**ASSESSMENT OF VACCINE AVAILABILITY AND STORAGE IN**

**COMMUNITY PHARMACIES IN RUKUNGIRI MUNICIPALITY,**

**RUKUNGIRI DISTRICT, UGANDA**

**AYESIGA HILTON**

**REG NO: UAH/PHA/004/19**

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**KAMPALA INSTITUTE OF SCIENCE AND TECHNOLOGY SCHOOL OF**

**HEALTH SCIENCES P. O.BOX 14274 MENGO, KAMPALA-UGANDA**

# DECLARATION

I, Ayesiga Hilton, hereby declare that this is my original work and has never been submitted before any school, or institution of learning for any academic award of any qualification. Theories, ideas and materials obtained from existing literature and other sources been dully acknowledged and referenced.

Signed………………………………… Date……………………………

# **APROVAL**

This is to certify that this research proposal has been under my supervision and meets the requirements of Uganda Allied Examination Board.

Signature………………………… Date…………………………………….

Dr. Amwine Joseph

**(Research Supervisor)**

# DEDICATION

The researcher would like to dedicate this research project to his family members for care, guidance, financial and moral support that inspired the researcher to complete this research project. God bless them all.

# ACKNOWLEDGEMENT

First and foremost, the researcher wishes to express his sincere gratitude to the Almighty God for His love and care that has enabled her to complete the research project.

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# TABLE OF CONTENTS

[DECLARATION ii](#_Toc133779183)

[APROVAL iii](#_Toc133779184)

[DEDICATION iv](#_Toc133779185)

[ACKNOWLEDGEMENT v](#_Toc133779187)

[ABSTRACT viii](#_Toc133779190)

[ABBREVIATIONS/LIST OF ACRONYMS x](#_Toc133779191)

[1.0 CHAPTER ONE: INTRODUCTION 1](#_Toc133779193)

[Statement of the problem 2](#_Toc133779194)

[CHAPTER 9 2.0 CHAPTER TWO: LITERATURE REVIEW 6](#_Toc133779195)

[CHAPTER 10 CHAPTER THREE: METHODOLOGY 16](#_Toc133779196)

[3.1 Introduction 16](#_Toc133779197)

[3.2 Study design 16](#_Toc133779198)

[3.3 Study Area 16](#_Toc133779199)

[3.4 Study population 16](#_Toc133779201)

[3.5 Sample size determination 17](#_Toc133779202)

[3.6 Sampling technique 17](#_Toc133779203)

[3.9 Data collection tool 18](#_Toc133779204)

[3.11 Study variables 19](#_Toc133779206)

[3.11.1 Dependent variables 19](#_Toc133779207)

[3.11.2 Independent variables 19](#_Toc133779208)

[3.12 Quality control 19](#_Toc133779209)

[3.12.1 Inclusion criteria 19](#_Toc133779211)

[3.12.2 Exclusion criteria 19](#_Toc133779212)

[3.13 Data analysis and presentation. 20](#_Toc133779213)

[3.15 Limitation of the study 20](#_Toc133779214)

[3.16 Dissemination of the results, 21](#_Toc133779215)

[CHAPTER 11 4.0 CHAPTER FOUR: RESULTS 22](#_Toc133779216)

[CHAPTER 12 5.0 CHAPTER FIVE: DISCUSSION 29](#_Toc133779217)

[CHAPTER 13 References 31](#_Toc133779218)

[CHAPTER 14 APPENDICES 35](#_Toc133779219)

[APPENDIX 2: Health Worker questionnaires 35](#_Toc133779220)

[14.1 Introduction 35](#_Toc133779221)

[QUESTIONNAIRE 36](#_Toc133779222)

# 

# LIST OF TABLES

Table1: Showing the operationalized Likert Scale……………………………………………18

Table 2: Respondents Demographic Information………………………………………..……..23

Table3: Availability of Child vaccines…………………………………………………….……24

Table 4 Availability of adult vaccines………………………………………………………...…26

Table 5 availability and adequacy of vaccine storage facilities in community pharmacies…..…27

# ABSTRACT

This study carried out an assessment of vaccine availability and storage in community

pharmacies in Rukungiri Municipality, Rukungiri District, Uganda” Study objectives included: To assess the availability of childhood vaccines in community pharmacies in Rukungiri municipality, Rukungiri district, Uganda, to assess the availability of adult vaccines in community pharmacies in Rukungiri Municipality, Rukungiri District, Uganda, to assess the availability and adequacy of vaccine storage facilities in community pharmacies in Rukungiri municipality, Rukungiri District, Uganda. Descriptive research design was employed. Data was purposively collected from 20 respondents. Objective one results of the study indicate that there is a high availability of child vaccines in community pharmacies in Rukungiri municipality, Rukungiri district, Uganda with the grand mean of 2.775 and a standard deviation of 0.84538, The researcher found out on objective two of the study that the availability of adult vaccines in community pharmacies in Rukungiri municipality, Rukungiri district, Uganda is high since it has the grand mean of 3.0375 that is high according to the likert scale and the standard deviation that is less than one and The results on objective three of this this study showed that there is a high availability and adequacy of vaccine storage facilities in community pharmacies with a high grand mean of 3.1500 and a standard deviation of 0.46615. Basing on the findings of the study, it was recommended that; Community pharmacies should employ management systems with nice modules that alerts the users about the expiry and the running out of stock before three months period of expiry or stock shortage. Community pharmacies should empower their employers with new skills and trainings about how they can run and handle some of the vaccine storage facilities and the equipment used to avoid wastage of the vaccines. The government should take the initiative of licensing pharmacies with workers with knowledge on the handling of vaccine storage equipment to avoid wastage of vaccines.

