Societal and health aspects of psychoactive drug abuse in Papua New Guinea

PAUL C.Y. CHEN, MPH, MD, FFCM*
FELIX Y.A. JOHNSON, FRCPSYCH, FRANZCP**
TUKUTAU TAUFA, MD, MPH, DIP. OBST***

Introduction

Prior to the arrival of the white man to the Pacific island countries, the indigenous people were using many wild plants possessing psychoactive properties. The most prominent were betel nut in much of Melanesia including the islands and coastal areas of Papua New Guinea, kava in much of Polynesia and pituri in much of Australia. The use of these three psychoactive drugs was wide spread and institutionalized as a ritual.

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Papua New Guineans like other Pacific peoples do not have a tradition of alcohol use. After prohibition was lifted in 1962, there have been extensive reports of alcohol abuse, drunkeness, aggressive and serious anti-social behaviour. By the early 1970's, cannabis, unknown to Papua New Guineans, had become established in the country. From 1985 to 1996, drug arrests related to cannabis rose from 45 to 1,444.

*Professor, International Medical University, 21 Jalan Selangor, 46050 Petaling Jaya, Malaysia, e-mail: pcychen@hotmail.com. **Assoc. Professor of Psychiatry, Faculty of Medicine, University of Papua New Guinea. P.O. Box 5623, Boroko, Papua New Guinea. ***Senior Lecturer in Community Medicine, Faculty of Medicine, University of Papua New Guinea, P.O. Box 5623, Boroko, Papua New Guinea. e-mail: tukutau.taufa@upng.ac.pg

This paper examines the societal and health effects of these three psychoactive drugs in the light of their history of appearance in Papua New Guinea.

Betel nut chewing

Appearance of betel nut in Papua New Guinea

The chewing of betel nut is indulged by people from the Indian sub-continent, Sri Lanka, Burma, Thailand, Malaysia, Singapore, Philippines, Indonesia, Papua New Guinea (PNG) and the Solomon Islands. Migrants from these areas have taken this custom to all corners of the earth.[1] The habit is of great antiquity as it is mentioned in the "Sustra Samhita" believed to have been written in India about A.D. 600. The Dutch archives of 1664 also mentioned import duty being levied on imported betel nut in Malacca.[2] Within PNG, betel nut was not chewed in the highlands as the betel nut palm (Palmac catechu) does not grow in altitudes of over 4000 ft. The introduction of socio-economic development to the highlands in the early 1960's is associated with its introduction and increasing use there.[3]

Composition and chemistry of betel nut quid

In Papua New Guinea, a betel nut quid consists of three parts (i) the areca nut (Areca catechu, Linn) from the betel palm (Palmac catechu), (ii) the leaf, bean or the bark from the betel vine (Piper betle) [4] and (iii) the slaked lime from burned shell or coral stones. It is alleged that in some parts of Papua New Guinea burned bones of human skeleton is added to give it "an extra kick". These three form the basic quid, however in parts of Asia aromatic ingredients, dyes and tobacco are added according to taste, caste and class.[1]

The principal alkaloids of the betel nut are arecoline, arecadine and guvacoline.[4] Arecoline is a muscarinic cholinergic agent. It affects the autonomic nervous system with peripheral stimulation and dilated blood vessels; increases heart beat and sweating. It increases digestion and absorption of food by increasing the activity of intestinal musculature. Gastric secretion is increased with relaxation of the pyloric sphincter.[4]

It has some purgative and antihelminthic properties that has been utilized by the Chinese for centuries.[6] Nowadays veterinarians use it for small animals like cats and dogs. It has psychic effect and is addictive.[7] The lime component of the quid increases the pH of the oral cavity from 7 to 10 thus increasing the absorption of alkaloids across the membrane and this results in the increased psychic effect. Mustard on the other hand is acidic and decreases the oral cavity pH from 7 to 4 and also tones down the psychic effect.[8]

Effects of betel nut chewing on behaviour and health

Its mild psychic euphoric and stimulant effects attracts people to take up this habit and in the process become addicted.[7,8] Some have claimed to "get drunk" with its use.[9] Some accidents have been blamed on betel nut chewing.[10] Obviously when chewed during peace negotiations, the mild psychic and euphoric effect help smooth the process of reconciliation.

