

Case Report

Marijuana-use related Homicide: A case study in Papua New Guinea

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Abstract

Production, trade and consumption of marijuana are illegal in Papua New Guinea. However, marijuana is still produced and used locally, with little known studies into the impact it may have on the individual and community. This paper reports two death incidents related to the use of marijuana in Goroka district, Eastern Highlands Province, Papua New Guinea, using the WHO 2016 Verbal Autopsy instrument, adapted for use within the Comprehensive Health and Epidemiological Surveillance System, operated by Papua New Guinea Institute of Medical Research since 2018. The paper confirms marijuana use as the cause of death leading to the two reported homicidal incidents and provides inputs for the current discussion of legalization of marijuana use in PNG, and calls for legal actions to effectively control marijuana abuse in the country.

Keywords: Cause of Death Analysis; Comprehensive Health and Epidemiological Surveillance System; Marijuana; Papua New Guinea; Verbal Autopsy

Introduction

Papua New Guinea (PNG) located in the South Pacific, is the most populous country in the region, with about 8.22 million people, but widely dispersed over the main land area of about 450,000 square km. Geographic barriers to access to remote terrains and isolated islands pose challenges to the delivery of public services to the population, particularly those living in rural areas. Poor maintenance of road, traffic and transportation infrastructures make the provision of public services inadequate. Marijuana or cannabis use has been observed in the Western Pacific only since the Second World War. Although it is not known when marijuana was first introduced to PNG, the drug is believed to be available in the 1960s, meaning the plant probably has been grown elsewhere in PNG for more than 50 years. It was documented that marijuana was relatively easy to import among other illegal goods across the customs barrier at that time.

The drug was also grown locally by some expatriate smokers for their own use and shared with friends. Marijuana only reached Chimbu Province in the Highlands Region in the late 1970s. Marijuana was recognized as being grown and used by many PNG

people in the mid-1980s, linked to the development of the mining industry, especially the opening of the OK Tedi mine in Western Province. The uptake of cultivation, use and trafficking of marijuana has been widespread in PNG since then. In the 1980s, marijuana was mainly available and used among criminal groups and PNG media represented the official views that marijuana cultivation and consumption spread virulently in the general population in the early 1990s [1]. Despite the recent economic growth, PNG faces increased concerns about developmental issues.

As fertility and mortality decline, the country has entered a health and epidemiological transition characterized by a reduction in infectious diseases and growing Non-Communicable Diseases (NCDs) [2]. A common perception emerging is that injuries are contributing significantly to causes of deaths. PNG Institute of Medical Research (PNGIMR) health surveillance data show that deaths from injuries have increased from 9% to 19% of total deaths over the last 50 years, meaning almost one in five of all deaths are due to injuries. Homicide was the leading cause of injury deaths, accounting for nearly one fourth of all injury deaths in the 2010s [2]. Domestic Violence (DV) is one of the main causes of injuries. Almost half of PNG women reported having experienced with DV in the last 12 months. One fifth of these women reported being physically abused, with 5% being threatened with a knife or a gun and 2.4% attacked with a knife or a gun in the past 12 months.

Women in the Highlands Region i.e. Goroka reported even a higher level of DV, with 8% reported as being threatened and 5% being attacked with a knife [3]. Homicidal deaths related to marijuana abuse have been well studied. Most studies have been conducted in high income countries and in closed settings such as correctional facilities and detention centres [4]. There are few known studies in community settings in Low- And Middle-Income Countries (LMICs). In PNG, marijuana abuse has been officially reported in the media [1, 5]. The on-going discussions of legalization of marijuana in high income countries in Oceania such as Australia and New Zealand have heightened the recent debate on marijuana use in PNG. However, there has been little investigation on the social and health problems related to marijuana.

Few epidemiological studies have been published in PNG on the use of marijuana and its impact on mortality at the individual and population levels. Little is known about the complex interactions between the marijuana abuse, domestic violence and injuries as the underlying causes of deaths in the community in PNG. In this study, we report a case study of two deaths incidents related to marijuana abuse in Goroka town in PNG, using verbal autopsy data, collected by an international standard research method to verify and confirm the cause of death. We also explore local socio-cultural perspectives toward marijuana use, contributing to the current discussion on policy and legalization of marijuana in PNG.

