longitude 32.4956° E, and it serves a catchment population exceeding 500,000 people, including both rural and urban communities (UBOS, 2020).

Study population

The target population included mothers and caregivers of children below 5 years who were residents of Luweero district.

Sample size determination

The sample size was determined using the Kish and Leslie formula to calculate the minimum sample size from the population. Since the total number of children under five years was estimated to be 100, the formula was adjusted for a finite population.

$$N = \frac{Z^2 p(1-p)}{d^2}$$

Where N is the sample size.

Z is the level of significance in Z scores. P is the proportion outcome.

D is absolute precision (the maximum error the investigator allowed between the estimated prevalence and the true prevalence of the problem in the population).

Therefore;

$Z = 1.96\%$ (standard normal deviation at 95% confidence interval) $P = 50\%$ (taken as a constant since the factors were not known)

$d =$ the standard error, which was 10% (0.1)

$$S0, N = \frac{(1.96)^2 0.5(1-0.5)}{(0.1)^2}$$

$$N = 96$$

96 Respondents were enrolled in the study.

Sampling technique

A probability sampling technique was used to select respondents. Here, every mother or caretaker who was available at the hospital during data collection had an equal chance of being selected since all the mothers who had children aged under five years were concerned about this issue.

The researcher used simple random sampling to select the respondents from mothers who were available. This method was used because the researcher wanted to provide an opportunity to all mothers.

Sampling procedure

The study employed a simple random sampling technique where individuals who possessed the characteristics the researcher was looking for were chosen randomly, such that each individual got the same chance to participate in the study.

Data collection method

Data was collected from respondents using self-administered questionnaires.

Data collection tools

Data was collected using semi-structured questionnaires containing both open and closed-ended questions, and was developed on the basis of the study objectives.

Data collection procedure

The purpose of the study was explained to the participants, and informed consent was obtained from respondents who met the inclusion criteria. Quantitative data were collected by giving each participant a questionnaire to fill out. The questions were read and translated into the local language.

(Runyoro and Swahili) For respondents who did not know English, the research assistant and respondents were given a chance to make their choice and record their answers.

Study variables

Independent variables

The independent variables of the study were the economic factors associated with childhood immunization coverage among children under five years.

Dependent variable

The dependent variable was low childhood immunization coverage among children under five years.

Quality control

The researcher ensured quality by;

Piloting the study.

The researcher conducted a pilot study at Luweero General Hospital, visited the area a week before the actual research, and obtained permission from the hospital administration. This visit aimed to ensure that the conditions within the hospital had not changed and to rule out the presence of highly infectious diseases that could have impeded the research in the facility.

Pre-testing of the study tool.

The researcher pre-tested the questionnaire using a small number compared to the estimated study population, which was 20 patients at Luweero General Hospital, before the actual data collection. This was done so that any necessary modifications could be made before the actual date and to determine whether the information collected was reliable and valid.

Inclusion criteria

Mothers with children below five years who were at the hospital and consented to participate in the study during the data collection period were included in the study.

Exclusion criteria

Participants who declined to consent and those with children above five years were excluded from the study.

Training of research assistants

The researcher taught the other personnel the necessary skills, who helped him in the data collection procedure. This aided data collection by saving time and preventing disruption of the hospital's normal work processes.

Ample time for data collection

For people who were unable to read and understand, a total of 10-15 minutes was allocated to each individual, and for illiterates, 20-30 minutes were allocated to each individual.

Observation of Standard Operating Procedures

This involved hand hygiene and hand rub so as to avoid cross-infection.

Data analysis and presentation

Data was analyzed manually using tally sheets and

statistically expressed in the form of frequencies and percentages. The narrative method involved the description of the observation, then presenting it in a detailed text for the reader to understand the situation fully. Tables, bar graphs, and pie charts have been used.

Data management

After the collection of questionnaires from the respondents, they were checked for completeness and accuracy of the filled information, and all the questionnaires that were identified to be inaccurately filled or incompletely filled were corrected before the respondents left. After data analysis, the questionnaires were kept under lock and key for the safety and confidentiality of respondents' data.

Ethical consideration

The research proposal was submitted to the research committee at Mild May Institute of Health Sciences, from where an introductory letter requesting the health facility to allow the researcher to collect data was provided; the health facility's medical superintendent granted permission to the researcher to collect data, and a copy of the approval letter was delivered to the person in charge of the outpatient department.

