



**COLLEGE OF MEDICINE AND HEALTH SCIENCES
SCHOOL OF PUBLIC HEALTH**

**PATTERNS OF ADDICTION AMONG RWANDAN PATIENTS REFERRED FOR
MENTAL HEALTH SERVICES IN RWANDA**

A thesis submitted in fulfillment of the requirements of the degree of
MASTER OF PUBLIC HEALTH

By

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Dedication

This work is dedicated to my beloved husband, my son and my daughter for their encouragement, love and inspiration.

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Abstract

Introduction

This study investigated the patterns of addiction among Rwandan patients referred for mental health services in Rwanda. The study aimed at documenting the epidemiological profile of patients with addiction and co-occurring disorders from rural and urban areas that are referred for mental health services in Rwanda. The study was conducted on 315 inpatients of Caraes Ndera Neuropsychiatric Hospital and its 2 branches; Centre Psychotherapeutique Icyizere, CARAES Butare and Isange Rehabilitation Center.

Methods

The research used data collected using the Addiction Severity Index (ASI). The raw data was in Excel documents and were transferred to the software STATA 13 to facilitate the data analysis. Descriptive statistics were performed using percentages and chi-square test with significant P-values ≤ 0.05 to assess the association between variables.

The logistic regression analysis has been used for determining risks factors associated to addiction severity.

Results

The results revealed that men are more likely to have a severe addiction compared to female and significant association between depression and addiction severity among patients. The results revealed also that the psychotropic medicines are associated with the severity of addiction and the heroin use among other substance was statistically significant.

Conclusion: the prevention measures of identified risk factors should be strengthened at community level.

Abbreviations

- ASI : Addiction Severity Index
- AUD : Alcohol Use Disorder
- CARAES : Caritate Aegrorum Servi
- CNS : Central Nervous System
- DSM : Diagnostic and Statistical Manual of Mental Disorders,
- HIV : Human Immunodeficiency
- N I D A : National Institute of Drug Abuse.
- NLUMP :National Land Use Master Plan
- OR :Odd Ratio
- UNODC :United Nations Office on Drugs and Crime
- USA : United states of America
- WHO :World Health Organization

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Introduction

Background

Worldwide, mounting evidence has linked differences in addiction issues to the individual's geographic location, specifically noting differences between urban and rural areas. Research on alcohol use disorders (AUD) has associated urban and rural differences in addiction patterns within specific settings; including spiritual and traditional practices, community and household interactions, financial conditions, the accessibility of psychoactive substances and the execution of regulations governing the use of alcohol (Mark A. Dixon, et al 2008).

Differences in knowledge and availability of drugs, such as novel psychoactive substances (e.g. mephedrone and synthetic cannabinoids) make living in urban areas a high predictor of increased substance use patterns (Martinotti et al., 2015). Knowledge about drugs is not only a key determinant of differences in urban-rural substance use patterns, but it is also a significant contributor to increased risks for poor health outcomes, such as overdose among individuals living in rural areas with opioids addiction. Life span occurrence for alcohol use varies significantly among rural districts (93.7%) and urban areas (86.6% for large cities, 89.1% smaller cities). (Donath et al., 2011) The systematic review study which covered 4 regions in Africa showed that Central Africa is leading in using any substance among adolescents at 55.5%, followed by East Africa at 48.99%, and West Africa at 38.3%. Southern Africa had a lower percentage for adolescents using any substance at 37%. The approximated percentage of any substance use among adolescents in sub-Saharan Africa was 41.6% (Ogundipe, Amoo, & Adeloje, 2018). A Nigerian study by Ogundipe (2018) also highlighted the ready availability of psycho-active substances particularly at parties alone, accounts for more than 25% of abuse in cities, while unemployment and influence from others were factors responsible for 18% and 24% respectively. (Abasiubong, Festus, 2014) Additionally, alcohol drinking is the third highest risk factor for global disease.

Alcohol is linked with an increased risk of cancer, cirrhosis of the liver, injuries sustained from accidents and heart disease. It is also associated with increased danger of contracting infectious illnesses, like human immunodeficiency virus (HIV) and tuberculosis. Characteristics

of urban-rural differences in substance addiction may be attributed to several mechanisms associated with accessibility to addictive substance, stressors and community support.

Protective factors against drug use in the community may include the accessibility of community support, positive webs, community insertion, community action, collective norms and feelings of belonging, which contribute to community resiliency(Ntaganira, Hass, Hosner, Brown, & Mock, 2012).On the other hand, some effects of acculturation have been harmful to the development of youth and have contributed to increased rates of suicide and drug use among youth. Groups of people, marginalized by social class, gender, or race, have limited access to resources, and increased marginalization. For example, people from lower socio-economic classes have poorer health due to less access to adequate medical resources, are more likely to use tobacco and illicit drugs, and to drink alcohol in a high-risk manner.(Zewdu, Hanlon, Fekadu, Medhin, & Teferra, 2019)

Statement of the Problem

The family plays a crucial role in raising children with exposure to either protective factors or high risk factors relative to substance abuse. Single parent families may be five times more likely to develop emotive, behavior, societal and educational difficulties comparative to other children who live with both parents. They are at high risk of smoking, drink heavily and use illicit drugs. Contributing factors to their use of drugs may be a result of divorced parents or parents who are engaged in a high conflict relationship, economic disadvantage which can affect the basic needs of children, less time with parents and reliance on peers who use drugs, the article Spooner C, Hetherington K. 2004 (228) defines certain of the most noticeable elements of the stressful experience of staying with a family member who is using alcohol, and drugs excessively. Often, the relationship may become dislikable and from time to time destructive; struggle over cash and properties; the experience of insecurity and anxiety about relatives abusing drugs; home and family life becoming disrupted and dysfunctional.(Spooner & Hetherington, 2004)

At the individual level, substance use may lead to addiction and co-occurring disorders such as depression, anxiety or drug-induced psychosis. Young people may find it difficult to finish their studies due to poor academic performance, inconsistent attendance or being unable to complete their studies because of being expelled or dropping out of school.

The stigma of addiction and drug use or family conflicts may worsen the situation of a person who is abusing substances. (Sahu & Sahu, 2016)

Another factor that can lead to the use of substances to cope, is the perception of stressful life experiences that the person cannot deal with effectively. In stressful situations the body has physiological and psychological mechanisms which help a person to cope with stressors. Those mechanisms are influenced by individual characteristics such as psychological, behaviors. One of the hypothesis is that drugs are used to reduce stress, this related stress drug use expose drug users to be dependent. Consequently, within the Western context, drug use in deprived and isolated urban areas may be a coping mechanism in response to a number of stressful life experiences. Drug use in defined groups may be more comparable between people living in in urban area connected by public transportation roads than between people living in unconnected area. Finally intra-urban differences in access to substances, such as the availability of licit and illicit drugs may be one of the key determinants of use of drugs in urban areas.(Galea, Rudenstine, & Vlahov, 2015)

While understanding patterns of addiction within the Western context has the potential for informing and improving policy and treatment interventions, little is known in Rwanda about patterns of addiction. Research on addiction in Rwanda has been epidemiologic in nature and there is a paucity of research that provides an overview of addiction in rural and urban hospitalized patients. Kanyoni M, et al.,study (2015) showed the prevalence of substance use in Rwandan youth, reported rural youth were smoking cannabis to socialize at a rate of 97.72% compared to those in urban areas at 93.46%.(Kanyoni, Gishoma, & Ndahindwa, 2015)The number of cannabis dependent people is higher in urban areas. A recent survey (Yvonne K, et al., 2018) showed that alcohol use disorder among the Rwandan population is 1.6%and substance use disorder was 0.3%.(Yvonne K. et,al 2018.). However, there is a dearth of literature addressing addiction in in-patients with addiction or co-occurring disorders. This research aims to contribute in filling this research gap in Rwanda.

Research objectives

Main objective

This study will document the epidemiological profile of patients with addiction and co-occurring disorders from rural and urban areas who are referred for mental health services in Rwanda.

Specific objectives

1. Describe and compare urban-rural socio demographic and clinical profiles of addiction among patients referred for mental health services in Rwanda.
2. Identify psycho-active substances abused in rural and urban areas.
3. Compare differences in addiction severity between urban and rural patients
4. Identify factors associated with severity of addiction among patients.

Research question

The following question will be guiding this study:

1. What are the socio-demographic and clinical profiles and addicted patients living in rural and urban areas and to what extent are their differences between the two.
2. What types of psychoactive substances are used by rural and urban patients referred for mental health services in Rwanda?
3. Are there differences in the severity of addiction between urban and rural patients referred for mental health services in Rwanda?
4. What are this risk factors associated with the severity of addiction among patients?

Significance and justification for the study

Drug abuse is one of the main health problems that affect youth in Rwanda today. However, there is critical gap of research in this area. This research is one of the first studies to provide a socio-demographic profile of substances used and severity of use within the respective areas in the clinical population.

The results from this study are significant for a number of people. Some of them are undoubtedly policy makers for which the results of the study will be contributing in formulation of tailored policy and treatment interventions. This study is important to inform policy makers on specific differences between urban and rural populations in term of choice and frequency of use of substances.

