



“Examine tobacco retailers around primary and secondary schools and assess the clientele with regard to sale to and by minors, the case of Nyarugenge district”.

Marie Rose Nyirakamana

College of Medicine and Health Sciences

School of Public Health

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Examine tobacco retailers around primary and secondary school and assess the clientele with regards to sale to or by minors, the case of Nyarugenge district

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By

Marie Rose Nyirakamana

PG213004189

Supervisor: **Ass. Prof Manassé Nzayirambaho**

Co-Supervisor: **Dr. Vedaste Ndahindwa**

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DECLARATION

I, MARIE ROSE NYIRAKAMANA, HEREBY DECLARE THAT THE THESIS HAS BEEN WRITTEN BY ME WITHOUT ANY EXTERNAL UNAUTHORIZED HELP, THAT IT HAS BEEN NEITHER PRESENTED TO ANY INSTITUTION FOR EVALUATION NOR PREVIOUSLY PUBLISHED IN ITS ENTIRETY OR IN PARTS. ANY PARTS, WORDS OR IDEAS, OF THE THESIS, HOWEVER LIMITED, WHICH ARE QUOTED FROM OR BASED ON OTHER SOURCES, HAVE BEEN ACKNOWLEDGED AS SUCH WITHOUT EXCEPTION.

ABSTRACT

Although the World Health Organization (WHO) members are encouraged to implement measures beyond those required by its Framework Convention on Tobacco Control, nothing in this instrument should prevent a party from imposing more strict and consistent requirements with their provisions and in accordance with international laws. Unfortunately, parties' performance is low and the available information in that sector of public health is limited, particularly in the low and middle-income part of the World(1).

Therefore, Rwanda being among low-income countries located in East African region has also a very weak tobacco monitoring system with limited and not updated statistics in this sector(2).

Consequently, the currently only available data are from Global Youth Tobacco Survey (GYTS) 2008, Demographic and Health Survey (DHS) 2010, Rwanda WHO STEPS Survey 2012/2013 (Rwanda NCDs risk factors survey). And they are not enough informative in terms of surveillance and efficient monitoring of significant trends in tobacco consumption in the country as advised by WHO.

In this regard, the current research entitled: " *Examine tobacco retailers around primary and secondary schools and assess the clientele with regard to sale to and by minors, in Nyarugenge district*" was conducted with the main objective of investigating retailers of tobacco products in the areas around primary and secondary schools and evaluate their clientele with regards to sale to and by minor. This study was a descriptive cross-sectional design where 53 schools were randomly selected and, two-stage sampling method was used to select the enumeration areas (Schools), where eligible participants were Tobacco retailers around each selected school and were voluntary recruited. Thus, each tobacco retailer outlet or shop located in a distance less than one kilometer was a candidate for questionnaire interview in this study.

As a result, this research has shown that in Nyarugenge district tobacco retailers in the school surroundings have weak compliance and low level of knowledge on the existing Rwandan tobacco control law. Therefore, tobacco retailers and their clientele of tobacco and tobacco products include minor people. Hence, this is against the current Rwandan tobacco control law which protects under 18 years old people from contact with tobacco and tobacco products(3).

The results of this study are important by delivering reliable data and scientific evidence for policy-makers, law enforcers, decision makers, as well as encourage other researchers to conduct more studies in this field. This will provide evidence for tobacco control policies implementation, enforcement, and legislation in Rwanda, African governments, and Worldwide at large.

SUMMARY

Tobacco contact with minor people has been shown as a great source of attempt for them to smoking. Generally, preventing tobacco sales to minors has been the major focus area of most tobacco retailing laws in different countries across the world (4). The Rwandan tobacco control law put the nursery, primary and secondary schools, health facilities and public places , children's garden as well as higher institutions among the premises prohibited to sell tobacco and tobacco products(3). It also highlights weighing sanctions to whoever sales tobacco and its products to people under 18 years of age(3). Rwanda a fast economically growing country in the heart of African presents the greatest threat in terms of future growth in tobacco use(5); hence, it lacks serious monitoring system for tobacco retailing and its effect on young generation .

This research was a descriptive cross-sectional study among tobacco retailers in the primary and secondary schools of Nyarugenge district to examine the tobacco retailers and assess their clientele with regards to sale to or by minors. A sample of 268 of tobacco retailers was used in the surroundings of selected schools.

The results show that 3% of tobacco retailers in Nyarugenge district are under 18 years old working mainly in convenience stores and mobile shops in the school surroundings. However, 42.5% of tobacco retailers confirmed that they experience under 18 year's old clients of tobacco and tobacco products. The level of knowledge of tobacco retailers on Rwanda tobacco control law is critical; 73.5% of tobacco retailers do not know the law existence hence their low compliance on the existing Rwandan tobacco control law.

Therefore, four main types of variables/indicators were analyzed in this study: (i) the tobacco retailing by minors is associated with the distance at which a retail outlet is located from school; whereby an outlet/shop distant from school (OR: 0.186, 95% CI [0.037-0.938]) is significant with $p=0.042$, and a retail/shop in a walkable distance from school (OR: 0.472, 95% CI [0.281-0.295]) is significant with $p=0.005$; (ii) The type of retail is associated with tobacco sale by minor (OR: 0.037, 95% CI [0.004-0.318]) is significant with $p=0.003$; (iii).The shop with no trading license (OR: 0.85, 95% CI [0.017-0.435]) is significant with $p=0.003$; (iv)The kind of tobacco and its products that the shop sells; other tobacco products rather than cigarettes(OR: 0.054, 95% [0.004-0.671]) significant with $p=0.023$.

As results, this study has shown that (i) the tobacco retailing in the school surrounding is a serious matter for both minor retailers and clients, because it may cause exposure to youth in and out of school; (ii) the tobacco retailers are not aware of the existing tobacco control law; (iii) the majority of law implementers do not have tobacco control regulations displayed at their institutions; hence, they do not feel concerned with tobacco control law implementation; (iv) Therefore, there is a need for mobilization targeting both retailers and the community to increase the awareness of the risk of tobacco contact with under 18 years people.

Dedication

First of all, I dedicate this study to our Almighty God, who guides each and every step of my life.

To my Mom; without her I would not be where I am now.

To Center for Tobacco Control in Africa, because without its grant this study could not be completed.

To my supervisors: Ass.Prof Manassé Nzayirambaho, and Dr. Vedaste Ndahindwa for their guidance;

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Acronyms

CI: Confidence Interval

DHS: Demographic and Health Survey

EDPRS2: Economic Development and Poverty Reduction Strategy phase 2

GIS: Geographical Information System

GPS: Global Positioning System

GYTS: Global Youth Tobacco Survey

FCTC: Framework Convention for Tobacco Control

ICT: Information and Communication Technology

IRB: Institutional Review Board

MDGs: Millennium Development Goal

MOH: Ministry of Health

NCDs: Non-Communicable Diseases

NGOs: Non-Government Organization

PPS: Probability Proportional to Size

RBC: Rwanda Biomedical Center

SHS: Second-hand Smoke

SPSS: Statistical Package for Social Sciences

WHO FCTC: World Health Organization Framework Convention on Tobacco Control

Table of Contents

ABSTRACT	ii
SUMMARY	iv
Dedication	vi
Acknowledgements	vii
Acronyms	viii
Table of Contents	ix
List of tables	xi
List of figure.....	xii
I.INTRODUCTION	1
I.1 Definition of terms	1
I.2 Background to the study	1
I.3 Problem statement.....	4
I.4 Theoretical framework for the research and its significance to specific tobacco control policy	6
I.5 Justification	7
I.6 Research questions.....	7
I.6.1 General Hypothesis.....	7
I.6.2 Objectives of this research	8
II. STUDY METHODOLOGY	9
II.1 Study design	9
II.2 Study area	9
II.3 Study and target population	9
II.4. SELECTION OF STUDY POPULATION	9
II.4.1 Sample and sample unit.....	9
II.4.2 Study variables	12
II.4.3 Data Collection.....	12
II.4.4 Quality assurance.....	13
II.4.5 Method of data analysis.....	13

II.4.6 Ethical Consideration	15
III. RESULTS	16
III.1 Descriptive analysis.....	16
III.1.1 Characteristics of retailers	16
III.1.2 Characteristics of retail outlets	19
III.1.3 Knowledge on Rwanda tobacco control law	28
III.1.4 Attitude, compliance, and practice	32
III.2 Variables associated with tobacco sale to or by a minor.....	34
III.2.1 Tobacco sale by minor	35
III.2.2 Tobacco sale to minor	36
III.2.3 Logistic regression analysis	38
III.2.4 Multivariate logistic regression analysis	41
III.3 Key informant interview	43
III.3.1 Policy implementers	43
III.3.2 Policy enforcers.....	44
IV. DISCUSSION	45
IV.1 Tobacco products in Nyarugenge district	45
IV.2 Knowledge, attitude, practice and compliance of tobacco retailers in Nyarugenge district	45
IV.3 Study limitations	47
CONCLUSION AND RECOMMENDATION	48
REFERENCE.....	50
Appendix1: Consent form	52
Appendix2: Key Informants Interview	54
Appendix3: Questionnaire.....	56
Appendix4: Ethical clearance.....	63

List of tables

Table 1: Age of tobacco retailers in Nyarugenge district	16
Table 2: Gender of tobacco retailers	17
Table 3: Experience of tobacco retailers in the school surroundings.....	17
Table 4: Level of education of tobacco retailers.....	18
Table 5: Characteristics of retailers' ownership types	19
Table 6: Characteristics of retailers' owners' gender	19
Table 7: Absolute distance of retail outlet to nearest school	20
Table 8: Distance intervals of retail outlet to nearest school	20
Table 9: Types of retail outlets	24
Table 10: Summary on potential clients of tobacco in the schools' surroundings	25
Table 11: Smoking signage summary	26
Table 12: Summary of opening hours	26
Table 13: Summary of trading license availability	27
Table 14: Summary of Characteristics of retail outlets.....	27
Table 15: Summary of the Knowledge on Rwanda tobacco control law existence	28
Table 16: Summary on the levels of knowledge on article on law regulating tobacco sells to or by minors	29
Table 17: Summary of the level of knowledge on what tobacco product the law applies to	30
Table 18: Summary of Tobacco retailers' knowledge on the law.....	30
Table 19: Summary on thinking on the law implementation.....	31
Table 20: The summary of the information on the under 18 customers.....	32
Table 21: Summary of the findings on reaction to minor customers	33
Table 22: The summary of responses to the document to rely on when checking for tobacco clients age.	34
Table 23: Summary on variable associated with the tobacco sell by minor	35
Table 24: Summary on variable associated with the tobacco sell to minors	37
Table 25: Summary on variable associated with tobacco sell to or by minors.....	39
Table 26: Multivariate analysis of variable associated with tobacco sell to or by minors.....	41

List of figure

Figure 1: Conceptual framework for tobacco sale to minor	6
Figure 2: Distribution of tobacco outlets around schools in Nyarugenge	21
Figure 3: Schools and Tobacco outlets' location in Nyarugenge District.....	22
Figure 4: Nyarugenge District Tobacco outlets' distribution in schools surroundings	23

I.INTRODUCTION

I.1 Definition of terms

Minor: a person under the age of full legal responsibility. Rwanda defines minor in the official gazette, as people below 18years(6)

Retail outlets: A store that sells smaller quantities of products or services to the general public.

Retail shops: a shop which sells goods to individual customers.