# ABBREVIATIONS/LIST OF ACRONYMS

**WHO:** World Health Organisation

**UNICEF:** United Nations International Child’s Education Fund

**EPI:** Environmental Performance Indicator

**REMA:** Rwanda Environmental Management Authority

**RDHS:** Rwanda Demographic and Health Services

**MOH:** Ministry Of Health

**AD:** Anno Domino

**HIV:** Human immune Virus

**COVID-19:** Corona Virus 2019

**CDC:** Centers for Disease Control and Prevention

# OPERATIONAL DEFINITIONS OF TERMS

**Vaccines:**  In this study, it refers to a substance used to stimulate immunity to a particular infectious disease or pathogen.

**Child Vaccines:** In this study, it refers to vaccines administered to children to stimulate their immunity to resist certain killer diseases

**Adult Vaccines:** In this study, it refers to vaccines administered to adults to stimulate their bodies to resist pandemic diseases

**Availability:** In this study, it refers to the presence of vaccines

**Storage:** In this study, it refers to the safe keeping of vaccines

**Community Pharmacies:** In this study, it refers to pharmacies located in Rukungiri municipality

# 1.0 CHAPTER ONE: INTRODUCTION

* 1. **Background of the study**

It is often stated that vaccination has made the greatest contribution to global health of any human intervention apart from the introduction of clean water and sanitation, but this is a claim that needs some qualification. Study of the pattern of infectious diseases in industrialized countries from the end of the nineteenth century onwards shows that there was a large and progressive decline in child mortality, owing largely to a reduction in mortality from infectious diseases, prior to the development and deployment of vaccines. Mortality from smallpox and measles was massive in the pre-vaccination period with up to a half of the population dying from the former during epidemics and measles was only a little less lethal in susceptible populations. Smallpox is the only human infection to have been eradicated, although eradication of guinea worm infection is close. Eradication of the rinderpest virus (World Health Organization, 2011).

In Africa, the availability of vaccines, has declined the mortality from the killer diseases like measles and small pox. The success of the EPI programme was achieved in part because of sound leadership in WHO and in many developing countries of Africa, and in part through financial support from the international community. Because EPI vaccines are relatively cheap when mass produced, full immunization of a child cost around $15 in the 1990s. Introduction of effective national EPI programmes in most developing countries has led to major reductions in deaths and hospital admissions from measles and neonatal tetanus. It has been estimated that in 2012 there were about 157 000 deaths from measles. A dramatic decrease from the situation 20 years ago but still an unacceptable burden from a preventable infection (WHO, 2013).

In East Africa, Rwanda in particular climate change impacts its economies (Gaspard R, Tuyishimire J, Mugabowindekwe M, Mugisha J.2019). For example, the Eastern Province counts long dry spells characterized by rainfall deficit throughout the year. Tis drawback raises the temperature abnormally, which might affect cold chain storage in the case of a power outage (REMA, 2019). In addition, according to the Long-Term Climate Risk Index (CRI) in 2017, Rwanda was ranked 130th among 180 countries with climate vulnerability. Moreover, according to the Rwanda Demographic Health Survey (RDHS) of 2019–2020, only 43.0% of households in Eastern Province have access to electricity which may negatively impact the cold chain management systems. (National Institute of Statistics of Rwanda, 2019).

In Uganda, there have been concerns of lack of availability of adequate vaccines at immunization units around the country as evidenced by high stock out rate for tracer medicine including vaccines is 20%. The policy focuses on provision of safe, potent and effective vaccines against targeted diseases given to the targeted age groups and other high-risk groups as may be determined by the epidemiological pattern of a disease (2011/12 MOH report).

Regardless of other scholars rectifying the issue of vaccine availability and storage in community pharmacies in previous studies, some stating the issue of temperatures in climate change, there still remains missing information since there is no any researcher from previous studies who speaks about availability and storage of vaccines in community pharmacies in Rukungiri Municipality, Rukungiri District, Uganda.

## Statement of the problem

Researchers in the previous studies continue stressing how availability and storage of vaccines continue being the main cause of wastage of vaccines due to poor storage and mishandling of the vaccines due to unprofessional personnel. Globally, Africa wise, in East Africa and Uganda at large the problem continues prevailing of which it is yet to also be established in Rukungiri Municipality. Government organs have tried to come up with the policies that can curb it up but still the problem still stands.

For instance, World Health Organization (WHO) established guidelines for storing and transporting temperature sensitive products. The aim was to set up harmonized standards of cold chain management of pharmaceuticals, ensuring the health products’ efficiency, quality, and efficacy, and detailed information on temperature-controlled transport (World Health Organization, 2011). However much the governments continue trying to see they can overcome the problems that are associated with the storing of the vaccines in the community pharmacies, problems like wastage of vaccines due to mishandling of the vaccines by the unprofessional workers continues prevailing and this has aroused curiosity of the researcher prompting him to carry out this study on assessment of the vaccine availability and storage in community pharmacies in Rukungiri municipality, Rukungiri District, Uganda.

## General Objectives

The main intension of this study was to assess vaccine availability and storage in community pharmacies in Rukungiri municipality, Rukungiri District, Uganda.

## Specific Objectives

1.To assess the availability of childhood vaccines in community pharmacies in Rukungiri municipality, Rukungiri district, Uganda.

2. To assess the availability of adult vaccines in community pharmacies in Rukungiri Municipality, Rukungiri District, Uganda.

3. To assess the availability and adequacy of vaccine storage facilities in community pharmacies in Rukungiri municipality, Rukungiri District, Uganda.

## Research questions

1. Assess the availability of childhood vaccines in community pharmacies in Rukungiri municipality, Rukungiri district, Uganda.
2. assess the availability of adult vaccines in community pharmacies in Rukungiri Municipality, Rukungiri District, Uganda.
3. assess the availability and adequacy of vaccine storage facilities in community pharmacies in Rukungiri municipality, Rukungiri District, Uganda.

## Significant of the study

The findings of this study will help non-governmental organization and community-based organizations to consider vaccine availability and storage in community pharmacies while planning in order to include them in their menu of things they do in order to improve on the skill of handling of the vaccines

The findings of this study will help the government organs like National Drug Authority to sensitize all health practitioners to improve on their storage of vaccines and their knowledge on how to use storage skits.