By having information about types of addiction we face in treatment settings, factors contributing to addiction and the categories of people who are affected, greater understanding about the differences between rural and urban substance use will help in the planning and implementation of existing measures and in the creation of new measures aimed at prevention and treatment of substance abuse.

The 2015 National Youth Polity noted that despite the Rwandan Government's Office to fight drug abuse, young people continue to be occupied in drinking alcohol and smoking tobacco and illegal substances. Yadufashije's study (2017) showed that youth between the ages of 18 and 35 years constitute the largest population of people abusing drugs. Results of this study will be used in planning for sensitization by all stakeholders, Ministry of Health, Rwanda Biomedical Center and the Ministry of youth in this endeavor. The National Polity (2015) argued that the prevention and intervention strategies must be priority to policy makers to decrease children's exposure to alcohol and other drugs, and youth involvement drug abuse or peer involved in anti-social activities. (MIJESPOC, 2015).

The current research may be useful for future researchers exploring patterns of drug choice and severity of use in Rwandan youth. It will enhance knowledge to assist in equipping the staff involved in taking care of the persons with addiction problems, with different expertise to work in preventing substance use in both rural and urban area. The research is of paramount importance to

clinical practitioners who are at the forefront in seeking ways to prevent substance use in Rwandan youth and in providing quality care for patients with addiction.

Theoretical and conceptual framework

Theoretical framework

The study is based on the theory that addiction arises from individual's pre-existing characteristics or the acquisition of characteristics that; combined with a given set of environmental circumstances, lead to a strong motivation to engage in harmful behaviors. Karen Van Gundy (2006) has argued that, while illicit drug use in rural areas is more prevalent among urban dwellers. The major substance abuse problems in rural or urban areas and categories of abused substances are more multifaceted.

The factors that are associated with drug use in rural and urban areas are the following;

- Risk: neighborhood disorganization early exposure to substances, substance abuse among peers, living in a non-nuclear family, family substance history, absence of parental direction and parental psychopathology.
- Protective factors: individual impulse regulator, parental checking, anti-drug use policies, educational skills among peers and strong neighborhood attachment.

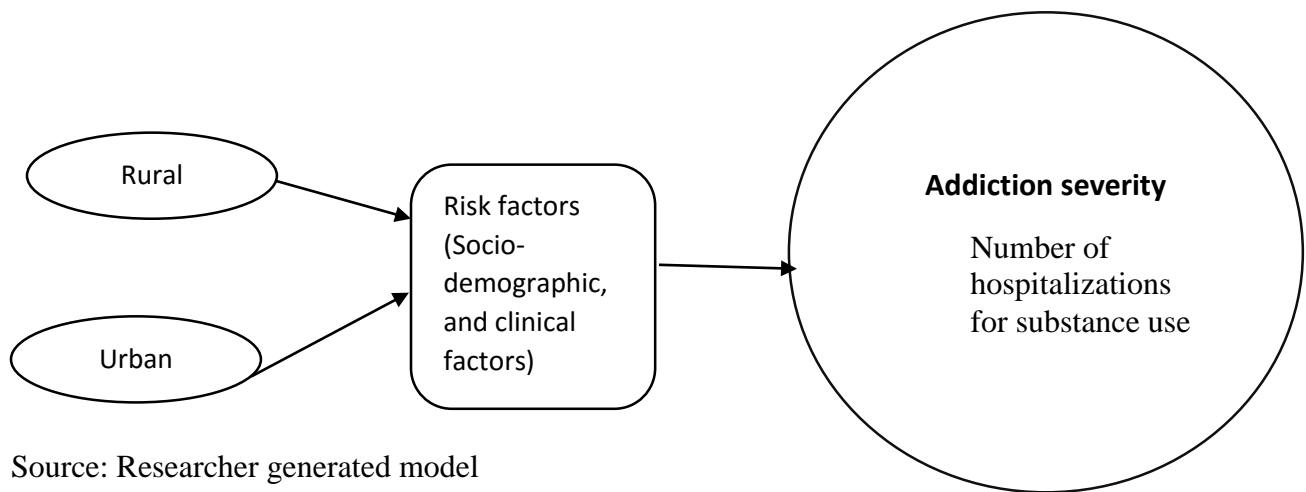
Factors that can be associated with both protection and risk: school performance, parental marital status, parent education, income level, socioeconomic status, marital status and anticipated future position (Karen Van Gundy, 2006).

Kanyoni at al. (2015) discovered that Rwandan youth who used more than one substance: 50.6% of young people had consumed alcohol, who used cigarette were 10%, who used cannabis were 40.4%, 0.5 used inhalants and 0.1 had consumed prescription drugs like diazepam. Moreover, about 1% used local beers with mixture of sorghum, sugar and cannabis. Yadufashije (2015) focused on lifetime prevalence to assert that substance use is currently a reality in the daily lives of young people in Rwanda.

Conceptual framework

The theoretical framework that has been used as a basis for the development of the conceptual framework for this study focuses on the overview of addiction in mental health services in Rwanda. The addiction severity is the dependent variable while the social demographic, legal and clinical risk factors of the urban and rural patients are considered as the independent variable.

Figure 1 Conceptual Framework



Source: Researcher generated model

Scope of the study

The study was conducted with inpatients of CARAES Ndera Neuropsychiatric Hospital and its branches; Centre Psychotherapeutique Icyizere, CARAES Butare and Isange Rehabilitation Center.

The participants were adult (18 years and above) who were admitted to the aforementioned settings, and who abused alcohol or drugs. Also this study doesn't take into account differences in substance abuse between genders and substance use in children. The research has focused more on addiction in general for hospitalized patients from early September 2018 to March 2019 who responded to questionnaires with the help of health professionals.

Operational Definition of Terms

Substance Abuse

Substance abuse is the dysfunctional use of substance, to such an extent that it misshapes the physical and mental functioning of the abuser. Likewise, drugs can be abused when they aren't pharmacologically essential and when they are utilized as a part of the substance of legitimate restriction (Bukunmi, 2017).

Urban & Rural area

According to the World Bank Group (2017) report, urban and rural areas are defined according to the land use planning. Urban area also defined according to the population density per square kilometer (Km²). The some report indicated that 2012 National census defined the urban area according to the developed area with important buildings and essential infrastructure such as markets, water and electricity, educational institutions and financial institutions. For the purpose of this study an urban area has at least 30,000 inhabitants and important infrastructures (education facilities, electricity and water, markets, banks and other financial institutions) and the remaining areas are taken as rural.

The East African Community Secretariat (2019) suggested the following definitions of terms:

Addiction

A chronic and recurrent brain disease characterized by compulsive drug research and use, disregarding and adverse consequence. It is considered as a disease of the brain because substance modify the brain, its structure and its functioning.

Drugs

The drugs are psychoactive substance for which use, possession or supply for non- medical and no-scientific purposes have been prohibited by national legislation and/or the international drug control conventions. These are also widely known as illicit drugs, controlled substances or narcotic drugs.

Drug use: self- administrative of a psychoactive drug. This may be for recreational, experimental, medical or survival purposes.

Literature Review

Drug addiction

Drug use has usually been considered as exclusive to urban population. Nevertheless, in the recent decades, the prevalence of drug-related disorder and drug-related deaths in rural areas has increased. The problem is encountered in both developed and developing countries (United Nations office of Drugs and Crime, 2006). The drugs fall into two broad categories: licit drugs (tobacco and alcohol, prescription medication) and illicit drugs (marijuana, heroin, cocaine, hallucinogens...). However licit and illicit drugs continue to cause over increasing morbidity and mortality, despite efforts to reduce this problem (Ompad & Fuller, 2004).

Substance Use in Africa

Drug addiction is a multifaceted disease it can however be treated. Even if the addiction begins with taking the drug, a person's ability to refrain from taking them becomes tough and the desire to increase the dose settles in an uncontrolled way. Addiction is not a simple consumption of drug, it always has serious consequences. A complete variety of dysfunctional behaviors can come from the substance abuse and interfere with the normal functioning of the family, workplace and the community in general (Mircha, 2013).

In Kenya there has been a recent shift in drug use and trafficking from smoking drugs to heroin injection. Recent information indicates an increase in HIV cases relates to injecting drug use. 4.8% of new infections were attributed to injecting drug use. However, the use of drugs in Kenya is dreadful and very difficult to discover because of stigma. There is also the aspect of poverty because many people who use drugs live in slums and in low-income communities.

Many people who use drugs do not have access to medical services, and they go there, there is a risk of hiding their addiction from health care workers. In South Africa, a population survey showed that the prevalence of consumption the last three months was 3.7% and the prevalence of cannabis use was 3.3%, followed by sedatives or sleeping pills at 0.8%,

amphetamine-type stimulants 0.7%, cocaine 0.6%, opiates 0.5% and hallucinogens 0.5% (Clement Deveau, 2006).

The socio- demographic factors were often associated with drug use, gender, young age, specific population group, lower income or unemployment and geographic location such as urban areas. In addition, it has been shown that mental health such as anxiety disorders, depression, HIV risk behaviors and crime are also associated with drug use (Peltzer, Phaswana-mafuya, Africa, & Chancellor, 2012).