Materials and Methods

Data used in this report were extracted mainly from the mortality data component of the Comprehensive Health and Epidemiological Surveillance System (CHESS), developed by PNGIMR based on the foundation of the exiting integrated Health and Demographic Surveillance System (iHDSS). CHESS is set up for surveillance of the population living in both rural and urban areas in both rural and urbane areas in four surveillance sites across the four geographical regions of PNG: Hiri (Central Province) and Port Moresby, the National Capital in the Southern region, Asaro and Goroka (Eastern Highlands Province) in the Highland region, Maprik and Madang (East Sepik and Madang Provinces) in the Momase region, and Baining and Kokopo (East New Britain Province) in the Island region, with a population coverage of approximately 80,000 people, equivalent to 1% of the PNG total population in the period 2018-2022 (Figure 1). Design and operation of the CHESS has been discussed elsewhere [6].



Figure 1: Map of PNGIMR's CHESS surveillance sites, 2018-2022.

In 2016, World Health Organization (WHO) introduced a new Verbal Autopsy (VA) instrument to collect, store, and analyse VA data for cause of death [7]. This tool was developed based on the consolidation and integration of various existing VA tools. The WHO 2016 VA instruments consist of three data modules, specified for: (i) adolescents and adults (aged 12 years or above); (ii) children aged 0-11 years; and (iii) neonates aged 0-28 days. This tool is designed as interactive and responsive to the provided information. Based on age and sex of deceased person, different sets of questions are selected and shown on the electronic device screen i.e. i-Pad or tablet to facilitate the interview with key informant. To identify causes of death, various questions are asked about clinical signs, medical records, personal and family history of the dead person. This VA tool is a practical method for determining probable causes of death at the population level in places where systems for medical certification of cause of death are weak [8].

The WHO 2016 VA tool is suitable for use in PNG, where civil registration and vital statistics systems are not yet fully developed [9]. The WHO 2016 VA instrument was modified by the PNGIMR's CHESS team, adapted to PNG context, and applied within the CHESS to collect mortality data for cause of death analysis in PNG. The tool was piloted in Asaro and Goroka surveillance sites in 2018, using the CHESS research platform, before scaling up across all four geographical regions of the

country in 2019 [9]. In this paper, we use the adapted WHO 2016 VA tool to identify cause of death from two incidents, recorded in Emagave village, Kabiufa Ward 2, Mimanalo Local Level Government, Goroka District, Eastern Highlands Province on the 14 June 2019: a 6-year-old female child and a 20-year-old man, namely Deli and Sovo, respectively (names of the victims are changed for confidentiality).

Deli was adopted by a farmer couple, who are the biological parents of Sovo. Both lived with their parents in Emagave village, which is about one-hour drive (30 km) in the west of Goroka town with subsistence agriculture such as sweet potato (*kaukau*) and coffee being the main cash crops. The incidents were reported to the CHESSE Principal Investigator (PI) by a data collector, who is based in the village and engaged in collecting and reporting death data in the community to PNGIMR's CHESSE. He is also the village leader and the uncle of the two deceased persons. He reported that Sovo killed Deli and then Sovo was killed by his relatives. The two death incidents occurred one after the other on the same day and witnessed by the mother and other people in the village. A team of two scientific officers, who were trained and have considerable experience with WHO 2016 VA tool, were sent to the village on the following days to interview the key informant and to gather further details and information about the incidents.

Finding

The key informant reported that Deli and her mother just returned home from the Community Health Centre located on the northern side of their home village, where Deli had Measles-Rubella and Polio vaccinations in the morning. Sovo grabbed Deli from the mother's hand, saying: "Mother, I want to have my sister"- the mother recalled. He then cut the big blood vein on the left side of Deli's neck with a bush knife and sucked the blood from the vein. The mother saw it and shouted for help, but was helpless because most of the people in the village were at the clinic. She ran to the clinic and called the people for help to stop Sovo and rescue Deli. When the relatives and villagers arrived at the scene, Deli had already died from the loss of blood. One of the relatives with a bow and arrow shot Sovo with three spears in his chest. After Sovo fell on the ground, he got a knife and cut through Sovo's chest, and destroyed and smashed his liver and heart.

Sovo instantly died of bleeding from the wounds. Using the WHO 2016 VA analytical tool, marijuana abuse is confirmed as the root cause leading to the two homicidal deaths. Reflecting upon the traumatic bloody killing, the key informant commented that *Sovo* used marijuana for more than a year. Sovo was seen with other young men in the village cultivating marijuana plant in their garden. They collected, shared and smoked marijuana among themselves. Sovo was believed to smoke about three rolls (each 5-7cm long) of marijuana daily. On the day of the incident,

Sovo was seen using marijuana about an hour before the incident happened. The research team was also told during the interview that Sovo practiced cult-related activities over a period of time together with three other village men.