At the end of this study, the researcher will be able to know the factors encountered by pharmacists in community pharmacies and hence rectifying them which will help all medical workers in that field.

This study will be used by future researchers, scholars, educationists and academicians a source of reference and citations.

## Scope of this study

The researcher intended to carry out this study in Rukungiri municipality, Rukungiri District, Uganda. The area of the study is 114.2 km from Mbarara city via Kabale-Mbarara Road. It is bordered by [Lake Edward](https://en.wikipedia.org/wiki/Lake_Edward) to the North West, [Rubirizi District](https://en.wikipedia.org/wiki/Rubirizi_District) to the northeast, [Mitooma District](https://en.wikipedia.org/wiki/Mitooma_District) to the northeast and east, [Ntungamo District](https://en.wikipedia.org/wiki/Ntungamo_District) to the east and southeast, [Rukiga District](https://en.wikipedia.org/wiki/Rukiga_District) and [Rubanda District](https://en.wikipedia.org/wiki/Rubanda_District) to the south, [Kanungu District](https://en.wikipedia.org/wiki/Kanungu_District) to the west, and the [Democratic Republic of the Congo](https://en.wikipedia.org/wiki/Democratic_Republic_of_the_Congo) via [Lake Edward](https://en.wikipedia.org/wiki/Lake_Edward) to the northwest. The district headquarters are approximately 382 kilometres (237 mi), by road, south-west of [Kampala](https://en.wikipedia.org/wiki/Kampala), Uganda's capital city. The co-ordinates of the area of study are **Latitude:** 0° 45' 6.6564'' S  
**Longitude:**29° 55' 40.062'' E.

## 2.0 CHAPTER TWO: LITERATURE REVIEW

## 2.1 Introduction

This chapter contains the reviewed literature on assessment of vaccine availability and storage in community pharmacies. The source of this literature is journals, reports and articles. The main aim is to identify the study gaps.

## 2.2 Availability of child vaccines in community pharmacies

Iimmunization is a safe, effective and cost-effective health intervention across different life stages, including childhood. Childhood immunization is a key strategy for the reduction of child morbidity and mortality: over the period from 2000 to 2015, the greatest decline in child mortality was attributable to reductions in vaccine-preventable diseases (UNICEF and (WHO, 2017).

Countries have employed numerous strategies to increase the coverage of childhood immunization among underserved populations, with varying success. Common ways of promoting childhood immunization include: providing education to parents and community members; issuing reminder cards; giving conditional cash transfers for parents who vaccinate their children; delivering regular vaccination outreach activities in villages; identifying unvaccinated children at home visits and referring them to clinics; and integrating vaccination services with other health services (Oyo-Ita A, Wiysonge CS, Oringanje C, Nwachukwu CE, Oduwole O, Meremikwu MM, 2016).

Still, not all children have equal opportunity to benefit from vaccines. While the success of immunization programmes is linked to aspects of health systems – such as accessibility of health facilities, health worker knowledge, vaccine supply and cost for vaccinations wider determinants of health also impact childhood immunization (Rainey JJ, Watkins M, Ryman TK, Sandhu P, Bo A, Banerjee K, 2011).

In low-resource settings, childhood immunization programmes are affected by political stability, war and unrest, gender equality, living conditions, traditional or cultural practices, geographic characteristics, government spending on health, and receipt of external support for health (Arsenault C, Johri M, Nandi A, Mendoza Rodríguez JM, Hansen PM, Harper S, 2017). Within countries, gaps in immunization coverage exist between population subgroups. The report State of inequality: childhood immunization presents within-country inequalities in 69 countries, demonstrating large and persistent gaps on the basis of economic status and mother’s education level in most countries. Countries have demonstrated different patterns of inequality in childhood immunization, with variable levels of within-country inequality by wealth, education, gender, place of residence and other characteristics (Restrepo-Méndez MC, Barros AJ, Wong KL, Johnson HL, Pariyo G, França GV et al, 2016).

In 1974, the World Health Organization (WHO) established the Expanded Programme on Immunization to develop and promote routine immunization programmes in countries. Since this time, national immunization programmes have been introduced around the world, and subsequently shaped by new technologies, evolving vaccine delivery practices and innovative approaches to financing. Global campaigns and initiatives, past and present, have contributed to the expanded reach of vaccines and their benefits to diverse geographic settings and population groups (World Health Organization, 2018).

In contrast, countries with high inequality alongside higher national levels of coverage require a targeted policy approach that prioritizes the most vulnerable. For instance, Kenya, with 90% childhood immunization coverage, displayed marginal exclusion patterns of inequality across certain dimensions, indicating that renewed efforts are warranted to reach the poorest, least-educated and largest families. Relative to the other priority countries, Indonesia also had high national childhood immunization coverage at 72%. Policies targeted towards subgroups with lower coverage, such as larger families, poorer household, less-educated mothers, and those living in poor-performing regions (Banten, Maluku, Papua and West Kalimantan), would be positioned to reduce inequalities and further improve the national coverage (World Health Organization, 2017).

According to World Health Organization (WHO), vaccines save lives by preventing 3.5–5 million deaths each year through immunization. Vaccines require special storage conditions called cold chain. Most ought to be stored and distributed at a temperature of between+2℃ and+8℃ throughout their supply chain to maintain their quality and potency. According to the 2016 WHO and United Nations Children’s Fund (UNICEF) joint report, only 15% of Low- and Lower-Middle-Income Countries (L&LMIC) achieved the recommended practice for effective vaccine distribution down the supply chain (World Health Organization, 2022).

## 2.3 Availability of adult vaccines in community pharmacies

Two main population registries on vaccine status exist: Vaccinnet14 (Flemish Community based) and E-Vax15 (French Community and German Community based). These are automatic ordering systems used by doctors that also collect information on vaccine administration.