Respondents were informed about the purpose of the study, what was expected of them, and their free will to participate or withdraw from the study at any time. Participants were also assured of confidentiality and use of information obtained only for the purpose of the study, and they gave informed consent.

The ethics and research committee of Mild May Institute of Health Sciences, in conjunction with my supervisor, addressed any critical parts of the report before approval, since every human being deserves to be treated with humanity; I upheld dignity in all that was done.

RESULTS

Socio-demographic factors influencing childhood immunization coverage among children under five years.

Table 1 shows the socio-demographic factors influencing immunization coverage among children under five years. n=96

Variable		Frequency (n)	Percentage (%)
Maternal Age	15- 24 years	20	20.8
	25-34 years	38	39.6
	35-40 years	38	39.6
Total		96	100
Child's age of vaccination	Before one year	85	88.5
	Above one year	11	11.5
Total		96	100
Maternal Level of Education	No formal education	18	18.8
	Primary school	34	35.4
	Secondary school	28	29.2
	Tertiary school	16	16.7
Total		96	100
Religion	Christianity	66	68.8
	Islam	28	27.2

Regarding maternal age, most 38(39.6%) of the respondents reported that they were between the ages of 25 to 34 and 35 to 40 years, and the least 20 (20.8%) of them were between the age.

Regarding their child vaccination age, the majority, 85(88.5%) of the respondents reported that they took their child for vaccination below the age of one year, whereas the minority, 11(11.5%) reported that they were vaccinated at

above one year of age.

Regarding maternal education level, most of the respondents reported that 34(35.4%) were from primary school, and the least 16(16.7%) of them were from tertiary school.

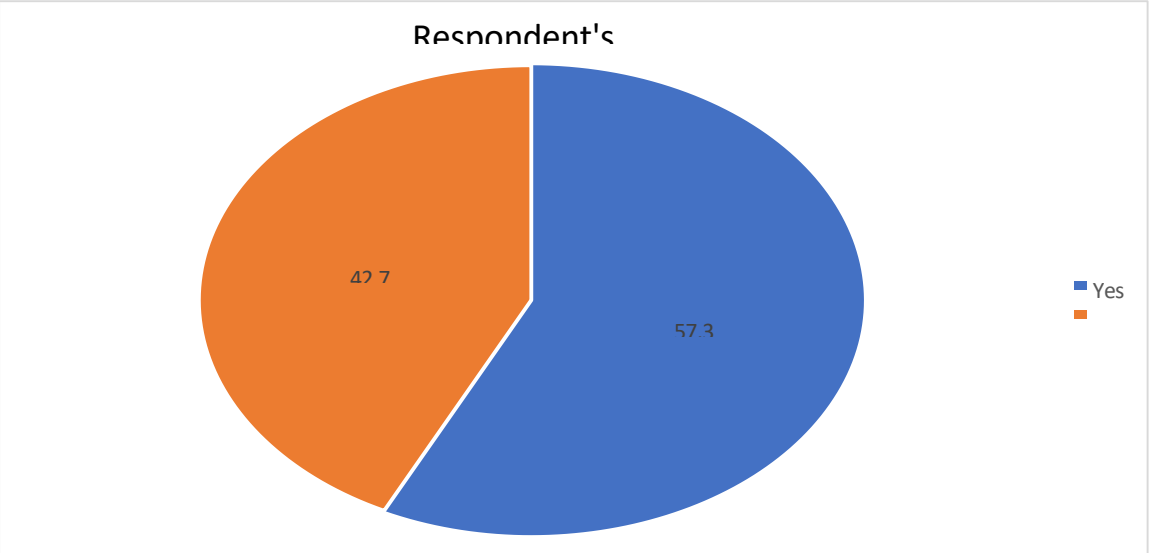
About their religion, 66(68.8%) of the respondents reported that they were Christians, whereas the least of them reported that they were from the Islamic religion.

Table 2 shows other social demographic characteristics.

Total		96	100
Residence	Urban	40	41.7
	Rural	56	58.3
Total		96	100
Occupation	Unemployed	15	15.6
	Farmer	25	26.0
	Causal/ temporary worker	20	20.8
	Self employed	18	18.8
	Salaried worker	18	18.8
Total		96	100
Marital status	Married	80	83.3
	Unmarried	16	16.7
Total		96	100

About their place of residence, 56(58.3%) of the respondents reported that they live in rural areas, while the least 40(41.7%) of them reported that they live in urban areas. Regarding their occupation, most of the respondents

least 15(15.6%) of them reported that they were not working. About their marital status, the majority 80(83.3%) of the respondents reported that they were married, while the minority 16(16.7%) of them reported that they were not



reported that they were working as farmers, whereas the married.