Sale to and by Minors: Most of the countries define Minor as those under the age of eighteen. Depending on a state, minors are not allowed to sell and / or buy tobacco products; therefore, anyone who involves a minor people in tobacco activities may face penalties.

Tobacco Retailers: means any person who sells, offers for sale, or does or offers to exchange for any form of consideration tobacco products or tobacco paraphernalia(7).

Youth: people in a period of transition from the dependence of childhood to adulthood's independence. The United Nations, for statistical purposes, defines 'youth', as those persons between the ages of 15 and 24 years(8), the Republic of Rwanda's Ministry of Youth, Culture, and Sports defines youth as those from age 14 to 35 years(9).

I.2 Background to the study

Most of the tobacco users around the world experienced the first tobacco product in their minor ages(5)(10). Tobacco contains nicotine, a highly addictive drug that causes many young people to progress from smoking occasionally to smoking every day(11)(12).

Given the dangers of tobacco to the health of a human being especially minors, the duty to protect people under eighteen years of age from tobacco products, as well as their right to be protected is implicit in the right to live and the right to the highest attainable standard of health. Therefore, effective measures to provide minor protection from exposure to tobacco require a total elimination of tobacco and tobacco products in a particular space or environment where they live.

In this field of public health, research projects have reported very much alarming results. For example, it has been realized that this epidemic itself kills around six million people a year and if no

urgent action is taken, the annual toll could rise to eight million by 2030, and more than 80% of the world's tobacco-related death will be in developing countries(13). In addition to that, more than five million out of the six million deaths are caused by direct consumption of tobacco products, and 600,000 deaths from non-smokers victims of second-hand smoking(14). Most dangerously there is a risk that, the tobacco use will result in the death of 250 million children and young people mostly in developing countries (15). Consequently, tobacco use is expected to kill as many as 1 billion people this century if the WHO FCTC is not implemented rapidly(16). In this regards WHO FCTC in its article 16, urges country members to prohibit sales of tobacco products to and by minors, which may include banning the sale of tobacco products directly accessible at points of sale, restricting accessibility of vending machines, prohibiting the manufacture and sale of toys or candy in the form of tobacco products, prohibiting free distribution of tobacco products, and banning the sale of cigarettes individually or in small packets(17).

Nevertheless, minors are more exposed to tobacco smoke and tobacco products from the different area. For example in United State, each day, more than 3,800 youth under age 18 smoke their first cigarette(18), then children smoke more than 800 million packs of cigarettes each year and the vast majority of these cigarettes are illegally sold to children(12).

In addition to a non-negligible number of students who have confirmed to have received free tobacco from a representative of a tobacco company, both national-wide and in Hawaii report on trends in underage tobacco sale, only about 20.0% of clerks asked for a minor's identification in 2012 and 2013. And this report shows that requesting a minor's identification or age at the time of purchase was significantly associated with low tobacco clientele in the State of Hawaii(19)

Furthermore, a study conducted in Australia shows that retailers in the schools surroundings contribute to increased cigarette purchases among adolescents thus result in augmentation of smoking behaviors, particularly experimentation and initiation(20).

Explicitly a study conducted in Mexico on indiscriminate sale of tobacco products to minors shows that (i) 99% of the retailers were aware of the law prohibiting the sale of tobacco to minors, and 97% were not in agreement with it; (ii) 40% of retailers said they would sell tobacco to minors if it was legal, despite the fact that 98% of retailers said that they did not sell tobacco to minors, but the

purchase attempts during that study were successful in 66% of cases; (iii) only in one attempt to purchase (0.6%) did the retailer ask the minor who the cigarettes were for(21).

WHO report on tobacco use burden in African regions shows that 18% of youth (21% boys, 13% girls) currently use any kind of tobacco products, 28.75% of study respondents reported that they bought cigarettes in a store and about 69% of youth were not refused purchase of cigarettes in a store because of their age(5).

The results from Global Youth Tobacco Survey (GYTS) in South Africa 2011 and many other Sub-Saharan Africa countries showed a high prevalence of cigarette and other tobacco use as well as high level of availability and access of young students to tobacco products. In addition to that; low price, exposure to second-hand smoke (SHS), advertising, school curriculum and many other factors significantly increase minor tobacco consumption(22)(23).

Consequently, it is estimated that in the period 2002/2030, tobacco-attributable deaths will decrease by 9% in developed countries, but increase by 100% (to 6.8 million) in developing countries(24). Unfortunately, more than a half of the world's population lives in areas that have not even a minimum of adequate and recent information on tobacco use. Particularly, monitoring systems are weak in low and middle-income countries(24).

For Rwanda particularly, in its official gazette on article 9 and 10 of section2; it is clearly defined that children's gardens and any other public places such as nursery, primary and secondary schools are among the premises strictly prohibited from selling tobacco and its derived products. Therefore, the law prohibits and suggests sanctions to whoever involve a person under eighteen in buying, selling and exchange of tobacco and tobacco products (3).

Rwanda signed the Convention on 2nd June 2004 and the ratification, acceptance, and approval were on 19/10/2005. Rwanda has shown political commitment to fully support the objectives of the Framework Convention on Tobacco Control (FCTC); the WHO FCTC came into force on 17/01/2006.

In 2005, the Ministry of Health signed an Instruction **No 20/10 of 2005** related to smoking in public places and second-hand smoking.

The Government of Rwanda has used the WHO FCTC to ban tobacco advertisement, promotion, and sponsorship since 2007.

Different campaigns were conducted targeting youth in schools, women as well as other specific group like army since 2005 aimed at increasing awareness of tobacco consequences.

In addition to that, the Government of Rwanda joins the International community to celebrate the World No Tobacco Day campaigns that are organized every year which includes a message from tobacco control laws, and their comprehensive regulations. As results, the tax has been increased on tobacco and tobacco products by more than 150%.

Also, the country has increased its efforts in the enforcement of the regulations on protection of public places such as nursery, primary and secondary schools, higher institutions as well as a prohibition for the seller to sell tobacco and tobacco products to a person under eighteen (18) as published in Rwanda National Official Gazette n°14bis of 08/04/2013(3).

However, in spite of the progress made by the government of Rwanda in banning tobacco use and creating, a conducive enabling smoke-free environment Global Youth Tobacco Survey in Rwanda 2008 showed that non-negligible number (19.2%) of student confirmed that their parents smoke at home and in their presence, even in public places(23), most dangerously 40,9% of students regular smokers confirmed that they started before the age of 10(23). Therefore, tobacco retailing in the school surroundings remains a source of exposure not well explored by researchers. In this regards, this research was conducted with the main objective to examine tobacco retailers' knowledge, compliance and practice with the existing tobacco control law; identification of tobacco products and the kind of retail outlets in school surroundings in Nyarugenge district

I.3 Problem statement

Although significant efforts have been achieved in order to prevent smoking and its health effects all over the world, the tobacco is still one of the biggest public health concerns, most especially among the minor generation. The situation in Rwanda is comparable to many countries in Africa and other developing countries where the tobacco retailing laws address different issues including prohibitions on selling tobacco products to and by minors(3). However enforcement of smoke-free legislation covering either home or educational facilities are low; and the absence or not representative data for

minor tobacco purchasing, consumption and tobacco retailer compliance(2). Retailing and small commerce in Kigali are one of the main activities of the population of this economically growing city, especially among youth and minors.

In addition to that, traditionally the tobacco had an important value in the Rwandese culture and social life. For example, it is used and plays an important role in traditional wedding ceremonies and other social activities where it used and shared as a symbol of deep friendship and sincere relationship. According to DHS 2010, the area of residence, level of education and wealth quintile are associated with tobacco consumption in Rwanda (25).

Particularly, the research results show that among 3 districts of Kigali city, Nyarugenge district ranks at the top in tobacco use among both men and women of 15-49 years old with 18% and 3.1% respectively(25). In this way, only Global Youth Tobacco Survey done in Rwanda 2008 shows the non-negligible number of tobacco user among minor students whereby for youth, tobacco use prevalence is 11.5%--13.3% for boys and 9.5% for girls; cigarette smoking prevalence is 1.8%-- 3% for boys and 0.9% for girls.

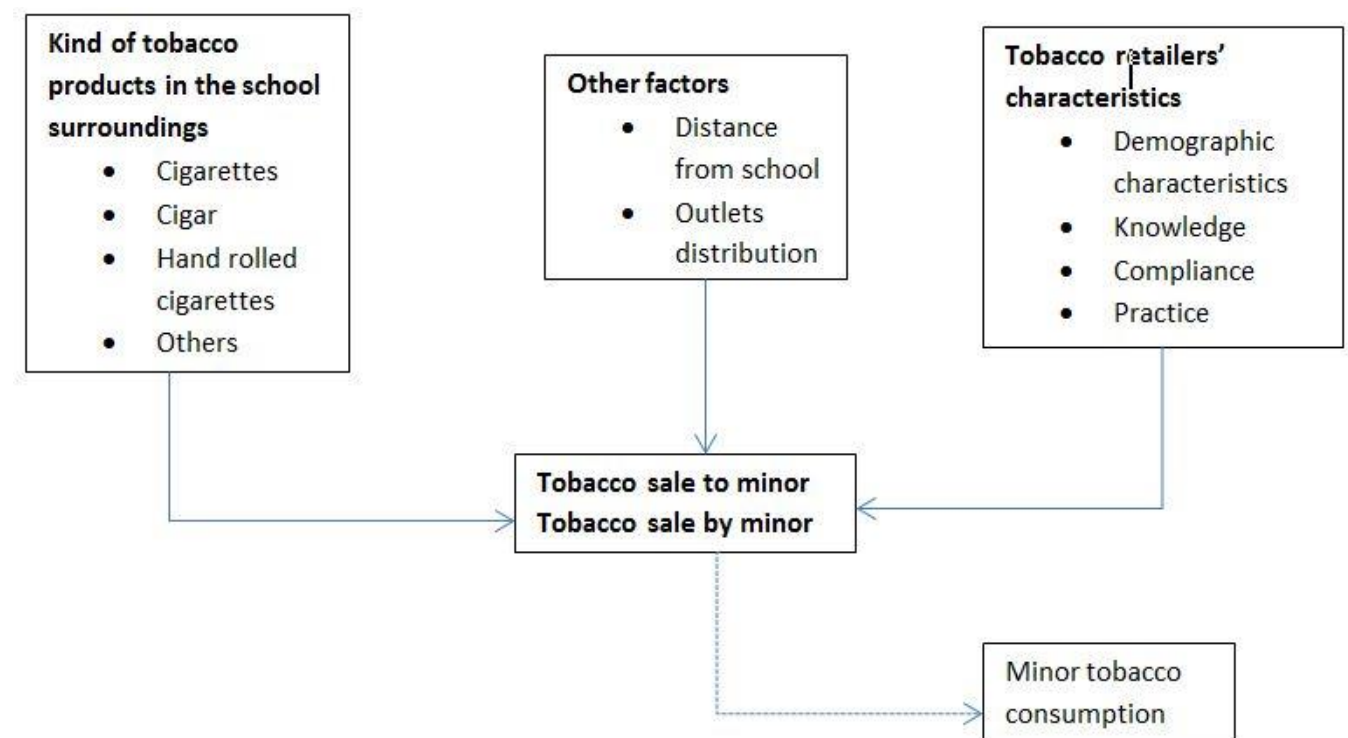
Furthermore, many types of research have been conducted mostly in developed countries on the prevalence of cigarette and other tobacco use as well as information on determinants of tobacco use among minors. But the unselective sale of tobacco products to minor persons, the role of the retailer in tobacco sales and promotion, is not detailed especially in low-income countries.

