UNIVERSITY of RWANDA

REPORTED SELF-MEDICATION USE IN CHILDREN IN PRIVATE AND PUBLIC HEALTH FACILITIES IN RWANDA

A CROSS-SECTIONAL STUDY

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REPORTED SELF-MEDICATION USE IN CHILDREN IN PRIVATE AND PUBLIC HEALTH FACILITIES IN RWANDA

A CROSS-SECTIONAL STUDY

A dissertation submitted in partial fulfilment of the requirements for the degree of master of medicine in General Pediatrics and Child Health in the College of Medicine and Health Sciences

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DEDICATION

To:

- ✓ All those who struggled to support and educate me to become who I am today, especially **my fathe**r **SIKUBWABO Claver** and **my mother MUKAMURANGIRA Liberatha,** I am grateful to what you did for me;
- ✓ My wonderful husband and best friend **Mr BAHIZI Marcel** for his incomparable love and patience;
- ✓ My beloved sons Bahizi Lenny Gianni and Bahizi Ryan Ellis
- ✓ Brothers, Sisters, Colleagues and all those who love me.

Thanks to almighty God

DECLARATION

I declare that " **Reported self-medication use in children in private and public health facilities in Rwanda, a cross-sectional study** " is my own work, that it has not been submitted for any degree or examination in any other university, and that all the sources I have used or quoted have been indicated and acknowledged by complete references.

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Dr Joyeuse UKWISHAKA   **March, 2019**
RMDC: 2380;
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All praises and thanks to almighty God, the Lord and creator of the universe by whose powers and glory all good things are accomplished. He is also the most merciful, who bestowed on me the potential ability and an opportunity to work on this thesis for the award of master of medicine in general pediatrics and child health in the College of Medicine and Health Sciences.

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ABSTRACT

Background: Self-medication, a worldwide practice has both benefits and risks. Many countries have regulated non-prescription medications available for use in self-medication; however, in countries such as Rwanda, where prescriptions are not required to purchase medications, the prescription-only, the non-prescription and traditional medications have been used for self-medication.

Objectives: The study aimed to determine the reported self-medication use in children in Private and Public Health Facilities in Rwanda,also to determine the factors associated with the parental decision to self-medicate their children and to identify common drugs used and source of information/advice in self-medication.

Methods: This was a cross-sectional multi-center questionnaire-based quantitative study of 154 parents of children under ten years.

Results: The use of self-medication by parents for their children under ten years of age was reported to be 77.9%. Among these parents, 50.8% used western medications only, 15.8% used traditional medications only, and 33.3% used both. Paracetamol was the most commonly used western medication; the traditional drugs used were Rwandan local medicines. Parents who used western medications had slightly more confidence in self-medication than traditional medicines users (p=0.005). Western medication users reported having barriers to consultation more frequently than traditional drugs users (p=0.028). Having more than one child below age ten was associated with self-medication use (OR=4.74, CI: 1.94-11.58, p=0.001). Age greater than 30 and living in Kigali were also predictors of the use of western medication versus traditional medication.

Conclusion: Self-medication is common in Rwanda. Parents are involved in this practice regardless of their socio-demographic background. Consideration should be given to regulating drugs used in self medicationas as well as the education of the population with the goal of minimizing the risks of self-medication and maximizing benefits.

KEYWORDS

Self-medication, medicines, parents, children, Non-prescription drugs, Rwanda

LIST OF ABBREVIATIONS

CMHS	:	College of Medicine and Health Sciences
CU	:	Christian Umuhoza
HC	:	Health Center
IRB	:	Institutional Review Board
JU	:	Joyeuse Ukwishaka
NM	:	Natalie McCall
NSAID	:	Non-Steroidal Anti-Inflammatory Drugs
OPD	:	Out Patient Department
OTC	:	Over the Counter
PC	:	Peter Cartledge
PI	:	Principal Investigator
UTHK	:	University Teaching Hospital of Kigali
WHO	:	World Health Organization

GLOSSARY

Advanced education level	:	having completed secondary school or university studies
High socio-economic status	:	being employed and having own house
Low socio-economic status	:	having neither employment nor own house
Middle socio-economic status	:	having either employment or own house
Basic education level	:	having no school or completed primary school
Parent	:	Infant's mother, father, aunt, uncle, any next of kin or non-related person primarily responsible for taking care of the infant/child
Self-medication	:	Selection and use of medicine including traditional medicines for treating self-recognized illnesses without consultation of a registered health care provider recognized in Rwandan Health care system."

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CHAPTER ONE: INTRODUCTION

Self-medication is one element of self-care which includes everything that people do themselves to maintain their life, to prevent and to treat illnesses (1). Since decades from the 1978 declaration of Alma-Ata, the principles of self-care, individual participation, responsibility and involvement in one's own health care have been recognized as an important element of primary health-care (2–4).

The WHO defines self-medication as "the selection and use of medicines by individuals to treat self- recognized illnesses or symptoms" (1). Other authors define self-medication as "a personal initiative to obtain and consume a drug for self-diagnosed illnesses without prior medical consultation or another person competent in the area for diagnosis, prescription, and surveillance of treatment"(5–9). In the pediatric population, self-medication implies the administration of a drug to a child without prior medical consultation (10).

Worldwide, countries regulate medications obtained without prescription (also known as Over-the-counter (OTC) drugs) available for use in self-medication. The drugs used in self-medication has to be approved, safe, effective, and accompanied by information to direct the users; This is also recognized as "responsible self-medication" by WHO (1,11).

Although there are several reported advantages of self-medication (when done responsibly), the population must be aware of potentials risks and harms of self-medication. These risks and harms were reported in the literature on self-medication and in the different WHO reviews and guidelines (12–14).

Problem statement

In Rwanda, self-medication is being used by parents for their children. The Rwandan Ministry of Health regulates essential medicines in accordance with WHO recommendations but there is no regulation of non-prescription or OTC drugs. In addition, there is a rise in antibiotic resistance in the country. Self-medication, if not done in a responsible and safe manner, could predispose our population to more harm than benefits.

So there is a need to establish the baseline data on parental self-medication practices in Rwanda including the use of traditional and western/modern drugs. This could help health care providers and policymakers to plan education and establish policies aiming to achieve responsible use of medicines

Research objectives

General objective

This study aim was to determine the reported use of self-medication in children in Private and Public Health Facilities in Rwanda.

Specific objectives

1. To determine the frequency of self-medication use in children in these health facilities.
2. To determine the factors associated with of use of self-medication in these children.
3. Identify common drugs and source of information/advice in self-medication used by parents of these children

CHAPTER TWO: LITERATURE REVIEW

Prevalence: Self-medication is a worldwide practice encountered in both the adult and pediatric population. The literature reports that between 32% and 98.1% of parents report using self-medications in Madagascar, Pakistan, India, Greece, and Australia (6,10,11,15–17). Tanzania, a fellow nation of the East African community has reported pediatric self-medication rates of 69% (18)

Self-medication practices: Parental attitudes towards western/modern medicines are different from that toward traditional ones. In Sudan, among parents who self-medicate their children, many (84%) favored western medicines, while few (15%) recommended traditional self-medication (19). In Saudi Arabia, 86.7% of parents preferred western medicines to treat their children and 13.3% used traditional ones (20).

Different reasons predisposing parents to self-medicate their children have been described in previous studies. Studies in Italy, Madagascar, Soudan, Saudi Arabia, India, and Pakistan revealed that parents use self-medication because they perceive their child's illness as being too mild and not requiring health professional consultation. Some parents prefer self-medication because they think they are comfortable in recognizing their children's disease based on the symptoms or they feel familiar with the disease by previous experience of the same symptoms (6,10,15,19–22).

High consultations fees have been found to be a major reason that predisposes parents to use self-medication but also avoiding long waiting time at clinic and perceiving the need to deliver emergency treatment to their children were also cited (15,19,20,22). Parents reported that they practice self-medication due to lack of time for consultation, some prefer to use old prescriptions and report having experience with the drug (6,10,16,21).

Similarities and differences exist when considering drugs used in self-medication; But many studies have found paracetamol to be the most commonly used drug in self-medication (6,10,15–17,20,22,23). However, the use of antibiotics in self-medication has also been documented; In Sudan, antibiotics were the most commonly used drug, while in other places, antibiotics were used in self-medication but not frequently (6,10,19,20). Other cited used medicines are cough and cold preparations (17,22,24). Non-steroidal anti inflamatory drugs NSAID were commonly used in Italy and Germany (21,24).

In regards to where parents find information on medications before self-medicating their children, physicians and pharmacists were the favorite sources of information in studies done in Italy, England, Pakistan, Sudan, Madagascar and Saudi Arabia (15,19–23). Some parents get information from relatives and household members (6,15,19,20,22), while for others, Internet/ media and drug leaflets serve as their primary sources of information (15,16,21).

Self-medication and parental social-demographic characteristics: Differences exists on which category of parents are more likely to use self-medication for their children. Studies done in Spain, Finland, Italy, and Madagascar (15,21,25,26), found that families with high income and with secondary and higher education level practice more self-medication than families with low income and low education level. On the other hand, in studies done in Germany and India, family income and parental education were not significantly influencing self-medication practice (11,24).

