REPUBLIC OF KENYA

NACADA

FOR A NATION FREE FROM ALCOHOL AND DRUG ABUSE

AJADA

African Journal of Alcohol & Drug Abuse

@NACADAKenya

Nacada Kenya

info@nacada.go.ke

www.nacada.go.ke

VOLUME 5 : JUNE 2021

ISSN Online: 2664-0066

ISSN Print: 2664-0058

Copyrights

Editorial Committee

Editor- in Chief

For submissions, please visit the NACADA website (www.nacada.go.ke) or write to us submissions.ajada@nacada.go.ke

ISSN: 2664-0066 Copyright© 2021

CONTENTS

Candy Consumption: An Inquiry on the Candy Crush Hypothesis

Joyzy Pius Egunjobi*

Psycho-Spiritual Institute, Marist International University College, Nairobi, Kenya Catholic University of Eastern Africa, Nairobi, Kenya

Email: JoyzyP@Yahoo.com

Tel: +254739137728

Submitted: 18th April 2021

Published: 30th June 2021

Abstract

Candy is eaten by people of all ages and all genders. Candy eating behavior can be that, with conscious efforts to lick it to finish, the eater may repeatedly crush it instead. This study examined what could be responsible for candy crushing despite the desire to lick it. A survey design is employed to understand this through questionnaire administered via WhatsApp and Facebook targeting anyone aged two and older across the globe. There were 212 respondents. The data was analyzed using simple descriptive statistics. Results show the prevalence of 89.6% of candy eating across age groups. Majority of the candy eaters put the whole candy in the mouth at once and start by licking and uncontrollably end up crushing it. About a quarter of the candy eaters indicated powerlessness over crushing candy. And the candy crushing can be hypothesized to be due to brain chemical 'dopamine' stimulated by sugar hijacking the decision-making/willpower part of the brain in the frontal lobe. It is recommended that neurological study be conducted to investigate what overrides willpower to not crush candy. This may shed more lights to understanding why people are addicted to certain substance.

Keywords: Candy, Candy Crush, Candy Crush Hypothesis, Candy Addiction, Sugar Addiction

Introduction

I like candy and I found myself crushing it. Many times, I really wish to lick it or enjoy it as it dissolves in my mouth. But I rarely succeed in this. In other words, I have consciously tried without number to lick the candy, but without knowing it, I find myself crushing it. Even when Shure (2018, par. 2) said "sucking, not chewing, is the best way to coax the optimal flavors and textures from almost any candy", I begin to wonder why it is exceedingly difficult for me to suck or lick candy even when I am deliberate, conscious, and intentional about doing so. Are there some things within, perhaps in my brain, that control what I do outside my desire, will, and intention? Is everything I do absolutely in my control? Is this just about me or it happens to some other people? Could this be the same phenomenon with people who struggle with drug addiction? This study, therefore, seeks to further understand what could be responsible for indeliberate candy crushing and how it relates to drug addiction. It is to generate discussions among addiction professionals if this behavior can be classified as 'candy addiction' and if it can be linked with alcohol and drug addiction. With scant studies and literature in this regard, it is hoped that this study will generate further enquiries to expand the scope of addiction study.

Candy, also known as sweet, bonbon, lollies, or confection, is a small piece of food made from honey or sugar in form of chocolate, nuts, fruit, or nuts. Merriam Webster Dictionary (n.d.) defined it as "crystallized sugar formed by boiling down sugar syrup" or "a confection made with sugar and often flavoring and filling". It is typed chocolates, bite size, bon bons, brittle candy, bubble gum, candy bars, cotton candy, candy buttons, candy canes, candy corn, fruit drops, candy coated popcorn, etc. (Candy Warehouse, n.d.). It is normally casually eaten as a snack between meals or anytime, when stressed, and for health reason to boost sugar level. It can be

licked, sucked, chewed, or crushed to enjoy the sweetening sensation.

Since prehistoric times, honey is the earliest sweet which people have eaten (Candy History, n.d.). Candy, however, has its origins in Ancient India where pieces of sugar were generated by boiling sugarcane juice consumed as khanda which is the etymology of the word Candy (Watt, 1893; Snodgrass, 2004). By 13th Century, the English word "candy" began to be used (Harper, n.d.). The word "bonbon", however, is of French origin from the 17th Century and simply means "candy" (Chef Rich, 2020). The Persians, then Greeks, between the 6th and 4th centuries BCE, discovered the Indian Khanda. Also, before sugar became readily available, honey was used to produce candy as it was in Ancient China, the Middle East, Egypt, Greece, and the Roman Empire where it was used to coat fruits and flowers to create forms of candy (NPCS, 2013; Toussaint-Samat, 2009). Before the Industrial Revolution and in the Middle Ages, candy made from cloves, ginger, aniseed, almonds, juniper berries, and pine kernels, became a form of medicine to calm the digestive system and treat sore throats (Toussaint-Samat, 2009).

According to Candy History (n.d.), the first candy came to America from Britain and France in the early 18th century. This was initially enjoyed by the very wealthy. However, with the Cheaper price of sugar and advancement in mechanization, mass manufacturing of the confections became easier, and candy became available to everyone. Joseph Fry introduced the first candy bar in Britain by 1847, and in the 1900, Milton S. Hershey invented Hershey's Milk Chocolate. Many new kinds of candies were introduced in the 20th century: Tablerone (1908), Milky Way (1923), Snickers (1930), Mars bar (1932), Bounty (1951), Twix (1967).

The Chief Marketer Staff (2000), citing Simmons Market Research Bureau, reported that 75% of adults regularly buy or eat candy while young adults 18 to 24 years old were the biggest, sweet tooth living in households with five or more people with or without children. It was noted that candy and gum were among the most widely distributed products in an estimated 1.5 million locations where retailers sell about 90% of candies. Consumers were also noted to purchase candies on impulse or as a treat when someone feels stressed.

Although, candy is eaten by people of all ages and all genders, studies show that females more than male eat more candy. In a study by Berbesque and Marlowe (2009), it was found that among the Hadza of Tanzania, hunter-gatherers who derive >90% of their energy from wild food, especially honey, women preferred sweet berries more than meat. The opposite was found in men who preferred meat to berries. In a laboratory study by Foltin, et al. (1983) as cited by Asarian and Geary (2013) in which savanna baboons were offered 75% sucrose fruit-flavored candy and chow pellets, females ate relatively more sugar than males. Also, in a field study of wild Borneo orangutans by Knott (1999), it was found that when sweet fruits were in season, females more than males increased their intake in ratio 2:1.

In the United States, Candy plays an important role in national and cultural traditions and celebrations for thousands of years and it continues to be enjoyed by most people as an occasional treat (Duyff, et al., 2015). Statistics show that 97% of Americans report candy consumption at least once per year (Hornick, et al., 2014). Among the total consumers, 62.8% eat hard candy or breath mints each month, 20% are considered heavy buyers, eating at least six rolls of candy per month, while half of the hard candy and breath-mint consumers eat between two and five rolls of it in a month's time (Chief Marketer Staff, 2000). Children in America consume candy frequently and, in excess (Savage, et al., 2019), and adults are not excluded. This, according to Ouyang (2016), is evident in the U.S. ranking no. 1 in the world in terms of the annual retail volume of consumed candy with the 2016 projection of consumption of more than 5 million pounds of sweet treats, followed by China with the consumption of 4.7 million pounds of candies in 2016. Mexico is also among the top 10.

According to a Statista Research Department report from 2015 on the frequency of chocolate and/or sweets consumption in the United Kingdom, 87 percent of respondents consume chocolate and/or sweets at least once a week, 44 percent consume them several times a week, and around a third consume them every day. Sugar confectionery consumption may have peaked, with better hope for the future as there is a spike in Germany's birthrate (Nieburg, 2017a). This growth, reported Nieburg, is not the same in France where the population which increased 0.8% year-on-year in 2014 slows in 2016. The fall in France's birth rate may affect the consumers consumption of candy. In New England and the Midwest, people tend to eat the most candy with the nationwide consumption peaking around Halloween, Christmas, Valentine's Day and Easter (Chief Marketer Staff, 2000).

African consumption of candy is also on the rise as the trading in sugar confectionery value sales is growing with the rise in medicated candies and soft gummies (Nieburg, 2017b). Yu (2017) also reported that there is a steady growth in the retail value sales of chocolate confectionery in West African countries especially in Nigeria and Cameroon where there is steady growth over the past five years. In Kenya, candy, sweets, and nonchocolate confectionery production expanded with a buoyant increase from 2007 to 2019 (IndexBox, 2021). However, in South Africa where confectionery industry chocolate valued at approximately R6.4bn and sugar confectionery valued between R12.5bn and R13.5bn, the industry has been under pressure during 2018 as a result of increasing imports, a challenging economic climate, low consumer confidence, and the demand for sugar-free products (Research and Markets, 2019).

The main ingredient in candy is Sugar (Singh, et al., 2021). This is mainly sucrose from sugar beets or sugarcane. Sucrose is from two simpler sugars: fructose and glucose (Science of Cooking, n.d.). Other sweeteners used include corn syrup, corn sugar, honey, molasses, maple sugar, and noncaloric sweeteners which can be in dry or liquid form (Singh, et al., 2021). Because candy is mainly sugar, it is linked to sugar addiction.

The idea of "sugar addiction" has been debated for many years (Avena, et al., 2008). On one hand, it may not fit strictly into substance addiction like cocaine, heroin, and alcohol, and on the other hand, it may not fit perfectly into behavioral addiction. This has led to many clinical accounts of "sugar addiction" to feature in many best-selling books (Appleton, 1996, DesMaisons, 2001, Katherine, 1996, Rufus, 2004 as cited by Avena, et al., 2008). Yet, sugar researchers and nutritionists have suggested that sugar has addictive properties and may be as addictive as cocaine (Schaefer & Yasin, 2020; Murray, 2021).

Sugar consumption, as Murray (2021) noted, can create a short-term high and a spark of energy in the body. Also, sugar intake releases opioids and dopamine in our bodies (Schaefer & Yasin, 2020). In other words, sugar is said to fuel every cell in the brain which sees sugar as a reward, and keeps wanting more (Ratini, 2020). Also, the escalation of substance intake, also known as bingeing, is a characteristic of drugs of abuse (Avena, et al., 2008). This is present in sugar intake. All these point to the probability of sugar addiction and invariably candy addiction even though there is no such classification in the Diagnostic Statistical Manual of Mental Disorders, Fifth Edition (DSM-V). Also, the behavioral findings with sugar (or candy) are similar to those observed with substance abuse as stated by Avena and colleagues.

There seems to be a connection between the brain and candy intake. When candy is consumed, the sugar goes into the stomach and then quickly enters the bloodstream. From the bloodstream, it finds its way to the brain. And there, it works its magic (Warrell, 2016). Candy is like an incentive to the brain and incentive processing is part of a host of cognitive processes including attention, motivation, and learning (Luking & Barch, 2013). Decades of animals and human's studies have recognized the roles

of the striatum, orbitofrontal cortex (OFC), prefrontal cortex (PFC), and other regions of the limbic system in the incentive processing (Haber & Knutson, 2010 as cited by Luking & Barch, 2013). So, when candy is taken, the glucose (sugar) in the candy fuels the brain cells called neurons (Reichelt, 2019).

According to Reichelt (2019) who is a neuroscientist, when sweet food is eaten, the mesolimbic dopamine system which is the brain's reward system gets activated. Dopamine is a brain chemical (neurotransmitter) released by neurons to signal that an event was positive. A behavior is reinforced when the reward system fires. Apart from the fact that eating candy releases dopamine in the brain, it also releases endogenous opioids which are responsible for the wonderful surge of pleasure felt when candy is eaten (Warrell, 2016). The brain then wants to experience this repeatedly. That is, the brain constantly remodels and rewires itself in the reward system through a process called neuroplasticity (Reichelt, 2019). The repeated eating of candy causes repeated activation of the reward pathway causing the brain to adapt to the frequent stimulation in order to achieve the initial effects, leading to tolerance, and resulting in dependence (DSM-IV; Egunjobi 2016; Egunjobi, 2010). This is a classic feature of addiction (Reichelt, 2019). Although not only dopamine is involved in the reward process. Serotonin also plays a part. For example, serotonergic neurotransmission plays vital roles in both satiation and food reward, although it is not clear whether there are male-female differences in the serotonergic control of eating (Asarian & Geary, 2013).

Not only is candy addictive, but it has also been noted for its health implications. Holland (2019) cited Dr Ken Berry stating that sugar addiction is a measurable, physiological phenomenon many people suffer from as it makes it difficult for many people to make the dietary improvements needed to improve their health. This is evident in several epidemiologic studies concerning the potential effects of candy consumption on health risk factors in children and adults, also, body weight and markers of disease risk like blood cholesterol, blood pressure, and blood glucose (Pei, et al., 2014; Duyff, et. al., 2015). Also, it is said that the best candy for the teeth is no candy at all because of the high sugar content (University General Dentists Team Member, 2019). This is because sugar feeds the bacteria in the mouth that causes tooth decay. The stickier the candy is, the worst it is for the teeth. Research has shown that a group of harmful bacteria produce acid in the mouth whenever they encounter and digest sugar. These acids, through the process called demineralization remove minerals from the tooth enamel causing decay (Tan, 2017).

Notwithstanding, there are health benefits of candy as well. Candy has some physical health benefits such as decreasing the risk of stroke and heart attack. For instance, dark chocolate is rich in antioxidant flavonoids which are healthy for the heart. Hence, eating this candy regularly can decrease the risk of stroke and heart attack by 39 percent (Warrell, 2016). In the same wave, and contrary to the finding of Pei, et al. (2014), consuming a fairly small amount of some types of candy, like cocoa, dark chocolate, and chewing gum, has been associated with positive effects on cardiovascular health and weight (USDA, 2014). Also, a research investigated over 15,000 US adults and found a moderate increase in energy, and candy intake not associated with increased weight or BMI, cardiovascular risk factors, or risk of metabolic syndrome (O'Neil, et al., 2011). In another longitudinal study, O'Neil, et al. (2013) examined associations between consumption of candy during childhood with health endpoints in adulthood. They followed the dietary habits, including candy consumption (chocolate, nonchocolate candy, and chewing gum), of some 355 10-years-old children from 1973 to 1984 and for a period of 23 years. It was found that there was no association between the candy consumption during childhood and their BMI and cardiovascular risk factors as adults. By implication, candy consumption in childhood was not predictive of health risks later in adulthood.

Methodology

To investigate the candy crushing behavior, an online survey design was employed. The infinite population size of the study involved any candy eater, aged two years and older. The sample size was 385 derived from the infinite population with 0.95 confidence level and margin error of 0.05. A voluntary sampling method was used to sample the participants. An online questionnaire developed on Google Forms was administered via Facebook and WhatsApp for data collection. For the minor respondents, the willing parents got the minor to participate in the study. It was hoped that parents would help the participating minor to understand the questions. Simple descriptive statistics were used for the data analysis.

Results

From the questionnaire distributed via Facebook and WhatsApp, 212 persons from across the globe responded. This makes the response rate 55% which was appropriate for an online survey. A response rate of 20% for an online/mail survey is regarded strong, while a response rate of 30% is considered extremely good, according to Dessel (2013). This was in keeping with Baruch and Holtom's (2008) conclusion that in a typical survey administration, a response rate of 55% or above is sufficient for data analysis. The data collected are presented and analyzed.

Demography

The demographical information of the respondents collected were the age and the gender. These were used to understand the prevalence of candy eating across age and gender.

Table 1 shows that the respondents were from all age groups such as children (ages 2 – 12), teenagers (ages 13 – 19), and adults (ages 20 and above). However, the majority (80.6%) of the respondents were adults. It also shows that both male and female respondents were well represented in the survey with most of them (63.7%) identifying as female.

The Prevalence of Candy Eaters

The prevalence of candy eaters and the manner or pattern of eating candy were also investigated. The respondents were asked about the frequency of their candy eating. Result (Table 2) showed that 89.6% of the respondents eat candy either seldomly, often, or always with most (62.2%) indicating that they eat candy seldomly. Children aged 2 – 6 years old eat more frequently than any other age group in the study.

The prevalence was also considered in terms of gender of the respondents. Female more than male eat candy more frequently (Table 3). This is evident in the case that the population of female respondents is almost twice that of male yet more male than female indicated never eaten candy, and female four times more than male indicated eating candy always.

In line of prevalence of candy eating, the number of candy eating was investigated by age and gender. The results were presented in Table 4 and Table 5. Table 4 shows that all children aged 2 to 12 years old eat between 1 to 6 candies a day. Meanwhile, most respondents (84.7%) eat between one to three candies on a given day. Higher number of candies (7 and above) are found among teenagers and adults with higher frequency among the teenagers.

When considered with gender as shown in Table 5, male more than female consumed seven to nine candies a day; and female more than male consumed 10 or more candies a day. There is no much gender disparity among those who consume between one and six candies per day.

Pattern of Candy Eating

The candy eaters in the survey were asked about their patterns and manners of eating candy. Respondents were asked whether they bite a little, bite in half, lick from hand, and put the whole candy in the mouth at once. Majority of the candy eaters (72%) put the whole candy in the mouth at once, bite a little (14.5%), bite in half (7%), while (6.5%)

lick it from hand (Figure 1). They were also asked if they lick the candy to finish, begin by licking then unconsciously crush it, or crush it at once. The findings show that majority of them (59.1%) begin by licking it and then unconsciously crush it to finish, 29% lick it to finish, while 11.8% crush it at once (Figure 2).

Behavior and Attitude of Candy Eaters

This study also sought to understand the behavior and attitude of candy eaters to see the likelihood of unhealthy behavior or addiction. Table 6 shows that about half of the candy eaters (50.3%) indicated that they 'sometimes' or 'always' hide candy to eat it later, and 44.6% 'sometimes' or 'always' secretively eat candy. While indulging in candy, 41.2% of the candy eaters have, at least, 'sometimes' or 'always', made efforts to stop and 25.8% indicated that they were 'sometimes' or 'always' powerless over candy eating. Also, when it comes to crushing candy instead of licking it, 70% of the candy eaters said they have 'sometimes' or 'always' made efforts to lick candy and not crush it. However, all of them reported that they 'sometimes' or 'always' do not succeed. Also, 20.2% of the candy eaters indicated that persons like doctors, nurses, family members, and friends have raised concerns about their candy eating habit, yet they did not stop eating candy.

Candy Eating and Holistic Health

The study also investigated if eating candy interferes with the eater's holistic health (dental, medical, psychological, and social-religious). The results show that 39.1% of candy eaters indicated that candy affects their dental health, medically (16.7%), psychologically/emotionally (9.1%), and socio-religiously (5.4%) (Table 7). However, comparing the data of the different health categories, candy eating has more dental challenges than any other health challenges. In general, the candy eaters were asked if they consider candy as good for their health (Figure 3). More than half of the candy eaters (58.2%) believed that candy is not good for their health and about 33.9% held a middle view. Only 7.9% held the view that candy that can has health benefits.

Discussions

This study investigated the prevalence and the manner of candy eating among children, teenagers, young adults, and adults. It was found that candies are eaten by people of different age groups from childhood (from 2 years old) to adulthood. Almost all the survey respondents reported eaten candy either seldomly or always. Children aged 2 – 6 years old eat more frequently than any other age group in the study and female more than male are candy eaters. The prevalence of candy eaters is consistent with Hornick, et al. (2014) who found that 97% of American candy eat candy at least once a year. Also, with the reports published in the United Kingdom by the Statistical Research Department (2015) where there was 87% prevalence of candy eating at least once a week. This is because candy plays an important role in national and cultural traditions and celebrations as well as being enjoyed by most people as an occasional treat (Duyff, et al., 2015). This study also validates the general opinion that candy is for children who rejoice over it and prefer it to any other useful healthy foods (Ministry of Health, n.d.). Also, that candy is eaten by females is supported by studies by Eckel and Geary (2001) and Bernstein (1999). This may be, as Eckel and colleague noted, that the female hormone estradiol indorses longing for sweets.

This study also show that some candy eaters may be addicted to it. Although this study did not conduct a diagnosis for candy addiction, some aspects of the survey reflected some characteristics of addictive behavior. These characteristics of addictive behaviors include eating candy secretly, making efforts to stop eating candy, loss of control of candy eating, concerns of a significant others or professionals on candy eating habit, and the health consequences. The finding of this study shows that about half of the candy eaters have at one time or the other hidden candy to eat it later, about a half secretively eat candy and have tried to stop eating candy, and more than a quarter admitted that they feel powerless over candy eating. Most

of the candy eaters believed that candy is unhealthy. Yet, they still eat it anyway. These are all signs found with someone struggling with addiction. Of course, powerlessness over a behavior or loss of control (American Psychiatric Association, 1994; Egunjobi, 2010) coupled with hiding the behavior like drinking in secret (McCann, 2021) are strong indications of addiction. From this study, it may not be wrong to say that 1 in 4 candy eater is addicted to it.

Some candy eaters can be prone to candy addiction because candy itself is addictive. Although, this is debatable just as in the case of sugar addiction (Avena, et al., 2008). It may also be rare to find the word "candy addiction". For instance, if one types "candy addiction" or "candy is addictive" in Google search, what will pop up are likely to be studies and articles on sugar addiction. Does that mean candy addiction is the same as sugar addiction? It may be rightly so. Because candy contains a lot of sugar and sugar researchers and nutritionists have suggested that sugar has addictive properties and may be as addictive as cocaine (Schaefer & Yasin, 2020; Murray, 2021). The sugary nature of candy contributes to the manner or pattern of eating.

There are different manners of eating candy such as biting a little at a time, biting it in half, licking it from the hand, and putting the whole candy in the mouth. This study shows that most candy eaters put the whole candy in the mouth with an effort to lick it and not crush it. However, majority 'sometimes' or 'always' ended up crushing it. This goes back to the questions raised in the introduction if there is something within a person, perhaps in the brain, that controls the crushing of candy outside one's desire, will, and intention. As Eckel and Geary (2001) noted, there is something besides willpower -- or lack of it -- at work. This can be identified as dopamine rush. The kind which occurs when playing a game called Candy Crush (The Virginian-Pilot, 2014).

Candy is an incentive to the brain (Luking & Barch, 2013) that when it is consumed the brain is the target (Warrell, 2016) where it stimulates the brain chemical called "dopamine". As Reichelt (2019) puts it, when sweet food is eaten, the mesolimbic dopamine system, the brain's reward system gets activated. Many studies have focused on the dopamine reward system which is responsible for the likelihood to repeat a rewarding (pleasurable) behavior, until it becomes tolerance (DSM-IV; Egunjobi 2016; Egunjobi, 2010).

There is the possibility of the dopamine stimulation by candy (sugar) in the brain. This may influence the roles of the striatum, orbitofrontal cortex (OFC), prefrontal cortex (PFC), and other regions of the limbic system in the incentive processing (Haber & Knutson, 2010; Luking & Barch, 2013). There is also the possibility that the crushing of candy when the eater has decided not to, is the result of the highjack of the decision-making part of the brain. In other words, it can be hypothesized that candy crushing is involuntarily based on the brain overcoming the willpower or human desire and determination. This call for further research to have better understanding of why we do what we do not want to do.

Conclusions

The study shows that people of all ages eat candy, but it is more common among females than among males. People who eat candy prefer to put the whole of the candy in the month, start by licking it but end up crushing it. The candy crushing can be, in part, a sign of candy addiction. The candy crushing can be hypothesized to be due to brain chemical 'dopamine' stimulated by sugar hijacking the decision-making/willpower part of the brain in the frontal lobe.

There is need for a neurological study to investigate the part played by the brain in the loss of control over candy crushing. Understanding this may shed more light into the mysteries surrounding addiction and addiction treatment.