Therefore, the main objective of this study is to examine tobacco retailers around primary and secondary schools and assess the clientele with respect to selling to and by minor in Nyarugenge district. Rwanda defines minor in the official gazette, as people below 18years(6) and this is very delicate and sensitive part of the population. Subsequently, all concerned actors with selling tobacco to minor people, parents and community in Nyarugenge district and the country, in general, shall see how to work together to protect the minors from the harmful effects of tobacco.

I.4 Theoretical framework for the research and its significance to specific tobacco control policy

Based on Framework Convention on Tobacco Control (FCTC) adoption and the real situation in RWANDA, the following framework illustrated in Figure 1 below is provided to describe a cycle for the availability of tobacco products sold in the primary and secondary school surroundings and how it may increase the minor tobacco consumption among minor students of primary and high schools.

Figure 1: Conceptual framework for tobacco sale to minor



The above figure portrays the conceptual framework of various hypothesized ways that tobacco retailers are unselectively selling tobacco to minors hence that can result in causing their clientele and tobacco use among minor people of Nyarugenge district.

I.5 Justification

The government of Rwanda has made process in banning tobacco use and creating a conducive enabling smoke-free environment, by ratification, acceptance and approval of FCTC convention; and political commitment. Nevertheless, Global Youth Tobacco Survey in Rwanda 2008 showed that non-negligible number (19.2%) of student confirmed that their parents smoke at home and in their presence, even in public places. Dangerously 40,9% of students regular smokers confirmed that they started before the age of 10(23). Yet Rwanda Biomedical Center and Ministry of Education are lacking reliable data on the tobacco sale to and by minors and tobacco retailers' compliance with the existing law. More researches are needed to provide reliable data to different actors having minor in their responsibilities. The involvement of those tobacco retailers in the policy enforcement through training and regular compliance checks would make it more successful.

I.6 Research questions

I.6.1 General Hypothesis

Unselective sale of tobacco products in the school surroundings causes the tobacco retailers' clientele from minor people.

Research Questions:

1. What tobacco products are sold to minors and by minors in retail outlets surrounding primary and secondary schools?
2. What is the nature of tobacco retail outlets in the areas surrounding primary and secondary schools?
3. What are knowledge, attitudes, practices, and compliance of tobacco retailers on current tobacco law with regard to sale to and by minors?

I.6.2 Objectives of this research

To respond to the above questions, the following objectives were set:

General objective: Investigate retailers of tobacco products in the areas around primary and secondary schools and evaluate their clientele with regards to minor selling and purchasing tobacco in Nyarugenge district.

Specific objectives:

1. Identify the tobacco products in retailers' outlets in the areas around primary and secondary schools.
2. Describe the nature of tobacco retailers' surrounding the primary and secondary schools in Nyarugenge district.
3. Determine knowledge, attitudes, practices and tobacco retailers' compliance with current tobacco law with regards to sale to and by minors in Nyarugenge District.

II. STUDY METHODOLOGY

This study was conducted in Nyarugenge district one of the three districts of Kigali city in the center of the country. A sample of 53 schools in this district was randomly selected. In the surroundings of sampled schools, in each tobacco retail outlets, one study respondent aged between 7 to 65 years old in the school surroundings was called upon to participate in this study; the response rate was 97.32% and a total 268 tobacco retailers were recruited to participate.

II.1 Study design

This research used a descriptive cross-sectional study among tobacco retailers around primary and secondary schools in Nyarugenge district.

II.2 Study area

Nyarugenge District is one of the three district of Kigali city, a capital of Rwanda located in the center of the country. The District is administratively divided into ten Sectors with a total of 47 cells. Nyarugenge district has a total of 42 primary schools and 33 secondary schools (26).

II.3 Study and target population

The study population is the population we can get access to. It is the population actually covered by the study. For this study, the study population is all tobacco retailers aged between 7 and 65 years. And, the target population is the specific group of people in the study area from which the information is desired. For this study, the target population is all non-nomadic tobacco retailers in Nyarugenge district aged 7-65.

II.4. SELECTION OF STUDY POPULATION

II.4.1 Sample and sample unit

The sample is the group of units selected to be in the study. In this study, the sampling unit is tobacco retail outlet.

There are three different types of unit: sampling unit, reporting unit, and unit of analysis(27). For this study, the sampling unit is tobacco retail outlet; reporting unit and unit of analysis are tobacco retailers in Nyarugenge district

II.4.1.1 Sample size

The total number of study participants was calculated using this formula in Equation 1:

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

Equation 1: Calculation of total number of study participants

Where;

n=Sample size

Z= value of 1.96 used at 95% (CI)

d= Margin of error set at 5%.

P= Proportion of tobacco retailers selling to or by minor, nevertheless no similar study has been conducted in Rwanda neither in the region. We considered a study conducted in Mexico where this proportion is 80.4%(21). We used this proportion for sample calculation in this study.

Hence, the sample size is:

$$n = \frac{1.96^2 \times 0.804(1 - 0.804)}{(0.05)^2} = 242$$

Thereafter we added 10% of non-respondent and the sample of **268 tobacco retailers** was recruited to carry out this study.

II.4.1.2 Sample design

This study is designed to obtain data that would be a representation of the whole district. To achieve this, a two stages cluster sampling method was used to select the enumeration areas (Schools), and eligible participants that are Tobacco retailers.

Stage 1: Selection of Schools

- **Sampling Frame**

We get access to all tobacco retailers aged 7-64 by the following method: A complete and accurate listing of all members of the study population was done. This sampling frame was clear, exhaustive and as current as possible.

The sampling frame provided the means of identifying and contacting the units of the study population.

Administratively, Nyarugenge District counts 33 secondary schools and 42 primary schools(26). Schools were considered as Enumeration Area. The list of all schools was used as a sampling frame for random selection of Schools to examine tobacco retailers around primary and secondary schools and assess the clientele with regard to sale to and by minors study as described below.

- **Number of Schools selected:**

For this study at least 5 participants around each school were recruited. Given that the estimated required sample size is 266 participants (including the 10% non-response rate), the total number of schools selected was, therefore, $266/5 = 53$ primary and secondary schools.

Thus, 53 schools were in total randomly selected from the list of all 75 schools in Nyarugenge District.

- **Sampling method for school selection:**

Probability Proportional to Size (PPS) sampling method was used to randomly sample the 53 schools from the whole district as follows:

Stratification and sample allocation:

The sample design used the proportional allocation. The target population (tobacco retailers 7-65 years old) was divided into 10 sectors which served as strata. The target population within each sector was listed alongside with the corresponding proportion of the targeted population.

To compute the number of individuals from the total sample to be drawn from each stratum (sector), the total sample size was multiplied by the proportion of each stratum.

Selection of schools:

For each sector, the school names were sorted in descending alphabetical order using Microsoft Excel worksheet.

The schools to be included in this study were selected using a data sampling algorithm in R software.

Stage 2: Selection of eligible participants in retail shops and outlets

Only one eligible participant (any tobacco retailer aged 7-65 years) in the selected shop or retail outlet was enrolled in the study. Eligible participant identifications such as name, sex, age and

other demographic identifications were recorded on the questionnaire but only age and sex were reported in the study findings.

Inclusion and exclusion criteria

Inclusion criteria:

- The study participants included all retail outlets around primary and secondary schools that sell tobacco and tobacco products in Nyarugenge district.
- The distance between shop or retail outlet and the school shouldn't be more than one kilometer.
- Study participants should voluntarily accept to participate in the study

Exclusion criteria:

- Shops and retailers which do not sell tobacco or tobacco products.
- Shops and tobacco retailers located at a distance longer than one kilometer from the selected schools.
- Those who did not accept voluntary to participate.

II.4.2 Study variables

Dependent variables: Tobacco sales to minors; Tobacco sales by minors.

Independent variables: Socio-demographic characteristics of tobacco retailers; proximity of tobacco retailers to schools; knowledge about Rwanda tobacco control law; compliance with laws and regulations related to the selling of tobacco to minors.

II.4.3 Data Collection

The source of data was the tobacco retailers around primary and secondary schools in Nyarugenge district using a questionnaire as illustrated on Appendix3. In addition to the data collectors' observation, data collection tool was developed and trained data collectors conducted an individual interview to each tobacco retailer around primary and secondary school who accepted to be part of this study and who signed the consent form. This study has also sought for data through interview of

key informants persons in policy implementation and law enforcement in Nyarugenge District using a questionnaire of which a copy is in Appendix2.

II.4.4 Quality assurance

To assure the quality of the data the following points were respected:

1. To establish a close communication among research team
2. To establish a sense of responsibilities of those involved in the research
3. To carry out the training of data collectors and research assistant
4. To avail, all needed facilities and equipment for data collection
5. To provide a proper documentation of procedures and methods to all those involved in the research
6. To conduct a pilot study in order to provide valuable insights for the entire study. Thereof, there was a close discussion among Principal Investigator, Academic supervisors of both the process and outcomes of a pilot study to correct some mistakes or errors identified; hence, data collectors became familiar with the data collection tools and practice.
7. To ensure a proper research data recording.
8. To frequently cross check the process and tools during the field work, by the Principle Investigator for accuracy and completeness.
9. To carry out a Data entry , after being checked by the Principal investigator,
10. To keep a close and regular contact with the academic supervisor for guidance and eventual advice.

II.4.5 Method of data analysis

Identification of tobacco products in retail outlets in the areas around primary and secondary schools.

The first objective consisting of identifying the tobacco products in retail outlets in the areas around primary and secondary schools was achieved through data collectors' observation plus a questionnaire interview. We asked questions on the kind of tobacco products that the retail sells.

Description of the nature of tobacco retails surrounding the primary and secondary schools in Nyarugenge district.

The second objective that is to describe the nature of tobacco retailers surrounding the primary and secondary schools in Nyarugenge district was also achieved through data collectors' observation to classify the retails/shops into categories plus a questionnaire interview to the tobacco retailers. The proximity of tobacco retail outlet to school was verified. The data collectors estimated the distance between tobacco retail and the nearest selected school and the real distance was verified using GPS measurements taken during data collection. The geographic coordinates of tobacco retail were taken using GPS machines and the data were imported into ArcMap and used to calculate more accurately the distance from the selected schools.

Determination of the level of knowledge, attitudes, and practices of tobacco retailers' compliance with current tobacco law with regards to sale to and by minors in Nyarugenge District.

Firstly, the questions on the knowledge of tobacco retailers on the existing Rwandan tobacco control law were asked, in order to know:

- If they had ever heard about the Rwandan tobacco control law.
- If there is any article regulating tobacco sell to or by minors,
- If they know the minimum age of a person who can buy or sell tobacco,
- If they know which tobacco and tobacco products the law applies to,
- And who they think should be part of tobacco control law implementation.

Secondly, the questions on tobacco retailers' attitude, practice and compliance with regards to the selling tobacco to minors or minors selling tobacco, were also asked in order to know:

- If they have ever had an under 18 years old customer,
- The frequency of under 18 customers and how they behave in that situation,
- The kind of document they rely upon when checking the age of the doubtful customer,
- And the retailers' reaction when a customer does not have a valid ID and that customer persist.

The data gathered were entered and analyzed using computer software applications such as ArcMap for spatial data analysis and statistical package for social sciences (SPSS version 16) where statistical test khi-square was used with 5% level of significance or $p\text{-value} < 0.05$ and Ms excel to generate tables.