The case of Rwanda: There is insufficient literature describing the use of self-medication in the paediatric population in Rwanda. Among studies done in Rwanda in the pediatric population, one study (in press) about parental knowledge, perception, and management of childhood fever, found that 95.9% of parents managed fever at a health facility with the remainder using different ways of getting medications either from a pharmacy, traditional healer or friend (27). This study did not specifically assess whether medications were used for self-medication in the chidlren who also consulted at a health facility.

Another study found that out of 275 respondents, 123 (44.7%) children delayed to consult as they received non-prescribed medicines at home. Among the participants, 55% gave paracetamol and ibuprofen and 44% gave traditional medicines (28). However, a detailed evaluation of self-medication was not conducted as this was not the study's objective.

CHAPTER THREE: METHODOLOGY

Study Design

This study was a cross-sectional study. Reporting of this study has been verified in accordance with the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) checklist (29).

Study Sites/settings

This was a multi-center study in two public (Ruhengeri and Muhima) and one private (Legacy) health facility: Ruhengeri Hospital is a provincial referral hospital, found approximately two-hours from Kigali, the capital of Rwanda. Muhima Health Center/Vaccination clinic is an urban public health center in Kigali city. Legacy Clinic is a private health clinic in Kigali and serves an urban population who are generally educated and of a higher socio-economic class.

Study population

The study population included parents of children aged one month to 10 years. The study aimed to recruit parents of both sick children and well children with different socio-economic status. Sick children were recruited at Ruhengeri Hospital OPD/in- patients and at Legacy Clinic, Kigali. Parents of well-children were approached at Muhima HC/vaccination clinic.

The selection of this study population was done to increase the representativeness of the sample and increase the generalization of the results to all Rwandan Population. In Rwanda there is a system of universal health coverage, Mutuelle de Santé, costing approximately $4/year per person available to all citizens and 79 percent of Rwandan households have at least one member covered by health insurance (30). Mutuelle de Santé does not cover the cost of services provided by the private sector (e.g. at Legacy clinic). All children receive vaccinations in Rwanda, free of charge, irrespective of Mutuelle coverage.

Selection of study population

Inclusion criteria:

All parents of children aged one month to 10 years and who accepted to participate in the study were eligible. Children above 10 years (defined as starting of adolescence) could have bagun to be involved themselves in self-mediation.

Exclusion criteria

Parents who were not primary caregivers of the children were excluded as they could not be participating in the self-treatment of the children. We also excluded participants who were not Rwandan or who consented but did not fully complete the questionnaire.

Sampling

Non-probability convenience sampling was used to get our study subjects sample on chosen sites during working days during the study period.

Variables

Dependent (outcome) variables

The frequency of self-medication use ; Reasons of parental self-medication; Common drugs used in self-medication

Independent variables

Age; Sex; Province of origin; Level of education; Social, economic status; Number of children under ten years; Health insurance; Relationship with the child; Marital status

Potential confounders in addition to some of the variables above

Site of interview

Potential biases

Mode of completion of questionnaire (verbal or written), Two of the co-investigators are employed at a Legacy clinic that we included in our study sites.

Questionnaire

A questionnaire was developed specifically for this project. To ensure content validity of our data collection tool, it was first built by the Principal Investigator (JU) using previously published studies (6,10,15–17,19–23). Secondly, the first draft was then reviewed by four local experts in research (three pediatricians (CU, NM & PC) and one statistician). To ensure readability and subject understanding, after being initially prepared in English, it was translated in local language (Kinyarwanda) by the PI. It was then back-translated in English for accuracy by an independent, non-medical translator, and then piloted in five subjects. Amendments were made based on this piloting, including changes in wording and the addition of additional items.

There were four sections to the questionnaire: i. Demographic characteristics of respondents; ii. Modern/western medicine questionnaire; iii. Traditional medicine questionnaire iv. No self-medication questionnaire.

Questionnaires were completed based on the previous use of self-medication. Therefore not all subjects completed all questionnaires. Parents completed more than one questionnaire if they use more than one type of self-medication. The 4th questionnaire was designed specifically for parents who have never used self-medication to their children.

Regarding the self-medication questionnaires, these included items on parental attitudes and perceptions about self-medication, conditions for which usually parents self-medicate their children, the commonly used medicine in self-medication, and the source of information/advice; parents should choose more than one item. The questionnaires included 5-point Likert-scales to assess the reasons that predispose the parents to use self-medication. The Likert scale questions were categorized into "barriers to consultation" and "confidence in self-medicating" questions.

Procedures for enrolment

All parents meeting the inclusion criteria were considered as potential study subjects. Parents were approached in the waiting area, prior to their consultation, and they were given a verbal explanation of the purpose and the methods of the study. All participants who signed the consent were then included. No data was kept on the number of participants who declined to participate.

Questionnaires were given to parents by the Principal Investigator or a trained data collector who was available to answer questions (without influencing the respondents while filling the questionnaire). For parents who could not read or who preferred to be assisted, the Principal Investigator or a trained data collector was assisting in reading questions and filling questionnaires. The questionnaires were completed in the waiting area of the respective health facilities. When the questionnaire was filled by the data collector (and not the parent independantly), this was indicated on the form.

Study period

Recruitment took place from July to September 2018 with all sites being visited twice.

Sample size calculation

We calculated sample size using the formula with Finite Population Correction (31), to be 152 parents (appendix 2).

Data management

EpiData 3.1 software was used for data entry and storage; data were then exported into Statistical Package for the Social Sciences (SPSS) version 17 and STATA version 11 for statistical analysis.

Statistical analysis

Both STATA 11 and SPSS version 17 were used for statistical analysis. Univariate analyses were undertaken. For continuous numerical data, Mean and Standard deviation were reported; for categorical data frequency tables, percentages and graphs were reported.

Chi‑ square test or Fisher's exact test were used for categorical variables' associations, p-values and Odd ratio were reported. P-value of less than 0.05 was considered statistically significant. In order to account for multiple confounders, we included in a mutivariate analysis the factors that had a p-value <0.2 in the bivariate.

We used Mann-Whitney U-test for the Likert scale questions to compare reasons advanced by two groups (western vs. traditional self-prescriber).

Ethical considerations

Confidentiality

The study respected confidentiality; the questionnaires were anonymous and included no personal identifiers. Consent forms were linked to the study participant using a research code (for the principal investigator to know from which site the survey was filled). The questionnaires were kept in a safe, locked environment and the database was password protected with limited access. The questionnaires were completed in the waiting rooms of the facilities therefore there is a small possibility of other parents overhearing the responses.

Informed consent

Every subject who participated in the study received explanation on the ongoing study and was given time to ask questions and raise concerns. The parents were told that the study is being conducted on medications in children but there was no emphasis on the fact that the study was about traditional and non-traditional medications so as to not influence the participants.

The participants were told about the fact that there was no consequence on the care given in the clinic or the hospital whether or not they choose to participate and that they could withdraw at any time without any consequences. A consent form was signed before enrollment to the study.

Risks to participant

There were no significant physical, social, emotional, financial, or legal risks to participants identified.

Ethical approval

The project was approved by the University of Rwanda/Academic team of Pediatric Department on 27th April 2018 and Institutional Review Board (IRB) of the CMHS (College of Medicine and Health Sciences) (Ref: No244/CMHS IRB/2018) on 10th July 2018 (Appendix 3).

The approval from Ruhengeri, Muhima and Legacy Clinic were obtained before the study was conducted.

Funding and sponsors

The project had no funds

Incentive to participant

No incentives were given to participants

Potential conflicts of interest

Two of the investigators are employed by Legacy clinics.

CHAPTER FOUR: RESULTS

Participation flow and social-demographic characteristics: During the study period (July-November 2018) a total of 162 questionnaires were distributed. Participation flow and selection of questionnaires for analysis are described in Figure 1.

Fourteen (9.1%) participants self-completed the questionnaire with 140 (90.9%) needing assistance with verbal completion of the questionnaire.