Economic factors affecting childhood immunization coverage among children under five years.

Figure 1 shows respondent's response on whether they thought being employed made it easier for them to take their child for immunization.
n= 96

Respondents thought that being employed made it easier for them to take their child for immunization; more than half, 55(57.3%) of them reported that it made it easier, whereas less than half, 41(42.7%) of them reported that it did not make it easier to take their child for immunization.

Table 3 shows respondent's response on whether their children received all the basic recommended vaccines according to the immunization schedule.
n= 96

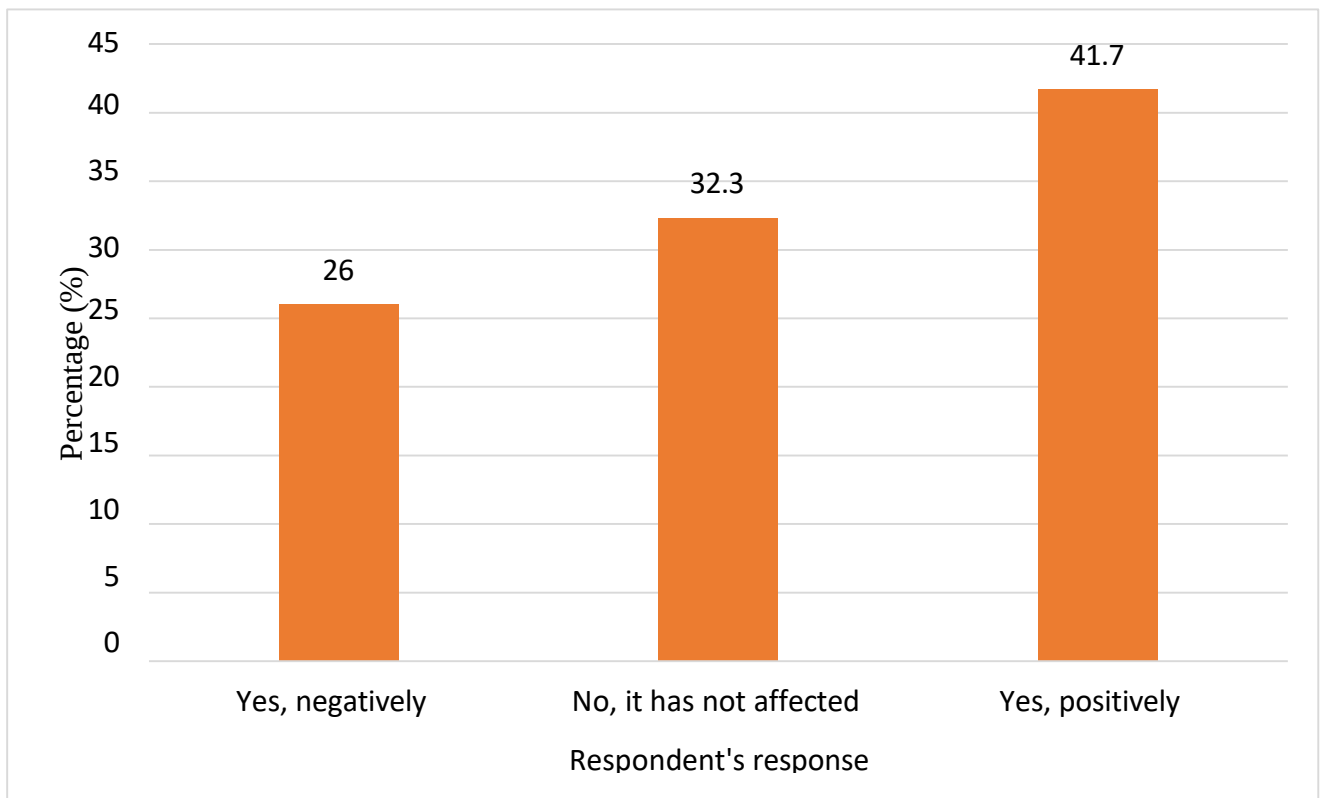
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Respondent's response	Frequency (n)		Percentage (%)
Fully immunized	30		31.3
Partially immunized	50		52.1
Not immunized	16		16.6
Total	96		100
If fully immunized, respondent's response on whether transport costs have ever stopped them from taking their child for vaccination.	Yes	18	60
	No	12	40
Total	30		100