II.4.6 Ethical Consideration

This study was conducted after submitting, getting ethical approval from College of Medicine and Health sciences Institutional Review Board (IRB) of which a copy is attached in Appendix4 and official permission from Nyarugenge district.

Prior to administering the questionnaire and collect any information related to the study, participants read and/or have all explanation about the study. Those who agreed to be part of the study signed a consent form in a presence of the trained data collector. Only those study participants who accepted to go for the study responded to the questionnaire. No individually identifiable information was collected. Only answers to the questions were analyzed. The data gathered are kept confidential and the tools used are kept in the secure place. The copy of consent form can be found in Appendix1.

III. RESULTS

III.1 Descriptive analysis

III.1.1 Characteristics of retailers

This section gives the general profile of study respondents in term of the age, sex, experience, level of education and retail ownership. This will help in understanding the kind of people that directly sell tobacco in the primary and secondary school soundings in Nyarugenge district.

Age

The age of study participants was between 7 to 65 years, hence, we grouped this variable age into two groups: fewer than 18 and the second group includes tobacco retailers who are above 18 of age that sell tobacco and tobacco products in the school surroundings. Table 1; shows that 3% of to tobacco retailers are under 18 years old and 97% are above 18 years of age.

Table 1: Age of tobacco retailers in Nyarugenge district

Age	Frequency	Percentage
Under 18	8	3
18 and above	260	97
Total	268	100

Gender

This demographic characteristic as illustrated in Table2 describes the gender of tobacco retailers who sell tobacco and tobacco products in the area around primary and secondary schools.

Table 2: Gender of tobacco retailers

Gender	Frequency	Percentage
Male	164	61.2
Female	104	38.8
Total	268	100

Based on this criterion, the participants are classified as male and female groups. Then the information in the above table shows that the majority of tobacco retailers in the school surroundings are mainly males.

Experience

Based on this characteristic, retailers around primary and secondary schools are classified according to how long they have been working there. Different groups are formed from those who have been working for less than 2 years, the second group includes those who have been working between two and 5 years and the last group includes those who have been working for 5 years and above. The findings were summarized on Table3 below.

Table 3: Experience of tobacco retailers in the school surroundings

Experience	Frequency	Percentage
Less than 2 year	159	59.4
2-5years	66	24.6
Above 5years	13	16
Total	268	100

As it is shown in the above table, tobacco retailers with a low level of experience are more frequent than the more experienced ones.

Level of education

This criterion describes tobacco retailers participants in this study and they are classified according to their different level of education; those who did not attend any formal school, those who did primary

school but did not finished, study participants that have completed primary school, those with secondary school but did not finished, other who completed secondary school, study participants that have completed college/ university or post graduate level. Also, the study participants who did not wish to say about their level of education was taken into consideration. The findings were summarized on the Table4 below.

According to the information in Table4, the majority of tobacco retailers in Nyarugenge district have completed primary school with a percentage of 33.6% ; 20.1% have less than primary level of education and 21.3% have completed secondary school while 0.4% of study respondent refused to say their level of education.

Table 4: Level of education of tobacco retailers

Level of education	Frequency	Percentage
No formal schooling	10	3.7
Less than primary	54	20.1
Primary school completed	90	33.6
Secondary school didn't complete	42	15.7
Secondary school completed	57	21.3
College/University completed	14	5.2
Refused	1	0.4
Total	268	100

Retail ownership

The retail ownership criterion gives two classes of study participants, where there is a type of business ownership and the gender of the owners as illustrated below on Table 5 and Table 6 respectively.

Table 5: Characteristics of retailers' ownership types

Shop ownership	Frequency	Percentage
Retailer is owner	219	81.7
Retailer is not owner	46	17.2
No response	3	1.1
Total	268	100

Table 6: Characteristics of retailers' owners' gender

Owner's gender	Frequency	Percentage
Male	37	80
Female	9	20
Total	46	100

The information in Table 5 shows that the majority of tobacco retailers own the business as compared to the number of non-owners. On the other hand, the information displayed in Table 6 shows that among the retailer owners, the females are far less involved in this activity as compared to fellow males.

III.1.2 Characteristics of retail outlets

Distance from schools

The distance at which a retail outlet is located from a school was computed by recording a retail outlet geographic coordinate using a GPS. Therefore, the locations of the retail outlets are classified into 6 classes according to respective distance interval from any outlet, or absolute distance from them. Those classes are (i) less or equal to 100 meters, (ii) distance from 101 to 200meters, (iii) from 201meters to 300 meters, (iv) from 301 meters to 400 meters, (v) from 401meters to 500 meters and

lastly (vi) from 501meters to 1000 meters. On the Table7 and Table8 bellow, are illustrated the number and percentages of tobacco outlets in a given distance interval and absolute distance respectively from a school.

Table 7: Distance intervals of retail outlet to nearest school

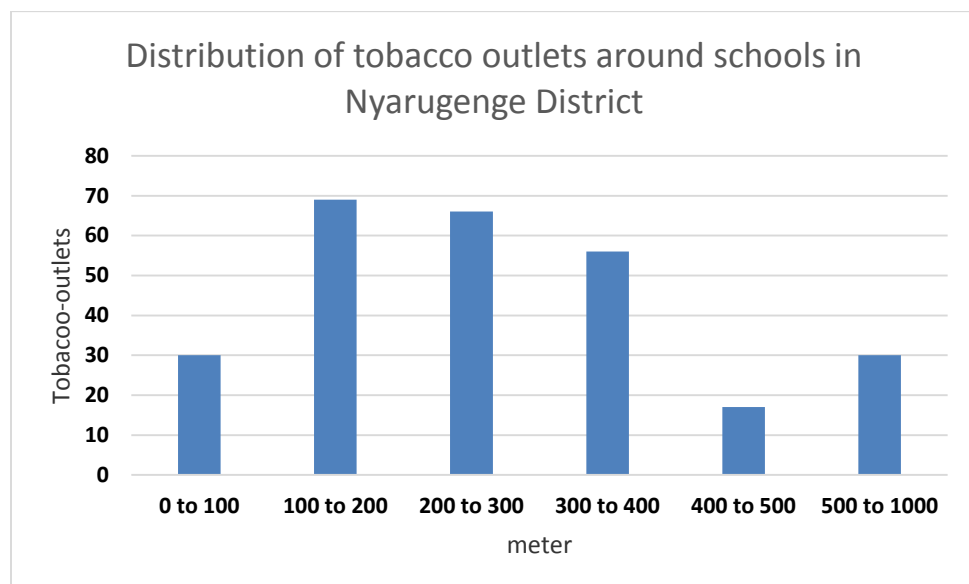
Interval of distance from School	Frequency	Percentage
0m to 100m	30	11.19
101m to 200m	69	25.75
201m to 300m	66	24.63
301m to 400m	56	20.90
401m to 500m	17	6.34
501m to 1000m	30	11.19

Table 8: Absolute distance of retail outlet to nearest school

Distance from School	Total	Average
100m	30	0.56
200m	99	1.86
300m	165	3.11
400m	221	4.16
500m	238	4.49
1000m	268	5.05

The information in the above table shows that more than 50% of the tobacco retail outlets are located in a walkable distance of 300m to school. Hence on average; in a distance of one-kilometer radius from any selected school in Nyarugenge district, there are at least 5 retail outlets that sell tobacco and tobacco products as it shows table 7.

Figure 2: Distribution of tobacco outlets around schools in Nyarugenge



The data plotted on the above histogram shows that the distance of 100 to 200 meters from the selected school has a high number of tobacco retail outlets.

Tobacco outlets in Nyarugenge district

Nyarugenge district is administratively divided into 10 sectors, among them 7 sectors are densely populated hence, there are more schools and commercial activities than the remote part of this district.