Sites of the interview were evenly represented. All provinces were not equally represented as the interview was undertaken at 2 sites in Kigali and one site in the North of the country, but we recruited 45, 7, 6, 4 participants from North, West, East, South province respectively who consulted the study sites. The minimum age of respondents was 18 years and the maximum age 51 years (Mean: 32.5, SD: 6.7). Mothers represented the majority (86.4%) of the respondents, and most of the respondents were married (94.2%) (Table 1)

Figure 1: Consort flow diagram (n: number of respondents; N: number of responses)
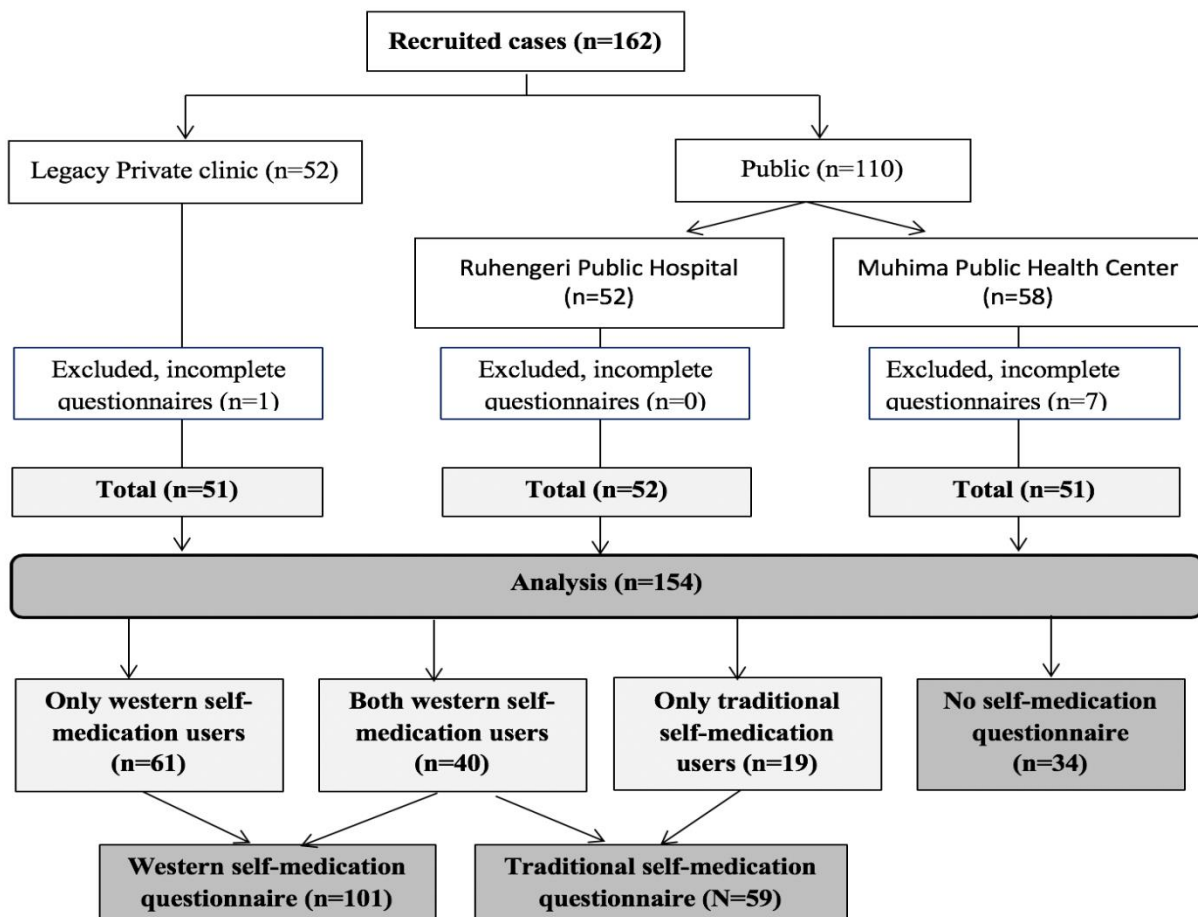
Table 1: Baseline data

Item	Classification	Frequency	Percentage
Site of interview	Private	51	33.1%
	Public	103	66.9%
Origin	Kigali	92	59.7%
	Outside Kigali	62	40.3%
Relationship	Mother	133	86.4%
	Other	21	13.6%
Marital status of parent	Married	145	94.2%
	Single (+ Separated, Widowed)	9	5.8%
Age of parent	≤30	60	39%
	>30	94	61%
Education level	Advanced	77	50%
	Basic	77	50%
Economic status	High	45	29.2%
	Low and Middle	109	70.8%
Health insurance	Private	60	39%
	Mutuelle de santé/None	94	61%
Number of children under 10yrs	1	48	31.2%
	>1	106	68.8%

Advanced education level: completed secondary school or university
Basic education level: no education or completed primary school
High economic status: have both employment and own house
Middle economic class: have either employment or own house
Low economic class: have neither employment nor own house

Table 2: Self-medication indication and practice

Item	Classification	Western medicines questionnaire (N=101)	Traditional medicine questionnaire (N=59)
Source of advice before deciding to use self-medication	My self	54 (53.4%)	14 (23.7%)
	Health care provider	32 (31.7%)	0 (0%)
	Friend/relative	17 (16.8)	36 (61.0%)
	Internet/media	5 (5.0%)	5 (8.5%)
	Traditional healer	1 (1.0%)	11 (18.6%)
	Other	2 (1.9%)	-
Symptom for which self-medication is given	Fever	78 (77.2%)	3 (5.1%)
	Cough and runny nose	44 (43.6%)	16 (27.1%)
	Intestinal worms	15 (14.8%)	20 (33.8%)
	Pain	6 (5.9%)	1 (1.7%)
	Difficult breathing	5 (5.0%)	2 (3.4%)
	Diarrhea/vomiting	5 (5.0%)	13 (22.0%)
	Skin conditions	3 (3.0%)	5 (8.5%)
	Others	15 (14.8%)	17 (28.8%)
Source of medications	Pharmacy	94 (93.1%)	-
	Leftover medicine	15 (14.9%)	-
	Health care facility w/o prescription	5 (5.0%)	-
	Shop/store	1 (1.0%)	-
	Relative/friend	0 (0%)	5 (8.5%)
	Traditional healer	-	22 (37.3%)
	Self-collected herbs /plants	-	36 (94.7%)
	Others	-	2 (5.2%)
Type of Health care facility consulted in case of self-medication Failure	Private	47 (46.5%)	9 (15.3%)
	Public	38 (37.6%)	23 (39.0%)
	Traditional healer	5 (5.0%)	5 (8.5%)
	None	24 (23.7%)	26 (44.1%)

Respondents could choose more than two options.

Self-medication indications and practices: Among 154 parents, 120 of them (77.9%) reported to have used self-medication for their children. Sixty-one (50.8%) of them used only modern/western drugs in self-medication, 19 (15.8%) used only traditional drugs in self-medication while 40 (33.3%) used both types. (Figure 1)

Many of our parents did not seek any advice before western self-medication but for traditional self-medication, friends and relatives served as the main sources of advice. All traditional self-medication users used local Rwandan medicines. Paracetamol was the most commonly used western medicine. Suspecting intestinal worms were found to be most frequently reported reason prompting parents to use traditional self-medication (Table 2).

Figure 2: Drugs used in self-medication with western medications (%)
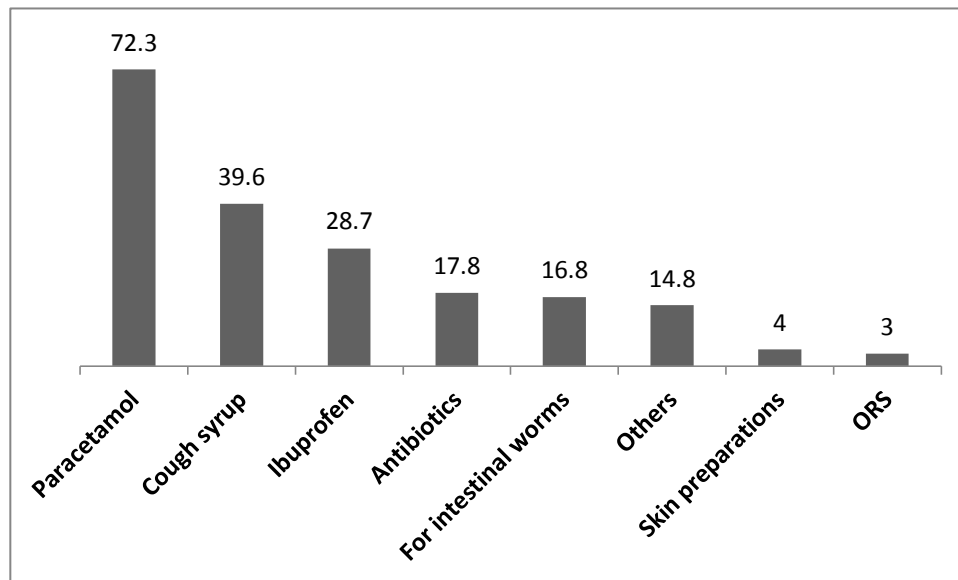
*Respondents could choose more than two options.

Reasons of using self-medication: There was a statistically significantly difference in reasons for choosing western and modern self-medication among our participants, with participants giving western medication having slightly more confidence in self-medication than self-medication providers of traditional medicines(p=0.005) and parents who used western self-medication agreed more on having barriers to consultation than traditional drugs self-prescribers (p=0.028) (Table 3).