From Table 3, about respondents' responses on whether their children received all the basic recommended vaccines according to the immunization schedule, 50(52.1%) of the respondents reported that they were partially immunized, while at least 16(16.6%) of them reported that not

immunized. Out of those that were fully immunized, 18(60%) of them reported that transport costs had ever stopped them from taking their children for vaccination, while at least 12(40%) of them reported that it had never stopped them.

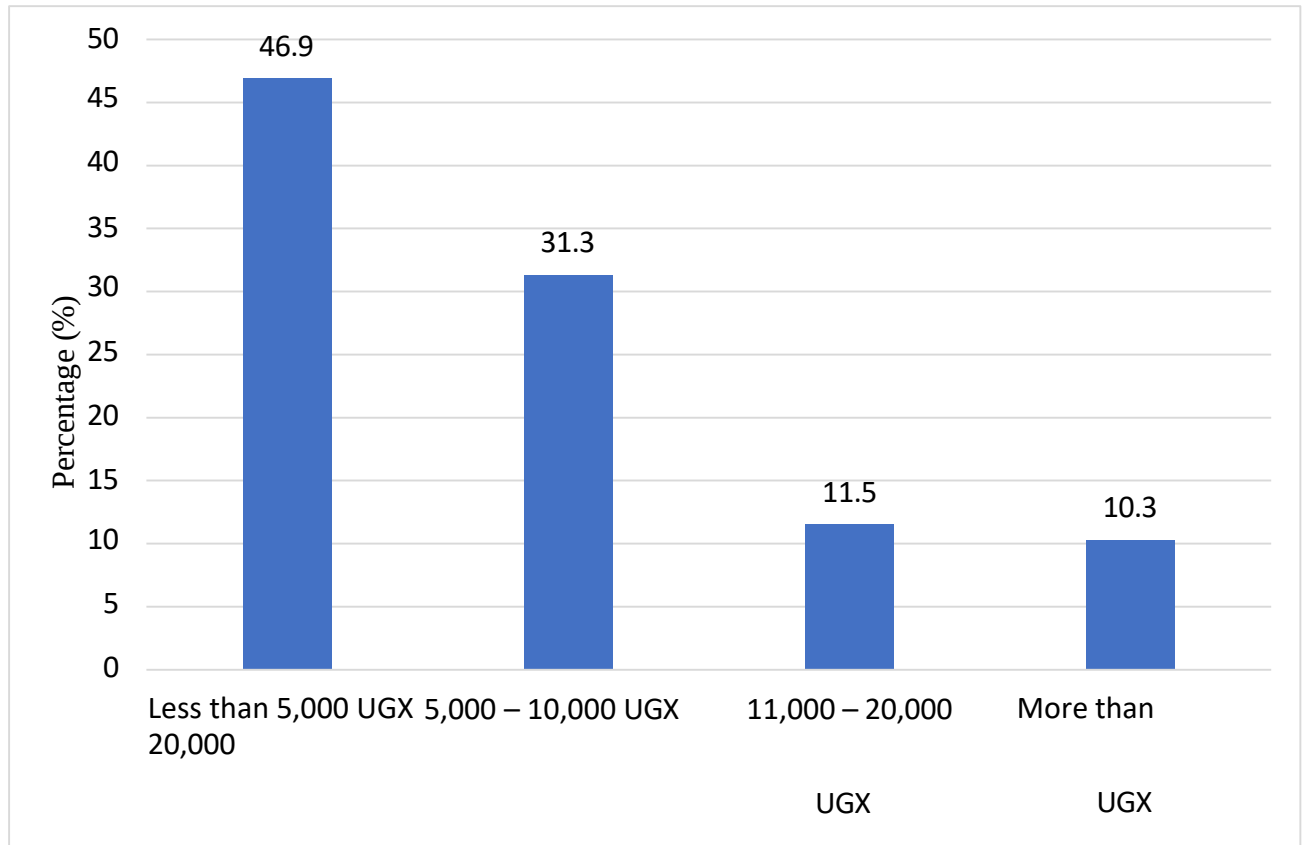
Figure 2 shows respondent's response on whether household income affected their ability to complete their child's immunization schedule.
n= 96



Regarding respondents' responses on whether household income affected their ability to complete their child's immunization schedule, 40 (41.7%) of them reported that it did affect them positively, whereas at least 25(26%) of them reported that their child's immunization schedule was negatively affected by household income.