Figure 3: Schools and Tobacco outlets' location in Nyarugenge District

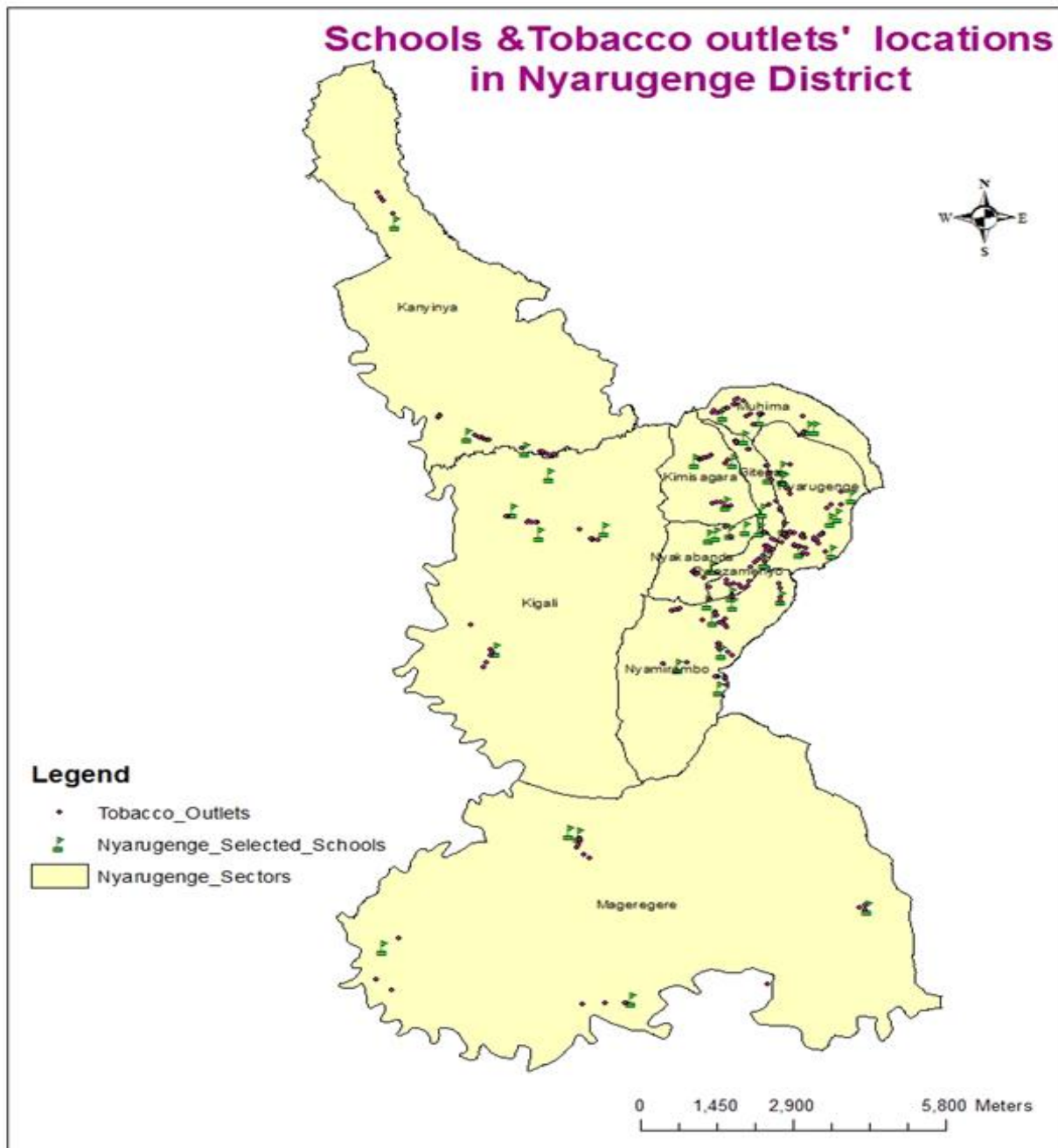
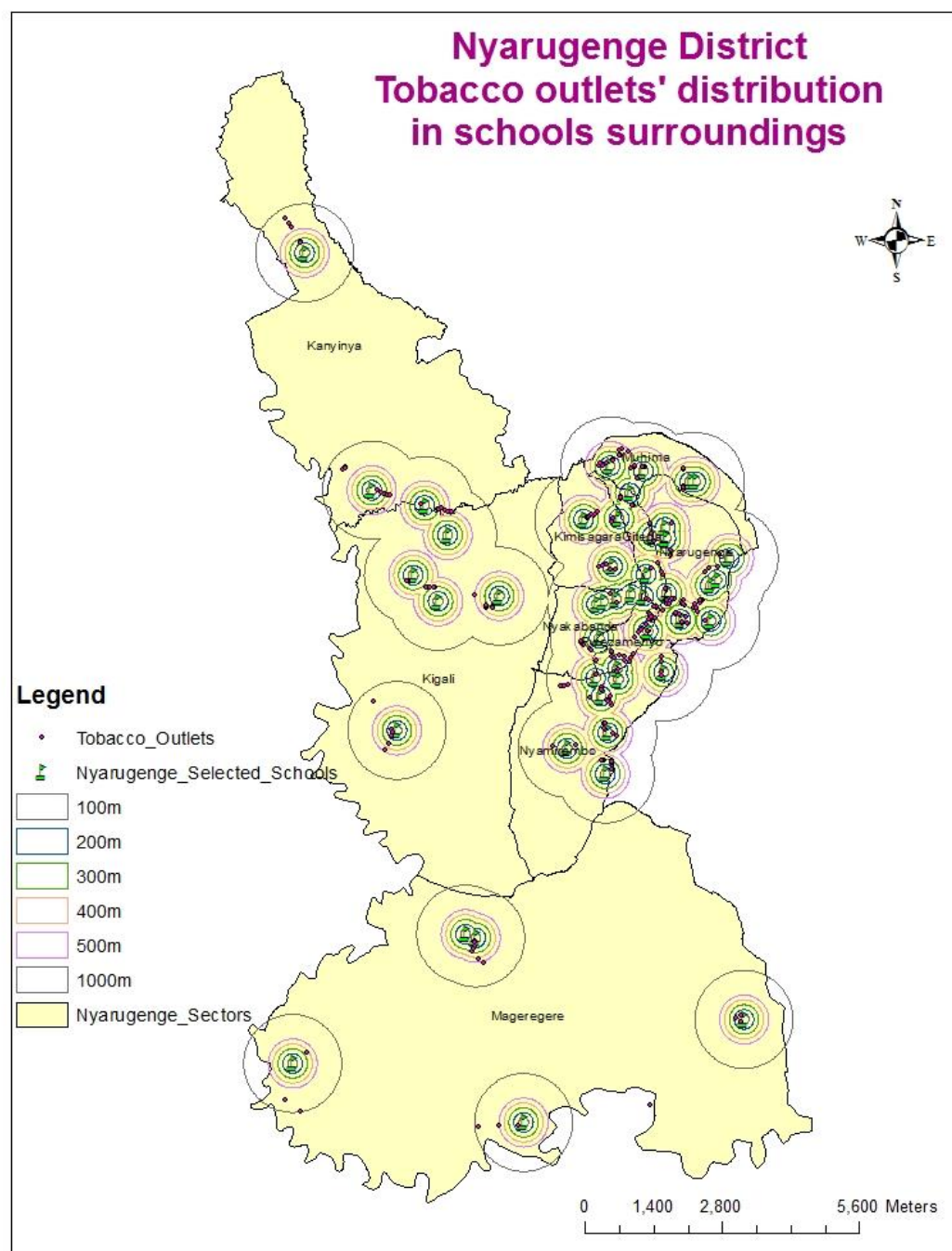


Figure 4: Nyarugenge District Tobacco outlets' distribution in schools surroundings



The map in Figure 5 shows the administrative boundary of Nyarugenge district, its respective sectors, the distribution of the selected primary and secondary schools as well as surveyed tobacco outlets. From this map, one can easily see an uneven distribution of the schools around the district extent. Most of the schools are concentrated in the urban and more populated sectors of Nyarugenge District. And in the less populated and remote areas (Kigali, Mageragere and Kanyinya sectors), there are fewer schools, thus fewer tobacco outlets. This presentation supports the statistics presented in Table 7 & 8 as well as in Figure 4 above. It shows that in densely populated areas, the number of schools is high as well as the number of tobacco outlets, which factor increases the accessibility of tobacco products by minor students.

In Figure 6, the distance from a school to a tobacco shop or outlet is mapped in the form of buffer around the schools locations, whereby each distance interval is presented by special color for an easy interpretation of the map.

Type of retail

Based on this criterion tobacco retails are classified into 7 categories notably; convenience store, supermarket, tobacco store; beer, wine and liquor store; soft drink and snack shop; mobile shop and others based on the merchandises the retail sell. The table 9 bellow shows a summary of the inventory done in the outlets.

Table 9: Types of retails outlets

Type of retail	Frequency	Percentage
Convenience store	130	48.5
Supermarket, General merchandise store	13	4.9
Tobacco store	1	0.4
Beer, Wine, Liquor store	17	6.3
Soft drinks and snacks shop	59	22
Mobile shop	48	17.9
Total	268	100

According to this table above there the biggest numbers of tobacco shops are convenience stores, followed by soft drinks and snack shops.

The main clients of tobacco products

The retail is receiving clients of different categories. The main clients are classified into primary school children, secondary school students, adolescent not registered in any formal school, house boys/girls, and adult men and women as illustrated in Table 10.

Table 10: Summary on potential clients of tobacco in the schools' surroundings

Potential client	Frequency	Percentage
Primary school children	1	0.4
Secondary school students	23	8.6
Adolescents not registered in any formal school of both	41	15.2
House boys/girls	1	0.4
Adults (men /women) above eighteen years old	201	75
Refused	1	0.4
Total	268	100
Age of potential male clients		
Under 18	75	28
18 and above	193	72
Total	268	100
Age of potential female clients		
Under 18	26	9.7
18 and above	160	59.7
No female clients	82	30.6
Total	268	100

The information table above shows that the potential clients of tobacco and tobacco products in the school surroundings of Nyarugenge District are adults (men and women) at 75% and 9% of primary and secondary students; in this table; clients of tobacco are also classified according to gender where 28% are male and 9.7% are female under 18.

Smoking signage

In the selected retail outlet and shops that sell tobacco and tobacco products, the area observation was done by data collectors to check if the retail shop has no smoking signage as it is recommended to put the signage in the seeable place. The information is summarized in Table 11.

Table 11: Smoking signage summary

Presence of smoking signage	Frequency	Percentage
Yes	15	5.6
No	253	94.4
Total	268	100

Based on the data collector's observation, 5.6% only have smoking signage while 94.4% of retails outlet do not have warning signage.

Table 12: Summary of opening hours

Working hours	Frequency	Percentage
Tobacco products are available at most half day	67	25
Tobacco products are available more than a half day	201	75
Total	268	100

This table describes how long the shops open per day; which explain the time period tobacco products are available per day; 75% of the retails open more than a half day.

Trading license

This criterion was describing the tobacco retail as either having the trading license or not.

Table 13: Summary of trading license availability

Trading license	Frequency	Percentage
Yes	209	73
No	59	27
Total	268	100

It is clearly shown by the information in the table that the majority of tobacco retailers have a trading license where 73% of them confirmed while 27% of retail outlets do not have.

Kind of tobacco and tobacco products sold in the retail outlet

This study described different kinds of tobacco and tobacco products that are available in the school surroundings and sold to or by minors. The following Table 14 shows a summary of the information about different kind of tobacco and tobacco products that were on sale at the time of data collection.

Table 14: Summary of Characteristics of retail outlets

Kind of tobacco	Frequency	Percentage
Cigarette	265	98.9
Cigar	1	0.4
Hand-rolled cigarette	2	0.7
Total	268	100

According to the data in this Table 14 above, shows that 98.9%.of retail outlet sell mainly cigarette. Other tobacco products are few.

III.1.3 Knowledge on Rwanda tobacco control law

The general knowledge of tobacco retailers was described on the existing Rwandan tobacco control law, as well as what the law says about tobacco sell to people under the age of majority, the year when the law was gazetted and who should be part of the law implementation according to them. The Table 15 bellow summarizes the findings on the knowledge of tobacco retailers on Rwanda tobacco control law.

Table 15: Summary of the Knowledge on Rwanda tobacco control law existence

Know existence of Rwanda tobacco control law	Frequency	Percentage
Yes	71	26.5
No	197	73.5
Total	268	100
Year when the law was gazetted		
Don't know	268	100
Total	268	100

The table 15 above shows that 73.5% of tobacco retailers do not know that there is tobacco control law here in Rwanda. Among 26.5% of those who confirmed that they know the existence of the law, none of them knows the year that it was gazetted.

Retailers' knowledge on article on law regulating tobacco sells to or by minors

This study was also interested in having the profile of tobacco retailers in terms of their knowledge on the article in the existing Rwandan tobacco control law. The information gotten is summarized in Table 16.

Table 16: Summary on the levels of knowledge on article on law regulating tobacco sells to or by minors

Know article on tobacco selling to or by minor	Frequency	Percentage
Yes	202	75.4
No	10	3.7
Don't know	56	20.9
Total	268	100
The minimum age of tobacco seller as provided by the Rwandan law		
Under18	41	15.3
18 and above	227	84.7
Total	268	100
The minimum age of tobacco buyer as provided by the Rwandan law		
Under18	16	6
18 and above	252	94
Total	268	100

The data in the table above shows that 20.9% do not know that there is an article regulating tobacco sell to or by minors, and 15.3% confirmed that in the law, the minimum age people who can sell tobacco is in under 18 in addition to 6% of respondent who said that the law state that the minimum age of people who can buy tobacco falls under 18.

Retailers' knowledge on what tobacco product the law applies to.

Like it was done previously in assessing tobacco retailers' knowledge on the article regulating tobacco sell to or by minor; tobacco retailers' knowledge of the kind of tobacco and tobacco products that the law applies to was assessed and summarized in Table 17.

It is clear in the table below that the majority of tobacco retailers are aware that the existing tobacco control law applies to all kind of tobacco and tobacco products but there is a non-negligible number of tobacco vendors who have wrong information as it is demonstrated in Table17.

Table 17: Summary of the level of knowledge on what tobacco product the law applies to

The Rwandan law on tobacco contact with a person under eighteen applies to		
	Frequency	Percentage
Cigarette	25	9.3
Cigar	4	1.5
Hand-rolled cigarette	6	2.2
Snuff/dipping cigarette	10	3.7
Chewing tobacco	1	0.1
All of the above	222	82.8
Total	268	100

It is clear in the above table that the majority of tobacco retailers are aware that the existing tobacco control law applies to all kind of tobacco and tobacco products but there is a non-negligible number of tobacco vendors who have wrong information as it is demonstrated in Table17.

Tobacco retailers' knowledge on tobacco control law

Questions on the law preventing under 18 persons from contact with tobacco and tobacco products and the penalty to whoever sell tobacco to under 18 years people. They were asked in order to assess the level of knowledge of study participants on the law and the information is summarized in the table below.