Tables

Table 1

Age and Gender of Respondents

Gender	Female	Male	Total	Percentage
Age				
2-6	3	0	3	1.5
7 – 12	8	7	15	7.1
13 – 19	16	7	23	10.8
20 – 39	44	35	78	37.2
40 and above	64	28	93	43.4
Total	**135**	**77**	**212**	**100**
Percentage %	**63.7**	**36.3**		**100**

Table 2

Prevalence of Candy Eater by Age

Frequency	Never	Seldom	Often	Always	Total
Age					
2-6	0	0	2	1	3
7 – 12	3	5	4	3	15
13 – 19	1	10	10	2	23
20 - 39	4	53	17	4	78
40 and above	14	64	14	1	93
Total	**22**	**132**	**47**	**11**	**212**
Percentage %	**10.4**	**62.2**	**22.2**	**5.2**	**100**

Table 3

Prevalence of Candy Eater by Gender

Frequency	Never	Seldom	Often	Always	Total	Percentage
Gender						
Female	8	84	34	9	135	63.7
Male	14	48	13	2	77	36.3
Total	**22**	**132**	**47**	**11**	**212**	**212**

Table 4

Number of Candy Eaten per day by Age

Age	1 -3	4 - 6	7 - 9	10 +	Total
2-6	1	2	0	0	3
7 - 12	10	2	0	0	12
13 - 19	16	2	1	3	22
20 - 39	62	9	1	3	75
40 and above	72	5	1	0	78
Total	**161**	**20**	**3**	**6**	**190**
Percentage %	**84.7**	**10.5**	**1.6**	**3.2**	**100**

Table 5

Number of Candy Eaten per day by Gender

	Number of candy per day				
Gender	1 -3	4 - 6	7 - 9	10 +	Total
Female	109	12	1	5	127
Male	52	8	2	1	63
Grand Total	**161**	**20**	**3**	**6**	**190**

Table 6

Candy Eating Behavior and Attitude

Categories	Never (%)	Sometimes (%)	Always (%)
Do you hide candy (sweet) to eat it later?	49.7	48.7	1.6
Do you ever eat candy (sweet) secretively?	55.4	41.9	2.7
While indulging in candy (sweet), have you ever told yourself that this is the "last time" you'll ever eat it?	58.8	31	10.2
Do you ever feel powerless (out of control) in your candy (sweet) intake?	74.2	21	4.8
Have you ever told yourself that you will lick the candy (sweet) this time, but you ended up crushing (chewing) it?	30	52.9	17.1

When you determined to lick the candy (sweet) and not crush (chew) it, did you succeed?	30	47	23
Has anyone (doctor/nurses/family/friend) show concern about your candy (sweet) intake, yet you did not stop?	79.8	12.8	7.4

Table 7

Candy Eating and Health

Categories	Yes	No
Have you experienced any dental problem due to eating candy (sweet)?	39.1	60.9
Have you experienced any medical problem due to eating candy (sweet)?	16.7	83.3
Have you experienced any emotional/psychological problem due to eating candy (sweet)?	9.1	90.9
Have you experienced any social-religious challenges due to eating candy (sweet)?	5.4	94.6

FIGURES

Figure 1

The Manner of Eating Candy

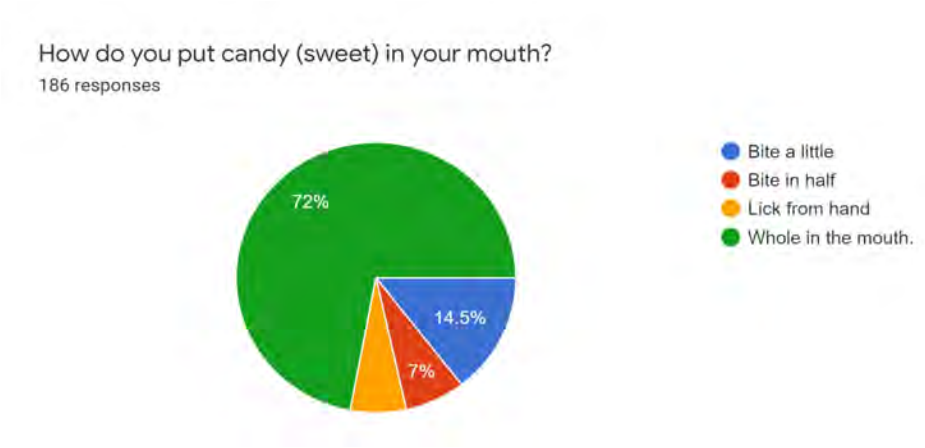


Figure 2

Pattern of Candy Consumption

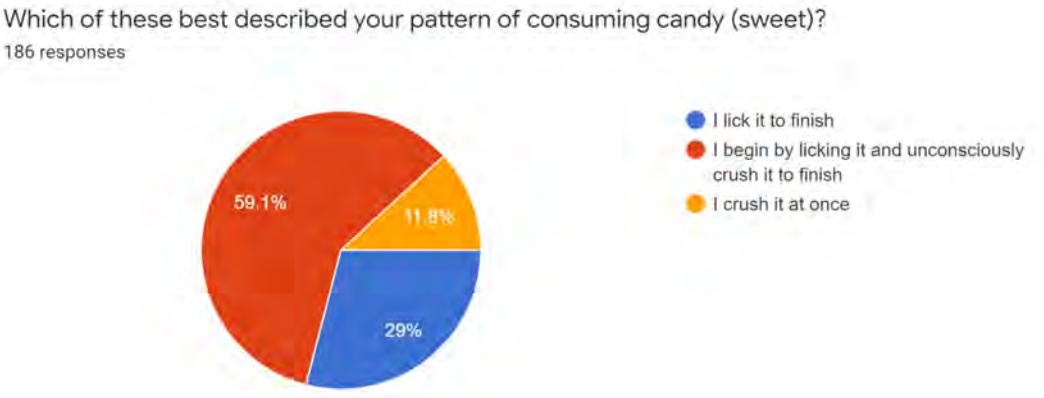
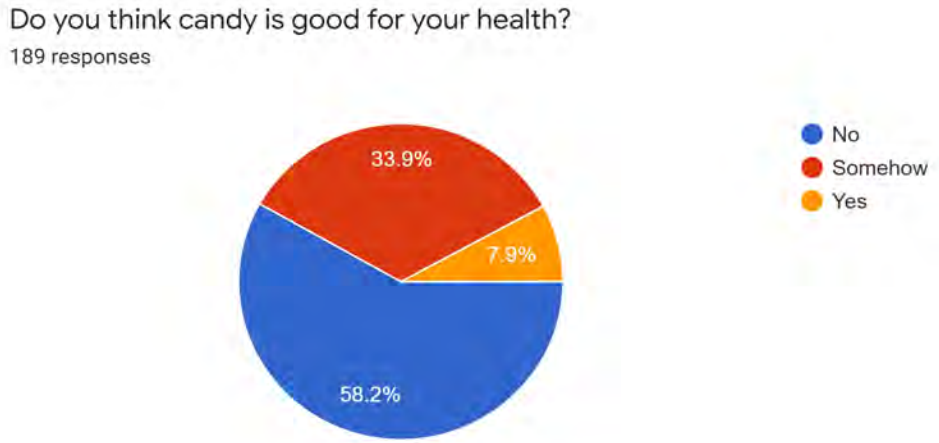


Figure 3

Do you Think Candy is Good for your Health?



References

American Psychiatric Association. (1994) Diagnostic and statistical manual of mental Disorders (4th ed.) Washington. D.C: Author

Asarian, L., & Geary, N. (2013, July 31).Sex differences in the physiology of eating. American

Journal of Physiololgy 305: R1215–R1267. http://doi.org.10.1152/ajpregu.00446.2012

Avena, N. M., Rada, P., & Hoebel, B. G. (2008). Evidence for sugar addiction: behavioral and

neurochemical effects of intermittent, excessive sugar intake. Neuroscience and biobehavioral reviews, 32(1), 20–39. https://doi.org/10.1016/j.neubiorev.2007.04.019

Baruch, Y., & Holtom, B.C. (2008). Survey response rate levels and trends in organizational research. Human Relations. 61(8), 1139-1160. https://doi.org/10.1177/0018726708094863

Berbesque, J. C., & Marlowe F. W. (2009). Sex differences in food preferences of Hazda hunter-gatherers. Evolutionary Psychology, 7: 601–616, 2009

Bernstein, I. L. (1999) Taste aversion learning: a contemporary perspective. Nutrition 15: 229 –234.

Candy History (n.d.). The sweet history of sweets. http://www.candyhistory.net/candy-origin/sweet-history/

Candy Warehouse. (n.d.). Types of Candy. https://www.candywarehouse.com/types-candy

Chef Rich. (2020, May 28). What is a Bonbon or Bon Bon? https://maefinefoods.com/blog/what-is-a-bonbon-or-bon-bon/

Chief Marketer Staff. (2000, December 1). Candy Lovers. https://www.chiefmarketer.com/candy-lovers/

Dessel, G. V. (2013, February). How to determine population and survey sample size?

CheckMarket. https://www.checkmarket.com/blog/how-to-estimate-your-population-and-survey-sample-size/

Duyff, R. L., Birch, L. L., Byrd-Bredbenner, C., Johnson, S. L., Mattes, R. D., Murphy, M. M.,

Nicklas, T. A., Rollins, B. Y., & Wansink, B. (2015). Candy consumption patterns, effects on health, and behavioral strategies to promote moderation: summary report of a roundtable discussion. Advances in nutrition (Bethesda, Md.), 6(1), 139S–46S. https://doi.org/10.3945/an.114.007302

Eckel, L. A. & Geary, N. (2001). Estradiol treatment increases feeding-induced c-Fos expression in the brains of ovariectomized rats. American Journal of Physiology. Regul. Integr. Comp. Physiol. 281: R738 –R746.

Egunjobi, J. P. (2016). The Biopsychosocial-Spiritual Approach: Towards a Holistic Understanding and Treatment of Drug Addiction. Lulu Press Inc.

Egunjobi, J. P. (2010). Substance Abuse and the Youths: Christian Perspective. Lulu Press Inc.

Foltin, R. W., Woolverton, W, L., & Schuster, C. R. (1983). Effects of psychomotor stimulants, alone and in pairs, on milk drinking in the rat after intraperitoneal and intragastric administration. Journal of Pharmacology & Experimental Therapeutics 226: 411–418, 1983.

Harper, D. (n.d.). "candy". Online Etymology Dictionary.

Holland, K. (2019, May 10). 10 Signs You Might Have a Sugar Addiction. https://www.tasteofhome.com/article/signs-have-sugar-addiction/

Hornick, B., Duyff, R. L., Murphy, M. M., & Shumow, L. (2014). Proposing a definition of candy in moderation: for health and well-being. Nutrition Today; 49: 87–94

IndexBox. (2021). Kenya: Overview of the Market for Candies, Sweets, and Nonchocolate Confectionery 2021. https://www.indexbox.io/store/kenya-sugar-confectionery-not-containing-cocoa-market-report-analysis-and-forecast-to-2020/

Knott CD. Changes in orangutan caloric intake, energy homeostasis and ketones in response to fluctuating fruit availability. International Journal of Primatology. 19: 1061–1079, 1999

Luking, K. R., & Barch, D. M. (2013). Candy and the brain: neural response to candy gains and losses. Cognitive, affective & behavioral neuroscience, 13(3), 437–451. https://doi.org/10.3758/s13415-013-0156-8

McCann, V. (2021, March 22). Secret Drinking – How to Spot the Signs of Hidden Alcoholism https://smarmore-rehab-clinic.com/blog/12/2020/secret-drinking-how-to-spot-the-signs-of-hidden-alcoholism

Merriam-Webster. (n.d.). Candy. In Merriam-Webster.com dictionary. Retrieved April 2, 2021,from https://www.merriam-webster.com/dictionary/candy

Ministry of Health. (n.d.). Children and Candy. https://www.moh.gov.sa/en/HealthAwareness/EducationalContent/BabyHealth/Pages/ChildrenAndDessert.aspx

Murray, K. (2021, March 30). Why Is Sugar Addiction A Problem? In Addiction Center. https://www.addictioncenter.com/drugs/sugar-addiction/#:~:text=Unlike%20many%20other%20substance%20use,and%20become%20hyper%20and%20crash.

Nieburg, O. (2017a, March 15). Katjes International CFO: Sugar confectionery consumption in Europe may have reached its limits. https://www.confectionerynews.com/Article/2017/03/15/Katjes-CFO-Sugar-confectionery-consumption-in-Europe-has-peaked

Nieburg, O. (2017b, July 20). African consumers trading up in sugar confectionery. https://www.confectionerynews.com/Article/2017/07/20/African-consumers-trading-up-in-sugar-confectionery

NPCS. (2013). Confectionery Products Handbook (Chocolate, Toffees, Chewing Gum & Sugar Free Confectionery). Asia Pacific Business Press.

O'Neil, C. E., Fulgoni, V. L., & Nicklas, T. A. (2011). Candy consumption was not associated with body weight measures, risk factors for cardiovascular disease, or metabolic syndrome in US adults: NHANES 1999–2004. Nutrition Research; 31: pp. 122–130.

Ouyang, X. I. (2016, October 31). Countries That Eat a Scary Amount of Candy. U.S. News.https://www.usnews.com/news/best-countries/articles/2016-10-31/countries-that-consume-the-most-candy-per-year

Pei, Z., Flexeder. C., Fuertes, E., Standl, M., Buyken, A., Berdel, D., von Berg, A., Lehmann, I., Schaaf, B., & Heinrich, J. (2014). Food intake and overweight in school-aged children in Germany: results of the GINIplus and LISAplus studies. Annual Nutrition Metabolism; 64:60–70

Ratini, M., Rev. (2020, April 07). Slideshow: The Truth About Sugar Addiction. https://www.webmd.com/diet/ss/slideshow-sugar-addiction

Reichelt, A. (2019, November 15). Your brain on sugar: What the science actually says. https://theconversation.com/your-brain-on-sugar-what-the-science-actually-says-126581

Research and Markets. (2019, February 15). South Africa Confectionery Industry 2019: Size & State of the Industry, Influencing Factors, Competition, Outlook & Key Players. PRNewswire. https://www.prnewswire.com/news-releases/south-africa-confectionery-

industry-2019-size--state-of-the-industry-influencing-factors-competition-outlook--key-players-300796492.html

Savage, J. S., Harris, H. A., Bleser, J. A., & Rollins, B. Y. (2019, October 15). Parents' and Children's Categorization of Candy are Similar: A Card Sort Protocol. Nutrients 11 (10): 2472. https://doi.org/10.3390/nu11102472

Schaefer, A. & Yasin, K. (2020, April 29). Experts Agree: Sugar Might Be as Addictive as Cocaine. In Healthline. https://www.healthline.com/health/food-nutrition/experts-is-sugar-addictive-drug

Science of Cooking. (n.d.). What is sugar? https://www.exploratorium.edu/cooking/candy/sugar.html

Shure, M. (2018, August 5). How to eat candy, an exhaustive guide. https://thetakeout.com/there-is-one-correct-way-to-eat-every-candy-1825607397

Singh, R. P., Knechtel, H. B., & Minifie, B. W. (2021, March 31). Candy. Encyclopedia Britannica. https://www.britannica.com/topic/candy-food

Snodgrass, M. E. (2004). Encyclopedia of Kitchen History. Routledge, pages 145–146

Statista Research Department. (2015, July 9). Frequency of eating chocolate and/or sweets in the United Kingdom (UK) 2015. https://www.statista.com/statistics/533356/uk-consumption-of-chocolate-sweets-frequency/

Tan, V. (2017, April 6). How Sugar Causes Cavities and Destroys Your Teeth. https://www.healthline.com/nutrition/how-sugar-destroys-teeth

The Virginian-Pilot. (2014, April 24). Candy Crush addiction: Is it helping or hurting your brain? https://www.pilotonline.com/blogs/article_0e05c407-3eea-5da0-9bfd-b814ce913752.html

Toussaint-Samat, M. (2009). A History of Food. Wiley-Blackwell.

University General Dentists Team Member. (2019, November 18). Best and Worst Candies for Your Teeth. https://utknoxvilledentists.com/best-and-worst-candies-for-your-teeth/

USDA. (2014, March 10). Report of the Dietary Guidelines Advisory Committee on the Dietary Guidelines for Americans. In Center for Nutrition Policy and Promotion. http://www.cnpp.usda.gov/sites/default/files/dietary_guidelines_for_americans/2010DGACReport-camera-ready-Jan11-11.pdf.

Warrell. (2016, April 19). Candy Makes Everything Better – Really! https://www.warrellcorp.com/blog/how-candy-brings-happiness/

Watt, G. (1893), The Economic Products of India, W.H. Allen & Co., Vol 6, Part II, pages 29–30

Yu, D. (2017, July 20). Local chocolate players remain competitive in West Africa as regional sales set to grow. https://www.confectionerynews.com/Article/2017/07/20/Chocolate-confectionery-sales-in-West-Africa-set-to-grow

Separate and combined effects of chronic administration of codeine and tramadol on food intake and body weight in male albino rats

Osuh, Jackson Iheukwumere[1*], Balogun Shyngle[2], and Lanre-Abass, Afeez Akindotun[2]

[1]Department of Psychology, Faculty of Social Sciences, Federal University, Oye-Ekiti, Nigeria

[2]Department of Psychology, Faculty of the Social Sciences, University of Ibadan, Ibadan, Nigeria

***Corresponding author**

Jackson I. Osuh, PhD

Department of Psychology, Faculty of Social Sciences, Federal University, Oye-Ekiti, Nigeria

Email: jacksonosuh@gmail.com.

GSM: +2347068848616

Submitted: 21st April 2021

Published: 30th June 2021

Abstract

Tramadol and Codeine are both opiates used as analgesics which act on the nervous and metabolic systems. However, their role in dietary disorder and body weight has not been established in the current trend among abusers. This study, therefore, examined the effects of chronic exposure to Codeine and Tramadol on food intake and body weight. Specifically, the study examined feeding behaviour and body weight of male albino rats. Male Albino rats numbering Twenty-Four, weighing between 150-200g and 7-9 weeks' old were used. They were collected from the University of Ibadan Veterinary animal farm. The rats were divided into 3 experimental groups of Codeine, Tramadol, combined Codeine and Tramadol and Control groups with 6 rats in each group and exposed to 8mg/kg of codeine, 20mg/kg of tramadol, combined 8mg/kg of codeine and 20mg/kg of tramadol, and normal saline for 28 days. Records of the amount of food ingested and the bodyweight of the rats were taken daily for the duration of the experiment. Randomized ANOVA at $p \leq 0.05$ showed a significant effect of Tramadol and Codeine on food intake ($F_{3,667} = 3.50$, $p < 0.05$, $\eta^2 = .02$. Male rats in the Tramadol and Codeine group ($\bar{x} = 94.29$), tramadol only ($\bar{x} = 93.22$) and Codeine only ($\bar{x} = 99.00$) groups significantly consumed less amount of food compared to the control group ($\bar{x} = 100.36$). Body weight was significantly influenced ($F_{3,667} = 3.55$, $p < 0.01$, $\eta^2 = .02$). Mean body weight was significantly lower for rats in codeine & tramadol ($\bar{x} = 133.21$), tramadol only ($\bar{x} = 132.31$) and codeine only ($\bar{x} = 133.79$) groups compared to the control group ($\bar{x} = 137.51$). It was concluded that chronic exposure to Tramadol and Codeine is associated with weight loss and reduced food intake, suggesting the risk of dietary health challenges and weight loss problems for abusers.

Keywords: *Food intake, Body Weight, Tramadol, Codeine, Male Albino Rats*

Introduction

Drug use and abuse has been a challenge to the society and the health systems. Studies have shown that those who engage in drug abuse particularly, young people do so for various reasons such as political, psychosocial, educational, physical, and moral gains. Recently, the trend of drug use and abuse indicate that tramadol and codeine are the leading drugs that are widely patronized especially in the West Africa. (Oraegbune et al., 2017; Fuseini et al., 2019).

Drug abuse has been identified to influence two negative outcomes on the bodyweight which is either weight gain or loss. Weight gain occurs when more energy received from

calories in food and beverages is gained than the energy expended by life activities, including normal physiological processes and physical exercise (Hodgkins et al. 2004; Funk et al. 2019). One may become overweight or obese if enough weight is gained due to increased body fat deposits, generally defined as having more body fat or adipose tissue than is considered good for health (Hodgkins et al., 2004; Funk et al., 2019).

A reduction of the total body mass, due to a mean loss of fluid, body fat or adipose tissue or lean mass, namely bone mineral deposits, muscle, tendon, and other connective tissue is referred to as Weight loss, in the context of medicine, health, or physical fitness (Stoppler, 2018). Generally, Weight loss is a decrease in body weight resulting from either voluntary activity such as diet or exercise or involuntary circumstances such as illness. It can either occur unintentionally due to malnourishment or an underlying disease or arise from a conscious effort to improve an actual or perceived overweight or obese state (Stoppler,2018) Weight loss may also be an outcome of drug use. There is considerable evidence from research reports to suggest that drug usage is linked to an increased risk of being underweight (Pasch et al., 2012).

Exposure to recreational, illicit, and prescription medication has effects on the social, physical, physiological and mental processes. Some drugs target the central nervous system (CNS) and just a single dose of such drugs and substances may result in temporary cognitive impairments. Some consequences of cognitive impairment may include lack of self-care, inability to remember to eat properly, leading to weight loss and lack of care for the immediate environment. According to Vieira, (2015), people who begin to abuse drugs may eventually suffer from permanent impairments in brain activity as well as physical changes that lead to dramatic weight loss and poor health.

There is a broad perception that drug use either suppresses or increases appetite resulting to decrease or increase in body weight. This poses a problem to the rehabilitation of people who use drugs because of the resultant potential relapse. Consequently, weight gain or loss contributes to the challenges of rehabilitation of drug users in the community treatment services, where experts are trying to tackle the weight problems of drug users with educational interventions to promote healthy food (Ersche et al., 2013). Based on this finding, the different types of drugs have a different impact on weight gain or loss. The drugs of special concern in the present study is the impact of Codeine and Tramadol on feeding behavior and weight gain or loss.

Tramadol, a synthetic analogue of codeine with central effects is an analgesic with an opioid like effect when taken orally (WHO, 2017). It is a choice prescription for treatment of mild to severe pain in both acute and chronic conditions (Fuseini et al., 2019; Grond & Sablotzki, 2004). Records of tramadol abuse, mostly by adolescents is alarming in some countries in Europe (Olsson et al., 2017). WHO (2017) report indicates that the level of tramadol abuse is unclear in Africa due to the lack of studies on the epidemiological statistics. However, there is evidence of a growing trend of abuse of tramadol in most African countries, particularly Nigeria, Togo, Ghana, Libya and Egypt among others. There is also evidence that Nigeria, Ghana, Togo, Sierra Leone, Cameroon and Côte d'Ivoire are major transit or destination countries for tramadol (Salm-Reifferscheidt, 2018). In Nigeria for instance, there is evidence that tramadol abuse has a prevalence rate of approximately 54.4%, with over 91% of these dependants obtaining the drug without prescriptions (Ibrahim et al., 2017).

The abuse potential of tramadol compared with other opioids like morphine is believed to be low (WHO, 2017), and it is not listed among the controlled substances regulated by the Food and Drug Authorities (Salm-Reifferscheidt, 2018; WHO, 2017). However, the risk for tramadol abuse is still very high, because, there are reports linking tramadol usage to overdose, as well as to serotonin syndrome, which can be fatal. (Hassamal et al., 2018). Tramadol has the potential

to activate the brain opioid receptors as well as interact with the serotonin and norepinephrine neurotransmitter systems using a similar mechanism like some antidepressant medications. (Hassamal et al., 2018). Tramadol also gives an experience of a pleasant rush of euphoria, the reason why most of the users abuse the drug sometimes. Reported side effects of tramadol especially when taken in high doses include, nausea and vomiting, constipation, sweating, dizziness, seizures and postural hypotension, abdominal pain, change of blood pressure, dry mouth, hallucination, sleepiness, sedation, respiratory depression among others (Jovanović-Čupić et al., 2006; Zhang & Liu, 2013; FDA, 2017; Hassamal et al., 2018). In spite of the enormous side effects, many people continue to abuse tramadol for physical, psychosocial and sexual reasons.

Codeine is a naturally occurring phenanthrene alkaloid and opioid agonist with analgesic, antidiarrheal and antitussive activities. Similarly, Codeine is used to treat mild to moderate pains and should not to be used for a prolonged time. Codeine binds to the opioid receptors at many sites within the central nervous system (CNS) thereby mimicking the actions of the endogenous opioid. Global reports indicate that codeine is the most consumed opioid based on tonnage (INCB, 2018). Codeine is widely abused because it is short acting, weak and a mild opiate (Tremlett et al., 2010). The drug is readily available because it is considered an Over the Counter (OTC) drug in formulations used for the treatment of mild to moderate pain or cough symptoms (Ferguson et al., 2019). A study by Cherian et al., (2018), using social media, suggests that codeine abuse may be becoming normalized, commercialized, and ritualized. Some names used for codeine among the users include lean (which is codeine cough syrup mixed with ice, soda, and occasionally hard candies) and depictions of codeine with other substances such as alcohol and cannabis in the preparation of lean (Cherian et al., 2018).

There is a global concern over the misuse and potential abuse of codeine and codeine-containing medications which have received attention in recent times in different countries of the world (Tobin et al. 2013; Stannard, 2013; Nielsen et al. 2015). Abuse of codeine may lead to addiction starting with occasional abuse of the drug and slowly develop into a physical dependence and then into addiction (Nielsen & Van Hout, 2017). The effects produced by codeine when taken in large amounts increases its addiction potential and once a physical dependence is formed, the individual will not be able to function normally without codeine in their system (Nielsen & Van Hout, 2017). The likelihood of overdose to the use of codeine is an additional risk factor to codeine addiction. The use of codeine with other central nervous system depressants like alcohol or other opioids increases its overdosing (Ferguson et al. 2019). Side effects produced by continuous use of codeine include altered perceptions, euphoria, stomach cramps, emotional responses to pain and sedation, nause, vomiting, diarrhea, loss of appetite and development of tolerance within relatively short timeframes on repeated use (Karamatic et al. 2011; Babalonis et al. 2013; Nielsen & Van Hout, 2017).

Tramadol and codeine are both opiates that are used to control pain which are prone to a lot of misuse and abuse despite the various side effects (Chikezie&Ebuenyi, 2019; Uwadiegwu et al. 2019). The use and abuse of opioids have been linked to several side effects suggestive of abnormalities in feeding behaviour such as loss of appetite, constipation, nausea, weight gain or weight loss and fatigue among others (Baldini et al. 2012; Zimatkin& Bon, 2014; FitzHenry et al. 2020). In a recent study, Balogun et al., 2020, reported that continuous exposure to tramadol and codeine was linked to low food consumption and weight loss in female Albino rats. However, studies establishing these relationships in male Albino rats are scarce. Therefore, this study examined the effects of separate and combined chronic administration of tramadol and codeine on food intake (feeding behaviour) and body weight of male Albino rats.

The specific objectives of the study were to:

• examine the effects of chronic Tramadol administration on feeding behaviour and body weight among male albino rats.

• examine the effects of chronic Codeine administration on feeding behaviour and body weight among male albino rats.

• examine the effects of combined chronic administration of both Tramadol and Codeine on feeding behaviour and body weight among male albino rats.

The following **research questions** were generated with a view to provide answers through the outcomes of this research;

• What are the effects of chronic administration of codeine and tramadol on food intake of male Albino rats?