The study by Obot (2011) in Tanzania has proven responses to the severity of addiction. He showed that the participants perceived serious problems to control consumption. This resulted in an obligation to use heroin and an inability to control consumption. Participants needed to reuse more drugs to feel better and avoid withdrawal once use stopped. In the same way, the participants had physical and psychological problems resulting from their consumption and expressed the wish to get help. Given this desire, relatively few had tried to quit smoking alone for about four months, with some of them being treated. The results also showed insufficient knowledge of pharmacological treatments. Although not diagnostic, the results suggest a level of problem revealing of substance dependence (Obot & Saxena, 2011).

In Rwanda, the prevalence rate of illicit drugs among young people is much lower than the statistics in neighboring countries. Current conditions expose children and adolescents to increased drug use. A review of the recent Rwandan newspaper and media shows that alcohol and illicit drug use among youth constitute a major concern in rural and urban areas (Kanyoni et al., 2015).

Risk factors

In many research works, they tend to show the risk factors which can cause a person to use substances in the future. They define risk factor as “ those that occur before substance abuse and are statistically associated with increased likelihood of drug use.(Dillon, Natalia, In, Richard, & Stephen, Emma Nicalas Geraldine 2007).

Environmental factors recognized as increasing the likelihood of youth drug use, drug availability, poverty, cultural norms and attitudes favorable to drug use, peer influence and urbanization as aspects of social change (Obot & Saxena, 2005).

In addition, some health risk behaviors, such as common mental disorders (major depression and anxiety disorder), alcohol use disorders, HIV risk factor and criminal victimization have been associated with drug use (Peltzer & Nancy 2018).

Urban vs. rural

Some researcher have revealed the substantial differences in drug abuse between urban and rural areas and this changes over time and according to geographical location. They have also showed a high rate of drug use among urban population compared to rural population, in some cases rural consumption surpasses that in the urban areas (Fuller, Ompad, and Daniella&Crystal 2004).

In general, the literature on the differences between urban and rural areas are mixed. Some reveal an increase in substance use in urban area while others showed an increase in rural settings(Pfeiffer Donath,Carolin,Grabel,Elina,Dirk,Elima, 2012). The particular problem is fact that the youth in rural area are more likely to use alcohol that those in urban areas (Kanyoni, Gishoma, & Ndahindwa, 2015).

Risk factors associated with substance use

There is not one factor that can predict addiction. Addiction is rather related to the biology of the person, his social environment, his age or stage of development. Addiction is proportional to the risk factor, the higher the risk factor, the more likely a person is to become addicted.

The common risk factor associated with substance abuse are peer presser, lack of self-confidence, families of divorced parents, lack of parental or adult supervision during adolescence, a unique attitude among today's youth of trying to use a drug and abuse during childhood (Lone, 2013).

Parental Influence

Parents are the role model of their children, that's why having parents who smokes is exposing you two times more likely to be at risk of smoking. Parents who don't smoke influence their children to not initiate to smoking. Female are the most vulnerable to become smoker when their parents are smokers. Studies found a relationship between mothers who smoke and female who become smokers. Being raised in a home where they smoke expose young people to second hand smoke, there is also an easy access to cigarettes which can trigger a children to initiate in smoking. Except parents, older siblings can influence young ones, and they are more likely to become smokers themselves. Parents who smoke are unknowingly providing their children with access to cigarettes and are less likely to object to their children smoking. Children with older siblings who smoke are more likely to become smokers in their return (Jiloha, 2019). Golestan (2010) revealed that parents who use psychoactive substances constitute a substantial risk factor as well as a factor of relapses among adolescent. The effect of addiction of parents is perceived in their children at various stages of development. Obviously parents who consume alcohol and other drugs will be having children who also use those drugs (Floyd – Taylor, 2006).

Concerning the use of psychoactive substance, authoritative style of parenting has been associated with lower psychoactive substance use among children. In particular, research has shown that children with responsible parents have lower alcohol consumption. Sometimes, the negligence of the parents lead to the drug use and it's of course considered a risk factor mostly for adolescent, including tobacco, alcohol, cannabis, cocaine and ecstasy.

Montgomery et al, (2008) revealed how smoking and the use of alcohol, cannabis, cocaine, ecstasy and drugs are usually associate with tolerant parents. Martine et al. (2017) found that the optimal parenting style is associated with lower substance use in youth. The same study showed that tolerant attitude of the parents toward the substance use and alcohol, drinking behavior would become significantly more likely to influence the children behavior (Martinez & Yubero 2011). Bahr et al. (2014) found an important influence on their children behavior that lead to addiction and antisocial behavior mostly when the parents have such behaviors. (Becona, Calafat, Martinez & Juan, 2011).

Family Structure

The family plays a vital role in shaping the child's behaviour since childhood. As evidenced by the Kanyoni et al. (20015), the majority of children who used drugs such as alcohol, Tabaco and marijuana came from the families where either parents or siblings used drug. At the other hand Josip Basic (2018) found that certain features of the family are more generally found in people abusing the addictive substance that in non –consumers and verse-versa.

In addition, the lack of skills in child-care and oppressive environment mostly poor communication leads to drug use. High level of education and socioeconomic life influence the behaviour of the children. Jiloha (2009) found that occurrence of using drug is generally in families with low socioeconomic status, family with marital disharmony, divorce, single parents and poor parental supervision.

It goes without saying that child abuse is also an undeniable risk factor that pushes children to use drugs. This includes physical abuse and psychological abuse like neglecting the child. A study by whitsell et al. (2003) reported that 29% of children who experienced the abuse were engaged in substance use. The family who commonly use addictive substance do not have adequate rules in the family. They always have family conflict and anti-social behaviour.

Friends support

The behaviour of friends has an utmost effect on young smokes. General youth take initiative to smoke due to the company of friends who is smoker. The girls that have friends who smoke are nine times likely to become smokers. A study carried out in India by Sharma & Josh (2013) found that the common reasons that influence the substance use by street children were 62.1% while experimentation was 36.3% finally boost to self - confidence was 28.7%.

Whiltsell et al (2013) revealed that peer pressure and perceived popularity are associated with the increase of substance use among adolescent. Particularly, when there is a belief that popularity among the peers is increased by the use of substances. As evidence by the Bahr et al (2014) there is a type of social motivation that who wants to be a leader of a group or stand out above others have to smoke cigarettes. So smoking is considered to be in association with maturity.

He concluded that family influence appeared to be partially mediated by peers. The rated of that mediated influence by peers tended to be around 50%.

Peer effect as estimated in Trutz Haase et al, (2010) study, has a controlling influence that lead to cannabis use. If a boyfriend or a girlfriend uses drugs, there is three time more likely for their friends to also use the same drugs. Particularly, all friends of young people who drink alcohol, the chances increase by factors of six.

The is a five time increase if most or all friends use cannabis, and the risk of using cannabis increase up to eight time if the best friends use drugs. Mothibi (2014) reported that peer group have a serious impact when they have to show that they're mature, independent, by drinking and resist to bigger amount of alcohol.(Mothibi, et al 2014)

The individual risk factors

The United Nation office on drugs and crime (2014) reported that the individual risk factors for substance abuse include poor self- control, inadequate social coping strategies, low self-esteem, depression, stressful life event and anxiety.

Cai-lian (2012) revealed that pleasurable sensation is generated by biological mechanisms. As evidenced by tom & Foo (2012) in their study, the brain has natural way of gratifying a person who experiences a pleasant feeling or feeling. Thus, the use of illicit drugs makes this way of pleasure a pleasant experience. The genetic factor count for between 40% and 60% of the total risk of addiction.

Farad Jililian (2017), Indicated that the hopelessness and sensation of seeking were confirmed at 95% as the main influential predictors of smoking. The same study showed that the anxiety, sensitivity and impulsivity were confirmed at 95% to be the main influential predictors on drug abuse. The results showed also that among the personality factors, like anxiety sensitivity were confirmed at 95% as the main influential predictors on psychotropic drug. (Tam & Foo, 2012). Yie-Chu Foot find that family factors especially family financial status, and peer influence play a role in one's substance use. This was confirmed by Shanmugam et Al. (2017), who indicated that the negative influences lead to substance use. Some people have difficulties in managing their

emotional and are high risk of abusing substance just to reduce the psychological pain other will have aggressive behaviors to cope with emotions pain.. (ShanmugamPK, 2017).

Availability of drugs

The Alaska Division of Behavioral Health (2011) reported the quality of the drug of being to be obtained, its accessibility are the greatest factor in the beginning and the maintenance of the substance use among youth. The more accessible and available drugs are in the community, the higher the risk for youth will abuse drugs. The findings of the same study revealed that in South Africa, drugs are easily available and affordable in shops and taverns. In addition participants reported that alcohol is sold to adolescent in their respective villages. When the drugs are available and one of the siblings or parents is using it, the adolescent is more likely to use it. Likewise when a peer group make the drug available, it is to recruit a new member in the substance use behavior (Mohasoa et al.,2017).