In Flanders, for example, all vaccinations with free-of-charge vaccines should be registered in the database. Although the aim is the exhaustive recording of vaccinations, these population registries are currently incomplete, particularly for adults and for the French-speaking community, for which recordings are essentially completed by school health services. Hence, for estimating vaccination coverage, regular vaccination coverage studies are set up, using the cluster sampling method. These studies are conducted for the three regions by the Communities almost every three to four years, from which national weighted averages are estimated.

According to the most recent surveys, vaccination coverage for the first dose of MMR (measles, mumps, rubella) is 95.6% in Wallonia, 94.1% in Brussels and 96.2% in Flanders (Vermeulen et al., 2017; Robert E, Swennen B & Provac-ULB - École de Santé Publique, 2015). Coverage of the MMR second dose is 93.4% in Flanders and 78.0% for Wallonia and Brussels.

Vaccination coverage for two documented doses of MMR is 87.4% in Flanders and 75.0% in Wallonia and Brussels (Vermeulen et al., 2017; Grammens et al., 2016). For influenza, vaccination coverage is based on surveys in specific risk groups (40–50% in health care workers (Vermeulen et al., 2017) and pregnant women (Maertens et al., 2016), or in the over 15 years old category by the Health Interview Survey (e.g., 60–70% in people aged 65 years and over (Gezondheidsenquete, 2013).

For mandatory immunizations, vaccination coverage is measured by administrative reports (e.g., reports of performed vaccinations by general practitioners and other providers). The registers of infants and children subject to mandatory vaccination against measles (at the required age) are used as the denominator in calculating the vaccination coverage rate. The Regional Health Inspectorates maintain these registers at the regional level. At the national level the vaccination coverage rate is analysed annually by the National Centre of Infectious and Parasitic Diseases. However, not all the performed vaccinations against influenza are fully recorded by health facilities. Moreover, there are no specific requirements on reporting vaccinations against influenza by age or risk groups. Thus, vaccination coverage estimates are often inaccurate, or data are insufficient for calculating coverage rates (National Centre of Infectious and Parasitic Diseases, 2017).

In recent years Croatia has faced a strong anti-vaccination movement, leading to hesitancy towards vaccination among both parents and health professionals. A study published in 2016 explored attitudes regarding vaccination in a nationally representative sample of 1000 people. Over two thirds of participants reported vaccine acceptance (69.9%; 95% CI = 66.2–73.3), about one fifth (19.5%; 95% CI = 16.9–22.5) reported vaccine hesitancy (i.e., they would accept some but not all vaccines), while 10.6% (95% CI = 8.4–13.3) would refuse all vaccinations (Repalust et al., 2016).

The Ministry of Health has overall responsibility for health policy in Lithuania. The main policy document in the vaccination field is the national immunization programme. Currently, the 2014–2018 programme is ongoing (Lietuvos Respublikos sveikatos apsaugos ministro, 2014). It comprises a situation analysis, objectives, tasks and targets, and outlines its implementation. The main objectives are: to control, eliminate or eradicate vaccine-preventable diseases (polio, measles, rubella); to decrease the risk of outbreaks; and to ensure the safety, effectiveness and accessibility of vaccination. The targets include immunization coverage for children of 90–95% in each municipality and the whole country, the eradication of measles in Lithuania, and the introduction of new vaccines. The national organizational framework is set out by a Ministry of Health decree (amended in 2017) (Lietuvos Respublikos sveikatos apsaugos ministras, 2017), which describes the functions regarding immunizations and the coordination of all stakeholders (primary health care institutions, public health institutions, etc.). Two public health institutions under the Ministry of Health, namely the Centre for Communicable Disease and AIDS (at national level) and the National Public Health Centre1 (at regional level, a network of 10 regional departments), are involved in the prevention of communicable diseases and are in charge of coordinating vaccination, monitoring vaccination coverage and surveillance of vaccine preventable diseases.

For measles, the vaccination programme is part of the national immunization programme (Rijksvaccinatie programma), under the responsibility of the Ministry of Health, Welfare and Sport, to protect children against infectious diseases. To execute the programme, the Ministry of Health, Welfare and Sport delegated the task to the National Institute for Public Health and the Environment (Rijksinstituut voor Volksgezondheid en Milieu), which monitors and registers the vaccinations. The Minister of Health, Welfare and Sport decides which vaccinations will be part of the national immunization programme (Kroneman et al., 2016; National Institute for Public Health and the Environment, 2018a), based on the advice of the Health Council of the Netherlands, an independent advisory body for the government. Childhood vaccinations are recommended in the Netherlands. Measles vaccinations are provided to children at the age of 14 months and the age of 9 years. Childhood vaccinations are free of charge. Parents receive invitations for their children from the National Institute for Public Health and the Environment, which uses the National Population Registry (Basisregistratie Personen) as the information source for these invitations. A reminder is sent if parents do not make use of the invitation.

Children who live in an asylum shelter receive an invitation for a meeting with Youth Health Care Services. A vaccination plan is tailor-made for them, based on the vaccinations they have already had. There is a small group of religious objectors and a growing group of people who do not believe in vaccinations. There are no special programmes or policies for them. Vaccination uptake is calculated based on data from the National Population Registry and the number of administered vaccinations (Schurink-van ’t Klooster & de Melker, 2017; van Lier et al., 2018).

Adult vaccinations against influenza are provided by general practitioners. They invite eligible persons based on the information in their information system. General practitioners mostly organize special vaccination hours, but they are free to organize the actual administration as they wish. The professional organization of general practitioners provides a guide on how the influenza vaccination campaign is organized and implemented (Vrieze et al., 2017).