Table 18: Summary of Tobacco retailers' knowledge on the law

Know that Rwandan law prevents under 18 persons from any contact with tobacco		
	Frequency	Percentage
Yes	110	41
No	158	59
Total	268	100
Knowledge on the penalty to whoever sell tobacco to under 18 client		
	Frequency	Percentage
Good knowledge	11	10
Some knowledge	13	11.8

Very little knowledge	86	78.2
Total	110	100

According to the information in above table, 59% of tobacco retailers do not know that there is a law preventing under 18 from any contact with tobacco and tobacco products. Only 41% confirmed that the law exists. Respondent who said that the penalty is any term of imprisonment are classified as having good knowledge; other who said that the penalty is fine, tobacco product removal or retail closing are classified as having some knowledge and those who confirmed that they know that the law exist but no information on the penalty are classified as very little knowledge. According to the information provided on table18, 78.2% have very little knowledge; only 10% have good knowledge on the penalty to who sell tobacco and tobacco products to fewer than 18 clients as provided by Rwanda tobacco control.

Retailers' thinking on the law implementation.

In this research, when assessing tobacco retailers' thinking, a question on who they think should be involved in the existing law implementation was part of the tool and the responses are summarized in the table below.

Table 19: Summary on thinking on the law implementation

Who should be part of tobacco control law implementation	Frequency	Percentage
Parents	125	42.9
School principals	26	9.7
Minor themselves	6	2.2
Tobacco retailers	79	29.5
Others	42	15.7
Total	268	100

As it is clear shown in Table 19; the majority of tobacco retailers in Nyarugenge district are not aware of their role in preventing tobacco sell to minors, only 29.5% of tobacco retailers recognize that they should be involved in the law implementation.

According to the table above, 42.9%, of tobacco retailers in Nyarugenge district think that tobacco control law specifically article on sale to minor should be implemented by the parents, 29.5% of them said that the law should be implemented by retailer themselves, 9.7% said that the law should be implemented by school principal and 2.2% said that the law should be implemented by minor while others said that the law should be implemented by police primary security agent (Inkeragutabara) and local authorities.

III.1.4 Attitude, compliance, and practice

The attitude and practice of tobacco retailers in Nyarugenge district were also assessed by asking them what they think about the existing Rwandan tobacco control law. Hence, the way they react when facing different kind of customers they receive every day.

Type of customer and retailers' reaction

The tobacco retailers were asked if they have ever had customer under 18 and how often they get those customers and how they behave in such situation; the information got is summarized in the table below.

Table 20: The summary of the information on the under 18 customers

Customer under 18	Frequency	Percentage
Yes	114	42.5
No	154	57.5
Total	268	100
Frequency of under 18 tobacco customer		
Always	4	3.5
Usually	9	7.9
Often	20	17.5
Sometimes	50	43.9
Rare	31	27.2
Total	114	100

The information displayed in table 20 shows that 42.5% of tobacco retailers experienced under 18 customers. And among them, 17.5% come often while 43.9% get under 18 customers sometimes.

Reaction to minor customers

For study respondent who confirmed that they have ever had customer under 18 were asked about their reaction to those customers, and the information is summarized in this table.

Table 21: Summary of the findings on reaction to minor customers

Reaction to under 18 customer	Frequency	Percentage
Allow the sale if they have a note from their parent	8	7
Allow the sale if they say they are old enough	79	69.3
Ask how old they are	5	4.4
Ask the identification card	1	0.9
Other, Specify	21	18.4
Total	114	100

As the table above illustrates, the majority of tobacco retailers only rely on what their clients tell them about their age, others (18.4%) specified that they cannot ask for an age when they get a customer.

Age verification and reaction of tobacco retailers

The documents that tobacco retailers in Nyarugenge district rely upon when checking for age of the clients, was also asked about. In addition to that, an attention was also paid in order to know when tobacco retailers get a customer without valid ID and this last persist.

Documents to rely upon when checking for age.

All the study participants were asked how they verify the age of tobacco and tobacco products' clients when checking if these last do not belong to the group protected by the law. The information is summarized in the following Table 22.

According to the information in the table below, 97% of tobacco retailers do not ask for any document, they rely on the physical appearance of the customer when checking for age. Other specified that they do not ask any document because they are sure that tobacco is for someone else. Therefore, when a customer does not have valid ID, 79.1% of tobacco retailers offer requested tobacco or tobacco product, only 16.8% refuse to deliver requested tobacco and tobacco product while 4.1% first check if that tobacco product is not to be consumed by the customer him/herself.

Table 22: The summary of responses to the document to rely on when checking for tobacco clients age.

Document to rely upon when checking for the age	Frequency	Percentage
National ID	1	0.4
Student card	1	0.4
Physical appearance	260	97
Other, Specify	6	2.2
Total	268	100
Reaction when a customer does not have ID and persist requesting tobacco		
Offer requested tobacco or tobacco product	212	79.1
Total refusal to sell	45	16.8
Other, Specify	11	4.1
Total	268	100

III.2 Variables associated with tobacco sale to or by a minor.

In a total sample of 268 tobacco retailers, 3% of them are under 18 years of age. Among the study respondents, 42.5% of them confirmed that they get customer under 18 years old. A bivariate analysis was computed in order to see the variables that are significantly associated with this number of minors selling and buying tobacco in the school surroundings.

III.2.1 Tobacco sale by minor

To check the factors that determine the sale of tobacco to underage people, a cross tabulation analysis were run in SPSS software. A variable “age” of participant grouped in under age and 18 and above was considered as the dependent variable and it was cross-tabulated with each variable that was suspected to have a relationship with it. The results are summarized in the following table.

Table 23: Summary on variable associated with the tobacco sell by minor

Factors associated with tobacco sale by minors					
Variables	Frequency		Chi square	P value	Decision
Gender	Under 18	8 and above			
Male	6	158			
Female	2	102	0.662	0.416	NS
Level of education					
Low level of education	8	245			
High level of education	0	15	0.489	0.484	NS
Experience					
Low experience	7	152			
High experience	1	108	2.712	0.1	NS
The shop ownership					
The respondent is the owner	6	213			
The respondent is not the owner	2	44	0.433	0.805	NS
Distance from School					
Walkable distance	2	167			
A bit distant	6	93	5.182	0.024	S
Type of retail					
Convenience store and shops	1	188			
Supermarket, General merchandise and tobacco store	1	30			
Mobile shops	6	42	18.949	0.000	S
Presence of no smoking signage					
Yes	1	14			
No	7	246	0.744	0.388	NS
Availability of tobacco to minors					
The shop opens at least 12	3	64			

hours a day					
The shop opens 13 hours and above per day	5	196	0.687	0.407	NS
The shop trading license					
Yes	2	207			
No	6	53	13.484	0.000	S
Kind of tobacco and tobacco products					
Cigarette	7	258			
Other tobacco products	1	2	9.649	0.002	S
Knowledge of tobacco control law					
Yes	0	71			
No	8	189	2.972	0.085	NS
Knowledge on article regulating tobacco sale to or by minor					
Yes	4	198			
No	1	9			
Don't know	3	53	3.492	0.175	NS
The penalty to whoever sell tobacco to underage					
Good knowledge		11			
Some knowledge		13			
Little knowledge	1	85	2.864	0.413	NS

From the above table, the dependent variables are the age of participants grouped in under 18 years' old and 18 and above tobacco seller. There are 4 variables that show statistical significance at 0.05 significant level, namely the distance from which a retail is located from the selected school, type of retail, whether a retail has a trading license or not, and the kind of tobacco and tobacco products sold there.

III.2.2 Tobacco sale to minor

By verifying the factors that cause tobacco retailers in the school surroundings of Nyarugenge district to sell tobacco and tobacco products to minor people, a variable "Customer under 18" was considered as a dependent variable. A cross tabulation of the dependent variable with other variables was run to check the ones which have a significant P value. The results are shown in table24.

Table 24: Summary on variable associated with the tobacco sell to minors

Factors associated with tobacco sale to minors					
Variables	Frequency		Chi square	P value	Decision
	Customer under18				
Gender	Yes	No			
Male	66	98			
Female	48	56	0.909	0.34	NS
Level of education					
Low level of education	108	245			
High level of education	145	9	0.042	0.838	NS
Experience					
Low experience	63	96			
High experience	51	58	1.359	0.244	NS
The shop ownership					
The respondent is the owner	94	125			
The respondent is not the owner	19	27	0.146	0.93	NS
Distance from School					
Walkable distance	83	86			
A bit distant	31	68	8.092	0.004	S
Type of retail					
Convenience store and shops	84	105			
Supermarket, General merchandise and tobacco store	13	18			
Mobile shops	17	31	1.282	0.527	NS
Presence of no smoking signage					
Yes	4	11			
No	110	143	1.637	0.201	NS
Availability of tobacco to minors					
The shop opens at least 12 hours a day	22	45			

The shop opens 13 hours and above per day	92	109	3.44	0.064	NS
The shop trading license					
Yes	89	120			
No	25	34	0.001	0.977	NS
Kind of tobacco and tobacco products					
Cigarette	111	154			
Other tobacco products	3		4.099	0.043	S
Knowledge of tobacco control law					
Yes	35	36			
No	79	118	1.805	0.179	NS
Knowledge on article regulating tobacco sale to or by minor					
Yes	82	120			
No	6	4			
Don't know	26	30	1.907	0.385	NS
The penalty to whoever sell tobacco to underage					
Good knowledge	4	7			
Some knowledge	5	8			
Little knowledge	36	50	0.359	0.949	NS

As it is clearly shown in the above table, the dependent variable is the customer under 18 buying tobacco and tobacco products. Only the distance at which retail is located from the selected school and the kind of tobacco and tobacco products sold have shown a statistical significance at 0.05 significant levels.

III.2.3 Logistic regression analysis

To predict variables which may be associated with tobacco sale to and by minor, a logistic regression analysis was conducted. And the results are summarized in the following table:

Table 25: Summary on variable associated with tobacco sell to or by minors

Tobacco sale by minor					Tobacco sale to minor			
Variable	OR	CI		P value	OR	CI		P value
Gender		Lower	Upper			Lower	Upper	
Male	1.937	0.383	9.782	0.424	1.273	0.775	2.09	0.341
Female					1			
Experience								
Low experience	4.974	0.603	41.014	0.136	0.895	0.309	2.59	0.838
High experience	1				1			
Distance from School								
Walkable distance	0.186	0.037	0.938	0.042	0.472	0.281	0.795	0.005
A bit distant	1				1			
Type of retail								
Convenience store and shops	1				1			
Supermarket, General merchandise and tobacco store	0.037	0.004	0.318	0.003	0.685	0.355	1.323	0.26
Mobile shops	0.233	0.027	2.04	0.188	0.759	0.301	1.918	0.56
Presence of no smoking signage								
Yes	1				1			
No	2.51	0.289	21.84	0.404	2.115	0.656	6.823	0.21
Availability of tobacco to minors								

The shop opens at least 12 hours a day	1				1			
The shop opens 13 hours and above per day	1.837	0.427	7.904	0.414	1.726	0.966	3.085	0.065
The shop trading license								
Yes	1				1			
No	0.85	0.017	0.435	0.003	0.991	0.553	1.779	0.977
Kind of tobacco and tobacco products								
Cigarette	0.054	0.004	0.671	0.023	0	0	0	0.999
Other tobacco products								
Knowledge on article regulating tobacco sale to or by minor								
Yes	1				1			
No	0.357	0.077	1.644	0.186	1.268	0.699	2.301	0.434
Don't know	1.963	0.183	21.018	0.577	0.578	0.147	2.273	0.433
The penalty to whoever sell tobacco to underage								
Good knowledge	1				1			
Some knowledge					1.26	0.343	4.628	0.728
Little knowledge	3.94	0.477	32.56	0.203	0.929	0.546	1.58	0.785

By testing the significance for each variable, the information in the above Table 25 shows that:

- The distance at which a retail/shop is located from the school is associated with both tobacco sale to minor and with tobacco sale by a minor. Whereby, the tobacco retailers in a walkable distance are more likely to sell tobacco to underage people than retailers in a distance far from school (OR: 0.186, 95% CI [0.037-0.938]) significant with $p=0.042$ and there is a risk of minors to sell tobacco in

walkable distance from school than in a distance far from the school (OR: 0.472, 95% CI [0.281-0.295]) significant with $p=0.005$.