Table 3: Reasons for using self-medication – Means of Likert questions

	Modern Medicine questionnaire (n=101)				Traditional medicine questionnaire (n=59)				p-value
	Disagree 1&2	Neutral 3	Agree 4&5	Mean (±SD)	Disagree	Neutral	Agree	Mean (±SD)	
Confidence in self-prescribing									
The symptoms of my child are minor and do not require a health facility consultation	29 (28.8%)	0 (0%)	72 (71.2%)	3.56 (**±1.08**)	23 (40%)	1 (1.7%)	35 (59.3%)	3.31 (**±1.14**)	p=0.164
I can recognize my child's disease based on his/her symptoms	35 (34.7%)	0 (0%)	66 (65.3%)	3.39 (**±1.07**)	27 (45.8%)	0 (0%)	32(54.2%)	3.22 (**±1.21**)	p=0.477
I have used drug previously	24 (23.8%)	1 (1%)	76 (75.2%)	3.64 (**±1.04**)	24 (40.8%)	0 (0%)	35 (59.3%)	3.31 (**±1.22**)	p=0.111
I want to give emergency treatment to my child	13 (12.9%)	1 (1%)	87 (86.1%)	3.83 (**±0.81**)	31 (52.6%)	0 (0%)	28 (47.4%)	3.00 (**±1.17**)	**p<0.001**
Non-prescription medicines work well	27 (26.7%)	6 (6%)	68 (67.3%)	3.37 (**±1.02**)	20 (34%)	3 (5%)	36 (61%)	3.27 (**±1.04**)	p=0.558
Non-prescription medicines are not dangerous	28 (27.8%)	4 (4%)	69 (68.3%)	3.38 (**±1.01**)	22 (37.3%)	3 (5%)	34 (57.7%)	3.24 (**±1.10**)	p=0.441
Total confidence score	-	-	-	21.2 (**±3.25**)	-	-	-	19.3 (**±4.38**)	**p=0.005**
Barriers to consultation									
I don't have health insurance	89 (88.1%)	0 (0%)	12 (11.9%)	2.06 (**±1.00**)	51 (86.4%)	0 (0%)	8 (13.6%)	2.14 (**±0.99**)	p=0.484
Consultations fees are high	88 (87.1%)	2 (2%)	11 (10.9%)	2.06 (**±0.83**)	53 (89.8%)	1 (1.7%)	5 (8.5%)	2.08 (**±0.81**)	p=0.725
I spent lot of time waiting when I consult a health facility	60 (59.4%)	2 (2%)	39 (38.6%)	2.84 (**±1.18**)	44 (74.6%)	1 (1.7%)	14 (23.7%)	2.53 (**±1.04**)	p=0.106
The health facility is far from my home	81 (80.2%)	0 (0%)	20 (19.8%)	2.34 (**±0.89**)	54 (91.5%)	0 (0%)	5 (8.5%)	2.14 (**±0.60**)	p=0.250
I don't have time to go to a health facility	71 (70.3%)	1 (1%)	29 (28.7%)	2.53 (**±1.11**)	53 (89.8%)	0 (0%)	6 (10.2%)	2.03 (**±0.76**)	**p=0.004**
Total barriers score	-	-	-	11.8 (**±3.18**)	-	-	-	10.9 (**±2.69**)	**p=0.028**

Likert scale: Strongly disagree = 1; Disagree = 2; Neutral = 3; Agree= 4; strongly agree = 5; P-value: Mann-Whitney U-test Comparison of means

Table 4: Reasons of not using self-medication

Reasons	Non self-prescribers (N=34)			
	Disagree 1&2	**Neutral 3**	**Agree 4&5**	**Mean (±SD)**
I have limited access to pharmacy	33 (97.1%)	0 (0%)	1 (2.9%)	1.94 (±**0.48**)
I have limited access to traditional healer	33 (97.1%)	0 (0%)	1 (2.9%)	1.76 (±**0.51**)
I can't afford medication in pharmacy	32 (94.1%)	0 (0%)	2 (5.9%)	1.88 (±**0.68**)
I have limited access to traditional medication shop/store	32 (94.1%)	1 (2.9%)	1 (2.9%)	1.82 (±**0.62**)
My child/children did not get sick	30 (88.2%)	0 (0%)	4 (11.8%)	2.18 (±**0.93**)
Nonprescription drugs do not work	9 (26.5%)	3 (8.8%)	22 (64.7%)	3.53 (±**1.05**)
Nonprescription drugs are dangerous	6 (17.7%)	1 (2.9%)	27 (79.4%)	3.82 (±**0.96**)

Likert scale: Strongly disagree = 1; Disagree = 2; Neutral = 3; Agree= 4; strongly agree = 5

Non-self-prescribers: The participants who did not self-medicate believed that self-medications do not work and can be dangerous. Access to pharmacy, traditional healer, traditional medication shop or cost were not found to be reasons not to use self-medication (Table 4).

Social demographic association with the use of non-prescription drugs: The association between different demographic characteristics and the use of self-medication was analyzed. In bivariate analysis the factors that were statistically significantly associated with use of non-prescription drugs included being from Kigali and having more than one child less than 10 years. In the multivariate analysis of the factors that were significant in the bivariate analysis ($p<0.2$), we found that the only factor associated with use of self-prescribed drugs is having more than one child below 10 (Table 5).

Association of Socio-demographic factors with the use of western vs. traditional medication: The association between socio-demographic factors and the use of western only vs. traditional only drugs was analyzed. In bivariate analysis the factors associated with use of western rather than traditional drugs in self-medication were: caregivers in private clinic, caregivers from Kigali, advanced education, high social economic class, having private health insurance, and having more than 30 years. We included all significant factors (p-value≤0.2) in a multivariate analysis and after adjusting for confounders only age above 30 and living in Kigali remained associated with the preference of western self-medication than traditional self-medication (Table 6).

Table 5: Social demographic association with the use of nonprescription drug

		Use of medication w/o prescription					
		Yes (n=120)	No (n=34)	OR (CI)	P-value	Adjusted OR (CI)	P-value
		N (%)	N (%)				
Number of children <10yrs	> One	92 (86.8%)	14 (13.2%)	4.6 (2.10-10.48)	**<0.001**	**4.74 (1.94-11.58)**	**0.001**
	One	28 (58.3%)	20 (41.7%)				
Origin	Kigali	78 (84.8%)	14 (15.2%)	2.65 (1.21-5.78)	**0.013**	2.23 (0.91-5.46)	0.078
	Outside Kigali	42 (67.7%)	20 (32.2%)				
Site of interview	Private	44 (86.3%)	7 (13.7%)	2.23 (0.89-5.55)	0.080	1.09 (0.32-3.67)	0.886
	Public	76 (73.8%)	27 (26.2%)				
Economic status	High	39 (86.6%)	6 (13.3%)	2.24 (0.86-5.87)	0.094	1.79 (0.53-6)	0.342
	Low/Moderate	81 (74.3)	28 (25.7)				
Age of parent	>30	77 (81.9%)	17 (18.1%)	1.79 (0.83-3.86)	0.136	0.82 (0.32-2.09)	0.679
	<30	43 (71.7%)	17 (28.3%)				
Education level	Advanced	61 (79.2%)	16 (20.8%)	1.16 (0.54-2.49)	0.699		
	Basic	59 (76.6%)	18 (23.4%)				
Relationship	Mother	104 (78.2%)	29 (21.8%)	1.12 (0.37-3.31)	0.837		
	Other	16 (76.2%)	5 (23.8%)				
Marital status	Married	113 (77.9%)	32 (22.1%)	1.00 (0.20-5.09)	0.991		
	Single	7 (77.8%)	2 (22.2%)				
Health insurance	Private	47 (78.3%)	13 (21.7%)	1.04 (0.47-2.27)	0.922		
	Mutuelle de santé/None	73 (77.7%)	21 (22.3%)				

Table 6: Social demographic association with type of used self-medication (modern vs. traditional)

		Parents who use only Modern self-medication (n=61)	Parents who use only Traditional self-medication (n=19)	OR (95%CI)	p-value	Adjusted OR(CI)	p-value
		N (%)	N (%)				
Site of interview	Private	33 (97.1%)	1 (2.9%)	21.21 (2.66-169)	**<0.001**	0.61 (0.02-18.16)	0.778
	Public	28 (60.9%)	18 (39.1%)				
Education level	Advanced	43 (95.5%)	2 (4.4%)	20.3 (4.24-97.12)	**<0.001**	2.38 (0.24-22.92)	0.453
	Basic	18 (51.4%)	17 (48.6%)				
Economic status	High	30 (96.7%)	1 (3.2%)	17.41 (2.18-138.77)	**0.001**	4.75 (0.32-70.28)	0.257
	Low /Moderate	32 (63.2)	18 (36.7)				
Health insurance	Private	38 (95%)	2 (5%)	14.04 (2.96-66.42)	**<0.001**	2.78 (0.20-37.44)	0.440
	Mutuelle de santé/none	23 (57.5%)	17 (42.5%)				
Age of parent	>30	49 (89.1%)	6 (10.9%)	8.84 (2.78-28.08)	**<0.001**	5.78 (1.25-26.68)	**0.025**
	≤30	12 (48%)	13 (52%)				
Origin	Kigali	46 (90.2%)	5 (9.8%)	8.5 (2.65-27.82)	**<0.001**	8.2 (1.58-43.12)	**0.012**
	Outside Kigali	15 (51.7%)	14 (48.2%)				
Number of children <10yrs	>one	49 (79%)	13 (21%)	1.88 (0.59-5.98)	0.281		
	One	12 (66.6%)	6 (33.3%)				
Relationship	Other	11 (84.6%)	2 (15.4%)	1.87 (0.37-9.29)	0.442		
	Mother	50 (74.6%)	17 (25.4%)				
Marital status	Married	59 (76.6%)	18 (23.4%)	1.63(0.14-19.14)	0.693		
	Single	2 (66.7%)	1 (33.3%)				

CHAPTER FOUR: DISCUSSION OF RESULTS

The main objective of this study was to determine the reported use of self-medication among parents for their children in three health facilities in Rwanda. This study had three specific objectives. The first was to determine the frequency of self-medication use in children in Rwanda, the second was to identify common drugs used and source of information/advice in self-medication, and the third was to determine the factors associated with of use of self-medication in children in Rwanda.