They built a small temporary house on the other side of the mountain nearby the village. They were seen occasionally going up to the mountain, offering prayers in the house and bowing to a cross made of wooden timber. Villagers said it was a depiction of directly worshiping Satan and termed this as a practicing cult. The research team was also told that when villagers broke into Sovo's house, they found a book with black cover containing instructions and steps to practicing or performing cult activities. In the house as observed and reported were bones of different animals with signs showing blood was sucked and eaten. According to the key informant, other marijuana users in the village also had such behaviours. The relatives burnt the house to ashes including the bones and the book in the witness of the mother and other villagers.

The responsible relatives and village leaders brought the two deceased's bodies to the Eastern Highlands Provincial Hospital morgue in Goroka town by vehicle on the same day. No bio-autopsy sample or testing was conducted at the hospital. After 6 days, the bodies were taken out from the hospital morgue and buried somewhere else far away from the village on 20th June 2019. No funeral services were held in the village. The death incidents were then reported to and filed with the Royal PNG Constabulary at the Goroka Police Station by close relatives. As the families and the villagers were concerned about the sensitive nature of the deaths and viewed the incidents as unfortunate and shameful, no further information, including images or drug screening information was disclosed. The key informant gave consent to the CHESSE PI and the team for scientific research purpose only.

Discussion

Marijuana trade in PNG

Over the past decade, marijuana has become more prevalent within PNG communities, revealing an important element in the broader political economy [10]. According to many accounts, marijuana grown as a cash crop is widespread throughout the Highlands Region and Eastern Highlands Province in particular (Table 1). Press reports in 2001 described drug use as common in Port Moresby, Lae, Goroka, and Mt. Hagen, which were "full of addicts and a whole new generation of semi-conscious human beings" [10]. Goroka is well known as one of the largest markets for marijuana production, supply and consumption in the Highlands Region of PNG. From our fieldwork, it is often seen that marijuana is grown in the gardens, particularly in the rural villages of Goroka district and surrounding areas.

Province	Estimated Profit (in Million Kina)	Estimated Number of Cultivator
Chimbu	23.5	35,500
Eastern Highlands	20	30,000-50,000
Western Highlands	15.6	15,000-44,000
Madang	5.4	15,000

Table 1: Marijuana Profits and Number of Cultivators by Province [11].

Goroka is also the biggest center for marijuana trafficking. Marijuana has been reported as being exchanged for weapons which are commonly used in tribal fighting between various local groups [11]. Young villagers are reportedly being lured away from coffee production and sales to smuggle marijuana from Goroka to coastal cities such as Wewak, Madang, and Lae. For many young people, marijuana seems to offer better cash income than other legal opportunities from mining and tourism. In the harsh reality of the current local economic recession, young people may see themselves as successful business people in the emerging drug trade. Young men in the village reported in this study may have tried to cultivate and sell marijuana as a way to mediate social and economic pressures and to meet individual, family and community expectations. Involving in this business are not only young men and teenagers, but also young women.

Adverse consequence of marijuana on mental health and development in PNG

Marijuana is the most commonly used illicit drug in PNG [5]. Evidence from our epidemiological surveillance data has shown serious and severe adverse consequences of marijuana smoking on individual health, especially mental health issue among PNG young men. Together with smoke tobacco, marijuana has contributed to the prevalence of DV, tribal fighting and social unrest in PNG [12]. Previous medical research show the effects of smoking marijuana fade quickly, but the drug can last in the body for weeks, depends on how often it is used or how much the user has consumed. Medical research on the long term effect of marijuana smoking suggests that the most common effect upon a user is that, it alters the mind of the user after a prolonged use [13].

Using self-report data from perpetrators of violence, the study conducted in New York correctional facilities of 268 individuals for homicides found that marijuana was the most commonly used illicit drug in the sample, about one-third respondents used marijuana in the 24-hour period before the homicide, and almost three-quarters experienced side effect from the drug when the homicide occurred. However, only 18 respondents (7%) admitted that the homicide was related to their marijuana use [4]. In our

case study, the key informant reported that they saw Sovo showing signs of psychopath and wild mood before the incidents. Although our VA data available from the CHES are not country representative, using the WHO 2016 VA analytical tool we are able to confirm marijuana abuse is the root cause of death leading to the two reported death incidents. Our field observations also strongly suggest that the abuse of marijuana could have negatively altered Sovo's mind, leading to mental health issues, and resulting in the bloody killing, as described.

The key informant also admits that many PNG people, particularly young men have taken to smoking marijuana because it is more accessible these days than in the past. Our surveillance data show that the numbers of accidents and injuries recorded at primary health facilities within the CHES sites increased from 24 cases in 2011 to 1492 in 2015 [14]. From our field work observations, many of these accidents and injuries could be attributed to the use of marijuana through ill health, road traffic and driving accidents, and social and DV incidents. Over time, there has been profound evidence that smoking, including tobacco and marijuana is the leading primary cause of lung cancer among other NCDs. Many other problems are caused by the abuse of marijuana to PNG society.