Its association with oral-oesophageal cancer is well known [11,12,13] and [14] this has been widely used by health authorities in their health campaigns in Papua New Guinea. So far the evidence for this association is on epidemiological grounds. Oral cancer is rare in non betel nut chewing areas and if found it is more on the floor of the mouth compared to bucal in betel nut chewing areas.[15] There is also some suggestion that the areca nut is casually linked to oral submucous fibrosis, a potentially malignant condition.

There is evidence that betel nut chewing triggers an attack of asthma in some people.[17] Arecoline from chewed betel nut is absorbed through the buccal mucosa and exerts a bronchoconstriction effect. The recent dramatic increase in asthma prevalence in the highlands area of PNG is thought to be partly due to this introduced habit.

Arecoline increases digestion and absorption of food by increasing the activity of intestinal muscles. This leads to increased protein and energy intake [18] which in turn has beneficial effects on pregnancy and foetus.[19] There is also the less publicised association of lower dental carries among betel nut chewers compared to non-chewers [20,21,22-23], and some reduction in blood pressure which is temporarily in its effect.[24]

Distribution and use of betel nut in Papua New Guinea

Traditionally, its use is more than an equivalent to sharing a glass of beer in a Western environment. At times it is used for healing, gifts, as an offering to a deity, to cement relationship and for greeting visitors.[9]

In coastal areas a feast without the supply of betel nut is considered incomplete. In some areas traditional dancers used betel nut strung with strings as decoration. Coastal bride price exchanges include betel nut not as payment for the bride but for sharing during the festive occasion. A pregnant woman who chews a betel nut that has two nuts inside is supposed to have twins. Now its use and distribution is so wide spread that it is felt in the local economy. However, there is no direct government tax on it, unlike tobacco and alcoholic drinks. The Government and the businessmen make money out of tobacco and alcoholic drinks, but not betel nut. Due to the unsightly spitting of quid, Local Governments ban it from normal market places and allocate, often with little success, confined areas for its sale. Lately betel nut vendors have added tobacco to their goods and in some cases, cannabis, adding a new dimension to the betel nut cycle. In the highlands, clients are attracted to betel nut markets with dart board game facilities.

Association between betel nut chewing and health in Papua New Guinea

In a traditional setting, the chewed left over of the quid and the betel nut husk is disposed off properly. This is partly due to fear of these items being used by their enemies for sorcery.[25] Nowadays the fear of sorcery has been diminished by education and church influence, and a chewer is likely to spit the quid and throw the betel nut husk in all directions causing unhygienic and unsightly environments. It is for these reasons that the chewing of betel nut is banned in all government buildings and air flights.

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In communities where respiratory infections including tuberculosis is prevalent, the unhygienic habit of spitting betel nut quid juice indiscriminately only helps its transmission and spread. The practice of using a common spatula or mustard to lick the lime is also conductive to the spread of respiratory and other infectious diseases.

Alcohol abuse

Appearance of alcohol in Papua New Guinea

Papua New Guineans like other Pacific Islanders did not have traditional alcoholic beverage before contact with the West.[25,26,27] The people in various parts of Papua New Guinea (PNG) encountered alcohol at different times during

more than a century of contact with the West. Alcohol was introduced into New Britain and New Ireland by the late 1840s and by the early 1880's limited exposure to alcohol was probably wide spread. Proclamation of colonial rule in 1884 led to a total prohibition on alcohol use by the Melanesia peoples of Papua New Guinea.[27]

Effects of alcohol on the human body

Most people talk about alcohol, but few people really understand what alcohol is and that it is the most dangerous drug on earth. The type of alcohol people drink is known as ethyl alcohol (ethanol) Ethyl alcohol is produced when yeast cells act on carbohydrates in fruits and grains. People usually drink three forms of ethyl alcohol known respectively as beers, wines and distilled spirits. Beers are fermented from grains and contain 3% to 5% ethyl alcohol. Wines are fermented from fruits especially grapes. Wines contain 12% to 14% ethyl alcohol, and fortified wines have more alcohol added and contain 18% to 20% ethyl alcohol. Spirits are made from distilled or boiled alcohol and contain 40% to 50% alcohol. Spirits are expressed in degrees of proof. Eighty proof is 40% alcohol and 100 proof is 50% alcohol. Examples of distilled spirits are brandy, gin, rum whisky and vodka.

Beverage alcohol has become associated with urbanization, sophistication and modern life-style. Beer has become woven into traditional social exchanges.