• What are the effects of chronic administration of codeine and tramadol on body weight of male Albino rats?

The following **hypotheses** were tested to determine the relationship between chronic administration of tramadol and codeine on feeding behaviour and body weight in male albino rats;

Tramadol and Codeine will separately and jointly interact to affect the amount of food consumed by male albino rats exposed to chronic administration of the drugs.

Tramadol and codeine will separately and jointly interact to affect body weight of male Albino rats exposed to chronic administration of the drugs.

Methodology

This research is a part of a larger experiment that investigated the effects of separate and combined chronic ingestion of codeine and tramadol on feeding behaviour and body weight of Albino rats. In an earlier publication, the researchers (Balogun et al., 2020) presented the effect of these drugs on female Albino rats. This paper will therefore focus on the effects of combined chronic ingestion of codeine and tramadol on feeding behaviour and body weight of male Albino rats. The methodology presents the methods adopted for this study which includes research design, participants, setting, instruments used, procedure and method of statistical analysis.

Research design

Independent group randomized design was used in this study. The male Albino rats were randomly assigned into four groups; the Codeine, Tramadol, the both Codeine and Tramadol and the control groups. The independent variables are the chronic administration of Tramadol and Codeine, and the combination of both drugs to the male Albino rats. The dependent variables were feeding behaviour and weight gain displayed or exhibited by the male Albino rats.

Setting

The experiment took place at the Animal Science Laboratory, University of Ibadan, Oyo State, Nigeria.

Animal Population

The animals used were male Albino rats. A total of 24 male Albino rats weighing between 150 - 200g and 4 – 6 weeks old were used. They were divided into four (4) groups with six (6) male rats in each group. The groups were Tramadol group, Codeine group, combined Tramadol and Codeine group and control group. The rats were randomly assigned to different groups.

Drugs

Tramadol HCL (50 mg capsules) and Cough syrup (containing 220mg codeine) were used for this study. Tramadol and Codeine were administered orally with the use of an oral cannula. The rats were given 20mg/kg bodyweight of Tramadol following the recommended 5mg/kg – 20mg/kg dose for oral administration of tramadol in rats (National Research Council, 2011) while Codeine was administered at a dose of 8mg/kg body weight every 24 hours following the recommended therapeutic dose of 2mg/

kg/6hrs (Uwadiegwu Achukwu et al., 2019). The dosage administered in this study was, therefore, Tramadol, 20mg/kg and Codeine, 8 mg/kg.

Materials/Instruments

The following materials and instruments were used for this study;

1. 24 experimental rat cages.
2. Recording sheets
3. Distilled water/saline
4. Laboratory coat
5. Oral cannula for the administration of drugs
6. Hand Gloves.
7. Face/Nose Mask
8. Coloured labelling the cages and placing identification marks on the rats.
9. Measuring cylinders used in diluting and measuring the solution.
10. Weighing balance for the daily weighing of rats and food.
11. Disposable syringes
12. Mouse cubes for feeding the rat
13. Codeine syrup
14. Tramadol capsules (powder in capsule serially diluted with distilled water)

Procedure

The rats were kept in the laboratory under the normal day-night 24-hour cycle and allowed to acclimatize for 21 days before the commencement of the experiment while allowing them free access to food and water. They were then randomly assigned into 4 groups; the tramadol group, the codeine group, the Combined codeine and tramadol group and the Control group with 6 male rats in each group. All the male rats were housed in individual cages and each cage was clearly labelled with the drug category. The male rats were also marked for clear identification.

On each day of the experiment, all the rats were weighed and records of the weights against each rat were taken. This was to determine what volume of drugs to administer to each rat. The drugs were then administered to each experimental group of the rats according to their body weights. The control group was given normal saline. After the drug administration, the rats were allowed 30 minutes before the commencement of data collection to give enough time for the onset of drug action. Baseline record was taken for 8 days to establish the feeding pattern of the rats before the commencement of drug administration. Records taken on each day of the experiment were;

- Bodyweight of the male rats

- Weight of food remaining from the previous day

- Weight of food spilt from the previous day

The amount of food consumed after a 24-hour cycle was determined by subtracting the weight of food spilt from the weight of food remaining while weight gained or lost was determined by calculating the difference in weight for each rat daily. After the baseline records were taken for 8 days, daily treatment and record taking for each rat continued for 28 days' duration of the experiment.

The rats were handled according recommended procedures by the cruelty to animal Act for animals used for research purposes and discarded accordingly at the end of the experiment.

Drug Dosage:

Tramadol: The dose of tramadol for this study is 20mg/kg body weight. Tramadol used for this study was tramadol HCL containing 50mg in a capsule. This was serially diluted to 20mg dose used for this study. A stock solution of tramadol containing 50 mg tramadol was prepared and diluted to 20mg by dilution into one thousand parts per million. This was achieved by taking 40mls of a solution containing 50mg tramadol and adding 60mls of distilled water to make a 100mls solution of 20mg tramadol.

Codeine: The dose of codeine used for this study is 8mg/kg body weight. Codeine used for this study was codeine linctus cough syrup. Codeine linctus cough syrup contains 15mg codeine in every 5mls of the syrup. The rats were administered 2.5mls of the syrup containing 8mg of codeine.

Statistical analysis

One-way ANOVA was adopted for the result analysis for this study. Any P value less than 0.05 was considered as significant.

Results

This study investigated the effect of chronic administration of tramadol and codeine on food intake and body weight of male Albino rats and the results are presented in line with the proposed hypotheses.

Hypothesis 1, stated that Tramadol and Codeine will separately and jointly interact to affect the amount of food consumed by male albino rats exposed to chronic administration of tramadol and codeine presented. The result as presented in Table 1, indicate that there is a significant effect of exposure to chronic administration of tramadol and codeine on food consumption among male Albino rats, $F(3,667) = 3.50$, $p < 0.05$, $2= .02$. Result of mean differences among the treatment groups using LSD mean comparison test presented in Table 2, shows that rats exposed to chronic administration of the combination of Tramadol and Codeine ($x = 94.29$), Codeine only ($x = 99.00$) and Tramadol only ($x = 93.22$) significantly consumed less amount of food compared to male rats in the control group ($x = 100.36$). The mean differences in food consumption were significant ($p<.05$). Food consumption decreased with exposure to chronic administration of tramadol and codeine compared to the control group. There was a significant increase in food consumption for male rats in the control group while it declined significantly for male rats in the tramadol and codeine experimental group.

Hypothesis 2, stated that tramadol and codeine will separately and jointly interact to affect body weight among male Albino rats exposed to chronic administration of tramadol and codeine. The result is presented in Table 3. It indicates a significant effect of the exposure to chronic administration of tramadol and codeine on body weight among male Albino rats, $F(3,667) = 3.55$, $p < 0.001$, $2= .02$. Result of mean differences among the treatment groups using LSD mean comparison test as presented in Table 4. shows that rats exposed to chronic administration of a combination of Tramadol and Codeine ($x = 133.21$), Tramadol only ($x = 132.31$) and Codeine only ($x = 133.79$) significantly exhibited weight loss compared to rats in the control group ($x = 137.51$). The mean differences were significant ($p<.001$). There was significant weight loss with exposure to chronic administration of tramadol and codeine compared to the control group. The decline in weight was seen to be directly proportional to the increase in numbers of days of exposure to the drugs. The result in Fig. 1, demonstrated that weight increased for the control group while weight declined significantly for exposed rats as the chronic exposure increase for more than 14 days.

Discussion

Significant links are suggesting a relationship between food intake and drug use (Salamone & Correa, 2013). Behavioural and neurophysiological data in support of this proposition abound. Naturally, humans experience psychological rewards that cause a person to repeat certain behaviours, such as eating, having sex or engaging in physical activity controlled at the level. Using brain imaging research, Volkow et al. (2011) discovered parallels between dysfunction in response to foods and drugs, as well as striatal dopamine function in the obese and drug dependence, as well as the signals linked with both. Brain systems such as the habenula, a structure near the pineal gland, and involuntary motions are other areas of brain dysfunction in obese and drug-addicted persons. This natural reward system is known to be influenced by the habenula and medications (Volkow et al., 2011). Cross-sensitization from sugar to medicines

in animals, as well as other behavioral similarities, corroborate these theories.

Several research has suggested that drug usage may protect body weight when in active use. Chronic moderate alcohol use has been linked to a normal or low Body Mass Index (BMI) (Barry & Petry, 2009; Yeomans, 2010). Similarly, despite its reputation for increasing appetite, Warren et al. (2005) found an inverse linear relationship between cannabis use and BMI in a sample of women. The lowest BMIs were identified in people with the highest overall drug use in a study of people in treatment for Substance Use Disorder (SUD) (Cofrancesco et al. 2007). Other studies that looked at weight and the chance of SUD diagnosis came up with similar conclusions (Pasch et al. 2012). There is considerable evidence to suggest that drug usage is linked to an increased risk of being underweight (Pasch et al., 2012). According to certain research, there may be variations in BMI between men and women. SUD diagnosis was linked to a reduced BMI in males, but not in women, according to a research (Pickering et al. 2011). Similarly, (Balogun et al., 2020) showed weight loss in female albino rats exposed to chronic medication therapy in a study involving exclusively female albino rats.

There is strong evidence of shared brain substrates for food and drug reinforcement in the literature on food consumption and drug addiction. However, whether drug usage influences food consumption or vice versa, as well as body weight, is an essential subject that has to be answered. Is there any other proof of a link between eating habits, body weight, and drug use?

The study therefore, examined the effect of tramadol, codeine, and combination of codeine and tramadol on food intake and body weight among male Albino rats. We hypothesized that tramadol and codeine will separately and jointly interact to affect the amount of food consumed by male albino rats given chronic treatment of the drugs. Chronic treatment of tramadol and codeine significantly influenced food consumption among male Albino rats in support of the proposed hypothesis. From Table 1 the result shows that food consumption was significantly influenced among male Albino rats, $F(3,667) = 3.50$, $p < 0.05$, $2 = .02$. Male rats which ingested the combination of codeine and tramadol, codeine only and tramadol only significantly consumed less food compared to male rats in the control group. This observation is in line with similar findings by Marrazzi et al. (1996), who concluded from their research result that chronic intake of morphine opioid drugs was associated with a decline in food intake among albino rats. In a recent and similar study, (Balogun et al., 2020), observed that female Albino rats exposed to the chronic treatment of tramadol, codeine and combined tramadol and codeine consumed less food compared to controls. The findings may be an indication that gender differences may not exist on the effect of exposure to tramadol and codeine and food intake.

The observed effects have credible empirical explanations. Despite the fact that tramadol and codeine are mild opiates that aren't as potent as other opioids like heroin, their use can nevertheless lead to the same issues as other opioids, including death from overdose. Serotonin syndrome has been connected to the usage of tramadol and codeine (Milano et al. 2017). Serotonin syndrome occurs when serotonin receptors are overstimulated, resulting in a high fever, rapid pulse, shivering, sweating, trembling, muscular spasms, agitation, and confusion (Milano et al., 2017). One of the reported negative effects of prolonged tramadol and codeine exposure is weariness, which could be attributed to the effects of serotonin syndrome (Walder et al. 2001). Fatigue slows metabolic rate and, as a result of a lack of hunger, produces a change in eating habits. This explains the probable reasons for the observed low food intake and decrease in body weight among the codeine only group, combined codeine and tramadol group and tramadol only group compared to control group.

The researchers also hypothesized that tramadol and codeine would interact independently and jointly to influence the

body weight of male Albino rats subjected to chronic drug administration. The male Albino rats' body weight was significantly affected by chronic tramadol and codeine administration. Weight loss was seen in the male Albino rats that were administered the medications. From The Table 3 the result shows that administration of tramadol and codeine significantly influenced body weight among the male Albino Rats. Male rats given chronic treatment combined tramadol and codeine, tramadol only and codeine only groups significantly exhibited weight loss compared to male rats in the control group. The result showed that there was significant weight loss with exposure to tramadol and codeine compared to the control group.

However, Findings from a study showed that daily oral administration of naltrexone, a similar opioid agonist with a relatively longer half-life, was associated with zero to minimal weight loss in humans with a conclusion that opioid agonists generally stimulate food intake, and may or may not be associated with increased BMI in human (Mysels & Sullivan, 2010). In a similar study, (Balogun et al., 2020), observed a decrease in weight among female Albino rats exposed to chronic administration of tramadol and codeine indicating that there may not be gender differences in the effect of opioid drugs on weight gain or loss. In another study, Barry & Petry, (2009), observed that there were no associations between opiate, marijuana, and cocaine dependence and BMI in men or women. Various mental processes leading to behavioural deficits are influenced by recreational, illicit and prescription drugs. According to (Gould, 2010), just a single dose of certain drugs may result in temporary cognitive impairments causing the inability of the person to remember to eat properly and the possible onset of weight loss. Weight loss as shown from the findings of this research are outcomes of abuse, addiction and dependence to drugs. According to Vieira, (2015), individuals who begin abusing drugs may have irreversible changes in their brain function as well as physical changes such as severe weight loss and poor health.

Some side effects of opiate analgesic drugs include: drowsiness, nausea, vomiting and constipation, leading to decreased appetite, slowed digestion and weight loss over time. (Ersche et al., 2013; McCabe et al., 2015; Vieira, 2015). One probable reason for reported weight loss among opiate dependence and addicted individuals may be that they are usually seen to be engaged in drug-seeking behaviours much more than eating properly (Fishbain et al., 2008). Opiate use can also have major effects on the body, and damage a user's eating habits and appetite. Symptoms of the reported side effects of opiates particularly nausea and vomiting can lead to lack of nutrients and an imbalance of electrolytes in the body resulting into a lack of appetite and difficulty to maintain a healthy diet.

One of the most debated aspects of opiate use is how the drug affects weight, appetite, and food intake (Owens, 2020). Opiates, like all addictive medications, alter the reward circuit in the brain. Drugs frequently impair this natural reward mechanism (Volkow et al., 2011). When drugs are taken to feel high, increase mood and energy, or reduce pain, the brain views these benefits as rewarding, according to Owens (2020). As a result of repeated drug use, the brain begins to associate the substance with pleasure, and an individual loses interest in other activities that previously provided natural sensations of satisfaction. Addicts' brain reward circuits have been altered to the point where the brain desires more of the drug to feel fulfilled. They get fixated on maintaining their drug use because the brain equates the opiate drug with pleasure and loses interest in previously rewarding things like eating or exercising. When people become addicted to opiates, they frequently lose weight and lose their appetite, and the more severe the addiction becomes, the more severe the weight problems grow, eventually harming one's general health and attractiveness. (2020, Owens).

Conclusion

There is strong evidence from this study establishing a clear association with chronic opiate use and weight loss and low food intake. The findings show that chronic intake of tramadol and codeine significantly influenced weight loss or weight reduction among the male Albino rats. Similarly, male Albino rats given chronic treatment of combined (tramadol and codeine), tramadol only and codeine only significantly exhibited lower weight compared to control male rats. On the same note, male rats exposed to the combination of tramadol and codeine, codeine only and tramadol only significantly consumed less food compared to control male rats. Findings of this study therefore, indicate high implications for nutritional problems and weight loss among opioids addicts and this represents health risk in itself.

Acknowledgement

The Department of Animal Science, University of Ibadan, Nigeria, made their animal laboratory available to the authors for this study. We therefore wish to express our gratitude to the department for their support. The Authors did not receive any funds from any funding agency for this study. We wish to state that the study was self-sponsored by all the authors.

Conflict of Interest

The Authors unanimously declare that there is no conflict of interest in this study.

Tables and Figures

Table 1: Summary of Factorial ANOVA table showing the influence of exposure to Chronic administration of Tramadol and Codeine on food intake.

Source	SS	Df	Mean Square	F	Sig.	p2	
Block	14.272	1	14.272	.024	.876	.000	
Treatment	6149.350	3	2049.783	3.499	.015	.015	
Error	390772.664	667	585.866				
Corrected Total	396936.286	671					

Table 2: Summary Bonferonni mean comparison analysis showing the mean difference between male rats exposed to chronic administration Tramadol and Codeine and male rats in the control group on food intake.

Treatment	Mean	S.E.M	1	2	3	4
Codeine	99.00	1.867	-	5.78*	1.35	4.72*
Tramadol	93.22	1.867		-	7.14*	1.06
Combined	94.29	1.867			--	6.07*
Control	100.36	1.867				-

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: LSD.

Table 3: Summary of Factorial ANOVA table showing the influence of exposure to Chronic administration of Tramadol and Codeine on weight gain.

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial 2
Block	88.932	1	88.932	.360	.549	.001
Treatment	2637.195	3	879.065	3.555	.014	.016
Error	164944.943	667	247.294			
Corrected Total	167671.070	671				

Table 4: Summary LSD mean comparison analysis showing the mean difference in weight between rats exposed to chronic administration Tramadol and Codeine and those exposed to Normal saline.

	Mean	S.E.M	1	2	3	4
Codeine	133.79	1.213	-	1.48	.58	-3.73*
Tramadol	132.31	1.213		-	.89	5.20*
Combined	133.21	1.213			--	4.30*
Control	137.51	1.213				-

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: LSD.

References

Avena, M. N. (2011). Editorial [Hot Topic: Food and Addiction: Implications and Relevance to Eating Disorders and Obesity (Guest Editor: Nicole M. Avena)]. Current Drug Abuse Reviews, 4(3), 131–132. https://doi.org/10.2174/1874473711104030131

Babalonis, S., Lofwall, M. R., Nuzzo, P. A., Siegel, A. J., & Walsh, S. L. (2013).

Abuse liability and reinforcing efficacy of oral tramadol in humans. Drug and Alcohol Dependence, 129(1–2), 116–124. https://doi.org/10.1016/j.drugalcdep.2012.09.018

Balogun, S. K., Osuh, J. I., &Onibokun, O. O. (2020). Effects of Separate and Combined Chronic Ingestion of Codeine and Tramadol on Feeding Behaviour of Female Albino Rats. Journal of Medical Research and Health Sciences, 6(7). https://doi.org/10.15520/jmrhs.v6i7.220

Barry, D., & Petry, N. M. (2009). Associations between body mass index and substance use disorders differ by gender: Results from the National Epidemiologic Survey on Alcohol and Related Conditions. Addictive Behaviors, 34(1), 51–60. https://doi.org/10.1016/j.addbeh.2008.08.008

Cherian, R., Westbrook, M., Ramo, D., & Sarkar, U. (2018). Representations of Codeine Misuse on Instagram: Content Analysis. JMIR Public Health and Surveillance, 4(1), e22. https://doi.org/10.2196/publichealth.8144

Cofrancesco, J., Brown, T. T., Luo, R. F., John, M., Stewart, K. J., & Dobs, A. S. (2007). Body composition, gender, and illicit drug use in an urban cohort. American Journal of Drug and Alcohol Abuse, 33(3), 467–474. https://doi.org/10.1080/00952990701301616

Ersche, K. D., Stochl, J., Woodward, J. M., & Fletcher, P. C. (2013). The skinny on cocaine: Insights into eating behavior and body weight in cocaine-dependent men. Appetite, 71, 75–80. https://doi.org/10.1016/j.appet.2013.07.011

FDA. (2017). Highlights of Prescribing Information Warning: Addiction, Abuse, and Misuse; Life Threatening Respiratory Depression; Accidental Ingestion; Ultra-rapid Metabolism of Tramadol and other Risk Factors for Life-Threatening Respiratory Depression in Children. www.fda.gov/medwatch.

Ferguson, M. C., Schumann, R., Gallagher, S., &Mcnicol, E. D. (2019). Single-dose intravenous ibuprofen for acute postoperative pain in adults. Cochrane Database of Systematic Reviews, 2019(2). https://doi.org/10.1002/14651858.CD013264

Fishbain, D. A., Cole, B., Lewis, J., Rosomoff, H. L., &Rosomoff, R. S. (2008). What percentage of chronic nonmalignant pain patients exposed to chronic opioid analgesic therapy develop abuse/addiction and/or aberrant drug-related behaviors? a structured evidence-based review. In Pain Medicine (Vol. 9, Issue 4, pp. 444–459). Blackwell Publishing Inc. https://doi.org/10.1111/j.1526-4637.2007.00370.x

Funk, M. D., Lee, M., Vidoni, M. L., &Reininger, B. M. (2019). Weight loss and weight gain among participants in a community-based weight loss Challenge. BMC Obesity, 6(1), 2. https://doi.org/10.1186/s40608-018-0225-1

Fuseini, A., Afizu, A., Yakubu, Y. H., &Nachinab, G. (2019). Facilitators to the continuous abuse of tramadol among the youth: A qualitative study in Northern Ghana. Nursing Open, 6(4), 1388–1398. https://doi.org/10.1002/nop2.353

Gould, T. J. (2010). Addiction and cognition. In

Addiction science & clinical practice (Vol. 5, Issue 2, pp. 4–14). BioMed Central.

Grond, S., &Sablotzki, A. (2004). Clinical pharmacology of tramadol. In Clinical Pharmacokinetics (Vol. 43, Issue 13, pp. 879–923). ClinPharmacokinet. https://doi.org/10.2165/00003088-200443130-00004

Hassamal, S., Miotto, K., Dale, W., &Danovitch, I. (2018). Tramadol: Understanding the Risk of Serotonin Syndrome and Seizures. In American Journal of Medicine (Vol. 131, Issue 11, pp. 1382.e1-1382.e6). Elsevier Inc. https://doi.org/10.1016/j.amjmed.2018.04.025

Hodgkins, C. C., Cahill, K. S., Seraphine, A. E., Frostpineda, K., & Gold, M. S. (2004). Adolescent Drug Addiction Treatment and Weight Gain. Journal of Addictive Diseases, 23(3), 55–65. https://doi.org/10.1300/J069v23n03_05

Ibrahim, A. W., Yerima, M. M., Pindar, S. K., Onyencho, V. C., Ahmed, H. K., Machina, B. K., Shehu, S., Rabbebe, I. B., & Wakil, M. A. (2017). Tramadol Abuse Among Patients Attending An Addiction Clinic in North-Eastern Nigeria : Outcome of a Four Year Retrospective Study. Advances in Psychology and Neuroscience, 2(2-1), 31–37. https://doi.org/10.11648/j.apn.s.2017020201.16

Incb. (2018). Narcotic Drugs — Estimated World Requirements for 2018 — Statistics for 2016. www.incb.org

Jovanović-Čupić, V., Martinović, Ž., &Nešić, N. (2006). Seizures associated with intoxication and abuse of tramadol. Clinical Toxicology, 44(2), 143–146. https://doi.org/10.1080/15563650500144418

Karamatic, R., Croese, J., & Roche, E. (2011). Serious morbidity associated with misuse of over-the-counter codeine-ibuprofen analgesics. In Medical Journal of Australia (Vol. 195, Issue 9, p. 516). https://doi.org/10.5694/mja11.10463

Marrazzi, M. A., McQuarters, A., Barnes, C., Lawhorn, J., & D'Amico-Rasmussen, Q. (1996). Male/female comparison of morphine effect on food intake - Relation to anorexia nervosa. Pharmacology Biochemistry and Behavior, 53(2), 433–435. https://doi.org/10.1016/0091-3057(95)02013-6

McCabe, S. E., West, B. T., Schepis, T. S., &Teter, C. J. (2015). Simultaneous co-ingestion of prescription stimulants, alcohol and other drugs: A multi-cohort national study of US adolescents. Human Psychopharmacology, 30(1), 42–51. https://doi.org/10.1002/hup.2449

Milano, G., Natta, W. M., Bello, A., Martelli, A., & Mattioli, F. (2017). Codeine precipitating serotonin syndrome in a patient in therapy with antidepressant and triptan. Clinical Psychopharmacology and Neuroscience, 15(3), 292–295. https://doi.org/10.9758/cpn.2017.15.3.292

Mysels, D. J., & Sullivan, M. A. (2010). The relationship between opioid and sugar intake: Review of evidence and clinical applications. In Journal of Opioid Management (Vol. 6, Issue 6, pp. 445–452). https://doi.org/10.5055/jom.2010.0043

Nielsen, S., Murnion, B., Dunlop, A., Degenhardt, L., Demirkol, A., Muhleisen, P., &Lintzeris, N. (2015). Comparing treatment-seeking codeine users and strong opioid users: Findings from a novel case series. Drug and Alcohol Review, 34(3), 304–311. https://doi.org/10.1111/dar.12224

Nielsen, S., & Van Hout, M. C. (2017). Over-the-Counter Codeine-from Therapeutic Use to Dependence, and the Grey Areas in Between.