Link between marijuana use and crime has been reported previously in PNG media, providing several exceptional cases. For examples, a nine-year-old girl and her grandmother were raped and murdered by six men in Chimbu Province, the Post-Courier reported in 2004. A man was reported to have been stabbed to death for refusing to smoke marijuana with friends [11]. However, in these stories the criminals were described as non-civilized, irrational, antisocial, and out of the state control, rather than victims of marijuana abuse. The International Narcotics Control Board's 2003 Mission reported that the PNG Government was ill-equipped to deal with the current and potential problems associated with illegal drugs in the country. From our public health perspective, there has been little evidence of improvement since then.

Current discussion on alcohol, substance and drug policy in PNG

Marijuana legalization policies have been evolving for the past decades. By the end of 2019, more than 50 out of 195 countries and territories in the world have legalized or decriminalized the use of marijuana for either medical and /or recreation purposes. This means many nations have embraced the reality that legal prohibition doesn't actually stop or prevent the population from using it. In Australia medical marijuana has been recently legalized to patients with qualifying medical conditions. New Zealand may be the next nation where non-medical marijuana use and supply will be legalized [15]. Canada and South Africa are countries first legalized the use of marijuana for recreational use. In the United States, 33 states and the District of Columbia have legalized the

medical use of marijuana, but at the federal level its use remains prohibited for any purpose. A policy of limited enforcement has also been adopted in Spain and the Netherlands where the sale of marijuana is tolerated at licensed establishments [16].

However, the overall scientific evidence of the impact of these policies is widely believed to be inconclusive and the effects of medical marijuana laws are inconsistent in terms of implementation and control measures, suggesting more heterogeneous approaches to legal responsiveness are required to meet the needs of different populations with various socioeconomic development status and cultural diversity [13]. In PNG, marijuana is the main and the most common illegal drug. It is illegal to cultivate, store, process, consume, and trade marijuana. Any kind of possession of marijuana will be punished. The production, sale and possession of any form of medicinal marijuana products and possession of marijuana for recreational purposes are illegal [17]. Despite the law, marijuana cultivation, consumption, trafficking and trading is widespread. Lack of legal and preventive measures in place has limited an effective implementation of such policy in the social political context of PNG. Marijuana is the only illicit drug for which use is currently prevalent in PNG [18]. As the current discussions of alcohol, substance and drug policy are on-going, we see little possible reason to legalize the use of marijuana for medical and/or recreational purposes in PNG at least in the near future.

Conclusion

This case study has provided an epidemiological literature review of the marijuana use in PNG in the last 50 years over the colonial and independence periods. Using the WHO 2016 VA instruments, we examine the cause of death of two death incidents captured by the PNGIMR's CHES. The study for the first time provides insight into marijuana smoking behaviour at the individual level. Findings of the paper show evidence of a potential link between marijuana abuse and homicidal deaths in the community of PNG. Marijuana abuse could be one of the factors triggering domestic violence and fueling social violence in PNG. That is required more legal actions for effective prevention and control. The complex interactions between the marijuana use, individual health and the community development have been highlighted by the impact of marijuana is having today in PNG. The production and consumption of marijuana among young people in Goroka district have raised great concerns about individual health and

family issues, creating immense social problems such as social violence and instability.

Socio-economic development will continue to bring about many social changes. The scope of marijuana uses and its impact on the burden of morbidity and mortality in PNG remain unknown, suggesting further studies are needed to better understanding of the magnitude of the issue and its pressure on the public health systems. In this regards, the continued on-going sustainable operation of the CHES is crucial for effective responses of the health sector to this persistent public health issue. Using VA data, policy makers could identify practical solutions that would lead to an effective implementation of laws and policies on prevention and control of substance and drug use in PNG. The paper provides preliminary findings and epidemiological observations of two death incidents directly associated with marijuana use in the community, contributing to the current on-going discussion of legalization of marijuana use in PNG.

Findings from the study suggest that a range of strategies are urgently needed to effectively prevent the wide spread of marijuana use in PNG society as well as the adverse it may have on mental health of PNG young generation. To deal with these problems is apparently far beyond the provincial health authorities, requiring social and legal control measures at both the national and local levels. These policy responses need to be placed in a broader context of prevention and control of alcohol, substance and drug use at the national and local levels. More research and development are needed towards a complete and comprehensive public health framework and roadmap for marijuana legalization in transit of political landscapes throughout the communities for the sustainable development of PNG.

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