## 2.4 availability and adequacy of vaccine storage facilities in community pharmacies

The occurrence and widespread of diseases, also known as epidemics and pandemics, have been recorded for centuries. Pandemic is detrimental to the economy, morals, culture, and human civilization (Boao Farum for Asia, 2021). The first recorded pandemic was smallpox in 1157 BC, with Pharaoh Rameses V of Egypt as one of the victims (Paul and Pal, 2020). This virus, spread to various parts of the world such as China from 25 to 49, Europe from the 11th to 13th centuries, and America from 1617 to 1619 (Thèves et al., 2016). In addition, other diseases have also occurred, such as Antonine (165 AD–180 AD), Justinian (mid-sixth century), black death (1347 AD–1400 AD), a different type of smallpox in the Former Yugoslavia (1972), Spanish Flu (1918 AD–1980 AD), HIV (1980 AD–1990s M), SARS Cov (2002– 2003), H5N1 (2009–2010), Ebola (2014–2016), and Zika Virus (2015–2016) (Huremović, 2019). The most current pandemic in the world from 2019 until now is COVID-19 (WHO, 2021a).

The rapid scientific findings of vaccines associated with these pandemics always help inhibit, prevent, and eradicate the incidence of disease transmission quickly and widely. According to the World Health Organization (WH0), the world successfully eliminated the smallpox epidemic in December 1979 (WHO, 2016a). The success attributed to this epidemic is partly dedicated to the great discovery of a vaccine by Edward Jenner in 1796 (WHO, 2016b) and developments by other scientists. However, the world is struggling to eradicate the most significant killer diseases such as tetanus, pertussis, meningitis-encephalitis, diarrhea, acute respiratory infections, and others that cannot be vaccinated (WHO, 2017a). From previous experience, it is understood that vaccination has succeeded in reducing the death rate due to pandemics and eliminating the existence of these viruses. Every year, millions of lives are saved through vaccination, which is widely recognized as the world’s most successful and cost-effective health intervention (WHO, 2019; Lloyd and Cheyne, 2017).

Therefore, this program is one of the main priorities to stop the ongoing COVID-19 pandemic (Goralnick et al., 2021). In June 2021, WHO noted the establishment of 287 registered COVID-19 vaccines, with 102 at the clinical stage (WHO, 2021b). The sheer number of successful candidates at the clinical stage bodes well for progress in the ongoing efforts.

furthermore, packaging at the producer level is divided into 3, namely primary, secondary, and tertiary (Ortiz et al., 2020; Ramakanth et al., 2021). Manufacturers produce vaccines and diluents for reconstituted products in primary packaging, which are then stored in secondary containers in the form of cartons (Vaccine Presentation and Packaging Advisory Group, 2015; WHO et al., 2017; Taneja et al., 2018). Furthermore, the secondary packaging is repackaged in a larger carton known as a ‘‘tertiary carton’’ (Ortiz et al., 2020; Vaccine Presentation and Packaging Advisory Group, 2015; Taneja et al., 2018)

In addition, vaccines have to be stored in cold temperature therefore it is imperative to make use of the cold storage method (Hatchett, 2017). The Rotavirus (ROTASIIL®), with a lifespan of 6 months at 37 ◦C–40 ◦C, increased to 30 months when stored below 25 ◦C (Naik et al., 2017). The selection of cold storage is very important considering the property and efficacy of vaccines are very sensitive to changes in temperature (Hatchett, 2017). Vaccines are stable enough to be used as drugs through efficient cold chain maintenance (manufacture, distribution, storage, and administration) (WHO and UNICEF, 2021; Kumru et al., 2014). The selection and management of cold storage operations are very important because vaccines are very sensitive when frozen (e.g., aluminum adjuvant vaccines) (Hanson et al., 2017; Kumru et al., 2014).

Meanwhile, other types will lose their efficacy when temperature increases (e.g., live attenuated virus vaccines) (Kumru et al., 2014). A total of 10 items consisting of the following details need to be fulfilled to achieve a good refrigerator management quality indicator (Thielmann et al., 2019a). Type of refrigerator suitable for vaccine cold storage (NS Department of Health Wellness, 2014; Australian Government Department of Health, 2019; CDC, 2021c), 2. The thermometer allows digital minimum–maximum recording (NS Department of Health Wellness, 2014; Health Protection Scotland, 2017; Salisbury et al., 2013),

Storage units are ideally placed in a room with good ventilation leaving space between each unit, walls, and ceiling. Furthermore, it needs to be ensured that nothing is blocking the motor and engine cooling device, and when stacked, the cold storage needs to be level and firm with the unit underneath (Objio et al., 2021). A study showed that most cold storage is stored in a room with the best temperature between 20 ◦C and 25 ◦C (CDC, 2021c). WHO recommends that the deviation vector, walk-in cold room and walk-in freezer room is 0.67 (WHO et al., 2017). Moreover, the relative humidity for the storage space is less than 55% and the ambient humidity level is between 45%–75% (WHO, 2020).

# CHAPTER THREE: METHODOLOGY

## 3.1 Introduction

This chapter presents introduction, study design and rationale, study setting and rationale, study population, definition of variables, research instruments, data collection procedure, data management, data analysis and presentation, ethical consideration, limitation of the study, and dissemination of the results.

## Study design

Across-sectional study design was employed. This study employed descriptive study design and this involved both quantitative and qualitative data collection approaches.

Descriptive design was used to show findings on the demographic characteristics’ assessment of vaccine availability in community pharmacies of Rukungiri municipality, Rukungiri district, Uganda.

The quantitative approach was used to obtain quantitative data which was converted into mean and standard deviation.

## 3.3 Study Area

## This study was carried out among community pharmacies in Rukungiri Municipality, Rukungiri district. The area of the study is 63.1 kilometers from Jinja city. The co-ordinates of this area of study are: 0°56'50.0"N, 33°07'16.0"E (Latitude:0.947223; Longitude:33.121106) and the main focus of the study was to assess vaccine availability and storage in community pharmacies in Rukungiri municipality, Rukungiri District.

## Study population

This area of study bears 5 pharmacies in number and Over 20 pharmacists operate in community pharmacies of Rukungiri municipality, Rukungiri district in a period of 3 months and that is all 20 pharmacists operating in 5 community pharmacies in Rukungiri municipality and therefore the researcher intended to collect his required data from 20 respondents since it is his target population.