Current Topics in Behavioral Neurosciences, 34, 59–75. https://doi.org/10.1007/7854_2015_422

Olsson, M. O., Öjehagen, A., Brådvik, L., Kronstrand, R., &Håkansson, A. (2017). High Rates of Tramadol Use among Treatment-Seeking Adolescents in Malmö, Sweden: A Study of Hair Analysis of Nonmedical Prescription Opioid Use. Journal of Addiction, 2017, 1–9. https://doi.org/10.1155/2017/6716929

Oraegbune, O. M., Adole, A. M., & Adeyemo, V. O. (2017). An Appraisal of Psychotropic Drugs and their Consequences among the Construction Industry Workers in Nigeria, Adamawa State. Case study. Nigerian Journal of Technology, 36(1), 241–251. https://doi.org/10.4314/njt.v36i1.29

Owens, B. (2020). Methadone Addiction and Weight Problems | Michael's House Treatment Centers. https://www.michaelshouse.com/methadone-addiction/methadone-addiction-and-weight-problems/

Pasch, K. E., Velazquez, C. E., Cance, J. D., Moe, S. G., & Lytle, L. A. (2012). Youth Substance Use and Body Composition: Does Risk in One Area Predict Risk in the Other? Journal of Youth and Adolescence, 41(1), 14–26. https://doi.org/10.1007/s10964-011-9706-y

Pickering, R. P., Goldstein, R. B., Hasin, D. S., Blanco, C., Smith, S. M., Huang, B., Pulay, A. J., Ruan, W. J., Saha, T. D., Stinson, F. S., Dawson, D. A., Chou, S. P., & Grant, B. F. (2011). Temporal relationships between overweight and obesity and DSM-IV substance use, mood, and anxiety disorders: Results from a prospective study, the national epidemiologic survey on alcohol and related conditions. Journal of Clinical Psychiatry, 72(11), 1494–1502. https://doi.org/10.4088/JCP.10m06077gry

Salamone, J. D., & Correa, M. (2013). Dopamine and food addiction: Lexicon badly needed. In Biological Psychiatry (Vol. 73, Issue 9, p. e15). NIH Public Access. https://doi.org/10.1016/j.biopsych.2012.09.027

Salm-Reifferscheidt, L. (2018). Tramadol: Africa's opioid crisis. Lancet (London, England), 391(10134), 1982–1983. https://doi.org/10.1016/S0140-6736(18)31073-0

Stannard, C. (2013). Opioids in the UK: What's the problem? In BMJ (Online) (Vol. 347, Issue 7922). British Medical Journal Publishing Group. https://doi.org/10.1136/bmj.f5108

Stoppler, M. C. (2018). Definition of Weight loss. https://www.medicinenet.com/weight_loss_problems_solutions/article.htm

Tremlett, M., Anderson, B. J., & Wolf, A. (2010). Pro-con debate: Is codeine a drug that still has a useful role in pediatric practice? In Paediatric Anaesthesia (Vol. 20, Issue 2, pp. 183–194). PaediatrAnaesth. https://doi.org/10.1111/j.1460-9592.2009.03234.x

Vieira, K. (2015). Alcohol, Drugs and Weight Gain or Loss: What the Research Says. https://drugabuse.com/guides/substance-abuse-and-weight-change/

Volkow, N. D., Wang, G. J., Fowler, J. S., Tomasi, D., & Baler, R. (2011). Food and drug reward: Overlapping circuits in human obesity and addiction. Current Topics in Behavioral Neurosciences, 11, 1–24. https://doi.org/10.1007/7854_2011_169

Walder, B., Tramer, M. R., & Blois, R. (2001). The effects of two single doses of tramadol on sleep: a randomized, cross-over trial in healthy volunteers. European Journal of Anaesthesiology, 18(1), 36–42. https://doi.org/10.1046/j.1365-2346.2001.00772.x

Warren, M., Frost-Pineda, K., & Gold, M. (2005). Body mass index and marijuana use. Journal of Addictive Diseases, 24(3), 95–100. https://doi.org/10.1300/J069v24n03_08

World Health Organization (WHO) (2017). Expert Committee on Drug Dependence. Thirty-eighth report, WHO Technical Report Series, No. 1005, 2017, ISBN 978 92 4 1210140 (44 pages)

Yeomans, M. R. (2010). Alcohol, appetite and energy balance: Is alcohol intake a risk factor for obesity? Physiology and Behavior, 100(1), 82–89. https://doi.org/10.1016/j.physbeh.2010.01.012

Zhang, H., & Liu, Z. (2013). The Investigation of Tramadol Dependence with No History of Substance Abuse: A Cross-Sectional Survey of Spontaneously Reported Cases in Guangzhou City, China. BioMed Research International, 2013. https://doi.org/10.1155/2013/283425

Factors Influencing the Use of Discretion in The Control of Illicit Brew Trade in Kenya, A Case of Kakamega and Uasin Gishu Counties

Heather E. Kipchumba[1*], David M. Minja [1]and Felix M. Kiruthu[1]

[1]Kenyatta University, Department of public policy and administration, Kenya

***Corresponding Author:**

Heather Eddah Kipchumba

Kenyatta University, Department of public policy and administration, Kenya

Email address: eddaheather@gmail.com
Tel: No. 0708 281 345

Abstract

Discretionary powers among street-level bureaucrats have the capacity of changing public policy on the spot, from its intended goals to new policies. Research on the use of discretion in the implementation of alcohol control policy on illicit brews is scanty. The paper, therefore, sought to examine the factors that influenced the Chiefs and their assistants in Kakamega and Uasin Gishu counties to utilize discretionary powers. The research utilized a cross-sectional research design, using a sample size of 124 respondents. A structured questionnaire was used to collect both qualitative and quantitative data and were analyzed using descriptive statistics and presented using tables. The research established that inadequate personnel, insecurity, inadequate stakeholder co-ordination, expansive jurisdictions, the status of the traders and inadequate means of transportation were the driving factors behind the use of discretion among the administrators, negatively impacting the control of illicit brew trade in the counties.

Key words: *Discretionary powers, policy implementation, illicit brews, street-level bureaucracy*

Introduction

Street-level bureaucracy is a theoretical model developed by Michael Lipsky in 1980 in his seminal book 'street-level bureaucracy' (Lipsky, 1980). It is a policy implementation framework used to explain the behavior of frontline and the lowest level of an organization's policy implementers and how their decisions directly affect the outcome of policies (Thao, 2017). According to Lipsky (2010), street-level bureaucracies are 'public service agencies that employ a significant number of street-level bureaucrats. The street-level bureaucrats on the other hand are 'the public service workers who directly interact with the citizen in the course of their jobs, and possess substantial discretion in the execution of their work' (Lipsky, 1980).

Street-level bureaucrats are all front-line workers in an organization such as the teachers, nurses, police officers, counsellors, among others whose duty involves direct interaction with citizen while implementing tasked public policies (Evans, 2016, Hupe, 2007). Public policy implementers at the street level possess some level of autonomy in implementing public policies, alcohol control inclusive. They are faced with real situations that are not catered for by legislations, forcing them to utilize discretion (Tummers & Bekkers, 2014).

Discretion is the authority vested upon government administrators in making policy implementation decisions, offering them the freedom to choose alternatives considered most appropriate in policy implementation. The chosen alternatives are expected to suit public interests (Vitanski, 2015). Regrettably, this is usually not the case. Lipsky (1980) and Evans (2010) defined discretion as; the extent to which a front line worker can exercise

their freedom of choice in particular contexts based on specific factors in deciding whether to implement a policy as it is, or alter it to suit the shortcomings of the implementation process.

Interestingly, public policy implementation is influenced by multifaceted, complex and multi-level factors, particularly policies meant to control 'wicked problems' that have overtime proved to be resistant to changes, and are diverse based on their local contexts (Rittel & Webber, 1973), such as alcohol and drug abuse, that has been in existence for centuries. Policy implementation debates have highlighted the fact that policies do not fail or succeed in their merit, but due to complex and messy government systems (Hudson & Hunter, 2019), discretion being one of the factors. Additionally, the street-level bureaucrats of a top-down system, carry out the actual policy implementation, and are always in constant touch with the citizens. In the course of implementing public policies, they respond to the citizen problems, mostly with inadequate information and limited time to make decisions. Their responses to the citizen in some instances do not necessarily follow the laid down legislations because of myriad policy implementation gaps such as inadequate resources, high public expectations, inadequate measures of performance and ill-defined policy goals in the organizations (Evans, 2016). Consequently, the bureaucrats, employ coping mechanism such as the use of discretionary authority to overcome the demands of their work, utilize limited resources at their disposal and to handle conflicting organizational goals. Moreover, their roles are dichotomized; they are expected to follow a 'rigid' script emphasizing organizational policies and goals, and at the same time, expected to be compassionate, treating each client on a case-by-case basis (Lipsky, 2010).

According to Lipsky's work (1969), Street-Level bureaucrats are identified as people employed by the government who display some specific trends: they are constantly called upon to interact with citizens in the regular course of their jobs, have significant independence in job decision-making, despite working in a bureaucratic organization. Additionally, their actions have the potential to intensively impact the lives of their clients and change the intended goal of the policies they action. Furthermore, the bureaucrats possess relative autonomy from management and enjoy a wide range of discretionary authority when making decisions to execute public policies. Thus, are not strictly bounded by precise rules in making their daily decisions, despite laid down codes of conduct. Therefore, the discretionary authority that they possess allows their actions to shape public policy outcome on the spot (Lipsky, 2010). Illicit brews are the traditional artisanal alcohol that is brewed at home from locally available materials. The liquor has not undergone any standardization procedure and therefore deemed illegal.

It is against this background, this paper examines research findings focusing on use of discretion, particularly, by the National Goverment Administrative Officers (NGAOs), specifically, the Chiefs and Assistant chiefs.

Statement of the problem

Implementation of alcohol control policies in Kenya can be traced back to the British colonial government in the East African protectorate. The government introduced the Act of Brussels 1880-90, to control the consumption of alcohol, both traditional artisanal and imported liquor in East Africa (Mututho, 2014). The illicit brew has since been addressed by various alcohol control policies, in different post-colonial government regimes. Having gone through several appeals, the current policy on alcohol in Kenya is the Alcoholic Drinks Control Act

2010, an amended Act of Parliament that consolidated all other laws on alcohol into one (Musungu & Kosgei, 2015; Mututho, 2014).

Several scholars have investigated the implementation of the Alcoholic Drinks Control Act 2010 (Kwambai & Kimutai, 2017; Akoth, 2012; Gitau, 2018, Mututho, 2014), but were carried out in different contexts in Kenya. Local studies in Kakamega and Uasin Gishu counties, have also been carried on illicit brews and their effects and control (Takahashi et al, 2017; Were, 2011; Barasa, 2018; Mmbali, 2016; Tuwei, 2014 and Komen, 2014), but were not directly investigating discretionary factors that drive national government administration bureaucrats in Kakamega and Uasin Gishu counties while implementing policy on illicit brew, a gap that the study sought to fill.

Research objective

The research objective of the study was to determine the factors influencing national government administration officers to use discretion in implementing alcohol control policy on illicit brews in the study area

Methodology

Research design

The study employed a cross-sectional descriptive research design because it favors studies carried out in contextual, natural, and real-life settings. The design also allows the researcher to probe details, to understand why people act in certain ways and how they account for their actions (Gray, 2010). The study, therefore, adopted the design to explain the factors influencing the Chiefs and Assistant chiefs to use discretion in implementing alcohol control policy on illicit brews in Kakamega and Uasin Gishu counties.

Target population

The study targeted all the national government administration officers at the street level from Kakamega and Uasin Gishu counties. They comprised 486 Chiefs and Assistant chiefs as presented in Table 1.

Table 1: Target population

Name of the County	No. of Chiefs	No. of Assistant Chiefs
Kakamega County	81	241
Uasin Gishu County	57	107
Total	**138**	**348**

Sources: Office of the CC, Kakamega and Uasin Gishu Counties, 2019

Kakamega County had a total of 81 Chiefs and 241 Assistant chiefs while Uasin Gishu had 57 Chiefs and 107 Assistant chiefs (Office of the County Commissioners, Kakamega and Uasin Gishu Counties, 2019).

Sample and sampling technique

Additionally, 30% of the Chiefs (41) and Assistant chiefs (104) respectively were sampled. The sample size was therefore 145 National government administrative officers at the street-level, as provided in Table 2.

Table 2: Sample size

Group	Kakamega County (12 sub-counties)	Uasin Gishu sub-county (6 Sub-counties)	Totals
Chiefs	24	12	36
Assistant chiefs	72	36	108
Total	**96**	**48**	**144**

Data collection and research instrument

Self-administered questionnaires with both structured and open-ended questions were used to collect data between 8th August 2019 and 25th July 2020. The NGAOs were given adequate time to fill the questionnaires. A total of 124 of the questionnaires were correctly filled and returned. The collected data was both qualitative and quantitative.

Data analysis

Quantitative data were analyzed using descriptive statistics while the qualitative data was analyzed thematically. Qualitative data was transcribed from its written form, edited and coded to create categories and themes.

Research results and discussion

The Chiefs and Assistant Chiefs are the street-level bureaucrats in the Ministry of Interior and Co-ordination of national government. They form part of the stakeholders at the street level implementing alcohol control policies through law enforcement, facilitating inter-agency collaboration, carrying out public education and advocacy on alcohol and drug abuse reduction (RoK, 2018). According to the National Government Co-ordination Act, 2013, the NGAOs, play a role in coordinating national government functions, protecting the peoples' safety and well-being, alcohol and drug abuse inclusive. The Chiefs and Assistant Chiefs, therefore, play a crucial role in the fight against illicit brews, through presidential directives and executive orders but their efforts, such as raids, arrests, and civic education are hampered by factors that push them to exercise discretion.

Factors driving the use of discretionary powers

The objective of the study was to examine the factors driving the National government administrative officers at the street level to utilize discretion while implementing illicit brew control policy. Their responses are presented in Table 3

Table 3: Factors driving the use of discretionary powers

Reasons for discretion	Frequency (f)	Percentage (%)
Inadequate personnel	91	73.4
Inadequate means of transportation	87	70.2
Inadequate stakeholder co-ordination	86	69.4
Insecurity	61	49.2
Other administrative duties	48	38.7
Status of the trader	53	42.7
Vast jurisdictions	33	26.6

Source: Field data, 2019

Inadequate Personnel

The Majority, 73.4 % of the administrators resorted to the use of discretion because the personnel needed to control illicit brews was inadequate. To achieve satisfactory control, the Chiefs require the support of their colleagues and that of the police and other stakeholders, such as the county government, the community policing committees and village elders. It was thus observed that some of the jurisdictions were vacant, while others had no police posts. In the local police posts, the officers were reported to be inadequate and required pre-planning for allocation of officers in illicit brew control. This led to implementation gaps, hence discretion.

It was also noted that the bureaucrats depended on the services of village elders, nyumba kumi initiatives and youth who were hired to help in the implementation of the policy. However, catering for their services brought with it additional financial implications. Thus, in the absence of adequate personnel, they resorted to their discretionary authority, implying that, illicit brew trade would continue unabated, until the officers' acquired adequate human resource reinforcement.

Inadequate means of transportation

It was reported by 70.2% of the Administrators that inadequate means of transportation forced them to resort to use of discretion. Most of them (62.1%) had reported that they did not have any formal means of transportation provided by their Ministry while 33.9% reported having government motorbikes. However, 77.4% reported having used hired motorbikes (bodabodas) during raids, arrests and transportation of suspects and exhibits.

It was also found that government vehicles available at the ward and sub-county offices were used in controlling illicit alcohol, but availability highly depended on the NGAOs negotiation and co-ordination skill with the office of the Assistant County Commissioner, or the Deputy County Commissioner, where applicable, the police and the county government. Unavailability implied resorting to discretionary powers, implying that the bureaucrats may not partake in raids and arrests.

Inadequate stakeholder co-ordination

It was reported by 69.4% of the Administrators that they resorted to using discretion because there was inadequate stakeholder coordination in the process of controlling illicit brews. According to Ferreira-Borges et al. (2013), stakeholder coordination within and outside government in most African countries were lacking in the control of alcohol. Moreover, Lutta (2016) noted that to achieve effective control of alcohol in Kenya, there has to be a good working relationship and coordination between the Police officers and the National government administrative officers.

According to the National Alcohol and Drug Abuse Policy of 2018, it was contended that Kenya was experiencing weak linkages among public sector stakeholders controlling alcohol and between public and private stakeholders, coupled with inadequate policy enforcement. The policy therefore aimed at enhancing harmony and coordination among stakeholders (RoK, 2018).

The adoption of a devolved system of government further saw the transfer of some services, from the central government to the county government, inclusive of alcohol control (Rok, 2013). Additionally, National Authority for Campaign Against Alcohol and Drug abuse (NACADA) Act, 2012, was established by parliament in 2012, to coordinate a multi-sectoral campaign against alcohol and drug abuse. Moreover, NACADA is tasked with policy development and dissemination, creation of alcohol and

drug abuse awareness, research, monitoring and training and reporting (NACADA, 2014; Rok, 2018)

However, 44.7% of the Chiefs and Assistant chiefs reported as having not been trained on how to implement the Alcoholic Drinks Control Act 2010, implying that the coordination between the Ministry of Interior and other stakeholders responsible for training policy implementers was inadequate. Moreover, the police officers, who constitute a key stakeholder was reported to often sabotage illicit brew implementation efforts by the NGAOs. It was further reported by 37.9% that the NGAOs and the police were corrupt, often receiving bribes from illicit brew traders. Furthermore, some collected weekly or monthly 'returns', while others were informers of planned raids because they benefited from the informal trade.

The county government on the other hand offered licenses to traders, capitalizing on the trade to collect revenue. This has led to unstandardized alcohol sale in the region, duplication of licenses and derailed illicit brew control efforts. In addition, some of the village elders were reported to trade illicit brews while others were consumers. Some members of the public on the other hand condoned the vice, making it hard to work in unison in implementing the policy against illicit alcohol.

The courts were also another stakeholder linked to inadequate coordination in the fight against trade and consumption of illicit brews. It was reported by 23.4% that, the penalties given to illicit brew traders presented to the court were too lenient to deter them from reverting to the illicit enterprise. As a driver for discretion, it was observed that, in the counties, there was disconnect between stakeholders controlling illicit brews, with success stories only applicable between two stakeholders, cutting out the rest. Consequently, giving the NGAOs the discretionary authority on when and when not to control the trade.

Insecurity

Some of the respondents 49.2%, reported about insecurity in their working environment while controlling illicit brew trade motivated them to utilize discretion. It was clear that, while controlling illicit artisanal alcohol, the bureaucrats were faced with both personal and family threats, emanating from traders, consumers, and sometimes local political leaders.

It was further noted that the rural areas were not different from the urban slums, though the slums posed more risks to the bureaucrats because of large populations and community watches set up by both traders and consumers, acting as informers of any intended raid within their communities. The infiltration of mobile technology has further complicated the insecurities that face the administrators. The technology was reported to be used to either sabotage their operations or warn them from discharging their duties, coupled with a high number of intoxicated and irate youth, ready to fight off officers entering illicit brew trade premises.

Moreover, double standards by other administrative officers controlling illicit alcohol such as the police, the community policing members and the county government askaris put the Chiefs and Assistant chiefs at risk. Some support the trade for their benefits, creating antagonism. Additionally, the Chiefs and Assistant chiefs are not armed, hence, compromising their security while on duty. This outcome supports Michael Lipsky's (2010) theoretical assumptions that street-level bureaucrats, exercise discretion as a coping mechanism to evade psychological and physical threats, consequently changing the policy implementation process and goals.

Other administrative duties

Besides the control of illicit brews in their jurisdictions, 38.7% of the Chiefs and Assistant chiefs reported that other administrative duties, forming part of their core functions, forced them to resort to discretion in controlling illicit artisanal liquor. Therefore, they perform their functions based on the priorities at their disposal.

The administrative functions of the Chiefs and Assistant Chiefs are provided in the Ministry of Interior and National Co-ordination Act, 2013. They are expected to co-ordinate national government functions such as crime prevention in their areas of jurisdictions, maintaining order, and provide administrative services, among others (RoK, 2012). If rapid result initiatives are introduced, such as registration of persons, their priorities shift, thus, control of artisanal liquor, is held back. This implies that other administrative duties give the bureaucrats no option other than to exercise their discretionary powers in deciding which duty to perform. On the other hand, it jeopardizes efforts earned in illicit brew control. As a result, traders take advantage of their busy schedules to brew, sell and distribute the informal liquor.

Vast jurisdictions

Difficulties posed by expansive areas of jurisdictions were reported by 26.6% of the NGAOs. The rationale behind vast jurisdictions was the vacant offices in locations and sub-locations, and therefore, other administrators covered the vacant positions to ensure continuous service delivery, inclusive of illicit brew control.

The vast jurisdiction is further complicated by inadequate stakeholder coordination, demand for services from the citizens, and other administrative duties. It was also reported that delayed recruitment of NGAOs to fill vacant posts was a force behind discretionary authority in alcohol control. The officers become overstretched, balancing between offering services in the areas they were appointed to serve, and other jurisdictions they serve at an acting capacity, and temporarily. The demand for their services, therefore, leads them to use coping mechanisms, hence discretion, affecting how they implement alcohol control policy on illicit brews.

Status of a trader

The status of the trader was reported by 42.7% of the respondents, as one of the driving force towards use of discretion in the control illicit alcohol. As argued by Lipsky (1969), street-level bureaucrat's work in implementing public policies is dichotomous; they are expected to strictly follow policies while actioning them to achieve desired goals but are also expected to show compassion to their clients in the process of implementation of the policy.

According to Angervil (2017), bureaucrats are expected to strictly follow policies and at the same time be compassionate to their clients while acting on policies. They, therefore, use their judgment on the clients and decide the costs and benefits that they can offer. The NGAOs in Kakamega and Uasin Gishu counties practiced their discretionary judgment based specific individual status of the traders.

First, illicit brew traders with specific medical afflictions were not arrested by the NGAOs. They were deemed to suffer and taking them to court would further damage their health condition, and they might be blamed by their communities for any adversities arising from their arrest. Known epileptics, HIV positive patients identified from previous arrests, persons with hypertension and other illnesses were not arrested.

Secondly, people living with disability, those taking care of disabled members of their families also benefited from the administrators' discretion. Thirdly, mothers with dependent children, who were sole breadwinners in their households, expectant mothers and guardians to underage children were not arrested during raids. The fourth group were the aged illicit brew traders who were above 70 and were viewed as senior citizens and respected. Finally, the NGAOs reported that there were individuals who lived in extreme poverty that illicit brewing and selling was their only means of survival. The administrators, therefore, processed them and imposed costs on them, instead of arresting and having them judged in a court of law.

Contribution to new Knowledge

Discretionary powers at the street level is a relatively new concept that has not been actively utilized in policy implementation studies in Kenya. From the findings, The implementation of alcohol control policy on illicit brews was hampered by the discretionary powers of the Chiefs and Assistant chiefs blamed on inadequate human and capital resources, vast jurisdictions, threats in the working environment and vast jurisdictions, policy implementations variables that when catered for can lead to effective control of illicit brew at the street level. Lipsky's theoretical assumptions on discretion were therefore validated by the research outcome.

Conclusion

Conclusively, the study established that public policy implementation highly depends on the complexity between legislations and practical reality on the ground. The use of discretion by the Chiefs and Assistant chiefs often changes the desired goals to curb illicit brews, either creating a status quo, or escalating the illicit trade. This is because the policy requires adequate human and physical resources to achieve efficiency, but also due to empathy and dichotomy of what it is expected of them. The Chiefs and Assistant chiefs therefore, possess significant levels of discretion that can be curtailed by management by addressing personnel inadequacy, improving their security, strengthening stakeholder coordination and revamping both material and financial resources. Discretionary powers among the Chiefs and Assistant Chiefs therefore emanate from the gaps in policy implementation process and as a result, derail the gains in controlling illicit brew trade.

References

Akoth, D. E. (2012). Effect of alcoholic drinks control act 2010 on alcohol consumption among residents of Nairobi County. A research project submitted in partial fulfillment of the requirements for the award of the degree of Master of Arts in project planning and management at the University of Nairobi.

Evans, T. (2010). Professional managers and discretion: Critiquing street-level bureaucracy, The British Journal of social work, 41(2): 368-386.

Evans, T. (2016). Professional discretion in welfare services: beyond street level bureaucracy, Routledge publishers, New York, USA.

Ferreira-Borges, C., Ketsela, T., Manodawafa, D. and Alisalad, A. (2013). Reduction of the harmful use of alcohol: a strategy for WHO, Africa region. Retrieved on 10th June 2018 from http://afro.who.int/sites/default/files/2017-06/ahm/608.pdf

Gilson L. (2015) Lipsky's Street Level Bureaucracy. Chapter in Page E., Lodge M and Balla S (eds) Oxford Handbook of the Classics of Public Policy. Oxford: Oxford University Press

Gitau, W. P. (2018). Factors Associated with Adherence to regulations on illicit alcohol sale in Thika Municipality, Kiambu County. A thesis submitted in Partial fulfillment for the degree of Master of Public Health, Jomo Kenyatta University.

Gray, E.D. (2010). Doing research in the real world, 3rd edition. retrieved from https://www.researchgate.net/publication/239938424_Doing_Research_in_the_Real_World_3rd_edition

Hudson, B., Hunter. D. & Peckham, S. (2019).Policy failure and the policy - implementation gap: can policy support programs help?, Policy Design and Practice, 2:1, 1- 14, DOI: 10.1080/25741292. 2018.1540378

Hupe, P. & Hill, M. (2007). Street-Level bureaucracy and public accountability, Public Administration, 85(2): 279-299.

Komen, K. K. (2014). Factors influencing drug abuse among secondary school students in Uasin Gishu East sub-county. A research project submitted in partial fulfillment of the requirements for the awards of Master of Arts degree in project planning and management, University of Nairobi.

Kwambai, M. & Kimutai, S. K. (2017). Effects of consumer perceived barriers to the implementation of Alcoholic Drinks Control Act 2010 on compliance. International Journal of academic research in Business and social sciences, 7(11): 963-976.

Lipsky, M. (1969). Towards a theory of Street-level bureaucracy. Institute of Research on Poverty, University of Wisconsin.

Lipsky, M. (2010). Street-level bureaucracy, 30th ann. Ed.: dilemmas of the individual in public service. Russell Sage Foundation.

Lutta, P. (2016). Corruption and enforcement personnel as factors that influence the implementation of alcohol and drug abuse policies in Nairobi. A research project submitted in partial fulfillment for the requirements for the award of the degree of Master of Arts in political science and public administration, University of Nairobi, Kenya.

