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Knowledge, attitude, and practices of caregivers towards pneumococcal vaccine uptake at Masaka regional referral hospital. A cross-sectional study.

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ABSTRACT

Background:

Pneumonia and other inspiratory-related infections are a major health concern, particularly among children under five years. Immunization with the Pneumococcal conjugate vaccine (PCV) is a critical preventive measure. This study aimed to determine the knowledge, attitude, and practices of caregivers towards pneumococcal vaccination at the MCH clinic in Masaka Regional Referral Hospital.

Methodology: The study employed a cross-sectional design, targeting caregivers of young children. A sample of 60 participants was obtained by simple random sampling, and data were collected using structured questionnaires. Collected data was analyzed using Microsoft Excel, and findings were presented in the form of tables and figures.

Results:

Out of 60 respondents, the majority (40%) were aged between 30-39 years, (30)50% had attained secondary level of education, while 4(7%) had no formal education, 39(65%) lived in urban areas, whereas 21(35%) lived in rural areas. Findings showed that 58% of the caregivers were knowledgeable about pneumococcal-related diseases, 63% were aware that the pneumococcal vaccine exists. There were significant gaps in their understanding of t h e benefits of the vaccines and recommended vaccination schedules. Attitudes towards vaccination are generally positive, with most caregivers recognizing the importance of immunization.

Conclusion:

While there is a high level of trust in the safety and effectiveness of the pneumococcal vaccine among caregivers, a negotiable portion of the population is unsure and holds negative beliefs about the vaccine.

Recommendations:

The management of MRRH should enhance awareness through targeted campaigns and educational materials, provide continuous training to health professionals, improve vaccine accessibility and supply chain management, and engage community leaders and support groups.

Keywords: *Pneumococcal Conjugate Vaccine, Masaka regional referral hospital.*
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BACKGROUND

Pneumococcal disease is the most significant cause of morbidity and mortality worldwide among children, particularly in low and middle-income countries. (WHO, 2021). It can lead to severe conditions such as pneumonia, meningitis, and bloodstream infections. The introductions of pneumococcal vaccines, namely PCV and PPSV, have proven effective in reducing the incidence of these diseases (Bonten et al., 2015).

Pneumococcal disease poses a significant health burden in Africa, particularly among children under five years. To combat this, the introduction of pneumococcal conjugate vaccines (PCVs) has been a crucial public health intervention (Kalata et al., 2019). Furthermore, the introduction of pneumococcal conjugate vaccines has been a critical public health intervention in East Africa. Countries like Uganda, Kenya, and Tanzania have incorporated PCVs into their national immunization programs with support from GAVI, the Vaccine Alliance (WHO, 2019)

Masaka Regional Referral Hospital serves a large population in the central Region of Uganda, where childhood vaccination programs are crucial for public health. Previous studies have shown misconception about vaccine safety, lack of information, and cultural beliefs significantly influence caregivers' decisions regarding vaccinations. Understanding caregivers' awareness of pneumococcal disease, perceptions of the vaccine's importance, and actual vaccination practices can highlight barriers to immunization and inform strategies to improve uptake (Ota .M.O.C, et al. 2019).

The government of Uganda, together with the WHO, emphasizes the importance of comprehensive vaccination programs to control infectious diseases, yet gaps in

knowledge and negative attitudes persist. This study explored the knowledge, attitude, and perception of caregivers towards pneumococcal vaccine uptake at the MCH clinic in Masaka Regional Referral Hospital.

METHODOLOGY

Study Design

The study was cross-sectional and descriptive in nature. The cross-sectional study design utilized surveys to generate quantitative data at the time of data collection.

Study Area

The study was conducted at Masaka Regional Referral Hospital in Masaka district. It was founded in 1927 as a treatment Centre for World War 1 veterans; it was elevated to regional referral status in 1966, with a population exceeding over 2 million people, and comprises both rural and urban areas, and provides medical care for the local people. The Centre is publicly funded and offers free services. These include Mother Child Health care, Immunization, dental, ophthalmic, inpatient laboratory services, Major surgeries, Ear, Nose, and Throat clinic, management of non- communicable diseases such as diabetes, hypertension, HIV/AIDS, and TB services, health checkups, and outreach services within the community.

Study Population

The study involved children under 5 years who were exposed to pneumonia, including those who were initiated on antibiotics, and all the caregivers at Masaka regional referral hospital. The study mainly targeted those who were present during the research period or the time of data collection.