## Sample size determination

Since the number of target population was less than 100, the researcher never employed any formular to extract his sample size and therefore the researcher employed his target population as his sample size and that is 20 respondents.

## Sampling technique

The researcher employed purposive sampling technique since the researcher intended to purposely collect his required data from pharmacists who operate in community pharmacies of Rukungiri municipality. The researcher selected this sampling since it helped him collect relevant information from the right targeted respondents.

## Sampling procedure

After obtaining the permission to collect data within community pharmacies of Rukungiri municipality, Rukungiri district, the researcher went directly pharmacists operating in community pharmacies of Rukungiri Municipality, Rukungiri district. Since the researcher employed purposive sampling procedure, the researcher purposely picked only pharmacists and not any other health worker.

## Data collection method

The researcher used a questionnaire as the method of data collection because it is time and cost effective since it helps the researcher to collect adequate data within a very short time. In addition, the researcher used a self administered questionnaire as a research tool to collect data from the respondents and since every respondent was able to read english, the researcher distributed a questionaire to each and every pharmacist for them to answer the items in the questionnaire.

## Data collection tool

The questionnaire contained the introduction part which described the researcher. In addition, the tool had four sections: Section A of the questionnaire included demographic information of respondents. Section B involved objective answering questions (quantitative data through closed ended questions). Section C involved respondents’ views and suggestions (qualitative information through open ended questions). Closed-ended questions were guided by a four-point Likert scale of; 1. Strongly Disagree, 2. Disagree, 3. Agree and 4. Strongly agree.

**Table1: Showing the operationalized Likert Scale**

|  |  |  |  |
| --- | --- | --- | --- |
| **Score** | **Response** | **Mean range** | **Interpretation** |
| 1 | Strongly Disagree | 1.00-1.74 | Very low level |
| 2 | Disagree | 1.75-2.49 | low level |
| 4  5 | Agree  Strongly agree | 2.50-3.24  3.25-4.00 | high level  very high level |

## Data collection procedure

A letter of introduction was obtained from KIST, introducing the researcher to the health office in Rukungiri municipality seeking a permission to carry out the study. After permission was granted, the researcher obtained an informed consent from the respondents and administered interview guides to respondents operating community pharmacies in Rukungiri municipality. This ensured voluntary participation, efficiency and confidentiality during data collection process.

## Study variables

## Dependent variables

Vaccine availability and storage

## Independent variables

* Availability of child vaccines
* Availability of adult vaccines
* Availability and adequacy of vaccine storage facilities

## Quality control

Quality control measures were put in place to ensure validity and reliability of collected data in the following ways;

In order to determine the reliability of the questionnaire, the researcher carried out a pre-test in community pharmacies in Mbarara city before its application since it has the very similar characteristics. Through this pilot study, redundant questions that never added any value to the study were removed. The validity of the questionnaire was tested using a content validity index (CVI) given by the following formula;

Here on, a minimum of 0.75 of CVI was used to confirm validity (Lawshe, 1975)

## Inclusion criteria

All pharmacists who work in community pharmacies.

## Exclusion criteria

* All health workers who are not pharmacists
* The staff working in those community pharmacies who are not pharmacists

## Data analysis and presentation.

The principal investigator checked for completeness of the responses to ensure that the information collected is accurate and complete. The responses were coded and entered into computer software SPSS for data analysis. The data was backed up in folders under different names to ensure safety of the data.

Data was presented in form of frequent tables, bar graphs, pie charts for easy interpretation by the readers as well as giving an impressive appearance to the readers. Descriptive statements were used to explain the findings in the tables, charts, and graphs for comprehensive purposes to the readers of the research report.

## Ethical Consideration

The researchers presented an informed Consent Form which the respondents read through and those contented, to answer the questionnaire. Lastly, strict confidentiality of all information received was assured to the respondents.

## Limitation of the study

The researcher encountered financial constraints in gathering the information. The researcher overcame this limitation, by drawing up a budget which was followed tightly to utilize the finances present.

The researcher encountered time constraints in the course of the study, balancing the research study and demanding course works. The researcher overcame these limitations by drawing up a timetable which was followed strictly to overcome this barrier.

## Dissemination of the results,

The results will be forwarded to KIST, UAHEB, to the supervisor and the researcher and the administration of Health office Rukungiri municipality.

# 4.0 CHAPTER FOUR: RESULTS

## 4.1 Introduction

This chapter presents the results and discussion on “assessment of vaccine availability and storage in community pharmacies in Rukungiri Municipality, Rukungiri District, Uganda” Study objectives included: To assess the availability of childhood vaccines in community pharmacies in Rukungiri municipality, Rukungiri district, Uganda, to assess the availability of adult vaccines in community pharmacies in Rukungiri Municipality, Rukungiri District, Uganda, to assess the availability and adequacy of vaccine storage facilities in community pharmacies in Rukungiri municipality, Rukungiri District, Uganda. Data was purposively collected from 20 respondents using a questionnaire.

## 4.2 Respondents Demographic Information

The study assessed respondents’ demographic information in terms of age, gender, religion, marital status and level of qualification. The findings are presented in the sub-section of the report.

**Table 2: Respondents Demographic Information**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **Frequency** | **Percentage**  **(%)** |
| **Age** | 18-25 years | 7 | 35 |
| 26-35 years | 7 | 35 |
| 36 and above years | 6 | 30 |
| **Gender** | Male | 12 | 60 |
| Female | 8 | 40 |
| **Religion** | Christian | 13 | 65 |
| Muslim | 4 | 20 |
| None | 3 | 15 |
| **Marital status** | Single | 11 | 55 |
| Married | 9 | 45 |
| Divorced | 0 | 00 |
| Widow/Widower | 0 | 00 |
| **Level of Qualification** | Diploma | 11 | 55 |
| Bachelor’s degree | 7 | 35 |
| Master’s degree | 2 | 10 |

N=20

Table 2 represents respondents’ personal information regarding age, gender, religion, marital status and level of qualification.