Prevalence of self-medication

We found that 77.9 % of participants reported having used self-medication for their children. Both western and traditional drugs were used. This finding is almost similar to that of a previous study done in Pakistan where the reported use of self-medication was 77.25% (6). It is a bit higher compared to studies conducted in Madagascar, and two Indian regions which reported 58.82%, 40.99%, 32% respective prevalence of use of medicine without a doctor consultation (10,11,15). However, even higher prevalence was reported in Greece and Australia, at 95.1% and 98.1% respectively (16,17).

This shows that self-medication in children is a worldwide practice with differences between countries.On the one hand, if self-medication is done correctly, it can be an important aspect of primary health care in addition to community health workers service. However, on the other hand, this can have a negative impact on the health of children, especially when no clear guideline exist or no regulations are enforced and when important information given to protect the patients from self-medication side effects does not exist.

Commonest drugs used in self-medication

We found that among participants who used self-medication, 51% used only western medicines, 16% used only traditional self-medicines and 33 % used both. Our findings show that we had a lower rate of parents who used only western medicines compared to the previous studies conducted in Sudan where 84% of parents preferred western medicines than traditional ones and in Saudi Arabia where 86.7% of parents used western medicines versus 13.3% who used traditional medicines (19,20); the difference in percentages of use of western medicines found, can be explained by the fact that in our study we separately considered participants who used both types of self-medication as we considered them to have no preference of either western or traditional drug by the fact that they used both.

Our finding that we had a lower percentage of western medicine use can be explained by the fact that most of our participants were urban from Kigali where there is easy access to pharmacies distributing western medicine (even without any medical prescription) rather than traditional ones.

According to our findings, all traditional self-prescribers used Rwandan local traditional medicines. Paracetamol was the most reported non-traditional drug used in self-medication. This finding was not surprising as we also found that fever was the symptom most commonly treated with western drugs and paracetamol is known to be the most common drug in self-medication (10,16,17,20,22).

In our setting, this might be because, of a high rate of parental fever phobia as it was reported in local studies (27), again paracetamol is an over-the-counter medication that is possibly most known by parents and easily purchased without any medical prescription.

After paracetamol, cough syrups were the second most widely used, this might be a problem specifically in young children as cough suppressants have not been well studies in this age group and can cause harmful effect (32). Drugs for intestinal worms were the third. This is important because deworming has become routine for almost all parents but again many other symptoms like decreased appetite, poor weight gain may be overlooked as intestinal worms but this association needs to be investigated further through other research.

In our study it was revealed that many parents who used western drugs admitted to self-medicate their children without seeking any advice (53.4%), the rest of parents (31.7%) preferring to get both information and advice directly from qualified health care providers before any western self-medication is given. Health care providers were the main source of information in studies done in Madagascar, Italy, Saudi Arabia, Pakistan and Sudan (15,19–22) but not in a study done in Pakistan where the majority of parents got information from previous prescriptions (6).

Our findings on advice seeking before western self-medication can be explained by the fact that we enrolled more parents who had more than one child below 10 years, and when the parents have more than one child, with the use of medicines often after consultation, they get familiar with them and gain confidence in using them subsequently without always going to seek for medical advice. However, for less experienced young parents even when they decide not to consult they tend to ask advice from health care providers mainly those working in pharmacies but further studies exploring such association are needed.

On the other hand, for parents who used traditional self-medication, 61% of them got advice from relatives and friends; this is a big percentage compared to other sources of advise in this group of traditional self-prescribers and it might be due to the fact that traditional medicines even though made known, they are not easily trusted as western medicines and parents before using them they tend fisrt to get advise from some one else who might have experince in using them.Then again futher exploration of such a relationship is suggested.

Reasons for using self-medication

In terms of reasons for using self-medication, reasons are similar in different studies done previously with the only differences being the most reported reasons across studies. In our study we found that the need to give emergency medication to children was the most cited reason followed by having experience with the drug whereas In some other studies these might not be the major reason for parents to choose self-medication where for instance the main reason included parents perceiving their children as having mild symptoms(6,33)

Interestingly, in our study, as opposed to other studies (15,17,19,22), financial, insurance or geographic access barriers were not reasons to choose self-medication.These findings can be due to that in Rwanda there is an affordable good health insurance scheme (Mutuelle de Santé) through which there is 90% reduction on actual consultation fees in public health facilities and even for the very poor people the government pays for their health expenses therefore probably these were not excuse for parents to choose self-medication.

Factors associated with the use of self-medication

Furthermore, our study showed that having more than one child less than 10 years was strongly associated with the practice of self-medication; No other factor was shown to be associated with parental use of self-medication. In contrast to our finding, an Italian study found that being female, younger and with higher education were positively associated with the practice of self-medication (21).

In Spain parents with a secondary educational level and middle social class were more likely to self-medicate their children than those with higher education and low or high social class (25). In Germany mother with lower education level used fewer OTC and no significant difference was seen with regard to income status (24), in India level of education was not found to have any association with self-medication (11). Our finding in our population suggests that for self-medication, few factors can help predict its use though we know already that it is being practiced; general education aiming to the whole population regardless of social demographic characteristic would be a better orientation.

Besides, we also found that caregiver's age above 30 was associated with the use of western self-medication compared to traditional one. This finding should have been influenced by the fact that we did not include in comparison the group of parents who used both western and traditional self-medication.The result on this finding can probably be due to the fact that older mother feel more confident in symptoms recognition and take their initial initiative to choose which medication they use in contrast to less experienced young parents but this is an assumption based on PI personal experience which needs further exploration.

We observed that coming from an urban area (Kigali) was also associated with the preference of western drugs over traditional ones, which can be explained by the fact that most of our study participants were from Kigali where there is wide availability of pharmacies dispensing western medicines than in rural area. But again these observed trends can be due to that in in town people people might be more educated and tend to under-esteem the use of traditional self-medication and discourage consultation of traditional healers but further studies are needed to explore that.

Strengths of this study: This was the first study about self-medication in children to be conducted in Rwanda, and this will be a great contribution to the existing literature in the field of self-medication use.
- We found a considerable number of self-medication use despite being non-regulated
- Even with health insurance, people use of self-medication
- Antibiotics and cough syrups were found to be among medicines used in self-medication
- Education level is not influencing self-medication

Validity of the results: Regarding internal validity we used a questionnaire designed specifically for this study based on previous research in the field. The internal validity could have been compromised by the high rate of verbal completion of the questionnaire, with participants being potentially prone to acquiescence bias. Recall bias may also have limited caregiver responses. Regarding external validity, this was a multi-center study and included participants of different social demographic characteristics to increase sample representation and generalizability but all provinces well not equally represented and the majority of our patients had access to a healthcare insurance (whether mutuelle or private health insurance).

Limitations: There are some limitations to our study, as a big number of questionnaires were filled with assistance (not because of illeteracy rather by participant's preference) so they should have been some influences and response biases. Again even though parents were given sufficient time to fill in the questionnaires, some recall biases should have remained in play.

Our analysis did not cover the comparison between three groups of respondents in terms of type of used drugs in self-medication (use of only western vs. only traditional vs. both). Combining parents who use only one type of treatment with both types in one group is going to potentially lead to some dilution of the differences between the groups, which could have contributed to lack of statistical significantly different findings between groups

Increasing the sample size and provinces representation would provide an added value to our results.

Conflict of interest: This study was done by a PI who is doing this for their thesis, which is mandatory for graduation.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

Conclusion

Self-medication which is a worldwide practice is also common in Rwanda. Parents are involved in this practice for their children regardless of their socio-demographic background. Consideration should be given to regulating drugs used in self medicationas as well as the education of the population with the goal of minimizing the risks of self-medication and maximizing benefits.

Clinical relevance of the findings (impact)

Awareness of existence of self-medication practice should stimulate the concerned Ministry of Health (MOH) to take over control on it, and to recognize and regulate the role of pharmacies and other medication shops that are involved in widespread of this practice. Evaluation should be undertaken to see if self-medication can reasonably be incorporated in our primary health care system.

Recommendations

1. Promote responsible self-medication; this implies providing necessary information about the medicines and use medicines that are approved for use in self-medication
2. Set up a list of OTC drugs for use in self-medication by MOH
3. Set rules and control measures on local pharmacies about drugs allowed to be dispensed without a prescription

Future research should focus on

1. The impact of self-medication on the users.
2. Implementation of self-medication in primary Health care system to decrease the burden of consultation for minor ailments
3. To explore the perceptions about western and traditional medicines in parents living in Kigali vs. parents living in outside Kigali.
4. Role of health care providers and pharmacists in providing advice before self-medication
5. Impact of living in urban area on the practice of self-medication

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APPENDICES

Appendix 1: Search strategy

	(Medication, Self OR Medications, Self OR Self Medications OR Drugs, Nonprescription OR Medicines Patent OR OTC Drugs OR Drugs, OTC OR Over-the-Counter Drugs OR Drugs, Over-the-Counter OR Over the Counter Drugs OR Patent Medicines OR Drugs, Non-Prescription OR Drugs, Non-Prescription OR Non-Prescription Drugs OR Non-Prescription Drugs)
AND	(Parental OR parent)
AND	(Children OR Preschool Child OR Children, Preschool OR Preschool Children)
LIMITS	The search was limited to papers in the English language and publications of recent 10 years only.