Figure 3: Shows respondents' responses on the amount of money they spent on transport when taking their children for vaccination to Luweero general hospital.
 n= 96

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Amount of money respondents spent on transport when taking their children for vaccination to Luweero general hospital, most 45(46.9%) of them reported that they spent less than 5,000 UGX, whereas the least 10(10.3%) of them reported that they spent more than 20,000 UGX.

DISCUSSION

Socio-demographic factors influencing childhood immunization coverage among children under five years.

Regarding maternal age, most 39.6% of the respondents that they were between the ages of 25 and 34 years, and 35 to 40 years. This implies that most of the respondents were between the ages of 25 and 35 years and 35 and 40 years, respectively. This is because women within these age ranges are more likely to have young children under five years and are therefore the primary caregivers responsible for ensuring immunization. These results are not consistent with the study findings according to (Dires et al., 2025) about Exploring factors influencing childhood immunization status in East Africa, which revealed that those aged between 15 and 24 years were 66.3%, and those

aged 25 to 34 years were 28.4%. This indicates that age influences health-seeking behavior, with younger mothers being more proactive and engaged in ensuring their children complete immunization schedules. To improve immunization coverage, interventions should target all age groups of mothers, with emphasis on younger mothers, while also encouraging older caregivers to participate actively in ensuring children complete their immunization schedules.

Regarding maternal level of education, most 35.4% of the respondents went to primary school. This implies that most of the mothers' level of education was at the primary level. This is because access to higher education was limited due to socio-economic factors, cultural practices, or early childbearing. These results are in agreement with the study findings according to (Sani et al., 2025) about Regional Disparities and Maternal Sociodemographic Determinants of Full Immunization Coverage Among Children Aged 12–23 Months in Nigeria, which showed that about 29.7% of mothers had a primary level of education. This suggests that maternal education influences child immunization coverage in such a way that

mothers with lower educational levels may have limited knowledge about the importance of immunization, health-seeking behaviors, and adherence to vaccination schedules, which could affect the overall coverage among children. To improve immunization coverage, health education programs should be strengthened, targeting mothers with lower levels of education.

About their religion, most 68.8% of the respondents were Christians. This implies that most of the respondents taking their children for immunization were Christians. This is because Christianity may influence positive health-seeking behaviors through religious teachings, community support, and encouragement from church programs that promote child healthcare. These findings are not in agreement with the study findings according to (Pandey et al., 2019) about Socio-demographic determinants of childhood immunization coverage in the rural population of Bhojpur district of Bihar, which revealed that where 89.2% of those who took their children for immunization were Hindu. This indicates that religious teachings may play a role in seeking health. Certain religious communities may provide greater support, guidance, or encouragement for child immunization. Therefore, engaging religious and community leaders to promote childhood immunization, ensuring mothers from all religions receive guidance and encouragement to participate in vaccination programs.

Regarding their place of residence, more than half, 58.3% of the respondents reported that they resided in rural areas. This indicates that more than half of them stayed in rural areas. "This is because rural communities often have limited access to healthcare services, longer distances to health facilities, and fewer awareness programs related to health. These results are in line with the study findings according to (Asmare et al., 2022) about disparities in full immunization coverage among urban and rural children aged 12-23 months in southwest Ethiopia, which elaborated that 54.5% of the respondents were rural residents. This suggests that the place of residence plays a significant role in immunization uptake. Mothers in rural areas may face challenges such as limited access to health facilities and fewer health education opportunities about immunization. To improve immunization coverage in rural areas, healthcare services should be made more accessible through outreach programs, mobile clinics, and community-based health education to support mothers in completing their children's immunization schedules.

Economic factors affecting childhood immunization coverage among children under five years.

