

Family health education on children vaccination: a case study in Mozambique

Abstract

Introduction: Vaccination is an important tool for preventing infectious and contagious diseases, which are common and lead to morbidity and mortality, with serious consequences for children in Mozambique and around the world. However, there is low coverage of fully vaccinated children in Mozambique. Lúrio University has implemented the 'One Student, One Family' Programme, in which students are assigned a family to accompany throughout the course, carrying out health outreach activities.

Objectives: To improve the knowledge and practices of children's carers about the vaccination schedule in families in Mutauanha, Nampula, Mozambique.

Methods: Case study of a participatory operational research in three phases, a) mixed descriptive cross-sectional cohort study of families, b) outreach on childhood immunisation, c) evaluation of the impact on families' vaccination knowledge and practices. We used a heterogeneous purposive sampling technique. Data collection used in-depth interviews with mothers and an observation form on compliance with the child's vaccination schedule, according to health card records. We processed the data using two-entry table and content analysis and the key categories identified and analysed using thematic analysis.

Results: We assessed five mothers, and 12 children included in the study. All the mothers showed that they had information about the concept and importance of vaccination; regarding practice, the majority did not prioritise the issue, but some adopted means to comply with the vaccination schedule. The health education intervention overcome these aspects, verified with the updates to the child's card vaccination.

Discussion: Most mothers did not prioritise vaccination in their child's health, but after the health education session, they began to prioritise and correct absences and delays.

Conclusion: The mothers had some knowledge about vaccination, despite poorly updated children's health cards. After the intervention, there was progress in the children's adherence to vaccination and in the models adopted to control upcoming dates. Outreach by health science students proved to be effective in promoting family health.

Keywords: child, extension, family, health, vaccination

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Abbreviations: WHO, world health organisation; MoH, the ministry of health; EPI, extended programme of immunisation; PCV-10, pneumococcal conjugate vaccine; HPV, human papilloma virus, GAVI, global alliance for vaccination and immunisation; LMICs, low- and middle-income countries; SDGs, sustainable development goals; FHS, faculty of health sciences

Introduction

Vaccination, especially in early childhood, is an important tool for preventing infectious and contagious diseases, which are common at this age and lead to morbidity and mortality, with serious consequences for children in Mozambique and around the world. Vaccination is a fundamental human right.¹ Childhood vaccination protects health, preventing infectious diseases and the occurrence of epidemic outbreaks. The Ministry of Health (MoH) of the Republic of Mozambique, following the recommendations of the World Health Organisation (WHO), has established a vaccination schedule to apply according to age group, implementing an immunisation programme, the Extended Programme of Immunisation (EPI),² and promoting regular campaigns through the school health programme, health fairs and specific vaccination campaigns. However, due to various factors,

such as the difficulty of accessing health centres (HCs) and vaccination campaigns, the low educational and economic level of parents, some beliefs and myths of the local culture, there is low coverage of fully vaccinated children in Mozambique.³

Vaccination coverage remains higher in urban areas and varies with income level, and we need more effort to reduce these inequalities. Loss rates (children who have not received booster doses) remain high (estimated at over 10 per cent). According to the WHO, disaggregated coverage levels for diphtheria - tetanus - pertussis (DTP3), hepatitis - B (HepB3) and polio (Pol3) have fallen in recent years.⁴

Vaccination coverage in Mozambique has been increasing since 1997 (58%), with 67% in 2003 and 70% in 2008. In recent years, new vaccines have been introduced - hepatitis B, haemophilus influenza, rotavirus and the pneumococcal vaccine. The rotavirus infections epidemiology in Mozambique before vaccine introduction, had an overall prevalence of 42.4%, highest in children between 6 and 11 months old.⁵

Neonatal tetanus eliminated in 2011. Target for elimination are measles and polio. As pneumonia remains a serious disease in childhood, in 2013 the EVP introduced the pneumococcal conjugate

vaccine (PCV-10). A demonstration project for human papilloma virus (HPV) scheduled to begin in 2014, with support from the Global Alliance for Vaccination and Immunisation (GAVI), was implemented in 2021. Vaccination against rotavirus, introduced in 2015, has still insufficient coverage, although several studies show the importance of increasing rotavirus vaccine coverage, particularly in Low- and Middle-Income Countries (LMICs).⁶ Research in the United States of America provides evidence for a decrease in seizure hospitalizations following rotavirus vaccine introduction, with the greatest impact in age groups with a high rotavirus-associated disease burden and during rotavirus infection season.⁷

The EPI manages several types of vaccines: measles, polio, tetanus, pertussis, Hib (influenza type B haemophilus), diphtheria, hepatitis B, tuberculosis, rotavirus and pneumonia. This programme also purchases vaccines to protect mothers against tetanus. Since 2009, it used the pentavalent vaccine for children, combining doses of vaccine for diphtheria, pertussis, tetanus, hepatitis B and Hib (DPT - Hepatitis B - Hib). It also currently combines rotavirus and PCV 10.