**Age:** Findings regarding Age showed that 7(35%) of the respondents were aged between 18-25 years of age, 7(35%) of the respondents were aged between 26-35 years and 6(30%) of the respondents were aged 36 and above.

**Gender:** The results of this study regarding gender indicated that 13(60%) of the respondents were of the male gender and 8(40%) of the respondents were of the female gender.

**Religion:** The findings of this study indicated that 13(65%) of the respondents were Christians, 4(20%) were Muslims and 3(15%) of the respondents were from neither Christians nor Muslims and therefore this showed that there was religious biasness.

**Marital status:** After carrying out this study, the results indicated that 11(55%) of the respondents were single and 9(45%) of the respondents were married

**Level of qualification:** The findings of this study indicated that 11(55%) of the respondents were qualified with a diploma honor, 7(35%) of the respondents were qualified with a bachelor’s degree and 2(10%) of the respondents held a master’s degree.

**4.3 Availability of Child vaccines**

The objective one of this study was to assess the availability of child vaccines in community pharmacies in Rukungiri Municipality, Rukungiri District, Uganda. The variable that was assessed was availability of child of child vaccines. The findings of this objective are indicated in the sub-section below.

**Table3: Availability of Child vaccines**

|  |  |  |
| --- | --- | --- |
| **Item on Availability of Child Vaccines** | Mean | Std. Deviation |
| Child Vaccines at our pharmacy are cost-friendly | 1.9000 | .89371 |
| Child vaccines in our stock take long to expire | 2.4500 | .99868 |
| Due to favorable environmental temperatures, our child vaccines cannot be easily wasted. | 3.4500 | .51042 |
| I am skilled enough not to mishandle child vaccines | 3.3000 | .97872 |
| **Average mean and standard deviation** | **2.775** | **.84538** |

Table 3 provides empirical formular for the availability of vaccines. Th findings of this study indicate that respondents agreed with the views that: Child vaccines at our pharmacy are cost-friendly, child vaccines in our stock take long to expire, due to favorable environmental temperatures, our child vaccines cannot be easily wasted and I am skilled enough to mishandle child vaccines.

In conclusion, Objective one results of the study indicate that there is a high availability of child vaccines with the grand mean of 2.775 and a standard deviation of 0.84538 meaning the researcher collected data from homogenous respondents.

The findings on objective one is supported by the views by World Health Organization, 2018 put it that in 1974, the World Health Organization (WHO) established the Expanded Programme on Immunization to develop and promote routine immunization programmes in countries. Since this time, national immunization programmes have been introduced around the world, and subsequently shaped by new technologies, evolving vaccine delivery practices and innovative approaches to financing. Global campaigns and initiatives, past and present, have contributed to the expanded reach of vaccines and their benefits to diverse geographic settings and population groups.

## 4.3 Availability of adult vaccines

Objective two of this study was to assess availability of adult vaccines in community pharmacies in Rukungiri Municipality, Rukungiri district, Uganda. The variable that was assessed was availability of adult vaccines and the results are shown in the subsection below.

**Table 4 Availability of adult vaccines**

|  |  |  |
| --- | --- | --- |
| **Items on availability of adult vaccines** | **Mean** | **Std. Deviation** |
| This pharmacy sells adult vaccines cheaply | 2.2500 | .96655 |
| Adult vaccines are cleared before they expire | 2.7000 | .81828 |
| Adult vaccines cannot be wasted due to favorable environmental conditions. | 3.7500 | .44426 |
| I am skilled enough not to mishandle adult vaccines | 3.4500 | .75915 |
| **Average mean and standard deviation** | **3.0375** | **.74706** |

Table 3 indicates the empirical information on availability of adult vaccines in Rukungiri municipality, Rukungiri district, Uganda. The results of this study show that the respondents agreed with the views: This pharmacy sells adult vaccines cheaply, adult vaccines are cleared before they expire, adult vaccines cannot be wasted due to favorable environmental conditions and I am skilled enough not to mishandle adult vaccines.

In conclusion, the researcher found out on objective two of the study that the availability of adult vaccines in community pharmacies in Rukungiri municipality is high since it has the grand mean of 3.0375 that is high according to the likert scale and the standard deviation that is less than one which shows that the researcher collected data from homogenous respondents.

Vrieze et al., 2017 who puts it that adult vaccinations against influenza are provided by general practitioners. They invite eligible persons based on the information in their information system. General practitioners mostly organize special vaccination hours, but they are free to organize the actual administration as they wish. The professional organization of general practitioners provides a guide on how the influenza vaccination campaign is organized and implemented, corresponds with the findings of this study.

## 4.4 availability and adequacy of vaccine storage facilities in community pharmacies

Objective three of the study assessed availability and adequacy of vaccine storage facilities in community pharmacies in Rukungiri municipality, Rukungiri district, Uganda. The variable that was assessed availability and adequacy of vaccine storage facilities in community pharmacies. The results of this study are indicated in the subsection below.

**Table 5 availability and adequacy of vaccine storage facilities in community pharmacies**

|  |  |  |
| --- | --- | --- |
| **Items on availability and adequacy of vaccine storage facilities in community pharmacies** | **Mean** | **Std. Deviation** |
| Storage units of our pharmacy have well sealed doors | 3.0000 | .56195 |
| Around the storage units of vaccines in our pharmacy, there is good air circulation. | 3.1500 | .36635 |
| Our pharmacy has temperature monitoring devices like thermometers to ensure the stability of favorable conditions | 3.3000 | .47016 |
| **Average mean and standard deviation** | **3.1500** | **.46615** |

Table 4 presents empirical information on availability and adequacy of vaccine storage facilities in community pharmacies in Rukungiri municipality, Rukungiri district, Uganda. The findings of this study indicate that the respondents agreed with the views: Storage units of our pharmacy have well sealed doors, Around the storage units of vaccines in our pharmacy, there is good air circulation, our pharmacy has temperature monitoring devices like thermometers to ensure the stability of favorable conditions.