Ethyl alcohol is rapidly absorbed into the blood and circulated throughout the body including the brain. The effect on the brain and the rest of the body depends on; the quality of alcohol, the kind of alcoholic beverage, whether alcohol is taken with a meal or on empty stomach, regularity of alcohol ingestion, the state of the liver and its efficiency in detoxicification, and the inherent biochemical and genetic make-up of the human body including liver enzymes which control the rate of alcohol oxidation to simpler molecules such as water and carbon dioxide.

In summary, the intoxicating effect of alcohol depends on the level of blood alcohol concentration. The effect is dose-dependent. Alcohol alters human behaviour through its effect on the brain.

The medical complications of excessive alcohol drinking include gastritis and gastric ulcer, duodenal ulcer, pancreatitis, alcoholic hepatitis, fatty liver, cirrhosis of the liver, oesophageal varices and Mallory-Weiss syndrome, alcoholic cerebellar degeneration, enlarged heart with heart failure, lobar pneumonia of alcoholics, alcoholic polyneuropathy, head injuries.

Time of appearance and effects on Papua New Guinea society

After World War II a new awareness of alcohol developed. This greater awareness was the result of the influence of Allied and Japanese soldiers on the people of PNG. This was due to the allied and Japanese soldiers' search for alcoholic drink and by the occasional bottle of alcohol from the soldiers to the people of Papua New Guinea. During the 1950s, the 'right to drink' issue gathered momentum and became more political. Periodic reports of illegal drinking by the Melanesians of Papua New Guinea appeared in the press. In 1955 a select committee was appointed by the Australian colonial government to consider the possibility of issuing drinking permits to selected individual Melanesians. At this stage white people were free to drink any form of alcohol and mixed race people (mix Melanesian and Caucasians) were required to obtain a special drinking permit.

Influential Papua New Guineans spoke out openly in favour of the right to drink after 1956. The right to drink issue became more political when Papua New Guineans became the only Pacific Islanders who were still prohibited from drinking any kind of alcohol. In February 1962, a liquor Commission was set up to investigate the right to drink issue and make recommendations to the government.[28]

In October 1962, the Commission recommended the lifting of prohibition and enactment of a new comprehensive liquor law. Interim drinking laws were approved by the government in November 1962 and PNG citizens were allowed to drink alcohol legally for the first time. In September 1963, a permanent legislation on alcohol was passed. Observers have reported increasing drinking of alcohol by Papua New Guineans since 1962/1963.[28]

Alcohol was perceived as a 'prestige intoxicant' from the beginning.[29] Beer has become an important trade item of conspicuous consumption. This is because beer has to be bought with cash. Ability to buy beer is a demonstration of success in the new cash economy. People with the most cash are those who are working for wages. Beverage alcohol has become associated with urbanization, sophistication and modern life-style.[6] Beer has become woven into traditional social exchanges. "Alcohol givers gain prestige and the exchange system has a built-in dynamics to increase the amount of each return presentation. In many parts of PNG alcohol has become the centrepiece of exchanges supplanting pork".[30]

Currently, alcohol use is associated with week-ends, parties, feasts, dances and other leisure activities.[30]

It has been observed that many men in PNG, since deprohibition in 1962, drink alcoholic beverages to excess and in ways that bring harm to themselves and others. Generally, men drink to get drunk. To achieve this end, large quantities (sometimes more than twelve bottles of beer) are consumed in one sitting. Men usually drink together in groups, going on a day-long or week-end-long binges. They drink until the alcohol runs out or until they pass out depending on which happens first. They may search for more alcohol to drink when they wake up. Many problems related to alcohol will remain until these men take more responsibility for their excessive drinking. Men must learn to get high and not get drunk, not to drink and drive. They must also learn that hostility and fights do not need to accompany drinking bouts, and that drunkenness is no excuse for abnormally aggressive and seriously irresponsible behaviour.[31]

Societal response

Societal response to the appearance of alcohol in Papua New Guinea took various forms; proclamation of colonial rule in 1884 led to a total prohibition on the drinking of alcohol by the Melanesian people.[27] This total prohibition lasted until 1962 when deprohibition took place; after world War 2, a new consciousness about alcohol beverages developed [28]; after 1956 the right to drink issue became a hot political issue which attracted a lot of public attention and debate. Prohibition ended in 1962.

A pattern of alcohol use seems to have developed since deprohibition in 1962. A drunken man may have his physical body smashed during a motor vehicle accident or in a drinking brawl. He may cause physical injuries to other people who may or may not have been drinking. In PNG, there is a growing association between alcohol use and traumatic injuries.[28,32]

Alcohol also, represents a new life-style, a new standard of living and a new form of wealth for interpersonal social exchange.