The aim of vaccination in the country is to ensure that all children receive all doses of all antigens before their first birthday, although children up to the age of 23 months remain eligible for routine vaccination. A fully vaccinated child is one who has received BCG, Measles, VAP3 and DPT / Hepatitis B by their first birthday. Children who drop out - in other words, those who do not complete the vaccination cycle - must be identified and followed up.

The MoH offers free routine immunisation services to children and women of a specific age to meet the country's needs: the target groups for routine vaccination include children under one year of age, pregnant women and women of childbearing age (15 to 49 years).

Protecting and promoting children's health is a major challenge worldwide, especially in developing countries where socio-sanitary and economic conditions are precarious, making children vulnerable to infectious diseases. In this context, knowledge of and compliance with the vaccination schedule for children is essential for dealing with numerous immune-preventable diseases and is one of the key elements in reducing the infant mortality rate.⁸

Through the EPI, the MoH aims to reduce the vaccination hesitancy rate, by making efforts in primary health care (PHC), contributing to achieving the Sustainable Development Goals (SDGs). In 2022, the first stage of the polio vaccination campaign began, targeting more than 4 million children under the age of five in the provinces of Niassa, Cabo Delgado, Nampula, Zambézia, Tete, Manica and Sofala.⁹ In 2023, a high-level GAVI mission visited Mozambique with the aim of renewing political commitment and finding ways to speed up routine immunisation reinforcements.¹⁰

Lúrio University (LU), as part of its objective of developing local communities, has implemented the 'One Student, One Family' Programme (Um-EF Programme) at the Faculty of Health Sciences (FHS) and in all its courses (Nursing, Pharmacy, Medicine, Dentistry, Nutrition, Optometry). In this programme, students are assigned a local family to visit and accompany throughout the course, carrying out health outreach activities, with rapid diagnosis, health education and referral to health services. This programme takes place in the chair of Community Health and forms the basis for practical classes.

To increase paediatric vaccine, interaction among health agents and parents at home visits, has demonstrated to be effective.¹¹

Objectives

- I. To assess the knowledge and practices of parents about the vaccination schedule for children in the Mutauanha neighbourhood in the city of Nampula, Mozambique.
- II. To educate carers about the vaccination schedule.
- III. Evaluate the change in knowledge and practices about the vaccination schedule.

Methods

Type of study: case study of a three-stage participatory operational research, a) mixed descriptive cross-sectional cohort study of families, b) outreach on childhood vaccination, c) evaluation of the impact on families' vaccination knowledge and practices.

Study area: Mozambique, city of Nampula, Mutauanha neighbourhood, Muatala Administrative Post.

Study population: families living in the Muatala neighbourhood, assisted by the Medical Course' students of the FHS of LU, 5th year, Chair of Community Health, subject Child Health, 6th group. These families are covered by the Um-EF Programme.¹² A purposive heterogeneous sampling technique was used to select representative participants for the study.

Inclusion criteria: children between the ages of zero and five years (the target age for the EPI), who have a child' health card or an immunisation record. Parents were interviewed if they were in normal mental condition and agreed to take part in the study by signing the informed consent form.

Exclusion criteria: families without children under five years of age and mothers or parents with cognitive disability or under psychotropic substances effects.

Variables: dependent, knowledge about the importance of vaccination and the vaccination schedule, practice of the vaccination schedule; independent, gender, age, level of education, profession, religion.

Baseline data collection took place in March 2021 and was repeated to assess progress in September 2021. It was carried out by 5th year medical students from LU's FHS, who were responsible for the respective families, using in-depth interviews with the children's mothers as a technique, supported by an interview script and field notes, accompanied by a data collection form for observing the child's health card.

The health education session (two hours) with the group of 5 mothers and 12 children, on the importance of vaccination and the vaccination plan, took place in the homes in April 2021, applied by the same students. Data were transcribed and translated according to the literal words of the interviewees, from the local language (Macua or Portuguese) into English. Data coding and key categories were identified and analysed using Laurence Bardin's thematic content analysis (categorisation, description and interpretation). The data were processed using Microsoft Office Excel version 13 in two-entry tables. The content was divided into categories, where the main objective of the study idea is described, and subcategories, where the ideas were broken down and studied separately (Table 1). The data were checked by two students from the group and two professors from the FHS (from the Community Health and Biostatistics disciplines). Finally, the data were presented in narrative form using the interviewees' own words as an illustration.