Mmbali, S. O. (2016). Alcoholism, bribery and abuse of power: A case study of chang'aa and Busaa in western Kenya. American Journal of social sciences, 4(1): 11

Musungu, B. J. & Kosgei, K. P. (2015). Production and consumption of non-standardized alcohol in Kenya: With whom does the buck stop? Global journal of Arts, Humanities and social sciences. 3 (10): 8-16.

Mututho, J. (2014). Alcohol in Kenya: Historical background. 68th World Congress of IOGT International at Cha Am, Thailand. Accessed on 3rd January 2018 from http://www.iogt.org/wp-content/uploads/2014

NACADA (2014). Summary report on morbidity and mortality caused by alcohol consumption in various parts of the country as at 11th May, 2014, NACADA board of directors, Nairobi.

Republic of Kenya (2012). The Chief's act, Chapter128. National Council for Law reporting, Nairobi.

Republic of Kenya (2013). The National Government Co-ordination Act, 2013. Kenya Gazette Supplement, Government Printer, Nairobi, Kenya.

Republic of Kenya (2018). The National Alcohol and drug abuse policy. Ministry of Interior and Coordination of National Government, Nairobi, Kenya.

Rittel, H. W. J, & M. M. Webber. 1973. "Dilemmas in a General Theory of Planning." Policy Sciences 4 (2): 155–169

Takahashi, R, Wilunda, C., Magutah, K., Tenambergen, M. W., Wilunda, B. and pengparn, (2018). Correlates of alcohol consumption in rural western Kenya: A cross- sectional study, BMC psychiatry, 17:175.

Tummers, L.G. & Bekkers, V.J.J.M. (2014). Policy implementation, street-level bureaucracy and the importance of discretion. Public Management Review, 16(4), 527-547.

Tuwei, P. C. (2014) Influences of drug abuse on students' academic performance in public universities. A case of Uasin Gishu County, Kenya. A research project, submitted in partial fulfillment for the award of degree of Master of Arts, in project planning and management, University of Nairobi.

Vitanski, D. (2015). Discretionary powers of the administration. Journal of process management, New technologies, International. (JPMNT), Vol.3, No. 2.

Were, O. I. (2011). A survey of illicit brew consumption and its effects on socio-economic status in the households of Mumias Division, Kakamega County, Kenya. A thesis submitted in partial fulfillment for the award of the degree of Masters in public health, school of public health, Moi University.

Emerging Trends on Non-Medical Use of Prescription Drugs in Kenya

Morris Kamenderi[1*], John Muteti[1], Victor Okioma[1], Job Kandie[2], William Munyoki[3] Kirwa Lelei[1] and Stephen Kimani[1]

[1]National Authority for the Campaign Against Alcohol and Drug Abuse (NACADA), Kenya

[2]Pharmacy and Poisons Board, Kenya

[3]Government Chemist, Kenya

Corresponding Author:

Morris Kamenderi,

Directorate of Research and Policy Development,

National Authority for the Campaign Against Alcohol and Drug Abuse (NACADA), Kenya

Abstract

The last decade has experienced increased availability of substances in the drug markets and the growth of a dynamic market for non-medical use of prescription drugs. Data suggests that non-medical use of prescription drugs exceeds many illicit drugs. Despite the growing global problem of non-medical use of prescription drugs, it has not been accorded the much needed attention especially in Africa and Kenya in particular. The study therefore aimed to establish evidence of non-medical use of prescription drugs in Kenya. The study used an exploratory cross-sectional design. The study was conducted in the eight regions of Kenya where 18 purposively sampled counties were covered. The study relied on non-probability sampling methods. Results of laboratory analysis confirmed that antidepressants, antipsychotic, anticholinergic, opioid analgesics, anaesthetics and antihistamines were the most prevalent prescription drugs for non-medical use. The study established evidence of non-medical use of prescription drugs. Towards addressing this emerging problem, the study recommends the need for more stringent measures to control prescription drugs with high potential for abuse; engagement of the law enforcement agencies and the healthcare providers to suppress diversion of prescription drugs for non-medical use; and implementation of demand reduction strategies aimed at prevention and education of those at risk on the potential harms and other adverse consequences of non-medical use of prescriptions drugs.

Key words: *Non-medical use and prescription drugs*

Introduction

Non-Medical Use of Prescription Drugs (NMUPDs) usually involves consumption of a prescription drug without a doctor's prescription or non-compliance with the prescription guidelines (Bennett, Holloway and May, 2018; Cicero and Ellis, 2017; Hulme, Bright and Nielsen, 2018). This includes consumption of a prescription drug at a higher dose; prolonged duration or frequency of use; altering routes of administration; and concurrent or consecutive use with other medications or illicit substances (Lankenau et al., 2012; Schepis, 2018).

The last decade has experienced increased availability of substances in the drug markets and the growth of a dynamic market for NMUPDs (UNODC, 2020). Data from UNODC shows that NMUPDs exceeds many illicit drugs and is ranked second after cannabis in some countries (UNODC, 2020). For example, in the United States, current non-medical use of prescription analgesics and tranquillizers follows illicit use of cannabis, with 3.3 and 2.0 million

people aged 12 or older (SAMHSA, 2017). In England and Wales, 6.4% of adults aged 16 to 59 (approximately 2.2 million people) reported non-medical use of prescription analgesics in the past year (Home Office, 2019). Although there are inadequate global estimates on the non-medical use of pharmaceutical opioids, tramadol has been reported in many countries from West and North Africa and the Middle East; while hydrocodone, oxycodone, codeine, tramadol and fentanyl has been reported in North America (UNODC, 2020). For instance, data from Nigeria shows that 4.6 million people were estimated to have used pharmaceutical opioids for non-medical use especially tramadol (National Bureau of Statistics and UNODC, 2018). The problem of NMUPDs in Kenya is more prevalent among adolescents with data indicating lifetime usage of 10.4% among primary school pupils (NACADA, 2018) and 16.1% among secondary school students (NACADA, 2016).

Although there is limited data on the consequences of NMUPDs, The Drug Abuse Warning Network estimated that there were 228,366 emergency department visits in 2011 resulting from a drug-related suicide attempt, with almost all cases (95%) involving prescription drugs (SAMHSA, 2011). In 2010, there were 38,329 drug overdose deaths in the USA, most involving use of pharmaceuticals (Jones, Mack and Paulozzi, 2010). Mortality arising from the drug related overdose was mainly attributed to pharmaceuticals especially opioids (16,651, 75.2%), benzodiazepines (6,497, 29.4%), antidepressants (3,889, 17.6%), and antiepileptic and anti-parkinsonism drugs (1,717, 7.8%) (Jones, Mack and Paulozzi, 2010).

Despite the growing global problem of NMUPDs, it has not been accorded the much needed attention especially in Africa and Kenya in particular. Although there is evidence of NMUPDs from national surveys in Kenya, there is limited evidence on the profile of specific drugs. Further, current strategies on alcohol and drug abuse prevention and control lay emphasis on the traditional drugs and substances of abuse namely alcohol, tobacco, khat, cannabis, heroin and cocaine with limited focus on NMUPDs. This study therefore aims to establish evidence of NMUPDs in Kenya. The findings provide valuable data to control access and misuse of prescription drugs for non-medical use. This information will also bolster the current strategies on drugs and substance abuse prevention and control in Kenya.

Methodology

Study design

The study used an exploratory cross-sectional design where both qualitative and quantitative data was generated. While the main methodological approach in contemporary research of drugs remains quantitative, there has been a growing responsiveness to triangulate studies with the use of qualitative methods as a means of in-depth investigation and understanding of the problem (Agar, 1980).

Study area

The study was conducted from 1st December 2019 - 30th January 2020 covering the eight regions of Kenya namely; Nairobi, Eastern (Upper and Lower Eastern), Central, Rift Valley (North Rift and South Rift), Nyanza, Western, North Eastern and Coast. In total, 18 counties were covered in the survey. These counties were Nairobi, Kajiado, Nakuru, Kisii, Kisumu, Busia, Trans Nzoia, Uasin Gishu, Kiambu, Nyeri, Meru, Isiolo, Garissa, Marsabit, Makueni, Mombasa, Kilifi and Kwale.

Sampling procedure

The study relied on non-probability sampling methods given the hidden and criminal nature of drug abuse and diversion of prescription drugs through illicit channels. All the eight regions were sampled purposively to understand the national landscape of the problem and to ensure broad representation of respondents based on economic, social and cultural diversity. From each of the eight sampled regions, 18 counties were purposively selected based on known drug use patterns and behaviour (NACADA, 2017), rural-urban dichotomy and proximity to Kenya's national borders. From the 18 counties, 22 sub-counties were purposively selected using similar criteria. From each sub-county, one location was also purposively selected for data collection. These were the units where focus group discussions (FGDs) were conducted as well as collection of suspected samples of prescription drugs for non-medical use prevalent in the area. FGDs were conducted at a venue provided by the area Chief. Identification of the first participant for the FGD was done by the area Chief or youth leaders implementing alcohol and drug abuse prevention and treatment interventions. In the inclusion criteria, a respondent needed to be either a current drug user or a recovering drug user. After identification of the first respondent meeting the inclusion criteria, snow balling sampling method was used to identify the next respondent through peer referral. Each respondent was allowed to recruit one respondent from their networks until a threshold of 6 – 8 FGD participants was achieved. Both male and female genders were included in the sample for FGDs. A total of 22 FGDs were conducted in the eight regions (Table A1). The study targeted a purposive sample of 176 participants.

Research instruments

Qualitative data was captured using focus group discussion guides. This elicited rich qualitative data that aided deeper understanding of the problem of NMUPDs in Kenya. One FGD was conducted in each of the sampled locations. After convening the team, the moderator started the session with the introductions and setting of the ground rules. This was followed by a brief description of the assignment and the benefits of the study findings. The moderator also assured the participants that their anonymity, confidentiality and privacy would be safeguarded. Individual responses were captured in writing in order to encourage participation in the discussions following reservations on the use of tape recording. The interviews were conducted either in Kiswahili or English languages based on the literacy levels of participants. The moderators were recruited prior to the study and trained on the objectives, identification of suspected prescription drugs and procedures for conducting the discussions.

Sample collection

During the FGD sessions, participants were requested to mention all the emerging drugs and substances that they were available in the locality, narrowing down to the specific drugs that they were currently using. From the discussions, the moderators were able to identify a list of suspected prescription drugs for non-medical use that were commonly known by their street names. After the discussion, the moderator identified two volunteers from the FGD who were currently using suspected prescription drugs to assist with the sample collection. Suspected samples were collected using convenience sampling method. After consent was obtained, the volunteers were facilitated to collect one sample per category of each suspected prescription drugs identified during the discussions.

The collected samples were received by a representative from the Government Chemist for coding and labeling. Each sample was

given a sample number; date of sampling; the county, sub-county and location; method of sampling; and the name of the handling officer. This information was further recorded in a sample collection register. Each suspected sample was also recorded according to its street names. After labeling, the samples were packaged and transported to the Government Chemist laboratory for testing and identification. Being an exploratory study investigating an emerging trend, there was no pre-determined sample size. Rather, efforts were made to collect any suspected samples of NMUPDs identified from all the sampled sites.

Sample identification

The samples were processed and screened using the UV-Visible Spectrophotometer (Shimadzu UV-VIS – 1650PC) and identity confirmed using Gas Chromatography linked with Mass Spectrometer detector (GC-MS, Agilent Model GC 7890B with a mass spectrometer 5977A MSD). Identification of samples was limited to the use of Agilent Life Sciences G1035D Wiley10th with NIST 2011 MS Library. GC-MS is one of the most commonly used techniques for the identification and quantitation of forensic drug samples including pharmaceuticals. As a "hyphenated" technique, it combines the separation power of a GC with the analyte specificity of a spectroscopic technique, providing highly specific spectral data on individual compounds in a complex mixture often without prior separation (Gill, Stead and Moffat, 1981; Rop et al., 1988). GC-MS and UV-VIS spectrometry techniques are also destructive in nature, because they require sample preparation making them unsuitable for use afterwards.

Data analysis

Descriptive statistics especially frequencies and percentages were used to describe, organize and summarize results from laboratory analysis. Content analysis was used to analyse the qualitative data. Field notes from the FGDs were entered into the computer immediately after the discussions. The field notes were reviewed numerous times and the broad thematic areas were extracted and coded. The codes were grouped into categories based on similarity. These categories were linked to their sub-categories and subsequently, they were arranged around a common cluster. Finally, the main theme was extracted. The coding process was undertaken by two researchers to ensure comparability of codes. Any differences in the codes were resolved through discussion and consensus. Direct quotes were also generated to capture views and experiences of participants.

Results

Background characteristics

Data from the 22 FGDs showed that a total of 154 respondents participated in the focus group discussions where 124 (85.5%) were male while 30 (19.5%) were female.

Results of laboratory analysis

Confirmatory laboratory results showed evidence of NMUPDs. The most prevalent prescription drugs for non-medical use were benzhexol; diazepam; flunitrazepam; amitriptyline; chlorpromazine; codeine; benadryl; haloperidol; tramadol; propofol; olanzapine; carbamazepine; and chlorpromazine (Table 2). Data also showed that the problem of NMUPDs was evident across a number of sampled counties namely: Nairobi, Garissa, Meru, Marsabit, Makueni, Mombasa, Kilifi, Kwale, Busia, Kisumu, Uasin Gishu and Nyeri (Table B1).

Profile of prevalent prescription drugs for non-medical use in Kenya

Further analysis showed that diazepam was the most prevalent prescription drug for non-

medical use representing 35.2% of the 68 confirmed samples followed by benzhexol (22.0%), flunitrazepam (14.7%), amitriptyline (7.3%), chlorpromazine (4.4%), codeine (4.4%), carbamazepine (1.5%), tramadol (1.5%), chlorpheniramine (1.5%), benadryl (1.5%), haloperidol (1.5%), propofol (1.5%) and olanzapine (1.5%) (Table 1).

Table 1

Profile of prevalent prescription drugs for non-medical use

Prescription Drug	Number	Percent
Diazepam	24	35.2
Benzhexol	15	22.0
Flunitrazepam	10	14.7
Amitriptyline	5	7.3
Chlorpromazine	3	4.4
Codeine	3	4.4
Carbamazepine	1	1.5
Tramadol	1	1.5
Benadryl	1	1.5
Biperiden	1	1.5
Haloperidol	1	1.5
Propofol	1	1.5
Olanzapine	1	1.5
Total	68	100

Note: Data from study findings, 2020

Classification of prevalent prescription drugs for non-medical use

The identified prescription drugs for non-medical use were categorized into 6 classes namely antidepressants (diazepam, flunitrazepam and amitriptyline); antipsychotic (olanzapine, chlorpromazine and carbamazepine); anticholinergic (benzhexol, biperiden and haloperidol); opioid analgesics (codeine and tramadol); anaesthetics (propofol); and antihistamines (benadryl and chlorpheniramine) (Table 2). Data showed that antidepressants were the most prevalent prescriptions drugs for non-medical use (57.3%) followed by anticholinergic drugs (25.0%), antipsychotic drugs (7.4%), opioid analgesics (5.9%), antihistamines (2.9%) and anaesthetics (1.5%).

Table 2

Classification of prevalent prescription drugs for non-medical use

Classification of drugs	List of prevalent drugs	No.	Percent
Total		68	100
Antidepressants	diazepam, flunitrazepam and amitriptyline	39	57.3
Anticholinergic	benzhexol, biperiden and haloperidol	17	25.0
Antipsychotic	olanzapine, chlorpromazine and carbamazepine	5	7.4
Opioid analgesics	tramadol and codeine	4	5.9
Antihistamines	benadryl and chlorpheniramine	2	2.9
Anaesthetics	propofol	1	1.5

Note: Data from study findings, 2020

Reasons for NMUPDs

The study explored the major reasons behind NMUPDs among the study participants to inform intervention areas that could be implemented to reverse this emerging trend. Findings revealed that prescription drugs were being abused due to their psychoactive effects and the perception that these drugs were "legal highs". Participants reported that since these drugs were available in hospitals and drug pharmacies, they were perceived to be legal.

"I don't fear to be arrested for taking these drugs. If you are caught using heroin or marijuana by police, you are going to be arrested. I don't fear to hide when taking these drugs because you can get them from

a chemist or a hospital" (a 21 year old male).

"When I take largactil, I will be high for two days. All I need to do is just to take a hot drink and I am high again" (a 27-year-old male).

Participants also reported that prescription drugs were very affordable, readily available and easily accessible. It was perceived as a cheaper way for users to get "high" especially when they could not access enough finances to purchase the more expensive narcotic drugs especially heroin. It also implied that non-medical use of prescription drugs could have been used to moderate the withdrawal symptoms among heroin users.

"With only 20 ksh, I am able to buy a few tablets that will make me feel good" (a 24-year-old male).

"When I don't have money to buy heroin, I will buy "ma-white" (street name for benxhexol) and use them to cover for missing heroin" (a 32-year-old male).

It was also noted in the discussions that prescription drugs were commonly used to "knock-off" the effect of stimulant drugs in order to overcome the side effects of insomnia. This emerging reason was a major enabler of the non-medical use of prescription drugs with a depressing effect on the central nervous system (CNS).

"After chewing khat for many hours, I can't sleep. I have to take "C5" (street name for diazepam) for me to sleep, otherwise I will stay awake the whole night" (a 30 -year old male).

In addition, it was revealed that prescription drugs were being used to enhance the psychoactive effect of narcotic drugs. It was perceived that the use of two or more drugs with a similar psychoactive effect on the CNS enhanced the intensity of intoxication among the users.

"When I smoke my dose of heroin, I will also top up with some cosmos (street name for benzhexol) to feel more high" (a 31-year-old male).

Further, the study established that prescription drugs were used as a motivation by gangs to commit crime. This included "spiking" and dragging of unsuspecting revelers by commercial sex workers with the primary intention of robbing from them.

"I always take bugizi (street name for flunitrazepam) before I go to commit a crime. It gives me courage not to fear anything. Even when I hurt somebody, tomorrow I will not remember what I did" (a 26-year-old male).

"These days we no longer put mchele (street name for flunitrazepam) in alcohol because men have known. I will buy a chewing gum, make a cut at the centre and insert a small piece of "mchele" in the gum. Once he is drunk, I will offer him a chewing gum but I will first pick one without the drug. Then I will give him the one with a drug. Once he chews the gum, I can do what I want" (a 27-year-old female).

"Men have become clever, but we have become cleverer. I will wait for him to get drunk. Then I will excuse myself and dash to the toilet and smear "mchele" around my lips. When I go back, I will kiss him and give him my saliva to swallow. But myself I will not swallow. Then I will be sure he is finished" (a 36-year-old female).

Sources of prescription drugs for non-medical use

The study explored the common sources of prescription drugs for non-medical use in order to assess the risks of diversion. It was reported that the prescription drugs were mainly supplied by some unethical persons running drug pharmacies as well as unethical healthcare providers in hospitals and mental health facilities. In addition, it was

demonstrated that in some areas, there were organized networks dealing with the supply of prescription drugs for non-medical use. These findings provided evidence of diversion of prescription drugs into the illicit market for non-medical use.

"If I want to buy my drug, I will just go to a chemist and they are going to sell to me" (a 24-year-old male).

"I buy from a specific chemist because they know me. But if you go there they will not sell to you because they do not know you" (a 28-year-old male).

"There is a person in town who gets the drugs in bulk from the hospital. He is the one who sells to us. But if you go to the hospital, they will not give you" (a 24-year-old male).

Discussion

There was emerging evidence of NMUPDs in Kenya. The most prevalent prescription drugs for non-medical use were antidepressants; anticholinergic; antipsychotic; opioid analgesics; antihistamines and anaesthetics. According to the UNODC, the past decade has witnessed the growth of a dynamic market for non-medical use of prescription drugs (UNODC, 2020). Medications with demonstrated non-medical use includes prescription opioids (Allen and Harocopos, 2016; Dertadian et al., 2017) and antidepressants (Mateu-Gelabert et al., 2017). Regulation of controlled substances including prescription drugs is governed by three multilateral treaties: The Single Convention on Narcotic Drugs 1961, as amended by its 1972 Protocol (United Nations, 1961), the Convention on Psychotropic Substances 1971 (United Nations, 1971), and the Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances 1988 (United Nations, 1988). In Kenya, these drugs are scheduled under the Pharmacy and Poisons Act, Cap 244 Revised in 2012 (GoK, 1989) and the Narcotic Drugs and Psychotropic Substances (Control) Act (1994).

According to the findings, diazepam, flunitrazepam and amitriptyline were the prevalent antidepressants for non-medical use. The past 20 years has witnessed increasing spectrum of medications including antidepressants (Evans and Sullivan, 2014). Antidepressants can be abused in multiple of ways, often in the context of polydrug use (Schmitz, 2016). They may be combined with other sedatives to enhance their effects, or they may be used to offset the effect of stimulant use. Non-medical use of antidepressants has arisen from their diversion (Hayhoe and Lee-Davey, 2018).

Anticholinergic drugs especially benzhexol, biperiden and haloperidol were another class of prescription drugs for non-medical use identified by the study. A similar trend has been reported in Jordan where anticholinergic drugs were the most commonly abused substances after opiates, cocaine, marijuana, and amphetamines (Hadidi, 2004). Literature shows that benzhexol is one of the anticholinergic medications with the greatest abuse potential attributed to its potency (Mohan, Mohandas and Dube, 1981). Stephens (1967) also noted that anticholinergic drugs are preferred due to their hallucinogenic effects (Stephens, 1967).

Non-medical use of antipsychotics was another emerging trend with confirmation of olanzapine, chlorpromazine and carbamazepine. The motivation for non-medical use of antipsychotics relates to: self-medication of anxiety, sleep disturbance, insomnia and depression; attenuation of negative effects of consuming or withdrawing from other substances; and enhancement of pleasurable effects through the co-ingestion of other substances (Malekshahi et al., 2015; McLarnon et al., 2012).

Under opioid analgesics, tramadol and medications containing codeine were the

main drugs for non-medical use identified in this class. Non-medical use of pharmaceutical opioids is reported in many countries, especially in countries of West and North Africa and the Middle East (tramadol), and in North America (hydrocodone, oxycodone, codeine, tramadol and fentanyl) (UNODC, 2020). Tramadol which has been identified in some parts of Africa are reportedly intended for the illicit market and the dosage is higher than those prescribed for medical purposes (UNODC, 2020). According to Manchikanti (2006), the non-medical use of prescription opioid analgesics is an ongoing challenge. Its overall burden to society has been difficult to quantify, though it manifests itself in several ways, including the physical and psychological consequences of addiction (Rhodin, 2006).

Another emerging finding was the non-medical use of anaesthetics especially propofol. Studies have showed that the abuse potential of propofol is related to its elation, euphoria and pleasurable feelings (Early and Finver, 2013; Bryson and Frost, 2011; Bonnet and Scherbaum, 2012). Propofol has also been reported to be the most commonly abused anaesthesia medication among anesthesia care providers in Australia and New Zealand (Fry, Fry and Castanelli, 2015). In the United States, Wischmeyer et al (2007) reported a fivefold increase in the non-medical use of propofol after comparing two time periods during 1990-2005.

The study also confirmed the non-medical use of antihistamines (benadryl and chlorpheniramine). Studies have shown that antihistamines; sleep aids; caffeine; ephedrine; pseudoephedrine; antitussives and expectorants; dextromethorphan; laxatives; anabolic steroids; and sildenafil are medications with highest abuse potential (Williams and Kokotailo, 2006; Tseng et al., 2003; Tinsley and Watkins, 1998). In other studies, codeine containing products, cough and cold medications are the most commonly implicated medications for abuse (Cooper, 2013; Murphy, 2001; Derry, Moore and McQuay, 2010; Eickhoff et al., 2012).

Besides laboratory identification of prescription drugs for non-medical use, the study investigated the major reasons associated with this emerging trend. The underlying reasons were related to their psychoactive effect and perception that they were legal; affordability, availability and accessibility; moderating the psychoactive effects of stimulants; enhancing the psychoactive effect of other drugs; and the motivation to commit crime. According to Hernandez and Nelson (2010), NMUPDs are on the increase because they are perceived to be more socially acceptable, less stigmatized and safer than illicit substances. Peprah et al (2020) in their study revealed that affordability and the psychoactive effects of prescription drugs were key motivators for NMUPDs. In addition, Boyd et al (2006) inferred that overcoming the negative effects of drugs especially insomnia was a major motivator of NMUPDs. Hellawell (1995) therefore deduced that NMUPDs will continue to increase due to the high profits, increasing demand and more permissive attitudes towards drugs among young people.

The study revealed evidence of diversion of prescription drugs for non-medical use. Findings established that unethical persons running drug pharmacies as well as unethical healthcare providers in hospitals and mental health facilities were the major sources of prescription drugs for non-medical use. Peprah et al (2020) made similar observations where prescription drugs for non-medical use were obtained from drug pharmacies without a requirement for a doctor's prescription. Diversion of prescription drugs involves the unlawful channeling of regulated pharmaceuticals from legal sources to the illicit marketplace, and can occur along all points in the drug delivery process,

from the original manufacturing site to the wholesale distributor, the physician's office, the retail pharmacy, or the patient" (Inciardi et al., 2007). It has also been established that pharmacists usually never keep any record or monitor patient medication profiles thereby creating a vacuum in the information necessary to make appropriate counseling decisions (Hammerlein, Griese and Schulz, 2007). Further, lack of pharmacist vigilance may lead to long-term abuse of the common medications (Sansgiry and Patel, 2013). Although control strategies typically focus on reducing the diversion of prescription drugs from legitimate sources, proliferation of unregulated sources has rendered control strategies less effective (Coleman et al, 2005).