Alcohol use today is involved with economic development. The PNG government derives substantial revenue from taxes on beer and other alcoholic beverages. Provincial governments also derive a lot of money from issuing liquor licenses and related fees.28 Alcoholic beverages are symbolic of all the new consumer goods that can be purchased with cash, including tobacco, rice and tinned fish, radio-cassette tape-recorders, video-cassette recorders and modern clothes. Alcohol also, represents a new life-style, a new standard of living and a new form of wealth for interpersonal social exchange.[30] Since deprohibition in 1962, production of beer has doubled approximately every four to five years. The Commission of Inquiry into Alcoholic drinking was set up in 1971. This Commission of Inquiry concluded that a "serious economic problem surrounded alcohol use in Papua New Guinea".[30]

Association between alcohol and offences

Alcohol-related social problems reported in PNG include domestic violence such as wife-beating, sexually transmitted diseases (STDs) and HIV/AIDS, long-term unemployment, marital discord and marital breakdown.

Alcohol-related legal problems reported in PNG include drunk driving offences, motor-vehicle accidents, physical assault causing actual bodily harm, break-and-enter and stealing, sexual assault such as rape and pack-rape.

Association between alcohol and health in Papua New Guinea

A WHO sponsored research project conducted in 1992 showed that alcohol consumption was more likely to be implicated in injury presentations to Accident and Emergency Departments of hospitals in PNG. 59% of patients with injuries reported that alcohol was a contributing factor in their presentation while in Fiji and Newcastle (Australia) 74% and 20% respectively did so. When these percentage are considered in relation to the objective breath analyser measures, the result can only be considered to be underestimations.

Neuropsychiatric complications of excessive alcohol drinking have been reported in PNG [33] and include alcohol tremor, alcoholic hallucinosis, delirium tremens, alcohol fits, vitamin deficiencies, for example, thiamine deficiency and nicotine acid deficiency, Wernicke encephalopathy, Korsakoff's psychosis, alcoholic dementia, alcohol dependence syndrome, acute alcoholic intoxication, suicidal behaviour.

The cost of alcohol related problems in Papua New Guinea

Marshall[31] estimates in 1990 that, despite the difficulty from lack of better statistics, annually alcohol-related road traffic crashes cost 5,500,000, alcohol-related wife beating cost Kina 860,254, alcohol-related deaths from tribal fights cost Kina 736,900, and "meths" deaths and methanol deaths (estimated at four per year) cost Kina 58,952, making a total cost of Kina 7,156,106.

Marshall also estimates that in addition to the above, other annual costs associated with alcohol abuse in PNG include alcohol-related tribal fights (other than deaths) at

Kina 20 million, alcohol-related crime and law-and-order problems at Kina 20 million, alcohol-related physical and mental health costs at Kina 5 million, other impairment from drinking methylated spirits at Kina 0.1 million, and alcohol-related economic opportunity costs at Kina 26.2 million, making a total of Kina 71.3 million, the combined grand total cost for all the above being Kina 78.5 million per year.

Cannabis

Cannabis, commonly known as marijuana, is made from the dried leaves and flowering tops of *Cannabis sativa*. Although it has been known in China, India and near East from antiquity and in Western Europe for about 1,300 years, its introduction to the Pacific Islands is more recent. It probably arrived in Hawaii about 100 years ago but only appeared in Oceania after World War Two. It was reported in Micronesia in the 1960's, in Tonga and Fiji by 1969. The evidence available indicates that cannabis only reacted upper Simbu Province in the mid-to-late 1970's.

Cannabis has been shown to increase the work of the cardiac system through increased blood pressure and pulse rate.

Chemistry and various preparations of cannabis

Cannabis is the generic term to denote the several psychoactive preparations of *Cannabis sativa*. The major psychoactive constituent is 9-tetrahydrocannabinol (THC) while cannabis contains at least 60 structurally similar compounds referred to as cannabinoids. Marijuana is the Mexican term that refers to the leaves or other crude plant materials; hashish to the resin of the flowering tops; and cannabis oil to a concentrate of cannabinoids obtained by solvent extraction.

Effects of cannabis on behaviour and health

The acute effects of cannabis use include mild euphoria, relaxation, increased sociability, heightened sensory perception and increased appetite. However, the following are some major areas of concern.