An automated email update was set up on PubMed during the process of writing this research proposal to ensure no new articles were missed.

Appendix 2: Full sample size calculation

We calculated sample size using the formula with Finite Population Correction (31):

$$n' = \frac{NZ^2 \ P\,(1-P)}{d^2\,(N-1) + Z^2 P\,(1-P)}$$

Where

n'	:	Sample size with finite population correction
N	:	Population size
Z	:	Statistic corresponding to level of confidence aimed at 95% CI
P	:	Expected proportion (we used the proportion from a similar study done in Tanzania in 2013 where 68.8% of parents of children under five reported that they have used self-medication) (34).
d	:	Precision (corresponding to effect size). (5%)

We calculated that the sample size, using the above formula but with a finite population correction of 280 parents (population size from which the sample will be taken, which are 80 parents in Legacy, 140 parents in Ruhengeli and 80 parents in Muhima) to be **152 parents.**

Appendix 3: Data collection tools

Questionnaire (English version)

RESEARCH CODE: ……… (Site of interview: ……………………date of interview: ……/………/………)

Number	Question	Response	Code
1	**In which district do you live?**	………………………………………….	
2	**Who are you in relationship to the patient?**	☐Mother ☐Father ☐Other…………………………(specify)	1 2 3
3	**What is your marital status?**	☐married ☐single ☐separated ☐widowed	1 2 3 4
4	**What is your age?**	…………….Years old	
5	**What is your highest level of education?**	☐None or started primary school ☐completed Primary school ☐completed secondary school ☐completed University	1 2 3 4
6	**Do you live in your own house?**	☐Yes ☐no	1 2
7	**Are you employed?**	☐Yes ☐No	1 2
8	**Is your job permanent?**	☐Yes ☐No	1 2
9	**Your health insurance**	☐None ☐Mutuelle de santé ☐other…………………………….. (specify)	1 2 3
10	**Number of your children under 10 years (that you care for)**	…………..children	1 :1 >1 :2

We are interested to know if you use medications without a prescription (non-prescription medication) for your child/children.

☐**No**, Skip section II and III below and go to section IV (BLUE PAGE)   ☐**Yes**, please fill in the following sections

11	**The non-prescription medications I use to self-medicate my children are**	☐modern/western (FILL GREEN PAGE) ☐traditional medicine (FILL PINK PAGE)	1 2

SECTION II
Please fill section below if you have ever given non-prescribed **modern/western medications (Skip this section if you haven't)**

12	When you give non-prescribed modern/western medication, whose advice do you follow? (tick all that apply)	☐ a health care provider ☐ internet /media ☐ friend/relative ☐ traditional healer ☐ other…………………………………………	1 2 3 4 5
13	Which of the following modern/western non-prescription medications do you use to self-medicate your child/your children? (tick all that apply)	☐ paracetamol ☐ ibuprofen ☐ cough syrup ☐ Oral rehydration solution ☐ antibiotics ☐ skin cream ☐ other: ….......................................	1 2 3 4 5 6 7
14	For which of the following problems do you give modern/western self-medication to your child? (tick all that apply)	☐ fever ☐ cough and/or runny nose ☐ difficulty breathing ☐ pain ☐ diarrhea and/or vomiting ☐ skin conditions ☐ other: ....(specify)	1 2 3 4 5 6 7
15	Where do you obtain or buy modern/western non-prescription medicine? (tick all that apply)	☐ a pharmacy ☐ a relative/ friend ☐ a left-over medicine ☐ shop/store ☐ a health care facility but without prescription ☐ other place……………………………………(specify)	1 2 3 4 5 6
16	Which health facility are you most likely to consult in case modern/western nonprescription medicine does not help? (tick ONE)	☐ public health facility ☐ private clinic ☐ traditional healer ☐ other…………………… (specify)	1 2 3 4

PLEASE TELL US IF YOU AGREE OR DISAGREE WITH THE FOLLOWING STATEMENTS?

	I USE MODERN MEDICINE SELF-MEDICATION FOR MY CHILD BECAUSE:	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
17	The symptoms of my child are minor and do not require a health facility consultation					
18	I can recognize my child's disease based on his/her symptoms					
19	I have used drug previously					
20	I want to give emergency treatment to my child					
21	I don't have health insurance					
22	Consultations fees are high					
23	I spent lot of time waiting when I consult a health facility					
24	The health facility is far from my home					
25	I don't have time to go to a health facility					
26	Nonprescription modern medicines work well					
27	Nonprescription modern medicines are not dangerous					

If you have other reason why you use traditional self-medication to your child please specify them:
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SECTION III

If you give **traditional medications (excluding home-made remedies like: lemon, honey…), please fill in the section below (Skip this section if you don't give traditional medications)**

28	**Which of the following traditional medications do you use to self-medicate your child/your children?** **(tick all that apply)**	☐Rwandan traditional medicines ☐Chinese traditional medicines ☐others………………………………..specify	1 2 3
29	**Whose advice do you follow to decide to self-medicate your children/ child with traditional medicines?** **(tick all that apply)**	☐a health care provider ☐internet /media ☐household member/friend/relative ☐traditional healer ☐other……………………………………	1 2 3 4 5
30	**For which of the following problem(s) do you give traditional self-medication to your child?** **(tick all that apply)**	☐ Fever ☐cough and runny nose ☐ difficulty breathing ☐pain ☐diarrhea and/or vomiting ☐skin conditions ☐other: .... (specify)	1 2 3 4 5 6 7
31	**Who gives you the traditional medicine?** **(tick all that apply)**	☐a health care provider ☐a relative/ friend ☐traditional healer ☐ other ………………………………… (specify)	1 2 3 4
32	**Which health facility are you most likely to consult if the traditional medicine does not help?** **(TICK ONE)**	☐public health facility ☐private clinic ☐traditional healer ☐other…………………………………………….(specify)	1 2 3 4

	PLEASE TELL US IF YOU AGREE OR DISAGREE WITH THE FOLLOWING STATEMENTS?					
	I USE TRADITIONAL SELF-MEDICATION FOR MY CHILD BECAUSE:	**Strongly disagree (1)**	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly agree (5)**
33	The symptoms of my child are minor and do not require a health facility consultation					
34	I can recognize my child's disease based on his/her symptoms					
35	I have used drug previously					
36	I wants to give emergency treatment to my child					
37	I don't have health insurance					
38	Consultations fees are high					
39	I spent lot of time waiting when I consult a health facility					
40	The health facility is far from my home					
41	I was not having time to go to a health facility					
42	Traditional medicines work well					
43	Traditional medicines are not dangerous					

If you have other reason why you use traditional self-medication to your child please specify them:
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SECTION III
For those who never used self-medication (modern/western or traditional medicine)

	Questions	1	2	3	4	5
	I DO NOT USE NON PRESCRIPTION MEDICINE TO MY CHILD BECAUSE:	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
44	My child/children did not get sick					
45	I can't afford medication in pharmacy					
46	I have limited access to pharmacy					
47	I have limited access to traditional healer					
48	I have limited access to traditional medication shop/store					
49	Nonprescription drugs are dangerous					
50	Nonprescription drugs do not work					

If you have other reason why you do not use self-medication to your child please specify them:
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Data collector to fil in:	☐ Parent fill-in independently
	☐Data collector completing the questionnaire

Questionnaire (Kinyarwanda version)

Kode y'ubushakashatsi: ……… (Ivuriro: …………………….. Italiki   …….……/…..………/…….……)

ICYICIRO CYA I

Numero	Ikibazo	Igisubizo	Kode
1	**Mutuye mu kahe karere?**	………………………………………….	
2	**Ufitanye iyihe sano n'umwana?**	☐ Nyina ☐ Se ☐Undi wita ku mwana………………………	1 2 3
3	**Irangamimerere yawe**	☐ Ubana nuwo mwashakanye ☐ Uri ingaragu ☐Watandukanye nuwo mwashakanye ☐ Uri umupfakazi	1 2 3 4
4	**Igihe wavukiye**	……………/……………../…………..	
5	**Wize amashuri angana ate?**	☐Ntayo cyangwa ntiwarangije abanza ☐ Warangije amashuri abanza ☐warangije amashuri yisumbuye ☐ warangije kaminuza	1 2 3 4
6	**Mutuye mu nzu yanyu bwite?**	☐Yego ☐Oya	1 2
7	**Ufite akazi?**	☐Yego ☐Oya	1 2
8	**Akazi kawe gahoraho?**	☐Yego ☐Oya	1 2
9	**Ubwishingizi bw'indwara mukoresha**	☐Ntabwo ☐Ubwisungane mu kwivuza ☐Ubundi…………………………..(buvuge)	1 2 3
10	**Umubare w'abana bawe bari munsi y'imyaka 10**	Abana …………..	1 :1 >1 :2

Waba warivuriye umwana wawe n' umuti utanditswe na muganga?