Conclusion

The study has established evidence of NMUPDs in Kenya. Towards addressing this emerging problem, the study recommends interventions that eliminate diversion of prescription drugs for non-medical use. First, there is need for more stringent measures to control prescription drugs with high potential for abuse. Secondly, there is need to engage the law enforcement agencies and the healthcare providers to suppress diversion of prescription drugs for non-medical use. Finally, there is need to implement demand reduction strategies aimed at prevention and education of those at risk on the potential harms and other adverse consequences of NMUPDs.

References

Agar, M. H. (1980). The professional stranger: an informal introduction to ethnography. SanDiego: Academic Press.

Allen, B. and Harocopos, A. (2016). Non-Prescribed Buprenorphine in New York City: Motivations for Use, Practices of Diversion, and Experiences of Stigma. J Subst Abuse Treat, 70, 81-86.

Bennett, T., Holloway, K. and May, T. (2018). A Comparison of Recent Trends in Prescription Drug Misuse. In T. Schepis (Ed.), The Prescription Drug Abuse Epidemic (pp. 243- 264). Santa Barbara, California: ABC-CLIO, LLC.

Bonnet, U. and Scherbaum, N. (2012). Craving dominates propofol addiction of an affected physician. J Psychoactive Drugs, 44, 186-90.

Boyd, C. J., McCabe, S. E., Cranford, J. A. and Young, A. (2006). Adolescents' motivation to abuse prescription medications. Pediatrics, 118(6), 2412 – 2480.

Bryson, E. O. and Frost, E. A. (2011). Propofol abuse. Int Anesthesiol Clin, 49, 173-80.

Cicero, T. J. and Ellis, M. S. (2017). The prescription opioid epidemic: a review of qualitative studies on the progression from initial use to abuse. Dialogues in clinical neuroscience, 19(3), 259-269.

Coleman, J. J., Bensinger, P. B., Gold, M. S., Smith, D. E., Bianchi, R. P. and DuPont, R. L. (2005). Can drug design inhibit abuse? J Psychoactive Drugs, 37(4), 343-62.

Cooper, R. J. (2013). 'I can't be an addict. I am.' Over-the-counter medicine abuse: a qualitative study. BMJ Open, 3(6), e002913.

Derry, S., Moore, R. A. and McQuay, H. J. (2010). Single dose oral codeine, as a single agent, for acute postoperative pain in adults. Cochrane Database Syst Rev, (4), CD008099.

Dertadian, G., Iversen, J., Dixon, T. C., Sotiropoulos, K. and Maher, L. (2017). Pharmaceutical opioid use among oral and intravenous users in Australia: A qualitative comparative study. Int J Drug Policy, 41, 51-58.

Earley, P. H. and Finver, T. (2013). Addiction to propofol: a study of 22 treatment cases. J Addict Med, 7, 169-76.

Eickhoff, C., Hämmerlein, A., Griese, N. and Schulz, M. (2012). Nature and frequency of drug-related problems in self-medication (over-the-counter drugs) in daily community pharmacy practice in Germany. Pharmacoepidemiol Drug Saf , 21(3), 254-260.

Evans, E. A. and Sullivan, M. A. (2014). Abuse and misuse of antidepressants. Subst Abuse Rehabil, 5, 102-20.

Fry, R. A., Fry, L. E. and Castanelli, D. J. (2015). A retrospective survey of substance abuse in anaesthetists in Australia and New Zealand from 2004 to 2013. Anaesth Intensive Care, 43, 111-7.

Gill, R., Stead, A.H. and Moffat A.C. (1981). Analytical aspects of barbiturate abuse: identification of drugs by the effective combination of gas-liquid, high-performance liquid and thin-layer chromatographic techniques. Journal of Chromatography, 204, 275-284.

GoK (1994). Narcotic Drugs and Psychotropic Substances (Control) Act. National Council for Law Reporting.

GoK (1989). Pharmacy and Poisons Act, Cap 244. Revised in 2012. National Council for Law Reporting.

Hadidi, K. A. (2004). "Development of a screening method for the most commonly abused anticholinergic drugs in Jordan; Trihexyphenidyl, procyclidine and biperiden." Legal Medicine, 6 (4), 233–241.

Hämmerlein, A., Griese, N. and Schulz, M. (2007). Survey of drug-related problems identified by community pharmacies. Ann Pharmacother, 41(11), 1825–1832.

Hayhoe, B. and Lee-Davey, J. (2018). Tackling benzodiazepine misuse. BMJ, 362, k3208.

Hellawell, K. (1995). The role of law enforcement in minimizing the harm resulting from illicit drugs. Drug Alcohol Rev, 14(3), 317-22.

Hernandez, S. H. and Nelson. L. S. (2010). Prescription drug abuse: insight into the epidemic. Clin Pharmacol Ther, 88, 307–317.

Home Office. (2019). Drugs Misuse: Findings from the 2018/19 Crime Survey for England and Wales. London: Home Office.

Hulme, S., Bright, D. and Nielsen, S. (2018). The source and diversion of pharmaceutical drugs for non-medical use: A systematic review and meta-analysis. Drug Alcohol Depend, 186, 242- 256.

Inciardi, J. A., Surratt, H. L., Kurtz, S. P. and Cicero, T. J. (2007). Mechanisms of prescription drug diversion among drug-involved cluband street-based populations. Pain Med, 8(2),. 171-83.

Jones, C. M., Mack, K. A. and Paulozzi, L. J. (2010). Pharmaceutical overdose deaths, United States, 2010. JAMA, 309, 657–659.

Lankenau, S. E., Schrager, S. M., Silva, K., Kecojevic, A., Bloom, J. J., Wong, C. and Iverson, E. (2012). Misuse of prescription and illicit drugs among high-risk young adults in Los Angeles and New York. J Public Health Res, 1(1), 22-30.

Malekshahi, T., Tioleco, N., Ahmed, N., Campbell, A. N. C. and Haller, D. (2015). Misuse of atypical antipsychotics in conjunction with alcohol and other drugs of abuse. J Subst Abuse Treat, 48, 8–12.

Manchikanti, L. (2006). Prescription drug abuse: What is being done to address this new drug epidemic? Testimony before the Subcommittee on Criminal Justice, Drug Policy and Human Resources. Pain Physician, 9, 287–321.

Mateu-Gelabert, P., Jessell, L., Goodbody, E., Kim, D., Gile, K., Teubl, J., Syckes, C., Ruggles, K., Lazar, J., Fredman, S. and Guarino, H. (2017). High enhancer, downer, withdrawal helper: Multifunctional nonmedical benzodiazepine use among young adult opioid users in New York City. Int J Drug Policy, 46, 17-27.

McLarnon, M. E., Fulton, H. G., MacIsaac, C. and Barrett S. P. (2012). Characteristics of quetiapine misuse among clients of a community-based methadone maintenance program. J Clin Psychopharmacol, 32, 721–3.

Mohan, D., Mohandas, E. and Dube, S. (1981). Trihexyphenidyl abuse. Brit J Addiction, 76 (2), 195-197.

Murphy, J. C. (2001). Americans make choices about self-care. Am J Health-SystPharm, 58(16), 1494.

NACADA (2016). National Survey on the Status of Alcohol and Drugs Abuse among Secondary School Students in Kenya. Nairobi: NACADA.

NACADA (2017). Rapid Situation Assessment of Drug and Substance Abuse in Kenya. Nairobi: NACADA.

NACADA (2018). Status of Drugs and Substance Abuse among Primary School Pupils in Kenya. Nairobi: NACADA.

National Bureau of Statistics and UNODC (2019). Drug Use Survey in Nigeria 2018. Vienna, 2 Austria.

Peprah, P., Agyemang-Duah, W., Appiah-Brempong, E., Akwasi, A. G. and Morgan, A. K. (2020). "With tramadol, I will ride a jaguar": a qualitative study of motivations for non-medical purpose tramadol use among coomercial vehicle operators in Kumasi, Ghana. Substance Abuse Treatment, Prevention and Policy, 49, 1-16.

Rhodin, A. (2006). The rise of opiophobia: Is history a barrier to prescribing? J Pain Palliat Care Pharmacother, 20, 31–2.

Rop, P.P., Spinazzola, J., Zahra, A., Bresson, M., Quicke, J. and Viala, A. (1988). Column liquid chromatographic analysis of barbiturates in biological fluids. Journal of Chromatography, 427, 172-180.

SAMHSA (2017). Key substance use and mental health indicators in the United States: Results from the 2016 National Survey on Drug Use and Health. Rockville, MD: Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration.

Sansgiry, S. S. and Patel, H. K. (2013). Nonprescription Drugs. In: Swarbrick J, editor. Encyclopedia of Pharmaceutical Science and Technology. Fourth Edition. Boca Raton, FL: CRC Press.

Schepis, T. S., Teter, C. J., & McCabe, S. E. (2018). Prescription drug use, misuse and related substance use disorder symptoms vary by educational status and attainment in U.S. adolescents and young adults. Drug and Alcohol Dependence, 189, 172–177.

Stephens, D. A. (1967) Psychotoxic effects of benzhexol hydrochloride (artane). Br J Psychiatry, 113, 213-218.

Tinsley, J. A. and Watkins, D. D. (1998). Over-the-counter stimulants: abuse and addiction. Mayo Clinic Proc, 73(10), 977–982.

Tseng, Y. L., Hsu, H-R., Kuo, F-H., Shieh, M. H. and Chang, C. F. (2003). Ephedrines in over-the-counter cold medicines and urine specimens collected during sport competitions. J Anal Toxicol, 27(6), 359–365.

United Nations (1988). Convention Against the Illicit Traffic in Narcotic Drugs and Psychotropic Substances. United Nations.

United Nations (1971). Convention on Psychotropic Substances. United Nations.

United Nations (1961). Single Convention on Narcotic Drugs 1961, as amended by the Protocol Amending the Single Convention on Narcotic Drugs 1972. United Nations.

UNODC (2020). World Drug Report. Vienna, Austria.

Williams, J. F. and Kokotailo, P. K. (2006). Abuse of proprietary (over-the-counter) drugs. Adolesc Med Clin, 17(3), 733–750.

Wischmeyer, P. E., Johnson, B. R. and Wilson, J. E. (2007). A survey of propofol abuse in academic anesthesia programmes. Anesth Analg, 105, 1066–1071.

Appendix A

Focus Group Discussion Sites

This appendix presents a detailed report on the sampling of the FGD sites across the country from the region, county, sub-county and location level.

Table A1

Focus Group Discussion Sites

Region	County	Sub-County	Location (FGD site)
Nyanza	Kisumu	Kisumu Town East	Town
	Kisii	Kisii Central	Nyatieko
Nairobi	Nairobi	Lang'ata	Nairobi West
		Eastleigh	Eastleigh
		Roysambu	Roysambu
		Kasarani	Githurai
Central	Nyeri	Nyeri Central	Mukaro
	Kiambu	Kiambu	Town
North Rift Valley	Uasin Gichu	Eldoret West	Kibulgeny
South Rift Valley	Nakuru	Nakuru	Municipality
	Kajiado	Kajiado Central	Kitengela
Eastern	Makueni	Makueni	Wote
	Isiolo	Isiolo	Central
	Marsabit	Saku	Township
	Meru	Meru North	Maua Town
Western	Trans-Nzoia	Trans-Nzoia West	Municipality
	Busia	Busia	Township
Coast	Mombasa	Kisauni	Kisauni
	Kwale	Diani	Diani
	Kilifi	Bahari	Mtwapa
		Malindi	Malindi
North Eastern	Garissa	Garissa Central	Township

Note: Data from study findings, 202

Appendix B

Laboratory analysis report

This appendix presents a detailed laboratory analysis report of the suspected samples collected during the study.

Table B1

Laboratory analysis report for suspected samples

Sample No.	Confirmed drug	Source County
F/MISC/641/19	Benzhexol	Nairobi
F/MISC/643/19	Diazepam	Nairobi
F/MISC/644/19	Benzhexol	Nairobi
F/MISC/645/19	Flunitrazepam	Nairobi
F/MISC/646/19	Diazepam	Nairobi
F/MISC/647/19	Benzhexol	Nairobi
F/MISC/653/19	Diazepam	Garissa
F/MISC/655/19	Amitriptyline	Garissa
F/MISC/657/19	Diazepam	Meru
F/MISC/664/19	Diazepam	Marsabit
F/MISC/672/19	Diazepam	Makueni
F/MISC/681/19	Diazepam	Mombasa
F/MISC/682/19	Flunitrazepam	Mombasa
F/MISC/686/19	Amitriptyline	Kilifi
F/MISC/687/19	Diazepam	Kilifi
F/MISC/688/19	Flunitrazepam	Kilifi
F/MISC/691/19	Diazepam	Kwale
F/MISC/692/19	Amitriptyline	Kwale
F/MISC/701/19	Flunitrazepam	Kilifi
F/MISC/702/19	Diazepam	Kilifi
F/MISC/706/19	Diazepam	Kilifi
F/MISC/710/19	Diazepam	Kilifi
F/MISC/711/19	Chlorpromazine	Kilifi
F/MISC/715/19	Amitriptyline	Kilifi
F/MISC/716/19	Diazepam	Kilifi
F/MISC/721/19	Amitriptyline	Mombasa
F/MISC/722/19	Flunitrazepam	Mombasa
F/MISC/723/19	Diazepam	Mombasa
F/MISC/726/19	Flunitrazepam	Nairobi

Sample No.	Confirmed drug	Source County
F/MISC/727/19	Diazepam	Nairobi
F/MISC/732/19	Diazepam	Kiambu
F/MISC/734/19	Diazepam	Nairobi
F/MISC/735/19	Benzhexol	Nairobi
F/MISC/737/19	Diazepam	Nairobi
F/MISC/745/19	Diazepam	Nairobi
F/MISC/747/19	Flunitrazepam	Nairobi
F/MISC/749/19	Benzhexol	Nairobi
F/MISC/750/19	Diazepam	Nairobi
F/MISC/751/19	Codeine	Nairobi
F/MISC/752/19	Benadryl	Nairobi
F/MISC/754/19	Flunitrazepam	Nairobi
F/MISC/756/19	Benzhexol	Nairobi
F/MISC/757/19	Benzhexol	Nairobi
F/MISC/758/19	Diazepam	Nairobi
F/MISC/760/19	Flunitrazepam	Nairobi
F/MISC/767/19	Benzhexol	Busia
F/MISC/773/19	Chlorpromazine	Busia
F/MISC/776/19	Chlorphenamine	Kisumu
F/MISC/781/19	Biperiden	Kisumu
F/MISC/783/19	Benzhexol	Kisumu
F/MISC/785/19	Benzhexol	Kisumu
F/MISC/786/19	Codeine	Kisumu
F/MISC/787/19	Carbamazepine	Kisumu
F/MISC/788/19	Codeine	Kisumu
F/MISC/792/19	Benzhexol	Kisumu
F/MISC/793/19	Haloperidol	Kisumu
F/MISC/796/19	Diazepam	Busia
F/MISC/801/19	Tramadol	Uasin Gishu
F/MISC/803/19	Benzhexol	Uasin Gishu
F/MISC/804/19	Diazepam	Uasin Gishu
F/MISC/809/19	Diazepam	Uasin Gishu
F/MISC/810/19	Benzhexol	Nairobi
F/MISC/821/19	Benzhexol	Nyeri
F/MISC/822/19	Propofol	Nyeri
F/MISC/836/19	Olanzapine	Uasin Gishu
F/MISC/837/19	Benzhexol	Uasin Gishu
F/MISC/838/19	Chlorpromazine	Uasin Gishu
F/MISC/707/19	Flunitrazepam	Kilifi

Note: Data from study findings, 2020

Exploring the Role of Spousal Communication as a Predictor of Relapse among Individuals in Recovery from Substance Use Disorders: Implications for Treatment Programs

Eunice Githae, PhD[1*] and Sarah Namukoa[1], Psychology Department, Kenyatta University[1], Kenya

***Corresponding Author:**

Eunice Githae PhD, Psychology Department, Kenyatta University, Kenya

Submitted: 23rd May 2021

Published: 30th June 2021

Abstract

Relapse among persons treated for substance use disorders (SUD) has increasingly become a problem across the world. Literature documents the role of spousal communication in relapse of individuals recovering from SUD. This study examined the association between spousal communication and relapse occurrence among patients in recovery from SUDS and the implications for treatment. The Vulnerability-Stress-Adaptation Model (VSAM) and the General Systems Theory were adopted as the theoretical frameworks informing the study. Screening for various drug use was done using the Drug Abuse Screening Test (DAST). A self-rated questionnaire was adapted from the Advance WArning of RElapse (AWARE) questionnaire was used in this correlational study to collect data that was purposefully selected from persons admitted in rehabilitation centers in Nairobi County. Results indicated that 37.41% of the participants who had spousal relationships had relapsed. Results also revealed poor communication between spouses was perceived as a cause of increased substance use. The study showed a positive statistical significance between spousal communication and relapse occurrence among inpatients with SUD ($r=.016$, $p=.002<0.05$). The study concluded that poor spousal communication was a predictive factor in relapse of individuals with SUDs. The study is significant to addiction professionals and practicing counselors who should enhance effective communication as a component of family therapy and as part of the treatment interventions.

Keywords: *Relapse, Substance Use Disorder (SUD), Spousal Communication, Inpatient, Recovery, polysubstance use.*

Introduction

Relapse rates remain high throughout the world, with the United States documenting a range between 40% to 60% while China reported 50% to 80% in 2016 (Zeng, Wang, and Xie, 2016). In Africa, high relapse rates have been reported among persons with substance use disorders (SUDs), although these rates vary widely between countries. Individuals recovering from SUD are expected to maintain sobriety following treatment. However, these individuals report high relapse rates post-treatment. Relapse complicates treatment of SUDs and makes it challenging to maintain sobriety post-discharge, or even build a successful life in recovery (Kadam, Sinha, Nimkar, Matcheswalla & DeSousa, 2017).

Robust research provides varying possible predictors to relapse such as family conflict, public health, and individual health (Soni, Upadhyay & Jain, 2017). Individual factors include anxiety, depression, positive mood, age of drinking onset, crime history, unemployment, history of substance abuse, high craving rate, and low educational level (Leach, & Kranzler, 2013; Bottlender & Soyka, 2014). Social factors on the other hand include social pressure, adverse life events, marital conflict, and work stress (Hiremath et al, 2015). Other factors include death of spouse, addicted friends and partners, being

single, abundance of drugs, rejection from friends (Afkar, Rezvani, & Sigaroudi, 2017) and family emotional climate (Githae, 2016). Other psychological factors are related to relapse include unresolved conflicts (Conrad, Omulema & Chepchieng, 2016). Some studies have attributed relapse to the alcoholic background, lack of religious morals, stress, availability of cheap alcohol at cheap prices, unpleasant social environment, and peer influence (Makena, 2014).

Literature demonstrates that the family is the most fundamental site for human relationship that offers a primary structure for establishing supportive relationships (Javanmard & Garegozlo 2013). Hiremath, Neregal, Mohite and Chendake (2015) supports this proposition by associating supportive family environment with better prognosis and a successful reduction in alcohol consumption and abuse during treatment. There is evidence indicating that marital satisfaction influences relapse among recovering patients with SUD (Oprisan & Cristea, 2012).

Unfortunately however, the family may also fundamentally play a role in positively influencing addiction and other social behaviors (Tihowe, Plessis & Koen 2017). According to Afkar et al. (2017) family congestion, discrimination, divorce, death of parents, and a relative's addiction are likely triggers of excessive use and relapse in an individual with SUD. Githae, Sirera and Wasanga (2016) identified a faulty family relationship pattern known as family emotional over-involvement (EOI), which is a tendency of family over-protection and which is a significant predictor of relapse for individuals recovering from SUDs. Poor communication patterns in families tend to cause psychological distress among persons recovering from alcohol addiction contributing to their relapse (Engel, Schaefer, Stickel, Binder, Heinz, & Richter, 2016).

Other researchers have suggested that low marital satisfaction predicts divorce, which in turn predicts relapse among persons with SUD (Kendler et al., 2017). According to Cranford (2014), there is an association between stressful marriage, marital dissolution and SUD in adults. The author demonstrated that divorce is a mediating variable in the relationship between alcohol use disorder (AUD) and marital satisfaction. Owens et al. (2013) argued that high level of marital satisfaction reflected marital quality and that this could help prevent relapse.

The Family Systems Theory supports the role of the family communication in predicting relapse. The theory posits that individuals exist within nested social systems, including societies, organizations, families, neighborhoods, and culture. These can reinforce dysfunctional behavior such as addiction through relationships of members of the group if any damage or disruption occurs to the normal functioning of a family. Most studies in this area argue that poor marital communication causes a double bind communication that has been associated with predicting relapse. In support to the Family Systems Theory, Golestan, Abdullah, Ahmad, and Anjomshoa (2010) and Parkins (2010) suggested that family factors, notably poor marital communication, family conflict, and parental substance use influenced relapse among SUD patients. Conrad, Omulema and Chepchieng (2016) also observed that dysfunctional families tended to exhibit faulty beliefs systems that could trigger alcohol dependence. From the perspective of the Vulnerability-Stress-Adaptation Model (VSAM), life encompasses adaptive processes such as stressful events and enduring vulnerabilities. Marital communication is a vulnerability event that influences persons with SUD to relapse. Substance use is viewed as an adaptive mechanism to temporarily relieve stressors resulting from a weak marital relationship that could be characterized by poor communication.

Marital communication varies across different cultures in different parts of the world. Good quality communication between individuals is the ability to symbolically and efficiently transfer the meanings and messages that one has in their mind, which makes the couple feel closer and intimate (Harris & Kumar, 2018). The authors argue that poor communication on the other hand is one where couples do not clearly articulate their needs and the messages in their minds. Poor marital communication is widely cited as a common antecedent to relapse and alcohol abuse among individuals with SUD. Zaidi (2015) investigated the relationship between co-dependency and relationship satisfaction among persons with SUD. Results indicated that problems in relational intimacy, stress, problems in communication, diffuse emotional boundaries, and poor conflict resolution impacted on interpersonal satisfaction through co-dependence. Codependence has been of major focus in the Systems Theory on studies of family psychopathology as a major contributor of relapse in substance use. Coleman and Straus (2013) identified antecedents to alcohol abuse as poor communication. Others include financial stressors and stressful marital interactions. These antecedents to alcohol abuse were thought to exacerbate substance use.

Poor communication and lack of open interactions between spouses has been identified as a risk factor for relapse in substance abuse. According to Nattala et al. (2010) faulty family communication served as an enabling behaviour to relapse in person recovering from alcohol and other substance abuse. This view was supported by Arria et al. (2013) who posited that poor communication within dysfunctional families promoted relapse. Similarly, Botvin and Griffin (2010) found that communication problems in relationships significantly facilitated addictive behaviours among persons recovering from alcohol use.

Most of the studies evaluated have been done with western populations and there is a dearth of literature on how poor communication correlates with relapse in SUD within the Kenyan context. This study, which was part of a larger research, investigated the relationship between poor spousal communication and a cognitive tendency or relapse occurrence among inpatients in selected rehabilitation centers in Nairobi City County, Kenya.

Objective: This study aimed at exploring the relationship between spousal communication and relapse occurrence of individuals recovering from AUD.

Hypothesis: There is a statistically significant relationship between marital communication and relapse occurrence among inpatients with AUD

Methods

A correlational study design was used to explore the relationship between spousal communication and relapse of a family member suffering substance use disorder (SUD) after treatment in a rehabilitation center. In order to derive a relationship between spousal communication and relapse, we screened for substance use and the quality of spousal communication, and correlated these with the warnings of relapse of the SUD patients. Each of the participants was screened for drug dependence using the Drug Abuse Screening Test (DAST). We utilized the Enrich Marital Satisfaction Scale which has a sub-scale for measuring communication problems among spouses. The scale focused on measuring people's compliance and satisfaction with aspects of marital relationship with low scores denoting poor communication; medium scores denoting medium and high scores denoting free and high quality levels of marital communication. This scale encompassed 5-point Likert type items assigned scores ranging from 1 to 5, depending on how much the respondent

agreed or disagreed to the statements provided. Some of the items on scale were scored in reverse order to enhance the reliability of the tool. The raw scores of these variables were converted into percentages.

We utilized the AWARE questionnaire designed by Gorski and Miller (1982) and Harris and Miller (2000), in measuring the warning signs of relapse occurrence among the respondents who were selected from a population of individuals with substance use disorders. It encompassed 28 items rated on 7-point Likert type scale system with 1 denoting never to 7 denoting always, which were arranged based on the order in which warning signs for relapse occurred. Lower total scores indicated lower potential of relapse while higher total scores indicated great potential for relapse. The overall total score for all the items on AWARE questionnaire were deemed as predictors of an individual' impending relapse.

Data was collected from a purposive sample of 394 participants over a six-month period. Of these, 147 were married or were in marriage equivalent spousal relationships. Results from these centers are arguably representative of the Nairobi County and the country at large because patients in these treatment centers are usually drawn from all parts of the country, and thus the study findings are generalizable to the larger population.

The test-retest reliability and internal consistency of Aware Questionnaire Scale was evaluated and acceptable (r=.767). Individual item-total correlations for the Marital Satisfaction scale tightly connected to the total score as shown below in Table 1.

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.957	.953	27

Table 1: Reliability Statistics of Aware Questionnaire Scale

Qualitative data was collected using a structured interview schedule designed for focus groups discussions (FGDs). The interview schedule encompassed demographic questions, questions about on individual's experiences in the treatment center, relapse and relationship/marital satisfaction including spousal communication. Questionnaires for quantitative data were distributed to participants who were at their exit point at the rehabilitation centers over a six-month period of time. Association between relapse and spousal communication was assessed using Pearson's Correlational coefficients and regressions were used to give the nature and direction of the relationship between study variables.