Sample Size Determination

The Fisher's formula was used to determine the sample size,

$$n=z^2P(1-P)\div d^2$$

Where; n=Minimum sample size
z=the table value for standard normal deviation corresponding to 95% significance level, (1.96)
p=prevalence of characteristic being estimated
d=Margin error, set at 0.05
The sample size of the study was calculated using the estimated prevalence of 7%.

$$n=(1.96)^2*0.5(1-0.5)\div(0.1265)^2$$

n=60 participants

Sampling Procedure

From the targeted study population, the sample size was determined by using the simple random sampling method. Each respondent in a sample had an equal probability of being selected to participate in the study. The expected participants were approached, and accorded a number or name. The names were then written on paper, which was rolled and placed in a bowl, and thoroughly mixed. Then a blind folded assistant selected at a time without replacement until the required number of respondents was acquired.

Data Collection Method

Questionnaires were administered to respondents (caregivers). A maximum of 15 respondents were sampled for approximately 5 days in order to meet the desired number of respondents.

Data Collection Tools

Data was collected using semi-structured interview guides, which consisted of closed-ended questions.

Data Collection Procedure

Questionnaires were administered to respondents at the ART clinic and other safe, comfortable, and accessible place with in the health facility, thus promoting efficiency and confidentiality during data collection.

Independent Variable

Knowledge, attitude, and practices of caregivers on vaccination against pneumococcal virus at MCH in Masaka Regional Referral Hospital.

Dependent Variable

Vaccination against pneumococcal disease.

Quality Control

There was vivid interviewing of successful respondents and observation during the data collection to ensure that all questions were understood and answered correctly. The pretest of the tools was done at Masaka Regional Referral Hospital, before the actual study. Refining and evaluation were carried out among 5 randomly selected individuals who were willing to volunteer. This provided clarity, validity, sequencing, and insight into how much time would be required to administer each instrument. Great care was taken when coding, entering, verifying, and cleaning data.

Inclusion Criteria

All caregivers who were present during the time of data collection.
Caregivers who were willing to provide informed consent to take part in the study.

Exclusion Criteria

All caregivers are unable to give informed consent due to cognitive impairment or other reasons.
Any caregiver who cannot understand or communicate in the language of the study.

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Data Analysis and Presentation

The data from the questionnaire was first scrutinized for any discernible errors. This helped in ensuring consistency of responses, uniformity, and accuracy of the data collected. The data was entered into Microsoft Excel and analyzed. The analyzed data were presented in the form of percentages and frequencies in tables and figures.

Ethical Considerations

A complete proposal was presented to the supervisor and the principal to endorse the study and allow data collection. Permission to carry out the study was sought through an introductory letter from the research and ethics committee, addressed to Masaka Regional Referral Hospital. Confidentiality was observed in the study. All information collected was kept confidential. In addition, voluntary participation was ensured, allowing each respondent to join freely and choose pull out of this study at any point when they feel uncomfortable.

RESULTS

Socio-demographic characteristics of the respondents.

Table 1 social-demographic characteristics of the respondents (N=60).

Variable	Category	Frequency (N=60)	Percentage (%)
Age	18-29	18	30
	30-39	24	40
	40-49	12	20
	>50	6	10
Address	Rural	21	35
	Urban	39	65
Level of education	Primary	9	15
	Secondary	30	50
	Tertially	17	28
	No formal education	4	7

A total of 60 respondents participated in the study. The majority of the respondents were between 30- 39years24 (40%), and the 6(10%) were the least. (10%) Were above 50 years.

Based on the level of education of the respondents, the majority of the respondents reached secondary level (30), 50%, while the least 4(7%) had no formal education.

Regarding places of residence, the majority, 39(65%), lived in urban areas, while 21(35%) lived in rural areas.

Knowledge of caregivers towards pneumococcal vaccination

Table 2: knowledge of caregivers towards pneumococcal disease vaccination, N=60.