One important reason why availability and accessibility are crucial for youth in comparison with adults is that youth substance use is less likely to be measured, because many of them use substance depending on the present opportunity like that youth find themselves in risky behaviors depending on risky opportunity in place. In environment where the access of substances is easy, it's more likely to have a big influence of substances use for youth.(Peltzer et al., 2012)

Knowledge, Attitude and Beliefs

Information of the adverse health effects plays a big role in protection of drug use. There are many myths around substance use basing on individual culture. Example few people will think that cannabis is a socially and religiously accepted and blessed by gods, while others will encourage drinking alcohol a small quantity because there is no adverse, finally the tobacco smoking will prevent obesity. This thinking motivates youth to use drugs without reluctance and blame. A positive attitude toward drugs can lead to substance use among youth (Jiloha, 2009).

A study by Embleton (2012) on street children in Western Kenya that only 29% of the participants leaned about the danger of drug use and 61% disagreed that they had that information. Nevertheless, Yadufashije et al (2017) suggested that one of the main factor indicated by parents and adolescents that motivates youth to use alcohol and drugs were poor communication about

health risk behaviors due to low perceptions of harm from alcohol and drugs abuse and time spent on communication and lack of supervision.

A study done by World Health Organization (2003) showed that the adult living in rural are less likely to abuse substances than adult who are living in urban. Things were different in youth where 90% of them were abusing heroin, cocaine, inhalants, amphetamines, and cannabis. They reported also heavy drinking and smoking among youth at 30%.Again, 70% of adults perceived heavy drinking and smoking among the youth as a risk. (WHO/UNDCP Global Initiative on Primary Prevention of Substance Abuse., 2003)

The socioeconomic inequalities that are observed in rural areas are perceived to be an important contributing factor to substance use (Seivewright and Fung, 2009). These characteristics include the following:

- Financial and social status: people in rural area tend to have low revenue, lower educational levels, and limited opportunities for improvement, inaccessibility to health services, redundancy, and income disparity.
- Social wealth which has challenges such as, low community support and reduced community involvement.
- Community factors: Many factors contributing to substance abuse can be seen in our surrounding environment. Such as poor hygiene, housing, quality education, employment opportunities, community violence, high availability of substances, laws and norms liberal towards substance use.
- Environmental events: natural disasters, war, conflict, climate change, environmental degradation and migration.
- Social change associated with changes in income, urbanization and environment degradation

Israel, (2014) showed that the easy availability of drugs, having vulnerable personality and socio- and environment factors are the leading causes of abusing drugs. The coming of different ceremonies which are availing alcohol depend on the culture is also seen as a risk factor. Fortunately occasional drinking or experiencing drugs do not cause any significant health problems or dependence. A vulnerable personality is exposing in developing dependence-related

disorders. Poor school performance, nonattendance, misbehavior, sensation seeking and impulsivity are behaviors usually related to drug using behavior.

Seivewright & Fung (2009) revealed social influences that are related to an increased penchant to drug use such as dysfunctional families, divorce, psychiatric disturbances in families, social deprivation, unemployment, homelessness and peer pressure within groups. However cocaine powder is the exception because is more used in urban and by person with high income. (Seivewright and Fung, 2009).

Protective factors

For many years studies indicated the roots cause and pathways of drug abuse and addiction. Some result from these studies showed that there are people who are at high risk of abusing drug.

Elements influencing a person to abuse drug are known as” risk factors “ while those preventing a person from drug abuse are known as “protective” factors (National Institute on Drug Abuse, 2003)

The United Nations Office on Drug and Crime (2011) reported that protective factors are those which prevent a person to abuse drugs:

- Starting family dynamic such as good communication and relationship between parent and children.
- Good teacher who have good relationship with students,
- Student with high motivation in their studies.
- Person with confidence, low level of impulsivity and with effective communication skills, feeling accepted in your community.

Dillon et al (2007) revealed that persons are starting abuse drug very young, the need of starting giving information about drugs to young children is crucial in preventing further damage. Many other studies confirmed that the young age is a risk factors of abusing drugs.

Especially during adolescent who is a development stage where a person is having curiosity, and difficulties in taking decisions, so the risk of abusing drugs is more seen. (Dillon et al.2007)

To have a safe childhood and guidance choosing healthy attitude must be a priority in other to have adolescent and adults who can say no to drugs and become resilient. Protective factors are very important for young people, by here comes the recommendations of strengthening protective factors to reduce future risks of drug abuse. NIDA (2003):

- The health communication in the community should include substance use, types of drugs such as legal (alcohol, tobacco) and illegal (marijuana, heroin).The utilization of substances in young people, and the bad effects of auto medication. The preventable risks in reducing substance use should be known by everyone, reinforcement of identified protective factors.
- Community intervention will target the modifiable risks in a specific population.((National Institute on Drug Abuse, n.d.)

Sharon Kingston (2017) said that even if families' involvement in protective factors can help in reducing the risks of drug abuse all parents are not able to protect their children. Some parents are themselves abusing substances such as tobacco; they have difficult to protect their own children from smoking cigarettes. Parents who expose their children to substances, they are judged to be unable to protect them from abusing drugs. All people involved in education and care of children must put effort together to implement an effective interventions which can protect children and adolescents who are at high risk of abusing substances

Category of drugs

The United Nations Office on Drugs and Crime estimation of illegal drug was 3% of the wide world population, in other words 185 million people, a big number of people were having between 15-64 years. The leading popular illegal substance was cannabis, and on other side cocaine, heroin, other opioids, amphetamine, is used in urban area in many parts of the world. (UNODC, 2004).

A study done by Michael Kuhar (2011) indicated three categories of substance such as sedatives (alcohol, benzodiazepines, barbiturates, inhalants), opiates second category ;(heroine and morphine ;) and finally psycho-stimulants (cocaine, amphetamine, and methamphetamine; marijuana; hallucinogens; and caffeine). Another researcher Karen Vangundy (2006) revealed the

same categories of drugs but in clinical area. People can misuse medicine used normally for treating some diseases, and again physiologically the medicine in such category will have an effect on different regions in the brain. For example some medicine will change the way we experience pain. The following list will help you to understand which category of medicine and its effect on the brain.

- Opioids : (morphine, codeine, oxycontin, Darvon, vicodin,).Medicine coming from opiates change the way we experience pain, pleasure, and a severe dose can cause respiratory depression or death. Opioids are highly addictive.
- Stimulants: Some medicine used for attention deficit or hyperactivity disorder, and narcolepsy have a role for stimulating the brain to produce more neuro-transmitters, by this action we can have physiological reactions like raise blood pressure and heart rate. One of the famous neuro-transmitter is dopamine which is giving a feeling of high or euphoria. Over dose of these drugs leads to an unbalanced heartbeat, seriously high body temperature, heart failure, and seizures. Mental effects include paranoia and aggression. Stimulants cause dependency.
- Depressants such as valium, Xanax, are among medicine used for treating anxiety and sleeping disorders. This category of medicine has an effect on central nervous system and the end result is the reduction of the brain speed. Often they are used together with other medicine and cause withdrawal symptoms when stopped suddenly such as seizures.(Van Gundy, 2006)

The East African Community Secretariat (2019) indicated that drugs can be categorized as:

- Depressant such as alcohol, benzodiazepines, opiates, cannabis at low dose, solvents, new psychoactive substances.
- Stimulants also have been revealed such as Nicotine, Khat, cocaine, amphetamines, Methamphetamine and ecstasy.
- Hallucinogens which has the ability to affect how we perceive our surroundings. Examples (ketamine, lysergic Acid Diethylamide, and phencyclidine).

Methodology

Variables

Dependent variable: addiction severity

Independent variables: Socio-demographic factors where we have, gender, age, profession, religion, living arrangement, friends, family, neighbors support, conflicts in family or in others people, legal problem seriousness.

Clinical variables are represented by the psychiatric co morbidities, like depression, anxiety, psychosis, the usage of psychotropic medicine or others medicine among patients, the existence of chronic medical conditions, finally comes the sexual and physical abuse, the use of different drugs like cannabis, heroin, cocaine, inhalants, and alcohols is also included in clinical factors.

Research design

Secondary data analysis of a larger prospective predictive study, which targeted to develop and evaluate an addiction care model of patients' motivation for engagement and retention in the addiction recovery process in Rwanda was done. The present component of the original study used a retrospective cohort study involving all patients who engaged in substance use and who were admitted for treatment at Caraes Ndera Neuropsychiatric Hospital and its two branches, Caraes Butare and Centre Psychotherapeutique Icyizere and Huye Isange Rehabilitation Center, over a six months period of time; from September 2018 to March 2019.

Lagunas (1992) suggested that the retrospective cohort use data already collected for other purposes. If the data are readily available, then the retrospective design is the quickest method. This study design is appropriate to the research as it allowed the researcher to compare the situation of drug abuse in both rural and urban areas in the targeted population.

Population

As said above, this study analyzed data collected from all eligible patients who engaged in substance use and who were admitted for treatment at Caraes Ndera Neuropsychiatric Hospital and its two branches, Caraes Butare and Centre Psychotherapeutique Icyizere and Huye Isange Rehabilitation Center, over a six month period of time; from September 2018 to March 2019.