We ensured ethical standards in data collection by informing the participants to complete an informed consent form; and allowing for voluntary participation. Respondents were not harassed for recruitment purposes, and confidentiality and anonymity were protected by restricting any use of personally identifiable information. Authorization to carry out research was granted by the Kenyatta University Graduate School board of postgraduate studies and National Commission for Science, Technology and Innovation (NACOSTI).

Results

At the end of the six-month period, 394 respondents from 15 rehabilitation centers had responded to the study questionnaire.

Of the respondents, 147 were in spousal relationships or had spousal equivalents, while the marital status of the 247 described as single, separated/divorced, widowed or they considered themselves unmarried due to other reasons. For the current study, the individuals with spousal relationships (n=147) formed the basis of our investigation of the study variables. We interviewed 84 respondents through focus group discussions (FGDs) in order to get a clearer view of spousal communication and its role in relapse for substance users in treatment. The tools of the study were administered at the exit point or discharge of the patient from the treatment centers which averaged at 3 months for the majority. All the respondents in the study had been screened and diagnosed with a drug abuse screening test (DAST) or with other substance use disorder (ICD-10), or had been dependent on a substance, which was the primary reason for admission into the treatment center. The demographic characteristics of the respondents are provided on Table 2. In addition 11.6% were female while 88.4% were male.

Table 2: Age of Participants

As indicated in Table 2, respondents between 18-25 years were 6.1%, while the majority (63%) of study participants comprised of the two main age cohorts (26-35 (42.9%); and 36-45 (29.3%) respectively). Participants between 56 and 69 were only a 2.7%.

The gender distribution of participants in this study is shown in Figure 1. The sample characteristics showed that, 11.6% were female while 88.4% (n=130) were male. The average age was 32 years (standard deviation [SD] = 10.6; range = 18–69 years). The sample included 96% with one or more SUD diagnosis. The remaining 4% had no specific diagnosis but had self-referred themselves to the treatment centers to be helped to manage the drinking problem and mitigate further deterioration into addiction.

The most frequently occurring substance use disorder was use of alcohol (76%) and use of cannabis at 46%. Of the 46% of cannabis users, majority (67%) combined this with alcohol use. Other drugs of choice included use of Khat (3%), use of sedatives (49%), and use of opioids (19%). Polysubstance users were the majority at 72%, while those who used single substances were at 28%.

The distribution of respondents based on the level of education is shown in table 3.

Table 3: Distribution of Respondents Based on Level of Education

	Frequency	Percent
High School Certificate	30	20.4
Diploma	43	29.3
First Degree	47	32.0
Masters	17	11.6
PhD	1	.7
Other	9	6.1
Total	147	100.0

As demonstrated in table 3, high school certificate constituted 20.40%; first degree holders constituted 32% while diploma holders constituted 29.3%. The respondents making up the other level of education was assumed to be low 6.1% of the participants and majority of individuals with SUD having a high school, Diploma, Masters' and PhD's education level.

Results from the AWARE gave a total of 37.41% of the participants that showed signs of impending relapse at the point of discharge from the rehabilitation center after three months of abstinence during treatment. Among these, 28 had earlier been readmitted in the rehabilitation center for inpatient treatment, hence they had relapsed after treatment. Further, patients who relapsed had showed signs of impending relapse and had attempted to discontinue treatment when they first were admitted (62%; n=34)

while a few had attempted to terminate treatment within the 3-month treatment period (n=21; 38%).

Based on the sum of means of responses derived from the Enrich Marital Satisfaction Scale for poor spousal communication (and based on a 5 Likert Scale) results yielded a total of 52.65% of the study participants. This meant that only 47.35% of the study participants reported a high quality of communication in their spousal relationships.

Bivariate predictors of relapse to substance use after inpatient treatment were measured using correlations to determine the relationship between spousal communication and relapse occurrence among inpatients with SUD. Table 4 shows the correlation between relapse occurrence and spousal communication.

Table 4: Correlation between Relapse Occurrence, and Spousal Communication

		Relapse Occurrence	Spousal Communication
Relapse Occurrence	Pearson Correlation	1	.016*
	Sig. (1-tailed)		.002
Spousal Communication	Pearson Correlation	.016*	1
	Sig. (1-tailed)	.002	

Results indicated that spousal communication and relapse occurrence were significantly related (r=.016); p=.002<0.05) (table 4). This result confirmed the alternate hypothesis that there is a statistically significant relationship between spousal communication and relapse occurrence among in-patients with SUD in rehabilitation centers in Nairobi County, Kenya. The increased risk of relapse was predicted by younger age and polysubstance use. There was an observation that the tendency for increased relapse risk was not significantly related to the level of education of the participant.

Discussion

We assessed the participant's impending relapse by utilizing the Advance WArning of RElapse (AWARE) Questionnaire as suggested by Gorski and Miller (1982; Miller & Harris, 2000). Participants reported an overall total score for all the items predicted about the participant's impending relapse using the AWARE tool. Summary and analysis of the responses made on the items in the questionnaire suggested that 37.41% had relapsing cognitive motivation, which was a predictor that actual relapse would occur after treatment at a rehabilitation center. This relapse rate is comparable to that reported in recent studies. For example 43% relapse rate reported by Chepkwony (2013), and 39.2% reported by Githae, Sirera, Wasanga (2016). The studies are comparable because all were done within the rehabilitation centers, albeit with differences in operationalization of the definition for relapse. However, the results in the current study were relatively low compared with other studies, which have reported higher rates from 40% to 60% in the USA to 50% to 80% (Zeng, Wang, and Xie, 2016) reported for China. Making direct comparisons between relapse rates among several populations is a challenging and problematic undertaking due to differences in context, reliability of tools adapted, research methodologies undertaken, the diversity of respondents, and diversity in the form of interventions undertaken by treatment centers. One notable difference is in operationalization of the term relapse. According to Githae (2019) relapse was

defined as re-admission into an inpatient treatment center. Other definitions are based on follow-up studies (e.g. Swanepoel, Geyer, & Crafford, 2016). The current study operationalized relapse as an intrinsic motivation of relapse occurrence, which happens cognitively long before the actual relapse (or going back to full blown use) has occurred. This definition is consistent with other literature (e.g. Gorski, 1982; Melemis, 2010) that argues that relapse begins in the mind, weeks and sometime months before an individual picks up a drink or drug.

Findings in this study associated younger age with a higher likelihood of relapse, with the majority relapsers being between age 25-35 years. This resonated with findings demonstrating that the younger a patient was the more the increased risk of poor prognosis in treatment of SUD (Rollins et al, 2005; Brorson et. al, 2013; Anderson et al, 2019). However, more studies are required to elucidate the association between age at onset of substance use and treatment outcomes. The current study findings showed no statistically significant difference between age, gender and education, and relapse for relapsers and non-relapsers. These results resonate with previous studies that have found no relationship between education level and gender in relation to relapse in SUD (Kabisa et. al, 2021).

The findings of the current study supported previous literature that has shown that polysubstance use is associated with increased risk of relapse (Anderson et al, 2019). Correlational analyses demonstrated that although the majority of respondents were admitted because of alcohol abuse, having polysubstance use predicted relapse risk at significant levels ($p>0.05$). A possible explanation for this association would be that using several substances at the same time would interfere with the predictability and outcomes of treatment and the recovery process. This finding is further supported by Kabisa et. al, 2021. Polysubstance use may also not get addressed during inpatient treatment process because each substance has an intricate and recommended treatment approach including the period of time one takes in treatment. When each of the drugs which is a problem is not given specific attention during treatment there is a risk of fitting treatment into 'one size fits all' and hence a likelihood of leaving a patient with unmet treatment needs during treatment.

Of the rehabilitation centers involved in the study, 90% applied family therapy sessions which were given during treatment. However, there were notable differences between respondents who attended to family therapy in the different rehabilitation centers and those that did not. The present study did not assess whether using family therapies or not the treatment environment influenced outcome predictors. However, during the FGDs we noticed that the patients rated the most successful counseling sessions as those that were attended by their close family members. This finding supported by what Githae (2016) who had alluded that family involvement during inpatient rehabilitation enhanced treatment outcomes.

We used the Enrich Marital Satisfaction Scale to measure the quality of communication among spouses. Findings of this study showed that 52.65% of the participants reported poor communication in their spousal relationships. This was a likely indication that being in a spousal relationship with an individual who had SUD had higher chances of affecting the communication pattern of the partners. These findings on spousal communication are supported by a myriad of other studies which have found out that marital communication plays a vital role in mitigating the risk for psychological distress (e.g. Harris & Kumar, 2018). Marital communication has been cited as a common antecedent to relapse among individuals with SUD. When investigating the relationship between marital satisfaction of

individuals married to a drinking partner, Zaidi (2015) found out that substance use affected intimacy, increased stress, negatively affected communication, and increased conflict between the married couple. Coleman and Straus (2013) identified one of the antecedents to substance abuse as poor communication. This is significant in informing interventions which should consider evaluating and improving spousal communication.

As hypothesized, there was significant support that spousal communication was positively correlated to relapse occurrence ($p=0.002<0.05$). Hence, the communication among spouses was a predictor of relapse occurrence among spouses with substance use disorder/s. When one person within the marriage relationship is affected by substance use disorder, the impact affects the quality of the marital bond. While the causal connections between substance use and marital communication is complex and only partially understood, available evidence demonstrates that the two problems exacerbate each other most of the time (Rodriguez, Neighbor, & Knee, 2014). This is likely to form a detrimental cycle whereby substance use is exacerbated while the quality of the relationship deteriorates. This was an important finding which should inform current practice and interventions undertaken by treatment centers during family therapy sessions.

Conclusions

This study makes an important contribution to a field that has tended to focus on patients' mental preparedness against relapse. Relapse was operationalized to make the distinction between relapse and risk of relapse emanating from impending feelings of going back to substance use after treatment. The study made a major finding that relapsing has a cognitive motivation which is detectable before the inpatient with SUD can be discharged from treatment and before the actual relapse occurs. In resonance with other studies, this study has associated younger age with a higher likelihood of occurrence, and which is also exacerbated by polysubstance use with a 90% risk of relapse. The study was instrumental in demonstrating that spousal communication among spouses was a predictor of relapse occurrence among spouses married to an individual with a substance use disorder. The findings greatly contribute to future interventions in family therapies offered to inpatients in the treatment centers. Interventions should consider enhancing marital communication between spouses of inpatients in order to strengthen their relationships and hence reduce the risk of relapse.

Limitations

However, some study limitations should also be considered. Our measure of relapse was based on self-reports. Although previous research has reported good reliability of self-reports, there remains some debate about the accuracy of this information. Furthermore, the definition of relapse used in this study does not take into account whether or not the individual will actually go back to using the substance of choice or not.

Recommendations for Future Studies

A more accurate measurement of relapse could include a follow-up study to find out whether those at the risk of relapse did actually relapse by going back to heavy drinking post- discharge. Further studies would also be needed to elucidate whether or not the age of onset influenced the relapse risk of the individual with SUD. Studies have shown that the substance dependence is positively correlated with the age of onset but we found no study that has linked onset age with the risk of relapse at discharge. It would also interest researchers to find out whether comorbidities do influence the impending feeling of relapse for individuals

with substance use disorders. Identifying the treatment needs of patients following inpatient SUD treatment may contribute to prediction of whether one is likely to relapse cognitively before going into a full blown return to substance use for individuals in alcohol use treatment. Further research is needed to illuminate the treatment-related factors that contribute to reduced risk of relapse after inpatient SUD treatment.

References

Afkar, A., Rezvani, S.M., & Sigaroudi, A.E. (2017). Measurement of Factors Influencing the Relapse of Addiction: A Factor Analysis. International Journal of High Risk Behaviors & Addiction, 6(3):e32141.

Anderson, H.W., Wenaas, M., & Nordfjaern, T. (2019). Relapse after inpatient substance use treatment: A prospective cohort study among users of illicit substances. Addiction Behaviour, 90:222–228.

Arria, A.M., Mericle, A.A., Rallo, D., Moe, J., White, W.L., Winters, K.C., & O'Connor, G. (2013). Integration of parenting skills education and interventions in addiction treatment. Journal of Addiction Medicine,7(1):1-7.

Bottlender, M and Soyka, M. (2014). Impact of craving on alcohol relapse during, and 12 months following outpatient treatment. Alcohol & Alcoholism, 39(4): 357-361.

Botvin, G.J., & Griffin, K.W. (2010). Evidence-Based Interventions for Preventing Substance Use Disorders in Adolescents. Child and Adolescent Psychiatric Clinic of North America. 19(3) 505-526

Chepkwony, S.J. (2013). An Investigation into Prevalence And Factors Contributing To Relapse Among Alcoholics In Selected Rehabilitation Centres In Nairobi County, Kenya. International Journal of Innovative Research & Development, 2(8): 340-346.

Coleman, D.H., & Straus, M.A. (2013). Alcohol Abuse and Family Violence. Retrieved from http://www.ncjrs.gov/App/publications/abstract

Conrad, K., Omulema, B., & Chepchieng, M. (2016). Selected Psychological and social factors contributing to Relapse among relapsed alcoholics of Asumbi and Jorgs Ark rehabilitation centres in Kenya. International Journal of Humanities and social science Invention, 5(10): 68-72.

Cranford, J.A. (2014). DSM-IV alcohol dependence and marital dissolution: evidence from the National Epidemiologic Survey on Alcohol and Related Conditions. J Stud Alcohol Drugs,75(3):520-9.

Githae, E. N. (2016). Family Expressed Emotion in Relapse of Alcoholism. International Organization of Scientific Research, Journal of Humanities and Social Sciences (IOSR-JHSS), 21(9)33-41.

Githae, E.N., Sirera, M., and Wasanga, C. (2016). Family emotional over-involvement and relapse among inpatient alcoholics in Nairobi, Kenya. IOSR Journal of Humanities and Social science, 21(7): 44-50.

Golestan, S., Abdullah, H., Ahmad, N., Anjomshoa A. (2010). The role of family factors on the relapse behavior of male adolescent opiate abusers in Kerman (a province in Iran). Asian Cult Hist, 2:126–31. doi:10.5539/ach.v2n1p126.

Gorski, T. F., & Miller, M. (1982). Counseling for relapse prevention. Independence, MO: Herald House-Independence Press.

Harris, F. & Kumar, A. (2018). Marital satisfaction and communication skills among married couples. Indian Journal of Social Work, 59 (1) 35-44.

Hiremath, P., Neregal, P., Mohite, V. and Chendake, M. (2015). Factors affecting alcohol relapse among alcoholic clients at tertiary care hospital. Indian Journal of Applied Research, 5(6): 784-786.

Javanmard, G and Garegozlom R. (2013). The study of the relationship between marital satisfaction and personality characteristics in Iranian Families. Procedia-social and Behavioral Sciences,84:396-399.

Kabisa, E., Biracyaza, E., Habagusenga, J.d. et al. Determinants and prevalence of relapse among patients with substance use disorders: case of Icyizere Psychotherapeutic Centre. Subst Abuse Treat Prev Policy 16, 13 (2021).

Kadam, M., Sinha, A., Nimkar, S., Matcheswalla, Y., & DeSousa, A. (2017). A comparative Study of Factors Associated with Relapse in Alcohol Dependence and Opiod Dependence. Indian J Psychol Med, 39(5):627-63

Kendler, K.S., Lonn, S.L., Salvatore, J., Sundquist, J., & Sundqueist, K. (2017). Divorce and the Onsetof Alcohol Use Disorder: A Swedish Population-Based Longitudinal Cohort and Co-Relative Study. Retrieved from https://ajp.psychiatryonline.org/doi/abs/10.1176/appi.ajp.2016.16050589

Leach, D., & Kranzler, H.R. (2013). An Interpersonal Model of Addiction Relapse. Addict Disord Their Treatment, 12(4): 183-192

Makena, M. (2014). Selected factors contributing to alcoholism among secondary school students in Mwimbi division, Kenya. European Scientific Journal, 10 (14):1857-7881

Melemis SM. I Want to Change My Life: How to Overcome Anxiety, Depression and Addiction. Toronto: Modern Therapies; 2010.

Nattala, P., Leung, K.S., Nagarajaiah., & Murthy, P. (2010). Family member involvement in relapse prevention improves alcohol dependence outcomes: a prospective study at an addiction treatment facility in India. Journal of Studies of Alcohol and Drugs. 71(4):581-7.

Oprisan, E and Cristea, D. (2012) A few variables of influence in the concept of marital satisfaction. Procedia-Social and Behavioral Sciences, 33: 468-472

Owens, M.D., Hallgren, K.A., Ladd, B.O., Rynes, K., & McCrady, B.S., & Epstein, E. (2013). Associations between Relationship Satisfaction and Drinking Urges for Women in Alcohol Behavioral Couples and Individual Therapy. Alcohol Treat Q: 31(4)

Rodriguez, L., Neighbors, C., & Knee, C. R. (2014). Problematic alcohol use and marital distress: An interdependence theory perspective. Addiction Research Theory, 22 (4) 294-312.

Soni, R., Upadhyay, R., & Jain, M. (2017). Prevalence of smart phone addiction, sleep quality and associated behaviour problems in adolescents. International Journal of Research in Medical Sciences, 5(2): 515

Swanepoel I, Geyer S, Crafford G. (2016). Risk factors for relapse among young African adults following in-patient treatment for drug abuse in the Gauteng Province. Social Work (South Africa). 52(3):414–38.

Tihowe, T., Plessis, E. and Koen, M. (2017) Strengths of families to limit relapse in mentally ill family members. Health SA Gesondheid, 22:28-35.

Zaidi, U. (2015). Co-dependency and Relationship Satisfaction among Spouses of Alcohol Abusers. Journal of Humanities And Social Science (IOSR-JHSS), 20(1): 86-91

Zeng, R., Wang, L., & Xie, Y. (2016). An Analysis of Factors Influencing Drinking Relapse among Patients with Alcohol-Induced Psychiatric and Behavioral Disorders. Shanghai Arch Psychiatry, 28(3): 147–153.

Does Family Structure Predispose Youth to Drug Use: The Case of Kajiado County, Kenya

Chege Antony[1*] and Beatrice Kathungu, PhD

Kenyatta University, Nairobi, Kenya

***Corresponding Author:**

Chege Antony,

Kenyatta University, Nairobi, Kenya

Email: antonyc06@yahoo.com;

Tel No.: +254 724 755 121

Submitted: 18th April 2021

Published: 30th June 2021

Abstract

There is evidence suggesting that drug use among the youth is common and has extensive effects on their social, health and economic lives. It is critical that this issue be addressed by understanding the factors that are associated with drug use in order to guide the development of targeted prevention programs. Family factors can either increase the risk or protect the youth from drug use. There is need to understand how family factors such as the structure of the family influence drug use among the youth. Guided by the structural family model this study sought to find out the relationship between family structure and drug use among youth in Kajiado County, Kenya. The study used the correlation study design and targeted youth between ages 10-25. To obtain the sample of 356 respondents, a multi-stage sampling procedure was used. Data was collected using a questionnaire, assessing family structure and drug use patterns. The chi square test was used to analyze the data. According to the findings, there were significant differences in recent, current and daily drug use between youth from double-parent and single-parent families, with those from single-parent families having the highest rates. These findings suggest that NACADA, youth organizations and other mental health practitioners concerned with drug use among youth should design drug use prevention programs that target youth from single-parent families who seem to be at a higher risk than their counterparts from double-parent families.

Key Words: *Family structure, Double-parent family, Single-parent family, Drug use and youth*

Introduction

The youth have been noted to be the most affected by the drug use problem throughout the world as it is evident in the World Drug Report (UNODC, 2018). For instance in the United States of America by the time the youth are in their late adolescence about 78% had consumed alcohol while 15% were lifetime abusers (Sweden, et al., 2013). This study notes that the median age of onset of alcohol use is 14 years. Similarly, the consumption of alcohol in combination with new drugs seems to be high among youth in school in Europe according to the European School survey Project on Alcohol and other Drugs (ESPAD) (2019) report that analyzed data in 35 countries. Among the substance used by the youth are alcohol, cigarettes and cannabis. The challenge of youth drug use appears to be affecting the human society as a whole (Kopsov, Ruchin, Eisemann & Sidorov, 2005; World drug Report, 2005; UNODC, 2018).

Various initiatives have been put in place to curb this problem in Africa but the situation is still worrying with evidence of use of different drugs across different countries. For instance, in Egypt, youth are reported to be using

opioids such as tramadol for non-medical reasons (Harris, Levey, Borba, Gray, Carney, & Henderson, 2011). Similarly, in their meta-analysis of drug usage among youth in Sub-Saharan Africa, Olawole-Isaac, Ogundipe, Amoo and Adeloye (2018) estimated that about 41.6% of youth of the mean age of 15.6 had used at least one drug. Alcohol and cigarettes were the most abused drugs in their meta-analysis. This is evidence that drugs are becoming a public health problem among the young generation.

In Kenya, the situation is not different. A number of studies have shown that youth around the country are using and abusing drugs. NACADA (2012) in their survey suggest that the youth have a higher prevalence of drug use compared to adults. The survey showed that youth between the ages of 15-24 are currently using drugs such as alcohol, miraa, tobacco and bhang. In a more recent survey, NACADA (2016) found that about 9% and 13% of youth between the ages of 15-24 were current users of alcohol and miraa (khat) respectively, at the coast of Kenya. This reflects a social challenge among the youth that is continuously growing.

Furthermore, even younger children are consuming drugs as the age of onset of use seems to be changing. According to Wangai (2007), in the former Ngong District public primary schools, children as young as eight and nine years old had begun using alcohol, marijuana and cigarettes. A recent study among pupils in primary school showed that children of the age of 4 years had already started using drugs (NACADA & KIPPRA, 2019). The continued use of these drugs depicts a situation where their lives will be affected in major ways and worse, there are chances of it being fatal.

There is evidence to show that the majority of deaths caused by illicit drug use occur among the youth (UNODC, 2012; UNODC, 2018). Other effects the young people may suffer as a result of drug use include; poor performance in school, dropping out of school, poverty, poor parent-child relationship, damage of the brain, different cancers as well as mental disorders (Muchemi, 2012; Mwithaga, 2013). Given these consequences, it is necessary to address the issue.

In order to address the challenge of alcohol and drug use, it is critical to appreciate the elements that may contribute to the problem. There is evidence to suggest that such factors may include family related ones. These factors include, low parental monitoring and control of the youth (Choquet, Hassler, Delphine, Falissard & Chau, 2007), low supervision, low socio-economic status (Acs & Nelson, 2002; Manning & Brown, 2006; Seltzer, 2000), parental-conflict (Golombok & MacCallum, 2004; Golombok, Tasker & Murray, 1997) high stress levels (Mckeown, Pratschke & Haase, 2003) among others. These factors play a role in the initiation and continuous use of drugs among the youth and numerous studies have been done to show this.

Depending on the structure of the family, these factors seem to be higher in some family structures than others. According to various studies these factors are particularly higher in single-parent families (Acs & Nelson, 2002; Choquet, Hassler, Delphine, Falissard & Chau, 2007) compared to double-parent families. With these findings in mind, it is highly likely that youth from single-parent families may engage in drug use. Therefore, there was need for a study to investigate whether it is the case.

In Africa, single-parent families are progressively replacing the traditional family, which consists of two parents and their children. (Hamplova & Shelley, 2011; Ntoimo & Chadoka-Mutanda, 2020). This phenomenon is on the rise and hardly do we find studies done to find out its contribution or lack of it on the rise of drug use among youth in this region.

Globally, some studies have connected family structure to youth drug usage. For instance, research conducted in America show that adolescents from single-parent households were more prone to consume alcohol uptake, use of cigarettes, among other risky behaviors (Oman, Vesely, Tolma, Aspy, Rodine, & Marshall, 2007). In another study conducted in Hong Kong, youth from non-intact families (maternal, paternal and no-parent) were more likely have used cigarettes, alcohol and other drugs compared to their counterparts from intact families (double-parent families) (Mak, Ho, Thomas, Schooling, McGhee, & Lam, 2010).

Similarly, in Europe Markina and Kask (2013) found that youth with both parents aged 12-16, in comparison to those from single-parent families drank less and consumed less marijuana in the previous month. However, in this study, there was no significant relationship in the use of hard drugs. This therefore calls for more studies on the area to investigate whether similar results would be established in other parts of the globe especially in Africa. In France, studies have found that boys and girls from single-parent families have rates of current tobacco and marijuana usage those from double-parent families. However, for boys' alcohol consumption was not associated with family structure (Choquet et al., 2007). The studies done in the Western world seem to show some association between the structure of the family and drug indulgence among the youth, despite the inconsistencies in terms of the type of drugs and gender of the youth. In Africa, there are few studies done on this topic and these studies seem to show inconsistencies.

In a study conducted among youth in secondary schools in Nairobi, Kenya by Mwadime (2005) it was found that students from double-parent families used cigarettes and none from single-parent families (see also Fawzy, Combs, Simon & BrownanTrellor, 1987). The inconsistent results in the study found in Africa, calls for more studies to ascertain the situation.

The mixed findings reflected in the above studies, depicts a need for more evidence through research to clarify the association between the structure of the family and use of drugs especially in Africa. This study endeavored to investigate the interaction between the two variables among youth and therefore sought to provide more evidence to the area.