Question	Response	Frequency (N=60)	Percentage (%)
Knowledge of the caregiver	Yes	35	58
	No	25	42
About illnesses caused by pneumococcal disease	Pneumonia and meningitis	28	47
	Incorrect or unsure	32	53
Awareness of the pneumococcal vaccine	Yes	38	63
	No	22	37
Source of information	Healthcare provider	32	53
	Social media	08	13
	Friends and family	12	20
	Internet research	8	14

On assessing the knowledge about pneumococcal disease, the majority 35% had knowledge, while 25% never had knowledge of pneumococcal vaccination. Regarding identifying illnesses that are caused by pneumococcal bacteria, the majority (53%) failed to identify pneumonia and meningitis as the illnesses caused by pneumococcal infection, and 47% were able to identify pneumonia and meningitis as the diseases caused by pneumococcal bacteria. On assessing whether the caregivers were aware

that a vaccine exists, 63% were aware, while 37% were not aware of the pneumococcal vaccine.
On assessing the source of information where the caregivers heard about the pneumococcal vaccine, 53% heard from health providers, 13% from social media.

Attitudes of caregivers towards pneumococcal disease and vaccination, N=60.

Table 2: Showing the attitude of caregivers towards the practice of vaccination, N=60.

Variable	Response	Frequency	Percentage
Safety on pneumococcal vaccine	Safe Very safe Unsure Unsafe	38 08 10 04	63% 13% 17% 7%
Effectiveness of the pneumococcal vaccine	Very effective Somewhat effective Unsure Ineffective	43 8 5 4	72% 13% 08% 7%
Belief in the importance of vaccination	Strongly agree Agree Disagree Neutral	24 22 05 09	40% 37% 08% 15%
Pneumococcal disease acceptance	Very acceptable Not accepted	45 15	75% 25%

Regarding the safety of the vaccines, the majority of the respondents, 38(63%), accepted that the vaccine is safe, and at least 04(7%) chose vaccination against pneumococcal being unsafe.
For effectiveness and efficiency, the majority (43)72% chose that the vaccine was very effective; however, the minority (4)7% believed that it was ineffective.

On assessing whether the caregivers agreed that it is important for children to be vaccinated against Pneumococcal diseases, the majority, 24(40%), strongly agree, while the minority, 4(08%), were neutral.
Regarding cultural attitude towards pneumococcal vaccination, majority45 (75%) accept vaccination while 15(25%) do not accept vaccination

Table 3: Practice of caregivers towards pneumococcal vaccination (N=60).

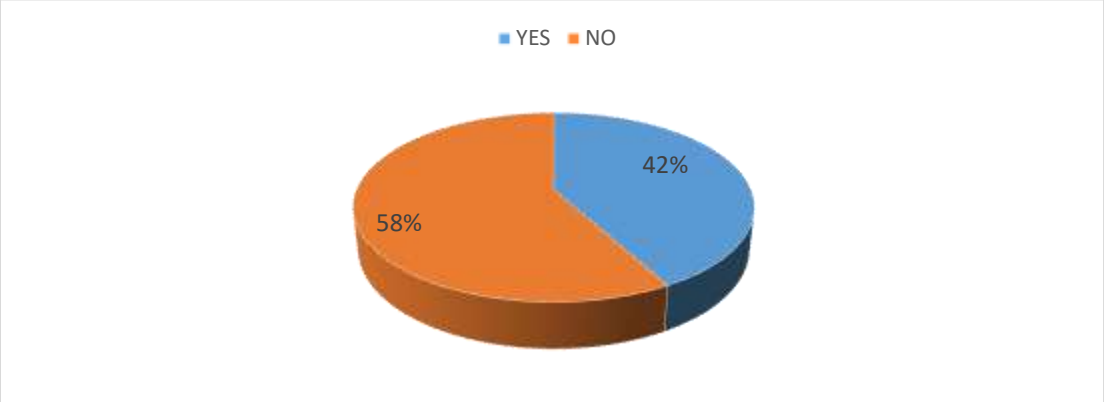
Variable	Response	Frequency (N=60)	Percentage (%)
Children's vaccination against pneumococcal disease	Yes No	32 18	53 30
The cause of the delay in vaccination	Cost of vaccine Concerns about side effects Difficulty accessing a health care facility Not aware of the vaccine	24 12 20 04	40 20 33 7
Challenges faced in accessing vaccination services?	Yes No	42 18	70 30
preventive measures to reduce pneumococcal disease spread	Yes No	25 35	42 58

Regarding the assessment of whether the caregivers had ever had any child vaccinated against pneumococcal disease, the majority, 32(53%), had ever vaccinated against pneumococcal bacteria, while the least, 18(30%), had never been vaccinated against pneumococcal bacteria.