In conclusion, the results on objective three of this this study showed that there is a high availability and adequacy of vaccine storage facilities in community pharmacies with a high grand mean of 3.1500 and a standard deviation of 0.46615 which shows that data was purposively and successfully collected from homogenous respondents.

The findings of this study are in line with the views of WHO, 2016a who state it that the rapid scientific findings of vaccines associated with these pandemics always help inhibit, prevent, and eradicate the incidence of disease transmission quickly and widely. According to the World Health Organization (WH0), the world successfully eliminated the smallpox epidemic in December 1979

# 5.0 CHAPTER FIVE: DISCUSSION

## 5.1 Introduction

This chapter contains summary, conclusion and recommendations of the study on

“Assessment Of Vaccine Availability and Storage in Community Pharmacies in Rukungiri Municipality, Rukungiri District, Uganda”

## 5.2 Discussion

This study carried out an assessment of vaccine availability and storage in community pharmacies in Rukungiri Municipality, Rukungiri District, Uganda” Study objectives included: To assess the availability of childhood vaccines in community pharmacies in Rukungiri municipality, Rukungiri district, Uganda, to assess the availability of adult vaccines in community pharmacies in Rukungiri Municipality, Rukungiri District, Uganda, to assess the availability and adequacy of vaccine storage facilities in community pharmacies in Rukungiri municipality, Rukungiri District, Uganda. Data was purposively collected from 20 respondents.

Objective one results of the study indicate that there is a high availability of child vaccines in community pharmacies in Rukungiri municipality, Rukungiri district, Uganda with the grand mean of 2.775 and a standard deviation of 0.84538 meaning the researcher collected data from homogenous respondents.

The researcher found out on objective two of the study that the availability of adult vaccines in community pharmacies in Rukungiri municipality, Rukungiri district, Uganda is high since it has the grand mean of 3.0375 that is high according to the likert scale and the standard deviation that is less than one which shows that the researcher collected data from homogenous respondents.

The results on objective three of this this study showed that there is a high availability and adequacy of vaccine storage facilities in community pharmacies with a high grand mean of 3.1500 and a standard deviation of 0.46615 which shows that data was purposively and successfully collected from homogenous respondents.

## 5.3 Conclusion

There is a high availability of child vaccines in community pharmacies in Rukungiri municipality, Rukungiri district, Uganda with the grand mean of 2.775 and a standard deviation of 0.84538.

There is a high availability of adult vaccines in community pharmacies in Rukungiri municipality, Rukungiri district, Uganda with the grand mean of 3.0375and a standard deviation of 0.74706.

There is a high availability and adequacy of vaccine storage facilities in community pharmacies with a high grand mean of 3.1500 and a standard deviation of 0.46615.

## 5.4 Recommendations

Basing on the findings of the study, it was recommended that;

Community pharmacies should employ management systems with nice modules that alerts the users about the expiry and the running out of stock before three months period of expiry or stock shortage.

Community pharmacies should empower their employers with new skills and trainings about how they can run and handle some of the vaccine storage facilities and the equipment used to avoid wastage of the vaccines.

The government should take the initiative of licensing pharmacies with workers with knowledge on the handling of vaccine storage equipment to avoid wastage of vaccines.

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# APPENDICES

# APPENDIX 2: Health Worker questionnaires

## Introduction

Dear respondent, am a student pursuing a diploma in pharmacy. I am conducting research to assess the vaccine availability and storage in community pharmacies in Rukungiri municipality, Rukungiri district, Uganda

You have been chosen as a potential participant in this study and the information you will be of great importance.

This research is for academic purpose and all responses obtained from you shall be treated with maximum confidentiality. You are free to participate and ready to drop out of the study at the point in time in any case you feel uncomfortable.

Instructions:

1. You are required to answer questions by ticking in the appropriate box where options are given /or fill in answers where gaps are provided.
2. You may ask for clarification where you are not sure.

Respondents signature: …………………………. Date: ………………………….

# QUESTIONNAIRE

**SECTION A**

Name of the respondent: ……………………………… Date: …./……/…..

1. Gender: male 󠅫󠇏 female󠅫󠇤
2. Age: 18-25 years, 26-35 years and 36 and above
3. Which religion are you?

Christian () Muslim () None ()

1. Marital status: single󠇤󠇥 married󠅫󠇔 divorced󠇕󠇕 widow/widower󠇫󠆿
2. Which level of qualification do you hold?

Diploma󠇖 () Bachelor’s degree () Master’s degree ()

**SECTION B: OBJECTIVE QUESTIONS**

Please Tick (**√**) where appropriate in the box provided.

4. Strongly Agree () 3. Agree) 2. Disagree () 1. Strongly Disagree ()

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Availability of child vaccines** | **SD** | **D** | **A** | **SA** |
| 1. Child Vaccines at our pharmacy are cost-friendly |  |  |  |  |
| 1. Child vaccines in our stock take long to expire |  |  |  |  |
| 1. Due to favorable environmental temperatures, our child vaccines cannot be easily wasted. |  |  |  |  |
| 1. I am skilled enough not to mishandle child vaccines |  |  |  |  |
| **Availability of Adult Vaccines** | **SD** | **D** | **A** | **SA** |
| 1. This pharmacy sells adult vaccines cheaply |  |  |  |  |
| 1. Adult vaccines are cleared before they expire |  |  |  |  |
| 1. Adult vaccines cannot be wasted due to favorable environmental conditions. |  |  |  |  |
| 1. I am skilled enough not to mishandle adult vaccines |  |  |  |  |
| **Availability And Adequacy of Vaccine Storage Facilities** | **SD** | **D** | **A** | **SA** |
| 1. Storage units of our pharmacy have well sealed doors |  |  |  |  |
| 1. Around the storage units of vaccines in our pharmacy, there is good air circulation. |  |  |  |  |
| 1. Our pharmacy has temperature monitoring devices like thermometers to ensure the stability of favorable conditions |  |  |  |  |