Table 1 Distribution of interviews and categories and subcategories

Category	Subcategory
Families' daily lives and vaccination	Relationship with the situation
Knowledge about vaccination	Concept of vaccination
	Importance of vaccination
Vaccination practices	Responsibility for vaccination

Ethical considerations: the study protocol was approved by the Medical School Council and the research began with the free participation and contribution of the parents, respecting privacy and confidentiality. The purpose of the intervention was explained, and an informed consent form was signed prior to data collection. The action-research followed Helsinki Declaration (2013) recommendations. The data are accessible in a digital archive upon justified request. Results interest for the promotion of global health determines their widespread dissemination.

Results

Five mothers representing the families studied were included and interviewed, with a total of twelve children aged between 0 and 5. In terms of the mothers' ages, one was aged between 17 and 19 and four were aged between 20 and 25.

In terms of schooling, 60% (3) had completed 7th grade and 40% (2) had completed 3rd grade. In terms of profession, four were traders and one was a domestic worker. All the mothers were Christians. Concerning marital status, they were all in a marital union. As for the number of children under the age of five, three mothers had three children, one had two and the last had just one child.

Of the twelve children aged between 0 and 5, five were under one year old and seven were over one year old.

When checking the vaccination schedule of the children up to one year of age, three had a non-updated vaccination schedule and two had an up-to-date schedule (Table 2).

Table 2 Checking the vaccination status of children up to 1 year old

Vaccination status	N	%
Up to date	2	40
Up to date with delay	0	0
Not up to date	3	60
Total	5	100

n: number; %: percentage.

Regarding the type of vaccine that was overdue in children under 1 year old, two children were not up to date with the 2nd dose of polio vaccine, injectable polio, diphtheria, whooping cough, tetanus, hepatitis B and meningitis, and rotavirus, and one was not up to date with vitamin A. Concerning the children over one year of age, four had all vaccines updated, two of them had not been updated and one had all updated but with delay.

Regarding the type of vaccine that was overdue in children over 1 year old, two children were not up to date with the 2nd dose of measles and vitamin A and deworming. The barriers to full childhood vaccination were explored, and the interviewees' evidence was integrated into three categories and four subcategories, presented within five thematic areas.

Category – Families' everyday life and vaccination: aiming to

understand the extent to which the daily life of parents influences the vaccination schedule, realising how sensitive they are to the phenomenon of vaccination.

Sub-category - Relation with the situation: how mothers deal with the fact that their children have or have had an overdue vaccination, to understand how they feel about this issue. We quote.

"Once I'm late for the vaccination, I just have to find a day when I can take the child." (1, 20 years old).

"Once the child's vaccination date had arrived, I took my child to the health centre on the day I had time." (2, 25 years old).

Category - Knowledge of vaccination: to understand and demonstrate whether the parents were aware of the childhood vaccination schedule and its importance for children's health.

Subcategory - Definition of vaccination and its importance: to understand whether parents knew the meaning of this very important action for their children's health. Asked to answer the question, they replied as follows:

"It's for the child to grow up well." (3, 22 years old).

"It's so that the child doesn't get ill." (4, 17 years old).

"It's a medicine." (5, 23 years old).

Category - Practices regarding vaccination: to understand carers and parents' practices in terms of active and timely participation in the vaccination of children.

Subcategory - Responsibilities regarding vaccination: responsibility is a feeling that is experienced differently from person to person; the EPI states that vaccines should be administered at the intervals defined by the type of vaccine and appointments for their administration should respect the rule defined by the MoH. When asked about the actions taken to fulfil this practice, the mothers replied:

"When I have an upcoming vaccination date, I always ask my husband to remind me." (1, 20 years old).

"Every day I have to go out to sell, but when I remember I take the child to be vaccinated." (4, 17 years old)

"I always check the next vaccination date on the card." (5, 23 years old).

When checking the vaccination record card, half of the cards were not up to date, with a higher prevalence in children under one year old.

Subcategory - Relating to the situation: it was found that half the mothers were totally relaxed, showing no concern about the lack of updating of the vaccination schedule.

Subcategory - Definition of vaccination and its importance: regarding the concept and importance of vaccination, all the mothers showed a degree of information on the subject.

Subcategory - Responsibilities regarding vaccination: about the practice of vaccination, it was found that most mothers did not put this issue on the list of priorities for their activities; however, some did take steps to comply with the vaccination calendar.

We then proceeded to draw up the health education session and acquire edited information for distribution, scheduling dates with the families for the intervention and evaluation (Table 4).

Table 3 Checking the vaccination status of children over 1 year old

Vaccination status	N	%
Up to date	4	57
Up to date with delay	1	14
Not up to date	2	29
Total	7	100

n: number; %: percentage.

Table 4 Health education plan

Activity	Objectives	Target audience	Date	Location
Talk on the importance of vaccination.	To make parents and carers understand the importance of vaccination.	Parents and guardians, community leaders and religious representatives.	23-24 April 2021	Residence of parents and guardians, Bairro Muatala, Nampula.
Vaccines names and their respective diseases	Explain the existing EVP vaccines and their respective protection.			
Methods / models for checking the next vaccination date.	Find practical models for monitoring and adhering to vaccination in the community.			