☐**Oya**, Simbuka ibyiciro II na III bikurikira, ujye ku cyiciro cya IV (IPAJI Y'UBURURU)
☐**Yego**, Uzuza ibyiciro bikurikira

11	Umuti navurishije umwana banjye utanditswe na muganga ni	☐Ugezweho/wa kizungu (UZUZA IPAJI Y'ICYATSI) ☐Imiti gakondo(UZUZA IPAJI Y'IROZA)	1 2

ICYICIRO CYA II – Niba warahaye umwana wawe umuti ugezweho/wa kizungu utaranditswe na muganga

12	Nafashe icyemezo cyo kwivurira umwana ngendeye ku nama mpawe na (shyira akamenyetso ku bisubizo byose ubona bikwiye)	☐umuganga ☐interineti cyangwa itangazamakuru ☐Uwo dufitanye isano/inshuti ☐Umuvuzi wa gakomdo ☐Undi………………………………(muvuge)	1 2 3 4 5
13	Umuti ugezweho/wa kizungu utaranditswe na muganga nakoresheje ni (shyira akamenyetso ku bisubizo byose ubona bikwiye)	☐parasetamoro ☐ibiporofene ☐umuti w'inkorora ☐amaserumu y'impiswi ☐antibiyotike ☐imiti basiga ku ruhu ☐indi: …......................................(yivuge)	1 2 3 4 5 6 7
14	Nahaye umwana umuti ugezweho/wa kizungu utaranditswe na muganga igihe yari afite (shyira akamenyetso ku bisubizo byose ubona bikwiye)	☐umuriro ☐inkorora n'ibicurane ☐ahumeka nabi ☐ububabare ☐impiswi cyangwa / no kuruka ☐indwara z'uruhu ☐izind: ....(zivuge)	1 2 3 4 5 6 7
15	Umuti ugezweho/wa kizungu utaranditswe na mugangana wukuye (shyira akamenyetso ku bisubizo byose ubona bikwiye)	☐ Muri farumasi ☐Mu bo dufitanye isano/ mu nshuti ☐ Uwasigaye ku wo nakoresheje ☐kuri butiki/mu bubiko ☐ Ku ivuriro ariko utanditswe n'umuganga ☐ Ahandi……...………………… (hagaragaze)	1 2 3 4 5 6
16	Ni irihe vuriro wiyambaza mu gihe **u**muti ugezweho/wa kizungu utaranditswe na mugangawahaye umwana utagize icyo umumarira?	☐ivuriro rya Leta ☐ivuriro ryigenga ☐umuvuzi gakondo ☐ahandi………………………… (hagaragaze)	1 2 3 4

TURIFUZA KO UTUBWIRA UKO WEMERA CYANGWA UHAKANA IBI BIKURIKIRA						
	NAVUJE UMWANA WANJYE UMUTI WA UGEZWEHO/ WA KIZUNGUUTANDITSWE NA MUGANGA KUBERA:	Sibyo na gato (1)	Sibyo (2)	Ndifashe (3)	Nibyo (4)	Nibyo cyane (5)
17	Ibimenyetso by'indwara byari byoroheje ku buryo bitari ngombwa kujyana umwana ku ivuriro					
18	Nsanzwe menyereye ibimenyetso by'indwara nk'izi					
19	Nari nakoresheje uwo muti mbere					
20	Nifuza guha umwana wanjye ubuvuzi bwihuse					
21	Singira ubwishingizi bw'indwara					
22	Ikiguzi cyo gusuzuma indwara kiri hejuru					
23	Bintwara igihe kirekire ntegereje guhabwa serivisi ku ivuriro					
24	Ivuriro riherereye kure y'iwanjye					
26	Sinari mfite igihe cyo kujya ku ivuriro					
26	Umuti utanditswe na muganga ukora neza					
27	Umuti utanditswe na muganga nta ngaruka ugira					

Niba hari indi mpamvu itavuzwe haruguru (yatumye)ituma wivurira umwana yitubwire:

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ICYICIRO CYA III
Kubakoresheje ubuvuzi bwa gakondo (ukuyemo ibikorerwa murugo nk'ubuki n'ibitunguru…)

28	Umuti wo mu bavuzi gakondo navurishije umwana ni(shyira akamenyetso ku bisubizo byose ubona bikwiye)	☐Umuti gakondo wa kinyarwanda ☐Umuti gakondo w'abashinwa ☐Undi……………………………….. (wuvuge)	1 2 3
29	Nafashe icyemezo cyo kuvurisha umwana umuti wo mu bavuzi gakondo ngendeye ku nama zikurikira (shyira akamenyetso ku bisubizo byose ubona bikwiye)	☐umuganga ☐interineti/itangazamakuru ☐uwo tubana/umuturanyi/inshuti ☐umuvuzi gakondo ☐undi…………………………………(muvuge)	1 2 3 4 5
30	Nahaye umwana umuti wo mu bavuzi gakondo igihe umwana yari afite (shyira akamenyetso ku bisubizo byose ubona bikwiye)	☐umuriro ☐inkorora n'ibicurane ☐ahumeka nabi ☐ububabare ☐impiswi cyangwa / no kuruka ☐indwara z'uruhu ☐izind: ....(zivuge)	1 2 3 4 5 6 7
31	**Aba bakurikira bampaye umuti wo mu buvuzi bwa gakondo**	☐umuganga ☐ uwo dufitanye /isano inshuti ☐umuvuzi wa gakondo ☐ undi ……………………………… (muvuge)	1 2 3 4
32	Ni irihe vuriro uhitamo kwiyambaza mu gihe umuti wo mu bavuzi gakondowahaye umwana utagize icyo umumarira?	☐ivuriro rya Leta ☐ivuriro ryigenga ☐umuvuzi gakondo ☐ahandi………………………. (hagaragaze)	1 2 3 4

	TURIFUZA KO UTUBWIRA UKO WEMERA CYANGWA UHAKANA IBI BIKURIKIRA					
	NAVUJE UMWANA WANJYE UMUTI GAKONDO UTANDITSWE NA MUGANGA KUBERA:	**Sibyo na gato** **(1)**	**Sibyo** **(2)**	**Ndifashe** **(3)**	**Nibyo** **(4)**	**Nibyo cyane** **(5)**
33	Ibimenyetso by'indwara byari byoroheje ku buryo bitari ngombwa kujyana umwana ku ivuriro					
34	Nsanzwe menyereye ibimenyetso by'indwara nk'izi					
35	Nari nakoresheje uwo muti mbere					
36	Nifuza guha umwana wanjye ubuvuzi bwihuse					
37	Singira ubwishingizi bw'indwara					
38	Ikiguzi cyo gusuzuma indwara kiri hejuru					
39	Bintwara igihe kirekire ntegereje guhabwa serivisi ku ivuriro					
40	Ivuriro rihererereye kure y'iwanjye					
41	Sinari mfite igihe cyo kujya ku ivuriro					
42	Umuti utanditswe na muganga ukora neza					
43	Umuti utanditswe na muganga nta ngaruka ugira					

Niba hari indi mpamvu itavuzwe haruguru (yatumye)ituma wivurira umwana yitubwire:

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ICYICIRO IV
Bireba ababyeyi bataravurishije abana baboumuti utanditswe na muganga (Umuti ugezweho/wa kizungu cyangwa umuti wo mu bavuzi ba gakondo)

	Ikibazo	1	2	3	4	5
	SINAVUJE UMWANA UMUTI UTANDITSWE NA MUGANGA KUBERA:	**Sibyo na gato**	**Sibyo**	**Ndifashe**	**Nibyo**	**Nibyo cyane**
44	Umwana wanjye wanjye ntiyigeze arwara					
45	Simfite ubushobozi bwo kugura umuti muri farumasi					
46	Farumasi zihereye kure y'iwanjye					
47	Ntuye kure y'umuvuzi gakondo					
48	Aho bacururiza imiti gakondo ni kure y'iwanjye					
49	Umuti utanditswe na muganga ugira ingaruka					
50	Umuti utanditswe na muganga ntukora neza					

Niba ufite indi mpamvu itavuzwe haruguru yatumye udaha umwana wawe umuti utanditswe na muganga yitubwire :
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Kuzuzwa na nyirubushakashatsi:	☐Umubyeyi yiyujurije ibibazo
	☐Umubyeyi yafashijwe kuzuza ibibazo

Appendix 4: Additional data tables

Social demographic association with type of used self-medication(Including option "BOTH")