- The type of retail is associated with tobacco the sale by minor (OR: 0.037, 95% CI [0.004-0.318]) significant with $p= 0.003$. The shop trading license is associated with tobacco sale by minor (OR: 0.85, 95% CI [0.017-0.435]) significant with $p=0.003$. Kind of tobacco and tobacco products is associated with tobacco sale by minor (OR: 0.054, 95% [0.004-0.671]) significant with $p=0.023$.

III.2.4 Multivariate logistic regression analysis

Multiple logistic regressions of factors associated with tobacco sale to and by a minor. Factors associated with tobacco sale to or by minors with less than 20% of p-value were entered in multiple logistic regression analysis to test the significance and the results are summarized in the table below:

Table 26: Multivariate analysis of variable associated with tobacco sell to or by minors

Tobacco sale by minor				
Variable	OR	CI		P value
Distance from School		Lower	Upper	
Walkable distance	0.112	0.012	1.034	0.053
A bit distant	1			
Type of retail				
Convenience store and shops	0.137	0.004	5.22	0.285
Supermarket, General merchandise and tobacco store	1.729	0.032	92.058	0.787
Mobile shops	1			
Kind of tobacco and tobacco products				
Cigarette	0.008	0.0001	0.401	0.0158
Other tobacco products	1			
The shop trading license				
Yes	0.256	0.008	8.303	0.443
No	1			

Tobacco sale to minor				
Variable	OR	CI		P value
Availability of tobacco to minors		Lower	Upper	
The shop opens at least 12 hours a day	1			
The shop opens 13 hours and above per day	1.635	0.882	3.03	0.118
Distance from School				
Walkable distance	0.483	0.282	0.824	0.007
A bit far	1			
Type of retail				
Convenience store and shops	0.87	0.429	1.763	0.699
Supermarket, General merchandise and tobacco store	1.022	0.382	2.737	0.964
Mobile shops	1			
Presence of no smoking signage				
Yes	2.426	0.731	8.048	0.147
No	1			

As it is displayed in Table 26, multiple logistic regression analysis has shown that

- The distance from which tobacco retail/shop is located from the selected school is associated with both tobacco sales to and by minors (OR: 0.112, 95% CI [0.012-1.034]) with significant p value=0.053 and (OR: 0.483, 95% CI [0.282-0.824]) with p=0.007 respectively.
- The tobacco sale by a minor is also associated with the kind of tobacco and tobacco products sold in the retail (OR: 0.186, 95% CI [0.037-0.938]).
- There is no significant association between tobacco sale by minor and the type of retail (OR: 0.137, 95% CI [0.004-5.22]) with p=0.285 no significant and the shop trading license of retail (OR: 0.256, 95% CI [0.008-8.308]) with not significant p=0.443.

III.3 Key informant interview

Qualitative data were collected from key persons in Nyarugenge district on the side of policy implementers and policy design and enforcers at the national level. The targeted persons were the district authorities whose responsibilities meet with tobacco retailing in one or another way in Nyarugenge district. Therefore, we collected data from district authorities in different units whose activities concern the wellbeing of the population, especially minors. We were also interested to know how the policy enforcers perceive the issue of tobacco retailing in the school surroundings of Nyarugenge district.

III.3.1 Policy implementers

The tobacco control policy implementers, we talked with different authorities in the health unit, youth sports and culture unit, education unit and business development unit. The majority of them have experience of greater than one year. All of them have responsibilities that meet with tobacco retailing in one or another way. The majority of them know the danger of tobacco retailing in the school surroundings where one of them said: “Tobacco retailing in the school surroundings may lead to some students to be tempted to smoking”.

On the side of policy implementers, 67% of them confirmed that they do not have any official document at their institution on tobacco sell regulation, therefore, 33% of study respondent confirmed that the document exist but they fail to state what the document says about tobacco sell to or by minors. All of the study participants are not aware of what the existing law at national level says about tobacco sell to minors.

All of the key informants know the risk behind tobacco sale to and by minors where one of them stated that “Strict measures should be put in place to stop minor from sale of tobacco”; and another said “tobacco retails should be taken as a bar where people under 18 are not allowed to enter”.

The majority of respondent said that their institutions lack any way to verify the practices of the existing tobacco control law; however they think that there is need for strong participation of different parties namely the community, youth in and out of school, ministry of trade and industry, ministry of local governance, police and parents to build a partnership for tobacco control.

III.3.2 Policy enforcers

Law and policy enforcement is a key issue in public health planning. We talked with tobacco control law enforcers in the Rwanda Biomedical Center, NCDs division, and Rwanda National Police Nyarugenge district. According to what they say, institutions lack documents in place to verify the practices of the existing tobacco control law. Hence, the performance is low due to poor partnership in law enforcement and implementation.

IV. DISCUSSION

IV.1 Tobacco products in Nyarugenge district

As results, the study has shown that 3% of tobacco retailers under 18 years old are working in a different kind of tobacco retail in the school surroundings. In addition to that, 42.5% of tobacco retailers confirmed that they experience under 18 years old clients of tobacco and tobacco products. In those retail outlets, 98.9% of tobacco products are cigarettes, and few of them sell cigar and hand rolled cigarettes. Therefore, one can conclude that it is not allowed in Rwanda for people under the age of majority to get contact with tobacco and tobacco products, and the law is not or less successfully enforced. And also, tobacco retailers in Nyarugenge district are mostly young people with low level of education; more than 50% of retailers have only completed primary school.

The information in the table 23 shows that the education level of retailers is associated with tobacco sale to minor and this is similar to a study report conducted in Australia on evidence of the impact of retail policy initiatives which highlighted retailers' education and law enforcement as key component(4) in handling the issue of tobacco sale to minor.

The above-presented results also show that 9% of tobacco retailers confirmed that the potential clients of tobacco and tobacco products in Nyarugenge district are primary and secondary school students. That is relatively similar to the results of Rwanda GYTS 2008 which showed that in schools 10% of young students experience any form of tobacco(22). That generation is a delicate groups of the society most especially the minors, who are exposed to the risk of the consumption of tobacco and tobacco products. As a consequence, that drug may put in danger their health; hence hinder the development of the society and entire country in general.

IV.2 Knowledge, attitude, practice and compliance of tobacco retailers in Nyarugenge district

Although different studies show that prohibiting tobacco sale to minor through increasing tobacco retailers' knowledge and voluntary compliance on the existing tobacco control law(12), the results from this study show that tobacco retailers in Nyarugenge district are not aware of Rwanda tobacco control law. That is illustrated by the fact that 73.5% of them confuse that law with the tobacco

warning message displayed on tobacco packet as instructed by the MOH. The results of this study show also that all tobacco retailers in Nyarugenge district do not know when the existing law was gazetted. This is also confirmed by a very low level of knowledge on tobacco retailing regulations where 15.3% of them said that the minimum age of people who can sell tobacco as provided by the law is under 18, and 6% of them confirmed that the law accepts under 18 persons to buy tobacco and tobacco products. This factor is a crucial issue because of this low level of knowledge. It can result in an eventual sell off the tobacco to minors, which may lead to tobacco consumption. In addition to that, the majority of those who confirmed that they know the existence of tobacco control law does not know the related penalties, especially in case the tobacco is sold to people with less than 18 years of age. Only 10% of tobacco retailers have good knowledge on the existing tobacco control law while 78.2% have a very little knowledge of the law. Most of the tobacco retailers in Nyarugenge district do not comply with the existing tobacco control law since 97% of study respondent said that they never ask ID to customers; they only rely on physical appearance. This low level of compliance with the existing law in the majority of tobacco retailers is a consequence of their ignorance of their role in tobacco control law implementation, and most of them think that the law should only be implemented by parents, local authorities, and police.

In this study, binary logistic regression as presented on Table 23, has shown that variables like level of education, distance from which the retail is located from the school, type of retail, kind of tobacco and its products sold in the shop as well as the trading license were associated with tobacco sale by the minors. On the other hand, the tobacco sale to minor is associated with the distance at which the retail is located from the schools. These results are similar to the report in Canada on the evaluation of retailers' behavior towards certain youth access to tobacco(28). In many other studies, there are different variables significantly associated with tobacco sale to minor including the age of the clerk, failure to ask for ID and the age of test shopper(29).

IV.3 Study limitations

In Rwanda, the minor definition has changed during data analysis phase of this study; this might be a barrier to study generalizability.

We were expecting to get the shapefile for the schools locations from Nyarugenge district GIS and mapping unit, but they do not have the one with updated schools, so it took some more time to get the better-updated shapefile from Rwanda Natural resources Authority.

The study was only conducted in the Nyarugenge District of Kigali City in Rwanda, in its urban area and surroundings.

The study was only limited to analysis of the impact of the availability and enforcement of the tobacco law on sale to or by the minors.

The information collected and analyzed are for the period of November 2015.

CONCLUSION AND RECOMMENDATION

Tobacco retailing in the school surrounding is a serious matter for both minor retailers and clients because it may cause exposure to youth in and out of school. Tobacco retailers are not aware of the existing tobacco control law. The majority of law implementers lack tobacco control regulations at their institutions; hence, they do not feel concerned with tobacco control law implementation.

There is a need for mobilization targeting both retailers and the community to increase the awareness of the risk of tobacco contact with under 18 years people.

Elaboration of tobacco regulation at different institutions concerned with health and education for them to own the sensitization and implementation of Rwanda tobacco control law.

More researches are needed to explore tobacco retailing in the school surroundings in the rural area to check the magnitude of this issue.

Some efforts and policy enforcement need to be done to achieve the goal of promoting and maintaining the wellbeing regarding free tobacco world for young people and Rwandan population. As for the Rwandan economy to flourish and to achieve its objective of becoming a middle-income country by 2020, young people have to be given special attention with the aim of empowering this population group and protecting them from harm of tobacco use by:

- Create a collaborative effort between different stakeholders to monitor the issue of tobacco retailing in primary and secondary school surroundings.
- Provide assistance to tobacco retailers to develop enough knowledge and skills needed to refuse tobacco sale to underage people.
- Sensitization and clear communication on the existing tobacco control law and the kind of products that the law covers.
- Training of tobacco retailers on their role and responsibilities in tobacco contact with young people and the penalties.
- Sensitization of tobacco retailers to check for official ID instead of relying on the physical appearance of tobacco clients.

More research projects on the factors that hinder the existing Rwanda policy practice and effectiveness and assess the role of different stakeholders in the implementation of the existing tobacco control law. In case a similar research is conducted with the same study design, we are recommending to consider the design effect.