Furthermore, in the view of identifying the reason hindering caregivers from receiving the vaccination, the majority, 24(40%), while the least 04(7%) were not aware of the vaccine. On identifying whether the caregivers had

any challenges in accessing vaccination services, 42(70%) had challenges, while 18(30%) never had challenges.
Regarding preventive measures to reduce the risk of pneumococcal disease, like practicing good hygiene or avoiding crowded places, the majority, 35(*58%*), denied, while the minority, 25(42%), accepted.

Figure 1: Showing the number of caregivers who practice good hygiene and avoid crowded areas to prevent pneumococcal diseases.



The majority (35)58% don't practice, whereas the least (25)42% practice good hygiene and avoid crowded areas to prevent pneumococcal diseases.

DISCUSSION

Knowledge of caregivers towards pneumococcal vaccination at Masaka RRH.

The study on caregivers' knowledge about pneumococcal vaccination reveals a mixed level of awareness. While a significant portion of caregivers (58%) are aware of pneumococcal disease and its vaccination, a notable percentage (42%) are not. This is attributed to increased health initiatives, informational websites, community outreach, and massive vaccination drives. These results disagree with the results of the study carried out in India by Lisk et al. 2018), which shows that the majority of the caregivers were unaware of pneumococcal vaccination.
Additionally, the minority of the caregivers correctly identified that pneumococcal bacteria can cause illnesses like pneumonia and meningitis (47%), but a larger group (53%) was either incorrect or unsure about the diseases caused by these bacteria. The following results were due to increased accessibility of the level of education and increased work done by health officials to provide maximum health education to different people attending Mother Child Health. These findings are in line with the findings from the study carried out in East Africa. Social media, health providers, and family discussions emerged as common sources of information about the pneumococcal vaccine.
Regarding the source of information where they first obtained the information concerning pneumococcal vaccination, it revealed that the majority, 53 %(n=32), got it from health care providers, and a minority (13%) from social media. These results were attributed to increased healthcare campaigns by the World Health Organization and CDC, and health education sessions were always conducted.

Attitude of caregivers towards pneumococcal vaccination at Masaka RRH

The data from the survey on caregivers' attitudes towards pneumococcal vaccination provides valuable insights into public perceptions and beliefs. The findings showed that the majority of respondents (76%) believed that the pneumococcal vaccine is safe, and a minority 7% were unsafe. This is due to a strong safety record since the vaccines have been used for decades and have exhibited a record of safety; millions of doses have been administered worldwide, with most recipients experiencing only mild, temporary side effects. There are extensive clinical trials before approval, ensuring that they meet high safety standards. Regulatory agencies like the FDA, WHO evaluate vaccines thoroughly before they are made available to the public. These results are in line with the research conducted by the FDA (2022).
Regarding the effectiveness, 85%% of respondents believed that the pneumococcal vaccine is very effective, and 7% believe it is ineffective. This is attributed to the fact that for many years they have been vaccinating all the vaccinated individuals, who have not contracted pneumonia or meningitis.
Additionally, 72% of respondents strongly agree that it is important for children to be vaccinated against pneumococcal infection, and 8% disagreeing. The results obtained were because of the increased awareness of diseases such as pneumonia and meningitis, which are deadly but can be prevented with vaccination. These findings agree with a similar study conducted by Bonten

et al. (2015), which revealed that it is important to vaccinate against pneumococcal vaccines.

Regarding the assessment of the practice of vaccination against pneumococcal disease,75% accepted that vaccination against pneumococcal disease is accepted; however, the minority 25% did not agree. This is attributed to the global health endorsement by the authoritative bodies, which lends credibility and encourages adoption across diverse cultures. These results are from the study conducted by Ota et al. (2019) on how widely different perceptions of the different cultures have on pneumococcal vaccines, which revealed that most communities accepted the use of pneumococcal vaccines.

Practices of caregivers towards pneumococcal vaccination

The data from the survey on the caregivers' attitudes and practices towards pneumococcal vaccination provides valuable insights into their perceptions and concerns. The study shows that the majority, 53% of the caregivers, appreciated pneumococcal vaccination and have ever had their children vaccinated, while 47%do not. This is attributed to the increased need to promote individual protection and to promote pneumonia eradication, hence providing good health. These results are not in line with the research conducted by Siele et al. (2023), which showed that the majority were not vaccinated due to limited access to healthcare facilities.