Inclusion criteria required study participants to be an inpatient at one of the targeted hospitals or treatment centers, be of adult age (>18 years), and abusing drugs and/or alcohol.

Sample size

We calculated the sample size using the following formula:

$$n = \frac{(z_{1-\alpha/2})^2 P(1-p)}{d^2}$$

(Israel, 2014)

- **n:** Sample size
- **Z_{1- α /2}**: For $\alpha=0.05$ this equals **1.96**
- **P:** Estimated Proportion = **0.2** (representing the national prevalence of alcohol abuse)
- **d:** Margin of error = **0.05**

This formula gives a sample size of 246 patients. However, this sample size was increased up to 315.

Research instruments

During consultation of patients, data were collected using the Addiction Severity Index (ASI). ASI is a semi-structured clinical research interview aimed to measure patient health focusing in seven potential areas in substance-abusing patients: medical status, employment and

support, drug use, alcohol use, legal status, family/social status and psychiatric status. This was suitable to this particular research study that dealt with substance use.

The National Institute on Alcoholism and Alcohol Abuse, the Office of National Drug Control Policy, and the World Health Organization had supported the ASI. The ASI was interpreted into Kinyarwanda. Translation was done by two bilinguals, professional translators. Forward and back translation was done to ensure accuracy of translating the ASI from English to Kinyarwanda.

Several studies from WHO (2016) confirmed the validity of this instrument in different countries. The content validity of the Kinyarwanda version was conducted by health care providers involved in mental health care.

For the purpose of this study and in line with what suggested by Saunders (2017), the patients are considered as addicted to any substance if his way of using substances causes physical damages or psychological suffering as demonstrated by at least two of the following symptoms happening within a 12 month period:

- 1) A permanent desire of drinking alcohol and using drugs (cravings).
- 2) The person cannot stop taking substances even if he is putting many efforts.
- 3) The person is taking a big quantity of substances and for a long period which is not planned.
- 4) The substance use is repeated and makes a person to fail to accomplish his important tasks
- 5) Much time is used to search for substances especially when the person is having withdrawal symptoms.
- 6) Use of substance is permanent even if the person is having social, relational issues caused by the use of drugs and alcohol.
- 7) The person is increasing the amount of alcohol or drugs to get the same effect.
- 8) When the person hasn't taken any substance is having physiological and psychological malaises which are reduced by the use of the same substance or a similar one.
- 9) The person is aware that the physical and psychological symptoms he had been due to substances and he is continued to use them.
- 10) The person is taking much risks which can be unsafe to his life .(drink and drive);
- 11) The person is no longer give importance to social, professional, or leisure activities.

Based on the above criteria, patients that are presenting two or more of the above criteria to the extent of being hospitalized more than once are considered to have a severe addiction in this study.

Psychometric property of research instrument

ASI was validated in Kinyarwanda version. Professionals in mental health were doing the review to see if the patients will understand the questions asked. The validity of the ASI has been well-established since it has been used for the past 25 years in clinical research for addiction units. It has demonstrated that it can measure what it was intended to measure and its reliability was also seen. This is why it has been supported by W.H.O (McLellan et al.2006).

Data collection procedure

The data were taken from the data base of the hospital after hospital approval. All eligible patients were assigned a number, and then these numbers were written on pieces of papers and put into a basket. Randomly, these numbers were picked from the basked one by one until the calculated sample size was reached. The raw data was in Excel documents and it was then transferred to the software STATA 13 to facilitate the data analysis.

Addiction severity was assessed with alcohol/drug components of the Addiction Severity Index and consisted on number of lifetime admissions for addiction care. We focused on number of life admissions for addiction care for both alcohol and drugs.

Statistical treatment of data

The data were uploaded and analyzed using STATA 13 statistical package. Descriptive statistics were performed using percentages and independent samples chi-square to compare the P-values of the two groups. This provided useful information about the differences which existed between the groups of comparison urban and rural, variables of interest in addiction severity. The results were compared with existing literature on risk- factors among patients. The logistic multivariate regression, and bivariate have been used for determining the level of association between risks factors and addiction severity among patients.

Limitations

The study was conducted on inpatients of Caraes Ndera Neuropsychiatric Hospital and its branches; Centre Psychotherapeutique Icyizere, CARAES Butare and Isange Rehabilitation Center. Therefore, findings are health facility-based. They can't be generalized to the general population.

Results

Socio demographic and clinical characteristics of addicted patients

The table below describes and compares urban-rural socio demographic and clinical profiles of addiction among patients referred for mental health services in Rwanda:

Males were dominating in both urban and rural at a rate of 92.69% in urban compared to 7.31% of females , while 90.91% of male and 9.09% of female were coming in rural area .Young-adult and adults were more represented with 95.77% coming in urban and 92.73% in rural.

Patients coming from urban area had university level of studies at 41.15% while 41% coming from rural area had primary level. Additional to this, patients from both urban and rural areas were well occupied full time at almost same rate of 31.15%. A large number of patients were separated from their partners, at 42.69% in urban and 38.18% in rural. Surprisingly almost all patients belonged to churches in both areas. A big number of patients lived with their parents at 48.46% in urban and 49.09% in rural. Patients reported that friends didn't support them in recovering process at 49.6% in urban while 43.64% in rural. Family support was felt by patients with addiction problems at 42.69% in urban and 56.36% in rural .The neighbors also played a big role in supporting them in recovering at 37.31% in urban and 43.64% rural.

Clinically patients had psychiatric diseases as co-occurrence such as depression in urban which was at 48.46%, while in rural was 50.91%, the following was anxiety with 42.31% in urban and 43.64% in rural, finally came psychosis with 37.77% in urban and 36.36% in rural. For the above reasons 31.92% had psychotropic medicine prescription in urban and 34.55% in rural. Sexual abuse were seen in rural at 3.64% while in urban were 1.15%, on an other hand physical abuse was more seen in urban areas at 8.46% while in rural was 3.64%.

Table 1 Socio-demographic characteristics of addicted patients

Patients	Urban		Rural		Total	
Gender	Frequency	Percent	Frequency	Percent	Frequency	Percent
Female	19	7.31	5	9.09	24	7.62
Male	241	92.69	50	90.91	291	92.38
Total	260	100	55	100	315	100
Age group						
18-19	10	3.85	4	7.27	14	4.44
20-64	249	95.77	51	92.73	300	95.24
65+	1	0.38	0	0	1	0.32
Total	260	100	55	100	315	100
Education level						
illiterate	3	1.15	1	1.82	4	1.27
Primary	53	20.38	23	41.82	76	24.13
High School	97	37.31	22	40	119	37.78
Graduate & Postgraduate	107	41.15	9	16.36	116	36.83
Total	260	100	55	100	315	100
Profession						
Full time	81	31.15	18	32.73	99	31.43
Part-time(Regular hour)	58	22.31	15	27.27	73	23.17
Part-time(Irregular hours)	26	10	6	10.91	32	10.16
Student	47	18.08	7	12.73	54	17.14
Services	7	2.69	1	1.82	8	2.54
Unemployed	41	15.77	8	14.55	49	15.56
Total	260	100	55	100	315	100

Socio-demographic characteristics of addicted patients

Marital status	Urban		Rural		Total	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Married	35	13.46	12	21.82	47	14.92
Remarried	3	1.15	1	1.82	4	1.27
Widowed	3	1.15	0	0	3	0.95
Separated	111	42.69	21	38.18	132	41.9
Divorced	8	3.08	0	0	8	2.54
Never Married	100	38.46	21	38.18	121	38.41
Total	260	100	55	100	315	100
Religion						
Protestant	91	35	18	32.73	109	34.6
Catholic	135	51.92	29	52.73	164	52.06
Jewish	1	0.38	0	0	1	0.32
Islamic	14	5.38	3	5.45	17	5.4
Other	10	3.85	2	3.64	12	3.81
None	9	3.46	3	5.45	12	3.81
Total	260	100	55	100	315	100
Livings arrangements						
With sexual partner and children	32	12.31	10	18.18	42	13.33
With sexual partner alone	3	1.15	2	3.64	5	1.59
With children alone	3	1.15	0	0	3	0.95
With parents	126	48.46	27	49.09	153	48.57
With family	37	14.23	8	14.55	45	14.29
With friends	10	3.85	2	3.64	12	3.81
Alone	38	14.62	6	10.91	44	13.97
Controlled environment	2	0.77	0	0	2	0.63
No stable arrangement	9	3.46	0	0	9	2.86
Total	260	100	55	100	315	100
Have friends support						
Strongly Disagree	57	21.92	15	27.27	72	22.86
Disagree	129	49.62	24	43.64	153	48.57
Agree	51	19.62	6	10.91	57	18.1
Strongly Agree	23	8.85	10	18.18	33	10.48
Total	260	100	55	100	315	100