Cannabis smoking is associated with significant depersonalization and loss of time sense, sensation of "high", anxiety and confusion. It also can affect memory particularly of previously learned items including the recall of prose material and the recall of a series of numbers. There is evidence that adolescent use of cannabis impairs educational performance.[36]

Cannabis also impairs psychomotor performance such as handwriting and driver coordination. Studies confirm that there is an increased risk of motor vehicle accidents among persons intoxicated with cannabis.[37] The psychoactive constituents of cannabis persist in the body for some time and have been shown to accumulate in body fat. Cannabis has been shown to increase the work of the cardiac system through increased blood pressure and pulse rate.

Long term use of cannabis has been shown to lead to subtle and selective impairment of cognitive function, including the organization and integration of complex information involving attention, memory, verbal learning, card sorting and time discrimination.[38] Prolonged exposure to cannabis smoke also leads to lung damage, chronic bronchitis and chronic cough. Chronic use of cannabis in pregnant women is associated with impairment in foetal development leading to a reduction in birth weight.

Cannabis use and schizophrenia

There is evidence that there is an association between the frequency with which cannabis had been used by adolescents and the risks over the subsequent 15 years of being diagnosed as schizophrenic.[39] A study by Allback et al support the argument that cannabis is a risk factor for schizophrenia.[40]

Cannabis distribution in Papua New Guinea

Cannabis, variously known in PNG as "spak brus", "spak gras", "bombai brus", "goes", "gonz", "leaf tees", "grass", "tea", "weed", etc, also goes by its Mexican name of marijuana. It probably first appeared in the Highlands Region in the 1970s.

By the early 1990s, cannabis was wide spread in Papua New Guinea, and was extensively cultivated in the Highlands. Iamo, W. et al estimate that between 92,000 to 130,000 people in the four province of Western Highlands, Chimbu, Eastern Highlands and Madang, were engaged in cannabis cultivation.[41] Cultivators included subsistence farmers, local villagers, plantation labourers and labourers in government stations and poorly paid public servants. Iamo reported that in Western Highlands, 74% of cannabis cultivators live in villages, 26% in towns, and that 60% of cultivators are male youths of 12 to 20 years of age, 36% are adults, while children make up 4% of cultivators. Few women are cultivators of cannabis.

Iamo in his report estimated that in the Western Highlands the annual crop of cannabis averaged K15.6 million in earnings for the depressed farmers. Similarly, in Chimbu, the income from the sale of cannabis averaged K23.5 million a year. Cannabis production and circulation is well organized. Dealers are principally from the Highlands with a network of contacts through which cannabis is distributed in exchange for cash. The dealers market and transport cannabis by road and air to cities and abroad through

organized rings. Iamo reported that 98% of dealers in cannabis are male, the majority of whom live in villages to avoid authorities.

Cannabis use and offences

The use of cannabis appears to be fairly widespread particularly among male youth. Iamo reports that in Chimbu male consumers aged between 15 to 25 are the dominant consumers. These are sophisticated men exposed to urban and Western culture, in their last year of high school, or who live in urban centres and near the Okuk Highway. However, reliable statistics on cannabis use are not available.

Due to the illegal nature of cannabis cultivation, distribution, possession and public consumption, the only statistics available pertain to cannabis offenders. However, these are merely the tip of the iceberg and few are detected or convicted. Nevertheless, the little data available paints an interesting picture of cannabis cultivation, use and offences in Papua New Guinea.

Data from the Royal Papua New Guinea Police Constabulary for the 12 year period, 1985 to 1996, show a dramatic rise in drug arrests from 45 in 1985 to 1,444 in 1996.

Ivarature in a study on drug offences and offenders dealt with by the Boroko District Court in 1995-1997, in Port Moresby, noted that 48% were adolescents aged 10 to 19 years of age, 30% were aged 20 to 24 years and the remaining 22% were aged 25 years and over, the mean age being 21 years. Of the charges, 8% were for cultivating a prohibited drug, 90% were for possession of an illegal substance, and 2% for both cultivating and possession of a prohibited drug.[42]

As noted earlier, very few women are cultivators of cannabis, however, women may occasionally be used to transport or sell cannabis. Ivarature notes that although the number of women who have been arrested and charged for drug offences remains small, the potential for increase is of concern.[42] All eight women arrested 1997 were unemployed, the average age being 24 years.

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Cannabis, violence and crime

It is not uncommon to read newspaper articles reporting that crimes have committed by persons under the influence of cannabis. However, the evidence does not bear this out.