On assessing the main reason why a person may delay receiving the pneumococcal vaccine, the majority, 40% of the respondents, are hindered by the cost of the vaccine, while the least 7% just aware of the vaccine. This is because pneumococcal vaccine production involves complex processes; thus majority of the population are low-income earners, most especially in developing countries like Uganda. Therefore, to increase the vaccination ratio in Masaka, the government must make it a routine for everyone at no cost. The results disagreed with the research conducted by Menge et al. (2022), which was about the factors associated with pneumococcal vaccination and childhood pneumonia, which revealed that the majority are highly affected by difficulty in identifying vaccination services.

On assessing whether the caregivers have ever had any challenges in accessing vaccination services, the majority 70% had ever been vaccinated, and only 30% had not vaccinated against the pneumococcal vaccine. These results are attributed to the remoteness of some areas, most especially in rural areas that have challenges in accessing health facilities, while some mothers give birth to traditional birth attendants who really lack knowledge about the current immunization schedule as per the Uganda National Expanded Program on Immunization (UNEPI). These results are in line with the study conducted by Muniu et al. (2024) about knowledge, attitude, and practices towards pneumococcal vaccination.

Concerning preventive practices like proper hygiene and avoiding crowded places, results revealed that the majority 58% do practice while 42% do not. These results are attributed to the low economic status of people, most especially in rural areas of Masaka, thus finding it difficult to practice good hygiene. For example, people even find challenges in accessing clean water, which becomes a challenge to get clean water to wash their hands. These results are in line with the study conducted by Katala et al. (2019) about practices in preventing pneumonia infection, especially in children under five years.

Additionally, caregivers reported taking measures to reduce the risk of disease, such as practicing good hygiene and avoiding crowded places, while 58% did not. Regarding the assessment of whether caregivers have ever been vaccinated. The majority (70%) and the least (30%) had challenges in vaccination.

CONCLUSION

The findings revealed that the majority of adults were knowledgeable about pneumococcal vaccination; however, knowledge gaps were observed in a few respondents. While there is a high level of trust in the safety and effectiveness of the pneumococcal vaccine among caregivers, there is still a notable portion of the population that is unsure about the vaccine. This uncertainty could impact vaccination rates and public health outcomes. The majority of the respondents had not vaccinated against pneumococcal disease, and this was attributed to the fear of side effects, poor economic status, and lack of access to health care services.

RECOMMENDATION

Develop and implement comprehensive educational campaigns to address the concerns of those who are unsure or believe the vaccine is unsafe or ineffective. These campaigns should provide clear, evidence-based information about the safety and benefits of the pneumococcal vaccine.

Encourage healthcare providers to actively discuss the importance of pneumococcal vaccination with caregivers during routine visits. Providers should be equipped with up-to-date information and resources to address any questions or concerns.

Community Outreach Programs should be organized to educate caregivers, especially in areas with lower vaccination rates. These programs include informational sessions, workshops, and the distribution of educational materials.

Leverage trusted sources of information, such as healthcare providers and community leaders, to disseminate accurate information about the pneumococcal vaccine. This can help build trust and counteract misinformation.

Introduce educational programs in schools to inform parents and caregivers about the importance of

pneumococcal vaccination. Schools can serve as effective venues for reaching a large number of caregivers.

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LIST OF ABBREVIATIONS

MRRH:	Masaka Regional Referral Hospital
HIB:	Haemophilus Influenzae Type b (often vaccinated alongside PCV)
MCH:	Maternal and Child Health
KAP:	Knowledge, Attitude, and Practices
GAVI:	Global Alliance for Vaccines and Immunization
PCV:	Pneumococcal Conjugate Vaccine
PPSV:	Pneumococcal polysaccharide Vaccine
HIV:	Human Immunodeficiency Virus
TB:	Tuberculosis
AIDS	Acquired Immune Deficiency Syndrome
WHO:	World Health Organization

SOURCE OF FUNDING

The study was not funded.

CONFLICT OF INTEREST

The author declares that there was no conflict of interest.

AUTHOR CONTRIBUTIONS

RN- Developed and investigated a study.
JK- Supervised the Study.
MMM- Supervised the study.

DATA AVAILABILITY

Data is available upon request.

INFORMED CONSENT

There was full disclosure; full comprehension, and respondents voluntarily consented to participate in the study.

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Joseph Kiwu is a tutor and research supervisor at International Paramedical Institute Maya.
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