Socio-demographic characteristics for addicted patients

Have family support						
Strongly Disagree	44	16.92	7	12.73	51	16.19
Disagree	45	17.31	13	23.64	58	18.41
Agree	111	42.69	31	56.36	142	45.08
Strongly Agree	60	23.08	4	7.27	64	20.32
Total	260	100	55	100	315	100
People in my neighborhood care about each other						
Strongly Disagree	52	20	12	21.82	64	20.32
Disagree	75	28.85	17	30.91	92	29.21
Agree	97	37.31	24	43.64	121	38.41
Strongly Agree	36	13.85	2	3.64	38	12.06
Total	260	100	55	100	315	100

Table 2: Clinical profile of patients

Experienced psychosis symptoms	Urban		Rural		Total	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
No	167	64.23	35	63.64	202	64.13
Yes	93	35.77	20	36.36	113	35.87
Total	260	100	55	100	315	100
Experienced serious anxiety symptoms						
No	150	57.69	31	56.36	181	57.46
Yes	110	42.31	24	43.64	134	42.54
Total	260	100	55	100	315	100
Experienced serious depression symptoms						
No	134	51.54	27	49.09	161	51.11
Yes	126	48.46	28	50.91	154	48.89
Total	260	100	55	100	315	100
Existence of chronic medical condition						
No	232	89.23	50	90.91	282	89.52
Yes	28	10.77	5	9.09	33	10.48
Total	260	100	55	100	315	100
Being abused sexually in 30 past days						
No	257	98.85	53	96.36	310	98.41
Yes	3	1.15	2	3.64	5	1.59
Total	260	100	55	100	315	100

Clinical profile of the patients

Being abused physically in 30 past days	Urban		Rural		Total	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
No	238	91.54	53	96.36	291	92.38
Yes	22	8.46	2	3.64	24	7.62
Total	260	100	55	100	315	100
Being troubled by social problems in 30 past days						
Not at All	211	81.15	43	78.18	254	80.63
Slightly	13	5	2	3.64	15	4.76
Moderately	14	5.38	7	12.73	21	6.67
Considerably	13	5	3	5.45	16	5.08
Extremely	9	3.46	0	0	9	2.86
Total	260	100	55	100	315	100
Living with a person who abuse alcohol						
No	184	70.77	37	67.27	221	70.16
Yes	76	29.23	18	32.73	94	29.84
Total	260	100	55	100	315	100
Been prescribed medication for any psychological problems						
No	177	68.08	36	65.45	213	67.62
Yes	83	31.92	19	34.55	102	32.38
Total	260	100	55	100	315	100

Psycho -active substances abused in rural and urban areas.

The table below shows the psycho-active substance abused in rural and urban areas. All patients abuse different drugs and alcohol. Inhalants were much abused in rural at 7.27% compared to urban with 5% in 22-30 days in one month, while alcohol was the most substance used in urban at 34.62% compared with 1.82% in rural .Beside the alcohol came, cannabis which was abused at almost same level in both areas, with 10.77% in urban and 7.27% in rural for one month. Cocaine, heroin and other opiates were not used in rural area while in urban there were few cases.

Table 3: Psycho -active substances abused in rural and urban areas

Frequency of Heroin use in 30 days in categories	URBAN		RURAL		TOTAL	
	Freq.	Percent	Freq.	percent	Freq.	percent
Never Used	170	65.38	54	98.18	224	71.11
Used not more than 7 days	23	8.85	0	0	23	7.3
between 8 and 14 days	18	6.92	0	0	18	5.71
between 15 and 21 days	20	7.69	1	1.82	21	6.67
Between 22 and 30 days	29	11.15	0	0	29	9.21
Total	260	100	55	100	315	100
Frequency of Cannabis use in 30 days in categories						
Never Used	160	61.54	42	76.36	202	64.13
Used not more than 7 days	37	14.23	6	10.91	43	13.65
between 8 and 14 days	14	5.38	2	3.64	16	5.08
between 15 and 21 days	21	8.08	1	1.82	22	6.98
Between 22 and 30 days	28	10.77	4	7.27	32	10.16
Total	260	100	55	100	315	100
Frequency of Alcohol use in 30 days in categories						
Never Used	76	29.23	33	60	109	34.6
Used not more than 7 days	47	18.08	16	29.09	63	20
between 8 and 14 days	29	11.15	3	5.45	32	10.16
between 15 and 21 days	18	6.92	2	3.64	20	6.35
Between 22 and 30 days	90	34.62	1	1.82	91	28.89
Total	260	100	55	100	315	100
Cocaine use in 30 past days						
Never Used	252	96.92	55	100	307	97.46
Used not more than 7	5	1.92	0	0	5	1.59
between 8 and 14 days	2	0.77	0	0	2	0.63
Between 22 and 30 da	1	0.38	0	0	1	0.32
Total	260	100	55	100	315	100

Psycho- active substance abused in rural and urban areas

Frequency of inhalants use in 30 past days						
Never Used	236	90.77	50	90.91	286	90.79
Used not more than 7	8	3.08	1	1.82	9	2.86
between 8 and 14 days	1	0.38	0	0	1	0.32
between 15 and 21 day	2	0.77	0	0	2	0.63
Between 22 and 30 da	13	5	4	7.27	17	5.4
Total	260	100	55	100	315	100

Frequency of others opiates use in 30 past days	Urban		Rural		Total	
	Freq.	Percent	Freq.	Percent	Freq.	Percent
Never Used	258	99.23	55	100	313	99.37
Used not more than 7	1	0.38	0	0	1	0.32
Between 22 and 30 days	1	0.38	0	0	1	0.32
Total	260	100	55	100	315	100
Frequency others hallucinogenic use in 30 past days						
Never Used	258	99.23	54	98.18	312	99.05
between 8 and 14 days	0	0	1	1.82	1	0.32
Between 22 and 30 days	2	0.77	0	0	2	0.63
Total	260	100	55	100	315	100

Differences in Addiction Severity

The logics regression for binary outcome compares the differences in addiction severity between urban and rural patients, also between male and female as shown in the table below: Among 315 patients, 219(69.5%, p0.047) in urban were occupied, and they were at risk of having a severe addiction compared to 47(15%) who lived in rural who were not at risk of being severely addicted. Surprisingly 260 patients from urban area 251(79.6%, p 0.047) belonged to different churches and they were exposed to have a severe addiction compared to 53 (17%) coming from rural area who were not exposed to severe addiction. Again, 260 patients from urban 83 (26.3%, p 0.03) had a regular psychotropic medicine prescription, compared to those from rural among 55 (36, 11.4%, p0.03) had also a regular prescription. Additionally 260 patients from urban 110(34.9%, p0.032) experienced depression and were at risk of having a severe addiction compared to those from urban 31(9.8% who were not depressed.

The use of alcohol in patients coming from urban 184(58.4%, p 0.000) put them at risk of having a severe addiction compared to those from rural area who didn't take alcohol. The following drugs related to severe addiction: Heroin among 260 patients from urban 90(28.5%, p 0.029) took heroin and they were exposed to severe addiction compared to 54(17.1%) from rural who didn't use heroin. Again among 260 patients 100(31.7% p, 0.029) lived in urban used cannabis and they were at risk of having a severe addiction compared to 42 (13.3%) from rural who didn't use cannabis.

Inhalants were more used in rural and among 55 patients 5(1.5%, p 0.025) used inhalants and they were at risk of having a severe addiction compared to 236(74.9%) from urban who didn't use it. Also 13 (4%,p 0.02) patients from rural who lived with a person who auto medicated himself were at risk of having a severe addiction compared to those from urban who didn't take unprescribed medicine. Additional to this patients from rural lacked friends support in recovery process 16(5% p0.026) had a severe addiction compared to 186(59%) from urban who had friends support. 18(5.7%, p0.001) patients with severe addiction coming from rural area had serious legal problems compared to 88(27.9%) from urban who don't have serious legal problems.

The severe addiction was predominant in urban 66.9% compared to patients lived in rural who had 13.6%. Males were the most to face addiction problems and had a severe addiction at 52% compared to female who had a severe addiction at 48%.