After the health education session and after the deadline for assessing knowledge retention and changes in attitudes and practices had passed, the mothers and the children's health cards were evaluated for changes (Table 5).

Table 5 Evaluation of health education

Finding	Activity	Target population	Results
Poor knowledge of the importance of vaccination / immunisation.	- Lecture on the importance of vaccination. - Name of vaccines and their respective diseases.	Mothers and carers, community leaders and religious representatives.	- Acceptable approach to the importance of vaccination.
Poor compliance with the vaccination schedule.	- Raising awareness of the importance of vaccination compliance. - Child health cards checked.		- Children's health cards up to date at the time of the assessment.
Weak concern / involvement of mothers in the practice of vaccination.	- Finding practical models for monitoring and adhering to vaccination in the community.		- Better control of upcoming vaccination dates. - Record dates for older children for greater attention.

Discussion

Interviewed mothers were young and had a low level of schooling, which can to some extent interfere with their understanding and good practices regarding the immunisation of their children. Research showed that a high population's cultural coefficient predicts higher vaccination coverage,¹³ and although education may be associated with vaccine uptake globally, its role varies by country characteristics.¹⁴ In terms of marital status, all the mothers were in a marital union, an important fact that promotes a family and the consequent sharing of the children's health care. Half of the health cards were not up to date, with a greater prevalence in children under one year old, a deficient situation compared to other results obtained in Brazil in 2005.¹⁵ Given the situation of the COVID-19 pandemic (2021), some mothers may imply that the closure of outpatient appointments covered EPI.¹⁶ Adherence to vaccination can be improved by simplifying administration;¹⁷ hesitancy to vaccinate can also be combated by using a new type of administration (micro-needle patch), not yet available in Mozambique.¹⁸ Vaccine hesitancy reflects lack of knowledge of vaccine benefits and (mis)perceptions of their risks amongst publics, due to their ignorance and the spread of misinformation and lies, disinformation, conspiracy theories and the influence of an increasingly globalized anti-vax movement.¹⁹

The lack of concern for updating the vaccination schedule is a negative aspect for children's health, jeopardising the objectives of the EPI. Measles, a highly contagious viral infection, is making a comeback over the past few years in several developed as well as developing countries, due to the decline in vaccination rates that protect the community, attributed to antivaccination campaigns and fake news over the internet, scaring parents from vaccinating their children.²⁰ The fact that mothers have information about the concept and importance of vaccination is a positive fact, which may reflect the efforts made by the MoH with the EPI to organise talks at the health centres and in the communities. Faced with the fact that most mothers didn't put vaccination on their list of priorities, children would be at risk of contracting diseases, interfering with psychomotor and cognitive development and the SDG. Research in Brazil demonstrates that rotavirus vaccination reduced 32,1% of hospitalisation rates due to diarrhoea in children under one year of age.²¹ In Mozambique, rotavirus vaccination reduced acute gastroenteritis prevalence in children up to 11 months of age from 19 to 10%.²²

Health sciences students work enabled mothers in the community to improve their knowledge about vaccination, knowing how to approach the concept and importance of taking children to the HU for vaccination, resulting in the target children complying with the

EPI. This work was also intended to increase adherence to health campaigns in the communities, where the population will be alerted to the need to participate in health promotion activities, to achieve the SDGs together, in line with the objectives of the MoH.²³ To improve childhood immunisation, birthing parents should be ready to take respiratory syncytial virus (RSV) vaccine as soon as possible, and a thermostable tuberculosis vaccine should be accessible in all HU.²⁴ This study did not consider vaccination against the human papilloma virus (HPV) because it is not applicable to the ages of the target group.²⁵ Study limitations were the small number of participant mothers and children, the African animistic concepts of diseases and its causes, with difficulties to understand viral and bacterial agents, and the general current absence of “risk” concept among mothers.

Conclusion

Vaccination is one of the most important preventive measures against infectious and contagious diseases, and over time we can see that it has a history of reducing and even eradicating diseases. Despite the mothers' low level of schooling, they had some knowledge of vaccination, which is one of their concerns when it comes to looking after their children's health, although this is not reflected in compliance with the vaccination schedule. As this is an intervention study, after evaluating the implementation of the health education plan, it was possible to see a significant improvement in the concept and importance of vaccination, a positive and progressive evolution in the children's adherence to vaccination, verified through the health cards, showing that the models adopted to control the next vaccination dates have improved. This operational research, a case study, demonstrates the effectiveness of outreach by health science students in promoting family health.

Declarations

The authors declare that they have no conflict of interest with the results of this study or its publication.

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