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APPENDICES

Appendix1: Consent form

Principal investigator: Marie Rose NYIRAKAMANA

Institution: UR/ SPH

I amworking for UR/SPH Research Institute. I am doing a research on tobacco retailers around the primary and secondary school and their clientele with regards to minor consumption in Nyarugenge District. I am going to give you information and invite you to be part of this research.

The purpose of this study is to examine tobacco products sold in the areas around primary and secondary schools and the clientele with regards to minor tobacco consumption in Nyarugenge district. There are schools that have been selected in Nyarugenge District to be part of this study.

Your participation in this research is entirely voluntary. It is upon to you, to decide to be part or not. Whether you choose to participate or not, I assure you that it will not affect your business, in the society, or any other thing of your daily life. You will receive no benefit(s) by participating in this research study but the potential benefits will be on the whole community of Rwanda.

You may change your mind later and stop participating even if you agreed earlier. I will give you a sheet of questions and you are free to do not respond to any question you want. The time to respond to the entire questionnaire is around 30minutes. However, I will follow you closely and keep track of any unwanted or any problems that may arise because of this study. The information you provide is totally confidential and will not be disclosed to anyone. It will only be used for research purposes. Your name, address, and other personal information will be removed from the instrument, and only a code will be used to connect your name and your answers without identifying you. All data, including questionnaires, will be kept in a secure location and only those directly involved with the research will have access to them. After the research is completed, the questionnaires will be destroyed.

This proposal has been reviewed and approved by the college Institutional Research Board (IRB), which is a committee whose task it is to make sure that research participants are protected from harm.

If you wish to find more about the IRB, contact Professor Kato J. NJUNWA, Dr. Brenda Asimwe Katara. It has also been reviewed by the Ethics Review Committee of the Center for Tobacco Control in Africa (CTCA), which is funding/sponsoring/supporting the study.

If you have any question you may contact any of the following:

Marie Rose NYIRAKAMANA; telephone: 0788575177

Professor Manassé NZAYIRAMBAHO; telephone: 0785255388

Doctor Vedaste NDAHINDWA; Telephone: 0788454613

I have read the foregoing information/it has been read to me. I have had the opportunity to ask questions about it and any question that I have asked have been answered to my satisfaction. I consent voluntarily to take part as a participant in this study.

Name of Participant _____

Signature of Participant _____

Date _____ dd/mm/yy.

Appendix2: Key Informants Interview

Examine tobacco retailers around primary and secondary schools and assess the clientele with regard to sale to and by minors, case of Nyarugenge district

We are conducting a study on” examine tobacco retailers around primary and secondary schools and assess the clientele with regard to sale to and by minors, the case of Nyarugenge district”. Therefore, we need key informant interview is important for this study.

Key informant interviews are one-on-one discussions with individuals in leadership, tobacco control focal person, law enforcers including police and overall leader of the retailers in the district, decision makers, or service roles designed to get their opinions about the issues on selling tobacco to and by minors you are concerned with, in this case, tobacco retailers around primary and secondary schools. The process of key informant interviewing not only gathers information on problems but also on solutions. This information will help you develop strategies for change. The process of interviewing can also generate new partners and allies for your cause.

In a nutshell, you are requested to participate in an interview as part of the above-mentioned study. A student at College of Medicine and Health Sciences has got a sponsorship from CTCA to conduct this research in the partial fulfillment of the requirements of Master of Science in Epidemiology.

This interview will take approximately one hour of your time. Please be assured that your responses will be kept strictly confidential. Responses will be analyzed and reported only in aggregate form and stripped of all identifying information. Please feel free to tell the interviewer if you do not feel comfortable with answering specific questions, you are not required to respond to all questions.

Scheduling: Would you allow me some minutes of your time to ask questions about tobacco retailers? Is this a good time for you?

Yes: conduct interview

No: Thank him/her, ask for more convenient time and call back.

Thanks for agreeing to help us out by speaking with us in this study. A key informant interview is conducted to obtain vital information about the particular community. It is used to gather information for a needs assessment and utilize the findings for effective planning. It is also used to assess if the needs in the community under study have changed over time. The information is typically obtained from a community member (key informant) who is in a position to know the community or the particular issue of interest.

In this study, we'd like to get more information about tobacco retailers' in the primary and secondary schools surrounding and assess their clientele with regards to sale to and by minors.

Institution:

Job title:.....

1. What is the relative priority of tobacco control in your organization compared to other public health issues?
.....
2. Can you please summarize your specific role, specific duties, and responsibilities with regard to tobacco control interventions?
.....
3. How has this country implemented the tobacco Control law? (who is in charge, any programs? Which articles have been implemented so far?)
.....
4. How is the article on prevention of sale to and by minors in the tobacco control law implemented, monitored and enforced in this country? (Probe for awareness, enforcement and penalties)
.....
5. How do you plan to implement the law on sale to and by minors in Rwanda?
.....
6. What programs are in place regarding tobacco retailers on the Rwanda tobacco control law and the article concerning regulation of tobacco sale to and by minors?
.....

Any additional information, recommendation or comments concerning tobacco retailers around primary and secondary school with regards to the minors selling and/or buying tobacco products; please, you can provide them to help the enforcement of Rwanda tobacco control law?

.....

Thank you! Your input is extremely important and we appreciate the time.

Appendix3: Questionnaire

Examine tobacco retailers around primary and secondary schools and assess the clientele with regard to sale to and by minors, case of Nyarugenge district

Section A: Background characteristics of retail outlet:

School location:

- a. Sector.....,
Cell,
Village
- b. School:

I. Retailer's identification:

(Only one option can be selected per sub-question)

a. How old are you in complete years?

Years

☐ Refused

b. What is your gender?

☐ Male

☐ Female

c. What is your highest level of education?

☐ No formal schooling

☐ Less than primary

☐ Primary school completed

☐ Secondary school didn't complete

- ☐ Secondary school completed
- ☐ College/University completed
- ☐ Postgraduate degree completed
- ☐ Refused

d. How many years have you worked here?

- ☐ Less than 2 year
- ☐ 2–5years
- ☐ 5years and above

e. Is this shop yours or you work for someone else?

- ☐ Owner, (if owner skips to section B)
- ☐ Not owner

f. If not the owner, what is the gender of the owner?

- ☐ Male
- ☐ Female

g. How old is he/she?

Years

- ☐ Don't know

Section B: Characteristics of retail outlets:

II. Tobacco outlets in the school surroundings

a. Distance from School

(Only one option can be selected)

NB: this will be automatically computed using geo-information management software.

- ☐ 0m – 100m
- ☐ 101m – 200m
- ☐ 201m – 300m
- ☐ 301m – 400m

☐ 401m –500m

☐ 500m–1000m

b. Type of retail:

(Only one option can be selected)

☐ Convenience store

☐ Supermarket, General merchandise store

☐ Tobacco store

☐ Beer, Wine, Liquor store

☐ Soft drinks and snacks shop

☐ Mobile shop

☐ Other, specify

c. What are the main clients of tobacco products in this shop?

☐ Primary school children

☐ Secondary school students

☐ Adolescents not registered in any formal school of both sexes

☐ House boys/girls

☐ Adults (men /women) above eighteen years old

☐ Refused

d. Can you please tell us the age of your tobacco products clients?

☐ Male age group in years

☐ Female age group in years

☐ Don't know

☐ Refused

e. Presence of no smoking warning signage:

(Do not ask, just observe)

☐ Yes

☐ No

f. How many hours per day is this shop open?

Hours

g. When does this shop open in the morning?

AM

h. When does this shop usually close in the evening?

PM

III. Does this shop have a trading license?

☐ Yes

☐ No

☐ Do know

IV. Which kind of tobacco and tobacco products do you sell in this shop?

☐ Cigarette

☐ Cigar

☐ Shisha

☐ Hand-rolled cigarette

☐ Snuff/dipping tobacco

☐ Chewing Tobacco

☐ Others, Specify

Section C: Knowledge on law on sale to and by minors

V. Have you ever heard about Rwanda tobacco control law?

☐ Yes

☐ No, skip to VIII

VI. In which year was this law gazetted?

☐ Don't know

- VII. In the Rwanda tobacco control law, is there any articles regulating tobacco sale to and by minors?
- ☐ Yes
- ☐ No
- ☐ Don't know
- VIII. What is the minimum age of the person who can sell tobacco and tobacco products as provided by the Rwanda Tobacco Control law?
- Years
- IX. What is the minimum age of the client who can be served tobacco products as provided by the Rwanda Tobacco Control law?
- Years
- X. The Rwandan law on tobacco contact with a person under eighteen applies to which of the following tobacco products?
- ☐ Cigarettes,
- ☐ Cigars,
- ☐ Shisha
- ☐ Hand-rolled cigarette
- ☐ Snuff/dipping tobacco
- ☐ Chewing Tobacco
- ☐ All of the above
- XI. Do you know that Rwandan law prevents under 18 persons from any contact with tobacco and tobacco products?
- ☐ Yes
- ☐ No
- XII. If yes, the penalty for whoever sells tobacco to a customer under 18 years is:
-
- XIII. Who should be part of tobacco control law implementation specifically on sale to and by minors?
- ☐ Parents
- ☐ School principals

☐ Minor themselves

☐ Tobacco retailers

☐ Others, Specify

Section D: Attitudes and Practice

XIV. Have you had a customer under 18 years buy tobacco products?

☐ Yes

☐ No, skip to XVII

XV. How frequently do you get such customers?

☐ Always

☐ Usually

☐ Often

☐ Sometimes

☐ Rare

XVI. What do you do?

(Don't read, wait for response)

☐ Allow the sale if they have a note from their parent.

☐ Allow the sale if they say they are old enough.

☐ Ask how old they are

☐ Ask the identification card

☐ Other, Specify

XVII. What document do you rely upon to check for their age?

☐ National ID

☐ Student card

☐ Physical appearance

☐ Others, specify

XVIII. What do you do when a customer does not have a valid ID, and that customer persist?

(Don't read, wait for response)

☐ Offer requested tobacco or tobacco products

☐ Total refusal to sell

☐ Others, Specify

This is the end of the survey.

Thank you very much for your help.

Data collected by:

Date:

Time:

Signature:

Appendix4: Ethical clearance

 **UNIVERSITY OF RWANDA** **COLLEGE OF MEDICINE AND HEALTH SCIENCES**
CMHS INSTITUTIONAL REVIEW BOARD (IRB)

Kigali, 02/10/2015
Ref: CMHS/IRB/309/2015

NYIRAKAMANA Marie Rose
School of Medicine and Pharmacy, CMH, UR

Dear NYIRAKAMANA Marie Rose

RE: ETHICAL CLEARANCE

Reference is made to your application for ethical clearance for the study entitled **"Examine tobacco retailers around primary and secondary schools and assess the clientele with regard to sale to and by minors, case of Nyarugenge district"**.

Having reviewed your application and been satisfied with your revised version incorporating the comments from IRB, your study is hereby granted ethical clearance. The ethical clearance is valid for one year starting from the date it is issued and shall be renewed on request. You will be required to submit the progress report and any major changes made in the proposal during the implementation stage. In addition, at the end, the IRB shall need to be given the final report of your study.

We wish you success in this important study.


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

EMAIL: researchcenter@ur.ac.rw P.O. Box: 3286, Kigali, Rwanda WEBSITE: <http://cmhs.ur.ac.rw/> www.ur.ac.rw