Figure 2: Addiction severity urban – rural

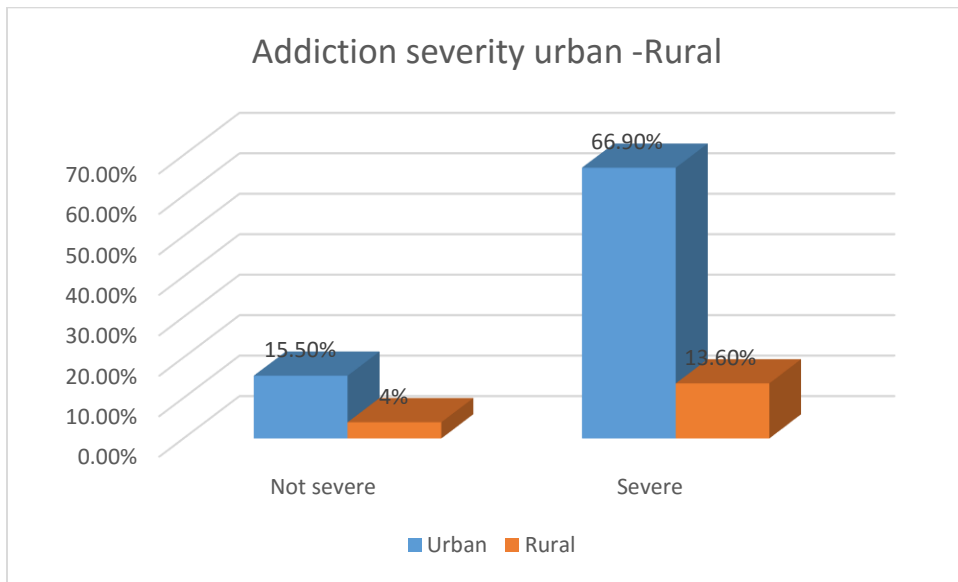


Figure 3: Addiction severity between male and female

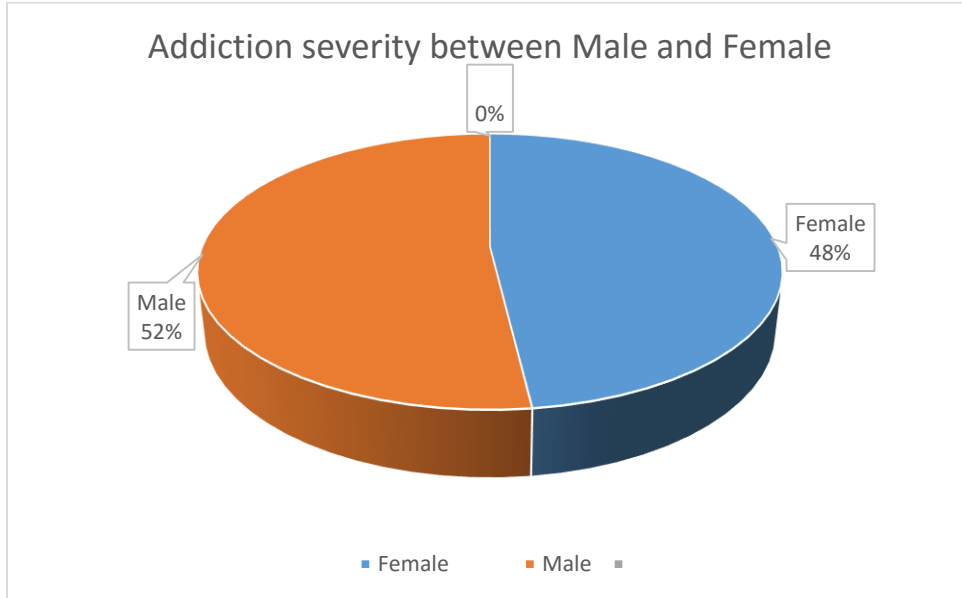


Table 4: Differences in addiction severity

Gender of patient	Urban			Rural		
	not sever	severe	Total	not sever	severe	Total
Female	6	13	19	0	5	5
Male	43	198	241	12	38	50
Total	49	211	260	12	43	55
P - Value= 0.140			P - Value= 0.215			
Age group						
18-19	2	8	10	1	3	4
20-64	46	203	249	11	40	51
65+	1	0	1	0	0	0
Total	49	211	260	12	43	55
P - Value= 0.114			P - Value= 0.873			
Profession group						
Full time	12	69	81	1	17	18
Part-time(Regular hours)	16	42	58	4	11	15
Part-time(Irregular hours)	5	21	26	1	5	6
Student	5	42	47	2	5	7
Services	4	3	7	1	0	1
Unemployed	7	34	41	3	5	8
Total	49	211	260	12	43	55
P - Value= 0.027			P - Value= 0.155			
Marital status group						
Married	5	30	35	4	8	12
Remarried	0	3	3	0	1	1
Widowed	2	1	3	0	0	0
Separated	22	89	111	1	20	21
Divorced	3	5	8	0	0	0
Never Married	17	83	100	7	14	21
Total	49	211	260	12	43	55
P - Value= 0.169			P - Value= 0.093			

Difference in addiction severity

Livings arrangements	Urban			Rural		
	not sever	severe	Total	not sever	severe	Total
With sexual partner and children	2	30	32	5	5	10
With sexual partner only	0	3	3	0	2	2
With children alone	0	3	3	5	22	27
With parents	30	96	126	2	6	8
With family	8	29	37	0	2	2
With friends	2	8	10	0	6	6
Alone	5	33	38	0	0	0
Controlled environment	0	2	2	0	0	0
No stable arrangement	2	7	9	0	0	0
Total	49	211	260	12	43	55
P - Value= 0.407				P - Value= 0.176		
Education level						
illiterate	1	2	3	1	0	1
Primary	9	44	53	4	19	23
High School	19	78	97	6	16	22
Graduates & Post graduate	20	87	107	1	8	9
Total	49	211	260	12	43	55
P - Value= 0.904				P- value = 0.184		
Religion						
Protestant	13	78	91	5	13	18
Catholic	32	103	135	5	24	29
Islamic	1	14	15	1	2	3
Other	2	8	10	1	1	2
None	1	8	9	0	3	3
Total	49	211	260	12	43	55
P - Value= 0.047				P - Value= 0.604		
Medical reasons						
Never Hospitalized	22	123	145	5	21	26
Not more than 10 times	25	78	103	5	20	25
between 11 and 27 times	2	5	7	1	2	3
between 30 and 37 times	0	4	4	0	0	0
Above 37 times	0	1	1	1	0	1
Total	49	211	260	12	43	55
P - Value= 0.302				P - Value= 0.265		

Difference in addiction severity

Existence of medical problems	Urban			Rural		
	not sever	severe	Total	not sever	severe	Total
No	43	189	232	9	41	50
Yes	6	22	28	3	2	5
Total	49	211	260	12	43	55
P - Value= 0.711			P - Value= 0.030			
Taking prescribed medicine regularly for physical problems						
No	45	198	243	10	42	52
Yes	4	13	17	2	1	3
Total	49	211	260	12	43	55
P - Value= 0.610			P - Value= 0.053			
Taking prescribed medicine regularly for psychological problems						
No	42	135	177	11	25	36
Yes	7	76	83	1	18	19
Total	49	211	260	12	43	55
P - Value= 0.003			P - Value= 0.031			
Experiencing serious depression, sadness and hopelessness						
No	32	102	134	6	21	27
Yes	17	109	126	6	22	28
Total	49	211	260	12	43	55
P - Value= 0.032			P - Value= 0.943			
Experiencing serious anxiety						
No	26	124	150	4	27	31
Yes	23	87	110	8	16	24
Tot	49	211	260	12	43	55
P - Value= 0.466			P - Value= 0.069			
Experiencing serious psychosis symptoms						
No	35	132	167	7	28	35
Yes	14	79	93	5	15	20
Total	49	211	260	12	43	55
P - Value= 0.243			P - Value= 0.666			
Family support						
Strongly Disagree	11	33	44	2	4	6
Disagree	6	39	45	4	9	13
Agree	20	91	111	3	28	31
Strongly Agree	12	48	60	2	2	4
Total	49	211	260	12	43	55
P - Value= 0.555			P - Value= 0.056			

Difference in addiction severity

Friends support	Urban			Urban		
	not sever	severe	Total	not sever	severe	Total
Strongly Disagree	17	40	57	7	8	15
Disagree	18	111	129	2	22	24
Agree	10	41	51	2	4	6
Strongly Agree	4	19	23	1	9	10
Total	49	211	260	12	43	55
P - Value= 0.087			P - Value= 0.026			
People in neighborhood care each other						
Strongly Disagree	11	39	50	4	8	12
Disagree	8	67	75	2	14	16
Agree	19	78	97	4	20	24
Strongly Agree	10	26	36	2	0	2
Total	49	211	260	12	43	55
P - Value= 0.148			P - Value= 0.048			
Family conflict						
not more than 7 days	2	2	4	4	8	12
between 8 and 14 days	3	10	13	2	14	16
between 15 and 21 days	2	8	10	4	20	24
between 22 and 30 days	33	142	175	2	0	2
Total	49	211	260	12	43	55
P - Value= 0.538			P - Value= 0.048			
Level of family problems in last 30 days						
Not at All	20	122	142	7	25	32
Slightly	4	10	14	1	4	5
Moderately	7	17	24	0	2	2
Considerably	7	24	31	4	3	7
Extremely	11	38	49	0	9	9
Total	49	211	260	12	43	55
P - Value= 0.254			P - Value= 0.085			
With whom spend most of his/her free time						
Family	20	72	92	5	20	25
Friends	27	133	160	7	21	28
Alone	2	6	8	0	2	2
Total	49	211	260	12	43	55
P - Value= 0.575			P - Value= 0.680			