		Modern (n=61)	Traditional (n=19)	Both (n=40)	Total (n=120)	p-value
		N (%)	N (%)	N (%)	N	
Site of interview	Private	33 (75.0%)	1 (2.3%)	10 (22.7%)	44	
	Public	28 (36.8%)	18 (23.7%)	30 (39.5%)	76	p<0.001
Origin	Kigali	46 (58.9%)	5 (6.4%)	27 (34.6%)	78	
	Outside Kigali	15 (35.7%)	14 (33.3%)	13 (30.9%)	42	p<0.001
Relationship	Mother	50 (48.1%)	17 (16.3%)	37 (35.6%)	104	
	Other	11 (68.8%)	2 (12.5%)	3 (18.8%)	16	p=0.309
Marital status	Married	59 (52.2%)	18 (15.9%)	36 (31.9%)	113	
	Single	2 (28.6%)	1 (14.3%)	4 (57.1%)	7	p=0.320
Age of parent	<30	12 (27.9%)	13 (30.2%)	18 (41.9%)	43	
	>30	49 (63.6%)	6 (7.8%)	22 (28.6%)	77	p<0.001
Education level	None or started primary school	18 (29.5%)	17 (27.9%)	26 (42.6%)	61	
	Completed secondary or university	43 (72.9%)	2 (3.4%)	14 (23.7%)	59	p<0.001
Economic status	Low	10 (34.5%)	5 (17.2%)	14 (48.3%)	29	
	Moderate	21 (40.4%)	13 (25.0%)	18 (34.6%)	52	
	High	30 (76.9%)	1 (2.6%)	8 (20.5%)	39	p=0.001
Health insurance	Private	38 (80.9%)	2 (4.3%)	7 14.9(%)	47	
	Mutuelle de santé	23 (31.5%)	17 (23.3%)	33 (45.2%)	73	p<0.001
Number of children <10yrs	1	12 (42.9%)	6 (21.4%)	10 (35.7%)	28	
	>1	49 (53.3%)	13 (14.1%)	30 (32.6%)	92	p=0.538

P-value: chi square or Fisher exact test

Other symptoms treated by traditional self-medication (In their local terms)

Symptoms	Frequency	Percent
Failure to thrive	1	2.7
Ibyinyo	1	2.7
Ibyinyo/ikirimi	1	2.7
Icyo mu mutwe(large fontanel)	1	2.7
Imitsi,igihorihori (large fontanel)	1	2.7
Infant colic	3	8.11
Ingonga (failure to thrive and vomiting)	1	2.7
Intestinal worms	20	54.1
Poisoning, constipation	1	2.7
Poisoning/intoxication	3	8.1
Ubutumbi (kubyimba inda wararebye intumbi)	2	5.4
Ubwinyo	1	2.7
Urogonga(failure to thrive and vomiting)	1	2.7
Total	**37**	**100**

Appendix 5: Consent forms

Consent form (English version)

Research code: ………

This study is about giving medications to children before consulting a health facility. It comprises questions which have to be responded by the parents who come at Health Centre for vaccination of their children and parents who bring their sick children to the hospital or the clinic.

It is completely anonymous and we will not record any information that will allow us to identify you. If you accept to participate, you will fill in a questionnaire that you will then place in a blank envelope in a sealed box. The study is being done by Dr. Joyeuse Ukwishaka who is a medical doctor training to be a Pediatrician at the University of Rwanda. She is not part of the team of healthcare workers who will take care of your child.

Participation in the study is voluntary, and no payment or another benefit will be given to you. The decision to participate or not in the study will not influence the care your child will receive. If you accept to participate, you can also withdraw from the study at any time without any consequences on the care of your child.

I have read the above-given information; I have had the opportunity to ask questions. I consent voluntarily to participate in this research.

Participant……………………………………………………………
Date…………………………/……………………/………………………
Signature ………………………………………………………………….

Researcher ………………………………………………………………
Date …………………………/………………………/……………………..
Signature …………………………………………………………………

Who to contact
If any question or concern about the study you can contact

Dr UKWISHAKA Joyeuse: Principal Investigator, +250788568498, ukwijoy12@yahoo.fr
Dr UMUHOZA Christian: Supervisor (+250)0788753718, crissumuh@yahoo.fr
Dr KABAYIZA Jean Claude, +25088484236, jckaba@gmail.com.com
Dr NATALIE McCall: co-supervisor (+250)788381561, nataliemccall@gmail.com

Consent form (Kinyarwanda version) Amasezerano yo kwinjira mu bushakashatsi ku bushake

Inyito y'ubushakashatsi:IMIGENZEREZE Y'ABABYEYI BIHERA ABANA IMITI BATABANJE KUBAVUZA

Numero y'ubushakashatsi: ………………

Ubu bushakashatsi burakorerwa kubabyeyi bazana abana mu ikingiza ku kigo nderabuzima cyangwa kubavuza Kwa muganga. Ubushakashatsi bugizwe n'ibibazo bibazwa bijyanye no kwihera abana imiti mbere yo kubavuza.

Uwemeye Kujya mu bushakashatsi asubiza ibibazo kandi Ntabwo dufata amazina cyangwa umwirondoro we.

Ubushakashatsi buri gukorwa na muganga Dr.UKWISHAKA Joyeuse uri kwiga ibyo kuvura abana kandi ntabwo ari mu ikipe y'abaganga bari kuvura umwana wawe.

Kujya muri ubu bushakashatsi ni ubushake, ntagihembo ababujyamo bazahabwa. Kwemera cyangwa kwanga Kujya muri ubu bushakashatsi ni ubushake kandi wemerewe kuba wabuvamo igihe cyose.

Nyuma yo gusoma no gusobanurirwa iby' ubu bushakashatsi, nemeye kujyamo.

Amazina: …………………………………………………………………
Italiki: ……………………/……………………………/……………………
Umukono………………………………………………………………..

Uhagarariye ubushakashatsi
Amazina……………………………………………………………………
Italiki…………………………/………………………………/…………………
Umukono………………………………………………………………..

Ukeneye ibisobanuro

Ku bindi bisobanuro cyangwa ibibazo kuri ubu bushakashatsi mwahamagara:

Dr UKWISHAKA Joyeuse: Principal Investigator, +250788568498, ukwijoy12@yahoo.fr
Dr UMUHOZA Christian: Supervisor (+250)0788753718, crissumuh@yahoo.fr
Dr KABAYIZA Jean Claude, +25088484236, jckaba@gmail.com.com
Dr NATALIE McCall: co-supervisor (+250)788381561, nataliemccall@gmail.com

UNIVERSITY OF RWANDA

COLLEGE OF MEDICINE AND HEALTH SCIENCES

CMHS INSTITUTIONAL REVIEW BOARD (IRB)

Kigali, 10th /07/2018

Dr UKWISHAKA Joyeuse
School of Medicine and Pharmacy, CMHS, UR

Approval Notice: No 244/CMHS IRB/2018

Your Project Title *"Predictors And Frequency Of Reported Self-Medication Use In Children In Private And Public Health Facilities In Rwanda"* has been evaluated by CMHS Institutional Review Board.

Name of Members	Institute	Yes	Absent	Withdrawn from the proceeding
			No (Reason)	
Prof Kato J. Njunwa	UR-CMHS		X	
Prof Jean Bosco Gahutu	UR-CMHS	X		
Dr Brenda Asiimwe-Kateera	UR-CMHS	X		
Prof Ntaganira Joseph	UR-CMHS	X		
Dr Tumusiime K. David	UR-CMHS	X		
Dr Kayonga N. Egide	UR-CMHS	X		
Mr Kanyoni Maurice	UR-CMHS	X		
Prof Munyanshongore Cyprien	UR-CMHS	X		
Mrs Ruzindana Landrine	Kicukiro district		X	
Dr Gishoma Darius	UR-CMHS	X		
Dr Donatilla Mukamana	UR-CMHS	X		
Prof Kyamanywa Patrick	UR-CMHS		X	
Prof Condo Umutesi Jeannine	UR-CMHS		X	
Dr Nyirazinyoye Laetitia	UR-CMHS	X		
Dr Nkeramihigo Emmanuel	UR-CMHS		X	
Sr Maliboli Marie Josee	CHUK	X		
Dr Mudenge Charles	Centre Psycho-Social	X		

After reviewing your protocol during the IRB meeting of where quorum was met and revisions made on the advice of the CMHS IRB submitted on 28th June 2018. **Approval has been granted to your study.**

Please note that approval of the protocol and consent form is valid for **12 months**.

You are responsible for fulfilling the following requirements:

1. Changes, amendments, and addenda to the protocol or consent form must be submitted to the committee for review and approval, prior to activation of the changes.
2. Only approved consent forms are to be used in the enrolment of participants.
3. All consent forms signed by subjects should be retained on file. The IRB may conduct audits of all study records, and consent documentation may be part of such audits.
4. A continuing review application must be submitted to the IRB in a timely fashion and before expiry of this approval
5. Failure to submit a continuing review application will result in termination of the study
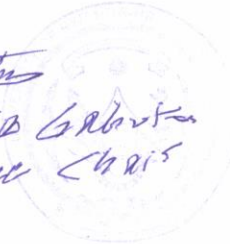6. Notify the IRB committee once the study is finished

Sincerely,

Date of Approval: The 10th July 2018

Expiration date: The 10th July 2019

Professor Kato J. NJUNWA
Chairperson Institutional Review Board,
College of Medicine and Health Sciences, UR

Cc:
- Principal College of Medicine and Health Sciences, UR
- University Director of Research and Postgraduate Studies, UR