Regarding respondents' responses on whether they thought being employed made it easier for them to take their child for immunization, more than half 57% reported that it made it easier. This implies that more than half of the respondents thought that being employed made it easier for them to take their children for immunization. This is because employment provides financial stability, access to health information, and flexibility to attend health

facilities, enabling mothers to meet the costs associated with completing vaccination schedules. These results are not in line with the study findings, according to Kuuyi & Kogi (2024), about factors contributing to immunization coverage among children under 5 years in Nadowli-Kaleo District of the Upper West Region in Ghana, which revealed that approximately 28.9% of respondents indicated that their employment made it easier for them to attend child immunization services. This implies that improving employment opportunities and workplace support for mothers could increase immunization uptake by reducing time and financial barriers. To increase immunization uptake, policies should focus on improving employment opportunities for mothers and providing workplace support, such as flexible hours, paid leave, and childcare facilities, enabling mothers to attend vaccination appointments for their children.

From the respondents' responses on whether household income affected their ability to complete their child's immunization schedule, most 41.7% of them reported that it affected them positively. This indicates that most of the respondents were affected positively by their household income. This is because higher household income provides the financial resources needed for transportation, healthcare fees, and other costs associated with taking children for immunization, making it easier for mothers to complete vaccination schedules. These results are in agreement with the study findings by Adebawale et al. (2019) about the relationship between household wealth and childhood immunization in core North Nigeria, which showed that the percentage of respondents with high household income was about 39%. This means that 39% of the children in the study came from rich households, and these had higher rates of complete immunization compared to those from poorer households. To improve immunization coverage among children from poorer households, targeted interventions such as free vaccination campaigns, transportation support, and community outreach programs should be implemented to reduce financial barriers and ensure equitable access to immunization services.

Regarding respondents whose children were fully immunized, about their response on whether transport costs have ever stopped them from taking their child for vaccination, most 60% of them reported that transport costs have ever stopped them from taking their child for vaccination. This indicates that of the respondents whose children were fully immunized, most of the respondents reported that transport costs had never stopped them from taking their children for vaccination. This is because high transportation expenses, especially for families living in rural areas, create a financial barrier that limits regular access to health facilities for timely immunization.

These results are not in line with the study findings according to (Simon et al., 2025) about regional, sub-regional, and country-level full vaccination coverage in children aged 12-23 months for 34 countries in sub-Saharan Africa, which found that 28.7% of respondents reported that they could not afford transport costs to take their children for immunization. This shows the influence

of transport costs on mothers' health-seeking behavior and the completion of childhood vaccination schedules. To reduce the impact

Transport costs on immunization, mobile vaccination clinics, outreach programs, and community-based vaccination campaigns should be implemented in order to bring services closer to people.

CONCLUSION

The study found that several economic factors influence childhood immunization coverage among children under five years at Luweero General Hospital. Employment status plays an important role, as caregivers who are employed are more able to facilitate transportation and other costs related to accessing immunization services. Household income also affects the ability of caregivers to complete immunization schedules for their children. In addition, poverty and transport costs were identified as barriers that limit caregivers from regularly taking their children to health facilities for vaccination.

Study limitation

Language barrier, which delayed data collection and reduced the quality of information obtained.

Inadequate time to carry out the study, which prevented the researcher from gathering all the required information.

Abbreviation

MCH

EPI

UBOS

MOH

UGX

SN

RM

FS

HN

JFN

Full Form

Maternal and Child Health

Expanded Programme on Immunization

Uganda Bureau of Statistics

Ministry of Health

Uganda Shillings

Sulaidah Najjuma

Ronald Mbidde

Francisco Ssemuwemba

Hasifa Nansereko

Jane Frank Nalubega

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The study received no external funding.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

DATA AVAILABILITY

Data is available upon request from the author.

AUTHOR BIOGRAPHY

Sulaidah Najjuma is a student pursuing a diploma in clinical medicine and community health at Mildmay Institute of Health Sciences.

Ronald Mbidde,

Francisco Ssemuwemba, research supervisor at Mildmay Institute of Health Sciences.

Inadequate funding to facilitate the research assistant during the process of data collection.

RECOMMENDATION

The Government of Uganda should strengthen public awareness about childhood immunization through increased health promotion campaigns using media platforms such as social media, radio, and community outreach programs. This will improve knowledge among caregivers about the importance of completing immunization schedules.

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Hasifa Nansereko, research supervisor at Mildmay Institute of Health Sciences.

Jane Frank Nalubega: research supervisor at Mildmay Institute of Health Sciences.

AUTHOR CONTRIBUTIONS

SN: collected the data.

RM: supervised the study.

FS: supervised the study.

HN: supervised the study.

JFN: supervised the study

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