Difference in addiction severity

Living with a person who uses alcohol	Urban			Urban		
	not sever	severe	Total	not sever	severe	Total
No	28	156	184	7	30	37
Yes	21	55	76	5	13	18
Total	49	211	260	12	43	55
P - Value= 0.020			P - Value= 0.455			
Living with a person who uses non prescribed drugs						
No	37	168	205	12	30	42
Yes	12	43	55	0	13	13
Total	49	211	260	12	43	55
P - Value= 0.526			P - Value= 0.029			
Frequency of alcohol use in last 30 days						
Never Used	0	76	76	7	26	33
Used not more than 7 days	11	36	47	4	12	16
between 8 and 14 days	14	15	29	0	3	3
between 15 and 21 day	10	8	18	0	2	2
Between 22 and 30 da	14	76	90	1	0	1
Total 49	49	211	260	12	43	55
P - Value= 0.000			P - Value= 0.279			
Frequency of cannabis use in last 30 days						
Never Used	14	146	160	8	34	42
Used not more than 7	9	28	37	2	4	6
between 8 and 14 days	7	7	14	0	2	2
between 15 and 21 day	9	12	21	1	0	1
Between 22 and 30 da	10	18	28	1	3	4
Total	49	211	260	12	43	55
P - Value= 0.000			P - Value= 0.306			
Frequency of Heroin use in last 30 days						
Never Used	0	170	170	54	98.18	98.18
Used not more than 7 days	16	7	23	0	0	0
between 8 and 14 days	15	3	18	0	0	0
between 15 and 21 day	17	3	20	1	1.82	100
Between 22 and 30 da	1	28	29	0	0	0
Total	49	211	260	55	100	100
P - Value= 0.000			P - Value= 0.594			

Difference in addiction severity

Frequency of inhalant use in last 30 days	Urban			Rural		
	not sever	severe	Total	not sever	severe	Total
Never Used	44	192	236	9	41	50
Used not more than 7	0	8	8	0	1	1
between 8 and 14 days	0	1	1	0	0	0
between 15 and 21 day	0	2	2	0	0	0
Between 22 and 30 da	5	8	13	3	1	4
Total	49	211	260	12	43	55
P - Value= 0.212			P - Value= 0.025			

Seriousness of legal problems

Patient	Urban			Rural		
	not severe	severe	Total	not severe	severe	Total
Not at All	17	93	110	3	25	28
%	34.69	44.08	78.77	25	58.14	83.14
Slightly	6	13	19	3	5	8
%	12.24	6.16	18.4	25	11.63	36.63
Moderately	8	31	39	1	7	8
%	16.33	14.69	31.02	8.33	16.28	24.61
Considerably	10	41	51	4	0	4
%	20.41	19.43	39.84	33.33	0	33.33
Extremely	8	33	41	1	6	7
%	16.33	15.64	31.97	8.33	13.95	22.28
Total	49	211	260	12	43	55
	100	100	100	100	100	100
P- Value = 0.567			P- Value = 0.001			

Factors associated with severity of addiction

The multivariate analysis allowed to identify factors associated with severity of addiction among hospitalized patients in referral mental hospital in Rwanda.

Among 315 patients 291(90.91%) are male, and are likely to have a severe addiction (OR: 3.30, CI: 1.051819 - 10.3526). Patients with depression are 154(48.89%) and their depression is associated with their severe addiction (OR: 2.12, CI: 1.083039 - 4.131259). 102(32.38%) patients

are taking psychotropic medicine and there is a strong association with a severe addiction among patients who are taking those medicine. (OR: 5.03, CI: 2.114666 - 11.97599)

Heroin is highly associated with a severe addiction 91 patients among 315 who used heroin are 12.36 times more likely to have a severe addiction. Surprisingly 206 patients lived with people who abused alcohol and this was negatively associated with having a severe addiction. (OR: 0.20, CI: 0.0869866 - 0.4708774). But patients who lived with people who used drugs were 3.34 more likely to be severely addicted (CI: 1.226377 - 9.076326), finally lack of friends support was associated with a severe addiction (OR: 3.70, C.I: 1.724258 - 7.92053).

Table 5: Factors associated with severity of addiction

Factors	Odds Ratio	P value	95% Conf. Interval
Gender			
Sex			
Male	3.30	0.04	1.051819 - 10.3526
Female	1.00		
Depression			
Yes	2.12	0.03	1.083039 - 4.131259
No	1.00		
Psychotropic Medicine			
Yes	5.03	0.00	2.114666 - 11.97599
No	1.00		
Friends support			
Disagree	3.70	0.00	1.724258 - 7.92053
Agree	2.44	0.06	0.9747324 - 6.087956
Strongly Agree	3.30	0.05	0.9926031 - 11.00158
Strongly disagree	1.00		
Live with a person abusing alcohol			
Yes	0.20	0.00	0.0869866 - 0.4708774
No	1.00		
Live with a non-prescribed drug user			
Yes	3.34	0.02	1.226377 - 9.076326
No	1.00		
Heroin use in 30 days			
Never used	1.00		
Between 22 and 30 days	12.36	0.02	1.555778 - 98.15832
Cons	0.32	0.09	0.0890685 - 1.172953

Discussion

Gender has been associated with having a severe addiction as men were 3.3 more likely to have a severe addiction compared to female (C.I 1.051819 - 10.3526). Díaz-Mesa et al., (2016) study shows the same findings as what a statistically significant gender differences were found, men tend to have more physical problems, legal issues, and alcohol and substances use compared to women who had other social and psychological problems.

The result also indicated that there is a significant association between depression and addiction severity. Patients who were having depression were 2.12 times more likely to have a severe addiction with a C.I (1.083039 - 4.131259) this have been confirmed by other studies such as Millet et al,1996 study which described the high association of alcohol and other drug dependence with depression. They found that the rates of major depression in opioids addicts to be 48.9% in males and 69.2% in females, in cocaine use 50% of patients were find to be depressed while other abusing cannabis were having an elevated depression associated (Miller, Klamen, Hoffmann, & Flaherty, 1996).

Because of co morbidities finds in patients with addiction, this study again showed that psychotropic medicine is associated with the severity of addiction .Patients who were taking psychotropic medicine were 5.03 times more likely to be associated with addiction severity. C.I (2.114666 - 11.97599). Studies done in USA found that antidepressants is a leading psychotropic among patients with severe addiction with 58.6% of other psychotropic prescribed, 47.7% was antipsychotics, 2,3% were benzodiazepines, and 2.7% anti-convulsiveness, 79.3% were prescribed at least one psychotropic drugs,37.85 two or more and 10.4% tree or more. (Foulds, Rouch, Spence, Mulder, & Sellman, 2016)

The heroin use was statistically significant in our study finds with a P value of 0.017 patients who were using heroin is 12.36 times more likely associated with a severe addiction(C.I 1.555778 -98.15832).Different literature revealed that 50% of heroin addicts have to go through rehabilitation programs. Which confirm the severity of their addiction.

The national institute on drug abuse report that a heroin is the most addictive drugs, the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV) criteria for dependence or abuse of heroin doubled from 214,000 in 2002 to 467,000 in 2012. The medical risks caused by injecting and social are devastating impact on society and cost billions.(MHR, Hussain, Rusdi, & Muhsin, 2010)

To live with a person who abuse alcohol and drugs are also find to be associated with a severe addiction in our patients, for alcohol the P-value 0.000 is highly statistically significant and for drugs the P value is 0.018. Patients who lived with them were 3.37 times more likely to have a severe addiction . It is also consistent with the finding of the study done in US that demonstrated the annual average of 8.7 million children aged 17 or younger living in U.S. households with at least one parent who had a Substance use disorder highlights the potential extensiveness of substance use prevention and treatment needs for the whole family.(substance abuse and mental health services administration., 2017). The lack of support by friends is also reported in our study and the OR is 3.7 more likely to be associated with addiction severity among patients. The findings of this study are well corroborated in literature by NIDA (2013) that when young adults enter the workforce or marry, they again confront new challenges and stressors that may place them at risk for alcohol and other drug abuse in their adult environments.

This study provided a significant base to motivate adult development in such a way that positive behavior is promoted. It is suggested that future research should intensify investigation into protective factors of substance use, specifically exploring how these factors relate and interact with one another and their potential moderator effects on substance use.

Conclusion

Addiction in Rwandan society is a real problem. The dominant of depression among other psychiatric co-occurrence was found to be in strong association with addiction severity. The study revealed a significant association between heroin among other psycho active substances and addiction severity. There is also a significant association between lack of friend support in recovery process and addiction severity.

At nutshell, the study shown that there are underlying factors associated with addiction severity among patients who are treated in referral hospital in Rwanda. Many risk factors can be reduced by prevention measures done firstly at the community level.

There is a need to strengthen current efforts aiming at fighting substances abuse, with focus to the most affected groups as highlighted in this study.

Recommendations

Based on the results of this study, the following are suggested recommendations:

- Reduce the prescription of psychotropic among addicted patients especially those with high level of addiction.
- Community social support structure should be created and strengthened in urban and rural areas to help patients in recovery process as a cheaper intervention.
- These results should be taken into account to improve the identification, prevention and treatment of substance use disorders.
- The referral hospitals should seek tools that assess the co morbidities and use other therapy rather than using psychotropic medicine only.

They should double efforts in research so as to avail appropriate intervention and to synergize with the community for early diagnosis and prevention.

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Appendix

Appendix 1 Questionnaires

Appendix 2 Data sharing agreement

Approval to conduct the research at the Hospital