As demonstrated above, literature shows that misuse of drugs is a challenge among the youth. This opinion is supported by various studies, some of which focus on comparing the level of drug use in different family structures. It is noted that most of these studies have been done mainly in the Western countries but they have not been exhaustive. It is important to note that Africa, specifically Kenya has its unique socio-cultural dynamics hence the need to find out whether similar results could be obtained in this region.

It is also noted that studies done in Kenya on the area, is on family structure in relation to education, behavior and delinquency (Mwadime, 2005). Hardly do we find any research examining the role family structure plays on drug use among the youth.

The objective of the current study was therefore to investigate the relationship between family structure and drug use among the youth in Kajiado County, Kenya. Furthermore, there was need to see if there were significant differences in drug use prevalence between youth from single-parent households and those from double-parent families.

Methodology

The correlation research design was used in this study. This design was suitable for the present study since it is used to investigate statistical association between variables. In line with this, the current research sought to establish whether there was a relationship between family structure and drug use among the youth. The research was done in Kajiado County where statistics suggested that misuse of drugs was an issue among the youth, with a study from one of the divisions, Ngong division, establishing that 8 and 9 year old children had started using drugs (Wangai, 2007). Furthermore, there were figures suggesting that the area's family structure was changing, with 37% of children living in single-parent families in the former Kajiado North Constituency (Apostles of Jesus Aids Ministries' database, 2011).

The study sampled youth between 10-25 years old. The reason for including youth as young as 10 years in the study was because NACADA (2012) found that the median age of tobacco and alcohol initiation in Kenya is 10 years. Furthermore, there was evidence that youth as young as 8 and 9 were using drugs (Wangai, 2007). A multi-stage approach was used to obtain the sample. In the first stage, Kajiado County was categorized into five sub-counties using stratified random sampling. Then, two of them were randomly selected. Each of the two sub-counties was further divided into rural and urban divisions, totaling to four divisions with youth selected using simple random selection for in-school youth and purposive selecting for out-of-school youth. This entailed sampling youth from youth clubs, churches, football teams, and theaters where they were likely to be found. The final sample comprised of 356 participants.

Data was collected by means of a questionnaire with three sections. The first one was the family structure questionnaire which intended to get participants' information on their family background including whether one had one or both parents/guardians. The second section gathered data on the frequency of drug usage among the participants capturing their lifetime use (ever use), recent use (past one year), current use (past one month) and/or daily use. Furthermore, there was a section that was used to obtain the participants' sociodemographic data such as the age, gender, level of education, and employment. The questionnaires were administered face to face.

In order to augment construct validity, firstly it was ensured that both variables under investigation, namely, family structure and drug use, were operationalized in harmony with their descriptions in existing theory and literature. Secondly the investigator ensured that the questionnaire's items were relevant to the study's variable. Thirdly, content validity was enhanced by making sure that items in the both questionnaires covered the various dimensions of the two constructs as elaborated in the research. Furthermore, as recommended by Fraenkel and Warren (2000), expert opinion was sought for them to consider the appropriateness of the items in the tool in relation to the objectives of the study.

To augment the instrument's reliability, the researcher used test/retest procedure where the questionnaire was administered to ten respondents akin to the ones in the sample. These participants were not included in the final sample. After two weeks, the tool was again administered to the 10 participants under the same conditions. The two-week period helped in reducing the recall effects. It also ensured that there are fewer chances that the behavior under study will change. As recommended by Rosner (1995), a Correlation Coefficient index was computed to compare the two sets of score and an index of 0.75 and above was considered god enough.

The obtained data was analyzed using descriptive statistics, such as frequency and percentages. Furthermore, a non-parametric test, specifically Pearson's chi square was employed to test whether there were any significant differences in drug use between youth from double-parent families and youth from single-parent families.

Results

During data collection, the researcher collected data from 371 participants but 15 questionnaires were not included in the final data as they did not answer the most crucial items of the study. Therefore, data from a total of 356 youth was analyzed.

In terms of demographics the bulk of the participants were youth between ages of 10 and 15 with females accounting for 59.4% of the total. The majority of the participants (44.8 percent) had completed secondary/high school, with only a few completing a diploma or university degree (13.8 percent). About 39% of the youth were from large families with the majority coming from double-parent families (63.2%) while 36.8% from single-parent families. The following section presents the findings on family structure and drug use among the youth from various family structures.

Family structure and Lifetime (ever) Use of Drugs

Data was analyzed to see if there were any variations in lifetime drug usage between youth from double-parent families and those from single-parent homes. Findings are as follows:

Table 1: Family structure and Lifetime (ever) Use of Drugs

Family Structure	Yes		No		Total	
	Frequency	Percentage %	Frequency	Percentage %	Frequency	Percentage%
Single-Parent/Guardian	90	68.7%	41	31.3%	131	100%
Double-Parent/Guardian	154	68.4%	71	31.6%	225	100%

The prevalence of lifetime drug usage among youth from single-parent and double-parent families differed by a little margin, as indicated in table 1. Youth from single-parent families accounted for 68.7 % of those who used drugs compared to 68.4 % of those from double-parent homes.

The hypothesis that there are no significant differences in lifetime (ever use) prevalence of drug use between youth from single-parent families and those from double-parent families was tested using the Pearson's chi square. Table 2 presents the finding

Table 2: Chi Square Test on Significant Differences between Drug Use among the Youth from the different Family Structures

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	ExactSig. (1-sided)
Pearson Chi-Square	.003	1	.960		
Continuity Correction	.000	1	1.000		
Likelihood Ratio	.003	1	.960		
Fisher's Exact Test				1.000	.529
Linear-by-Linear Association	.003	1	.960		
N of Valid Cases	356				

As indicated on table 2, the results were not significant, .003, p=.960. We therefore fail to reject the null hypothesis that there are no significant differences in the lifetime (ever use) prevalence of drug use among youth in single-parent families and those in double-parent families, since the p value was greater than .05.

Family Structure and Recent (past one year) Use of Drugs

Data was further analyzed to compare between youth from two family structure, namely double and single-parent families, to find out the prevalence of recent (past one year) use. Table 3 indicates the findings.

Table 3: Family Structure and Recent (past one year) Use of Drugs

Family Structure	Yes		No		Total	
	Frequency	Percentage %	Frequency	Percentage %	Frequency	Percentage %
Single-Parent/ Guardian	81	61.8%	50	38.2%	131	100%
Double-Parent/ Guardian	98	43.6%	127	56.4%	225	100%

Table 3 shows that slightly above two-thirds of single-parent youth (62%) had taken drugs in the previous year but fewer than half of those from double-parent families did (44%).

Pearson's chi square was used to test the hypothesis that there are no significant differences in the recent (past one year) drug use prevalence of drug use between youth in single and double-parent families. Table 4 shows the findings.

Table 4: Chi Square Test on Family Structures in the Past One Year (Recent Use).

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	11.063	1	.001		
Continuity Correction[b]	10.344	1	.003		
Likelihood Ratio	11.143	1	.002		
Fisher's Exact Test				.003	.002
Linear-by-Linear Association	11.032	1	.002		
N of Valid Cases	356				

According to table 4 findings, the differences were significant, 11.063, p=.001. We reject the null hypothesis in favor of the alternative hypothesis that there are significant differences in the recent (past one year) use prevalence of drugs between youth in single-parent families and those in double-parent families because the p value is less than .05.

Family Structure and Current (past one month) Use of Drugs

Data was further analyzed in order to compare current (past one month) consumption of drugs among the youth from various family structures (specifically, double-parent families and single-parent families). Table 5 shows the findings.

Table 5: Family Structure and Current (past one month) Use of Drugs

Family structure	Yes		No		Total	
	Frequency	Percentage %	Frequency	Percentage %		Percentage %
Single-Parent/ Guardian	76	58.0%	55	42.0%	131	100%
Double-Parent/ Guardian	84	37.3%	141	62.7%	225	100%

As seen in table 5, the frequency of current users changed depending on the family structure. Drug use was lowest among youth from double-parent families (37%).

Pearson's chi square was then used to test the hypothesis that there are no significant differences in current (past one month) drug use prevalence between youth in single-parent families and those in double-parent families. The findings are as shown on table 6.

Table 6: Chi square test on significant differences between drug use among the youth from the different family structures in the past one month (current use)

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	14.312	1	.000		
Continuity Correction	13.489	1	.000		
Likelihood Ratio	14.333	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	14.272	1	.000		
N of Valid Cases	356				

The obtained results showed that =14.312, p=.000 as shown in table 6. As a result, we reject the null hypothesis in favor of the alternative hypothesis that there are significant differences in the current (past one month) drug use prevalence among youth in single-parent families and those in double-parent families because the p value is less than .05.

Family Structure and Daily Use of Drugs

The respondents were asked if they used any of the drugs on a daily basis in order to compare the frequency in daily use of drugs among youth across various family structures. The responses are as depicted in table 7.

Table 7: Family Structure and Daily Use of Drugs

Family structure	Yes		No		Total	
	Frequency	Percentage %	Frequency	Percentage %	Frequency	Percentage %
Single-Parent/ Guardian	23	17.6%	108	82.4%	131	100%
Double-Parent/ Guardian	22	9.8%	203	90.2%	225	100%

Table 7 shows that the youth from single-parent families were likely to use drugs on a daily basis (18%) than those from two-parent households (10%).

Pearson's chi square was again used to test the null hypothesis that there are no significant differences in drug use prevalence between youth from single-parent families and their counterparts from double-parent families. Table 8 summarizes the findings.

Table 8: Chi Square test on Significant differences between Daily Drug Use among Youth across different Family Structures.

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.538	1	.033		
Continuity Correction	3.861	1	.049		
Likelihood Ratio	4.394	1	.036		
Fisher's Exact Test				.046	.026
Linear-by-Linear Association	4.525	1	.033		
N of Valid Cases	356				

According to table 8, the results were; = 4.538, p=.033. As a result, we reject the null hypothesis in favor of the alternative hypothesis that there are significant differences in prevalence of daily drug use between youth in single-parent families and those in double-parent families, since, the p value is less than .05.

Discussion

The findings of this study suggest that there were no significant differences in lifetime usage between youth from single-parent homes and youth from double-parent families. This could be due to the fact that they are from the same locality and hence the risk factors for drug use in the area may have an equal influence on them and therefore, the slight difference. This is in line with Rhew, Hawkins and Oesterle's (2011) study on 'drug use and risk among youth in different rural contexts' that found that youth from different residential locations were exposed to similar risk factors that were associated with drug usage. In addition, it is probable that, when they first used drugs, some of the youth who now live in single-parent families were living with both parents. Therefore, they just experimented with the drugs and stopped at that. The ones who transitioned to single-parent families due to various reasons probably continued using the drug to cope with the changes which can be stressful and hence the significant differences observed in the following sections. It is observed that transitions to single-parent families may come with its challenges such as financial challenges, dealing with loss, uncertainties, anger, distress (Dunn & Deater-Derkard, 2001), among others.

In terms of recent (past one year), current (past one month) and daily use the results suggest that there were significant differences with the youth from single-parent households more likely to use drugs than the ones from double-parent families. The frequency of use of drugs among the youth from single-parent families may be explained by the fact that family related risk factors are such as low control and supervision from their parents are present in these families compared to double-parent families (Choquet, hassle, Delphine, Falissard & Chau, 2007). However, it is also possible that they use these drugs as a way of coping from the pressure they experience from taking the position and responsibilities of the absent parent since the couple subsystem lacks a member. Because of the gap, it is possible that the primary parent who is present fills the gap using the youth present. As a result, the youth are forced to early maturity to fit in the new role in the

family for there to be complementarity in the parental dyad as depicted by Goldenberg and Goldenberg (2008). This may increase their stress levels hence the use of drugs to cope.

The study's findings are comparable to those of Markina and Kask (2008), who established that youth from broken households took drugs more than those from double-parent families, although they did not break down the data by lifetime (ever) use, recent (past one year) use, current (past one month) use and daily use. Similarly, Oman, Vesely, Tolma, Aspy, Rodine and Marshall (2007) established that youth from single-parent families were more likely to be current users of various drugs. In another study, it was revealed that single-parent families' youth are more likely to take tobacco than their counterparts from double parent families (Atkins, Oman, Vesely, Aspy and McLeroy, 2002). Furthermore, the current study results are comparable to a study done by Antecol and Bedard (2007) that found lesser likelihood for the youth to engage in deviant behaviors like smoking, drinking, and marijuana usage, in families where the father stayed longer.

Conversely, results of this research were in variance with Mwadime (2005) who carried out a study among secondary school students in Nairobi, Kenya. The researcher found that only students from two-parent families had smoked cigarettes, while single-parent families had none.

With the exception of lifetime (ever) use where no significant differences were found, the current study's findings appear to indicate that when at least one parent is absent from the family, the young members of the family are at a greater risk of drug use. This is mirrored by the fact that single-parent family youth showed higher use than the ones from double parent families, in all the categories. This is in line with research conducted by Choquet et al (2007) who found a higher likelihood that youth from single-parent families had used tobacco, marijuana, or alcohol in the previous month (current use).

Conclusion and Recommendations

The purpose of the study was to find out whether there is a relationship between family structure and drug use among the youth in Kajiado County, Kenya. According to the findings of this study, single-parent family youth had a greater risk of drug use than the ones from double-parent families. Therefore, mental health professionals such as counselors and psychologists, as well as other partners tasked with addressing the drug use challenge need to establish drug prevention programs that specifically target youth from high-risk family structures who appear to be at an increased risk of drug use. Furthermore, some of the programs should target youth who use the drugs daily as they are at a higher risk of developing substance use disorders among other health and social challenges

Again, there is need for mental health practitioners together with NACADA, health policy makers, religious leaders, teachers and other stakeholders to develop innovative programs that educate the youth about the hazardous nature of drug use.

Acknowledgements: We would like to thank all the participants in this study as well as all the people contributed in guidance. We are also indebted to NACADA who funded this study.

Conflict of Interest: None Declared

References

Acs, G., & Sandi, N. (2002). The kids alright? Children's well-being and the rise in cohabitation. Washington DC: The Urban Institute.

Antecol, H., & Bedard, K. (2007). Does Single Parenthood Increase the Probability of Teenage Promiscuity, Drug Use and Crime? Journal of Population Economics, 55-71.

Apostles of Jesus Aids Ministries. (2011). Database. Nairobi: AJAM.

Atkins, L. A., Oman, R. F., Vesely, S. K., Aspy, C. B., & McLeroy, K. (2002). Adolescent Tobacco Use: The Protective Effects of Developmental Assets. American Journal of Health Promotion, 198-205.

Choquet, M., Hassler, C., Morin, D., Falissard, B., & Chau, N. (2008). Percieved parenting styles and Tobacco, Alcohol and Cannabis use among French Adolescents: Gender and Family Structure Differentials. Alcohol and Alcohlism, 73-80.

Clark, S., & Hamplová, D. (2013). Single motherhood and child mortality in sub-Saharan Africa: a life course perspective. Demography, 1521-1549.

Demo, D. H., & Acock, A. C. (1996). Family Structure, Family Process, and Adolescent Well-beig. Journal of Research on Adolescence, 457-488.

Dunn, J., & Deater-Deckard, K. (2001). Children's Views of their Changing Families. London: York Publishing Services Ltd.

ESPAD. (2019). Results from the Eurpean School Survey Project on Alcohol and Other Drugs. Luxembourg: European Union.

Fawzy, F., Coombs, R., Simon, J., & Brownan-Terell, M. (1987). Family Composition, Socioeconomic status and Adolescent Substance Abuse. Addictive Behavior, 79-83.

Fraenkel, R. J., & Wallen, E. N. (2000). How to design and evaluate research in education. San Francisco: McGrw-Hill.

Goldenberg, H., & Goldenberg, I. (2008). Family Therapy: An Overview. BrooksCole: Cengage Learning.

Golombok, S., Tasker, F., & Murray, C. (1997). Children raised in fatherless families from infancy; Family relationship and socio emotional development of children of lesbian and single heterosexual mothers. Jurnal of Child Psychology and Psychiatry, 783-791.

Harris, B. L., Levey, E. J., Borba, C. P., Gray, D. A., Carney, J. R., & Henderson, D. C. (2011). Substance use behaviors of secondary school students in post-conflict Liberia: a pilot study. International Journal of Culture and Mental Health, 190-201.

Kopsov, R. A., Ruchkin, V. V., Eisemann, M., & Sidorov, P. I. (2005). Alcohol abuse in Russian delinquent adolescents; Associations with comorbid psychopathology, personality and parenting. European Child & Adolescent Psychiatry, 254-261.

Mak, K.-K., Ho, S.-Y., Thomas, G. N., Schooling, C. M., McGhee, S. M., & Lam, T.-H. (2010, August 19). Family structure, parent-child conversation time and substance use among Chinese adolescents. Retrieved January 15, 2021, from BMC Public Health: https://bmcpublichealth.biomedcentral.com/articles/10.1186/1471-2458-10-503#citeas

Markina, A., & Kask, K. (2013). The Effects of Family Factors on Alcohol Consumption in Three East-European Countries. Journal of Contemporary Criminal Justice, 53-69.

McKeown, K., Pratschke, J., & Haase, T. (2003). Family Well-Being: What Makes a Difference. Dublin: Kieran Mckeown Limited .

Muchemi, R. N. (2012). Drug and Substance abuse among youth in the informal settlements within Nairobi. Nairobi.

Mwadime, M. M. (2005). Single-parenthood: an examination on its effects on behavior and education of students in selected secondary schools in Narobi. Nairobi: Kenyatta University.

Mwithaga, M. (2013). Assesing the socio-economic impact of alcohol and drug abuse on the youth in Kenya. Nairobi.

NACADA. (2007). Rapid Situation Assessment of Drug and Substance Abuse in Kenya. Retrieved July 13, 2014, from NACADA.

NACADA. (2012). Rapid situation assessment of the status of drug and substance abuse in Kenya. Nairobi: NACADA.

NACADA. (2015). Exploratory Survey Report on the Use of Narcotic Drugs in the Production of Confectioneries in Kenya. Nairobi: NACADA.

NACADA, & KIPPRA. (2019). Status of Drugs and Substance Abuse among Primary School Pupils in Kenya. Retrieved January 12, 2021, from National Authority for the Campaign against Alcohol and Drug Abuse: https://nacada.go.ke/sites/default/files/2019-10/Report%20on%20the%20Status%20of%20Drugs%20and%20Substance%20Abuse%20among%20Primary%20School%20Pupils%20in%20Kenya.pdf

Ntoimo, L., & Chaadoka-Mutanda, N. (2020). Demography of Single Parenthood in Africa: Patterns, Determinants and Consequences. In C. O. Odimegwu, Family Demography and Post-2015 Development Agenda in Africa (pp. 147-169). Switzerland: Springer International Publishing.

Olawole-Isaacs, A., Ogundipe, O., Amoo, E. O., & Adeloye, D. (2018). Substance Use among Adolescents in Sub-Saharan Africa: A Systematic Review and Meta-analysis. Sub-Saharan Africa Journal of Child Health, 579-584.

Oman, R. F., Vesely, S. K., Tolma, E., & Aspy, C. B. (2007). Journal of Research on Adolescence, 743-766.

Oman, R. F., Vesely, S. K., Tolma, E., Aspy, C. B., Rodine, S., & Marshall, L. (2007). Does Family Structure Matter in the Relationships Between Youth Assets and Youth Alcohol, Drug and Tobacco Use? Journal of Research on Adolescence, 743-766.

Rhew, I. C., Hawkins, J. D., & Oesterle, S. (2011). Drug use and risk among youth in different rural contexts. Health and Place, 775-783.

Rosner, B. (1995). Fundamentals of Biostatistics. Toronto: Duxbury Press.

Sweden, J., Burstein, M., Case, B., Conway, K. P., Dierker, L., He, J., et al. (2013). Use and Abuse of Alcohol and Illicit Drugs in US Adolescents: Resuts of the National Comorbidity Survey-Adolescent Supplement. Archives of general Psychiatry, 390-398.

UNODC. (2012). World Drud Report. Vienna: United Nations.

UNODC. (2012). World Drud Report. Vienna.

UNODC. (2018). Drugs and Age: Drugs and associated issues among young people and older people. Vienna: United Nations Publication.

Wangai, P. N. (2007). Knowledge of drug and substance abuse in public primary in Ngong division. Nairobi: University of Nairobi..

Emerging Trends on Smokeless Tobacco Use in Kenya

Kirwa Lelei*, John Muteti[1], Victor Okioma[1] and Adrian Njenga[1]

[1]National Authority for the Campaign Against Alcohol and Drug Abuse (NACADA), Kenya

***Corresponding Author:**

Kirwa Lelei,

Directorate of Research and Policy Development,

National Authority for the Campaign Against Alcohol and Drug Abuse (NACADA),

Kenya

Submitted: 11th May 2021

Published: 30th June 2021

Introduction

In Kenya, there is growing demand towards smokeless tobacco use especially among the youth and adolescents. Available data shows that 14.5% of secondary school students and 6.0% of primary school pupils in Kenya have ever use tobacco in their lifetime (NACADA, 2016; NACADA, 2018). Smokeless tobacco use is an emerging public health challenge with epidemiologic and laboratory evidence concluding that it causes oral cancer, esophageal cancer, and pancreatic cancer in humans (United Nations Population Fund, 2010; United Nations, 2011). In addition, more than 30 carcinogens have been identified in smokeless tobacco products (Central Intelligence Agency, 2012). Further, smokeless tobacco products contain nicotine, and users demonstrate signs of dependence similar to those of cigarette smokers (Kyaing, 2004).

With the elaborate Government interventions to control smoking, smokeless tobacco may become an attractive alternative especially among the youth and adolescents. In this regard, NACADA conducted an assessment to establish emerging trends on smokeless tobacco use. Samples of smokeless tobacco were collected in the 8 regions of Kenya stratified across 18 purposively sampled counties. A total of 33 samples were collected and submitted to the Government Chemist for analysis and identification.

Findings

Confirmatory results showed *snuff, tamboo, ndovu*, nicotine pouches and kamath spit tobacco were the most prevalent forms of smokeless tobacco products being used in Kenya (Table 1). Laboratory analysis showed that all these products contain nicotine thereby confirming their risk for dependence among the users. In terms of the nicotine levels, snuff was more potent followed by *ndovu, tamboo* and lastly nicotine pouches.

Table 1: Laboratory analysis report for tobacco samples

No.	Sample No.	Type of Sample	Nicotine Content	Source County
1.	F/MISC/833/19	Tamboo	0.79%	Nairobi
2.	F/MISC/834/19	Tamboo	0.94%	Nairobi
3.	F/MISC/835/19	Tamboo	0.1%	Nairobi
4.	F/MISC/819/19	Tamboo	0.7%	Kitale
5.	F/MISC/805/19	Snuff	1.16%	Uasin Gishu

No.	Sample No.	Type of Sample	Nicotine Content	Source County
6.	F/MISC/825/19	Snuff	0.43%	Nyeri
7.	F/MISC/826/19	Snuff	0.51%	Nyeri
8.	F/MISC/633/19	Snuff	0.93%	Nairobi
9.	F/MISC/639/19	Snuff	0.25%	Nairobi
10.	F/MISC/649/19	Snuff	0.4%	Nairobi
11.	F/MISC/742/19	Snuff	0.54%	Nairobi
12.	F/MISC/720/19	Snuff	1.19%	Mombasa
13.	F/MISC/662/19	Snuff	0.04%	Meru
14.	F/MISC/658/19	Snuff	0.269%	Meru
15.	F/MISC/669/19	Snuff	1.60%	Makueni
16.	F/MISC/670/19	Snuff	1.97%	Makueni
17.	F/MISC/673/19	Snuff	1.61%	Makueni
18.	F/MISC/674/19	Snuff	1.89%	Makueni
19.	F/MISC/678/19	Snuff	1.62%	Makueni
20.	F/MISC/818/19	Snuff	0.51%	Kitale
21.	F/MISC/779/19	Snuff	0.05%	Kisumu
22.	F/MISC/799/19	Snuff	0.28%	Kisii
23.	F/MISC/703/19	Snuff	1.58%	Kilifi
24.	F/MISC/768/19	Snuff	0.05%	Busia
25.	F/MISC/769/19	Snuff	0.0497%	Busia
26.	F/MISC/770/19	Snuff	0.11%	Busia
27.	F/MISC/739/19	Nicotine Pouches	0.62%	Nairobi
28.	F/MISC/740/19	Nicotine Pouches	0.34%	Nairobi
29.	F/MISC/741/19	Nicotine Pouches	0.31%	Nairobi
30.	F/MISC/778/19	Ndovu	0.7%	Kisumu
31.	F/MISC/790/19	Ndovu	1.53%	Kisumu
32.	F/MISC/794/19	Ndovu	-	Kisumu
33.	F/MISC/832/19	Kamath Spit Tobacco	1.19%	Nairobi

One of the emerging challenges observed through the focus group discussions indicated that smokeless tobacco products were cheap, readily available and accessible even to the underage children. In addition, these products were non-compliant with the requirements of the Tobacco Control Act 2007.

Recommendation

The current legal framework anchored under the Tobacco Control Act, 2007 provides for labeling, packaging, sale, distribution and promotion requirements for tobacco products with a bias on smoking. This therefore presents enforcement challenges towards the control of smokeless tobacco products. There was need for the Ministry of Health through the Tobacco Control Board to amend the Act to provide for the control of smokeless tobacco products.

REPUBLIC OF KENYA

NACADA
FOR A NATION FREE FROM ALCOHOL AND DRUG ABUSE

NSSF Building 18th Floor, Eastern Wing, Block A
P.O. Box 10774 – 00100 Nairobi
Phone: +254 202721997
Email: info@nacada.go.ke
Website: www.nacada.go.ke