The Institute of Medicine, USA in a review of retrospective and prospective studies noted that these studies have failed to yield evidence that cannabis use leads to increase aggression..[43] It notes that cannabis appears to have a sedative effect and may reduce the intensity of angry feelings and the probability of interpersonal aggression. In a study of cannabis in Costa Rica, Carter noted that if crimes were committed under the influence of cannabis, they may simply represent the activity of a criminal who happens to smoke cannabis, cannabis being simply incidental to the crime.[44]

In both the Costa Rica study and in study of cannabis use in Jamaica by Comitas, the use of cannabis is extremely widespread in the lower social classes. Comitas describes cannabis use as a "marker" of lower class status, noting that it is one of the first things they shed in upward mobility.[45] Lower class status is associated with unemployment and poverty, which are really the basic cause of crime rather than cannabis use.

Ivarature in his study of 128 drug offenders in Papua New Guinea, noted that only 14% of those charged had full-time work, 61% were unemployed, 2% were either students or prisoners and 16% were of unknown status.[42] He also noted that 65.5% of those charged had had no previous conviction. Iamo suggests that there is no evidence that cannabis use leads to violent or criminal behaviour and that policy makers would do well to avoid treating those charged with possession or use of cannabis in a harsh manner.[41]

Discussion

Of the three psychoactive drugs commonly used in Papua New Guinea, betel nut chewing is the most extensive and wide spread, being used by both men and women throughout PNG. In the islands and coastal areas its use is institutionalized as a ritual. More recently, it has become widely used in the Highlands region where special betel nut markets attract clients with dart board game facilities. Betel nut markets have increasingly become avenues for the sale of tobacco as well as the illegal retail of cannabis. The mild euphoric and stimulant effect of betel nut chewing attracts people to this habit which is addictive. However, there is no indication that betel nut chewing will be attractive to drug enthusiasts in the West such as the Peruvian coca leaf, Indian hemp (cannabis), the Asian poppy (opium) or the American tobacco. However, the possibility of some use in the West cannot be ruled out.

The most problematic psychoactive drug in Papua New Guinea is alcohol. As it was prohibited until 1962, there is no traditional institutionalized mechanism to control its use and the associated abuse. Its impact on both society and health has been enormous. The estimated annual cost, particularly of lost opportunity, and destruction or damage to life and property, is about Kina 78.5 million. Alcohol

consumption is largely a male activity, but the potential to draw women into its grip is a looming possibility. Several highland provinces impose prohibition, but with very limited success. On the other hand, alcohol has become institutionalized as an important centrepiece in the exchange system associated with the prestige of a man particularly in the highlands.

As in the case of alcohol, cannabis was introduced into Papua New Guinea by the white man, but more recently in the 1970s. Hence, there is no traditional institutionalized mechanism to control its use and avoid abuse. Although cannabis is not associated with violence but induces mild euphoria, relaxation, and increased sociability, it poses a hazard because of the impairment of cognitive function and other mental effects. Its extensive and widespread cultivation and use is mainly among young males with few women being involved. As in the case of alcohol, the potential to draw women is high. In just one province, Chimbu, the sale of cannabis averaged Kina 23.5 million per annum. The popular news report that cannabis is associated with criminal activity, but the cause-effect relationship remains unclear and it would seem that in Papua New Guinea, the association may simply be purely coincidental rather than causative of crime.

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In Papua New Guinea, all three psychoactive drugs appear to be socially inter-linked. Betel nut markets are reportedly avenues of tobacco, and cannabis retail. Criminal activities are often alcohol-related and associated with cannabis possession. Ivarature reports that 60% of the drug offenders are unemployed and that the median age is 25 years.[42] The cause-effect relationship of alcohol, cannabis and betel nut chewing, poor education, unemployment, low income, and crime is not clear and remains to be unravelled.

Intervention programmes to deal with each or combinations of the three psychoactive drugs that are abused, will need to recognize the social inter-linkages between the three drugs and take into account societal factors such as poor education, unemployment, male predominance in the abuse of alcohol and cannabis and its relationship to crime, violence, traffic accidents, as well as the health hazards associated with each of the three psychoactive drugs common in Papua New Guinea.

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In men 9 out of 10 abdominal tumours are malignant.
In women, 9 out of 10 abdominal swellings are the pregnant uterus.

Rutherford Morison (1853 - 1939)