

## **EFFECTS OF ALCOHOL ABUSE ON HUMAN COGNITION**

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### **Abstract**

Malaysia is the tenth largest consumer of alcohol in the world and so few studies have been carried to find the precise magnitude of the problems caused by this consumption. The facts and figures show that it is increasing each year. Alcohol abuse in Malaysia is mainly heavy intake in the form of drinks, underage drinking and driving under the influence of alcohol. This is due to the ready availability of alcohol and the cheap price which is affordable by many. The main effect of alcohol in humans is the brain which is the “central processing mechanism” for cognitive processes such as perception, attention, consciousness, thinking, storing and retrieval of memory, cognition development, problem solving and intelligence. The effects can be short term or lasting implications not only to the drinkers but their family and their country. Everyone should be aware of the adverse effects of alcohol especially to children since their brain are still developing and are subject to environmental stimulation. Educating the people is one way to eradicate alcohol abuse. All religions forbid the drinking of alcohol because of its effects on our mental and psychological health.

## **Abstrak**

Malaysia ialah negara yang kesepuluh terbesar dalam pengambilan alkohol di dunia dan tidak banyak kajian yang dijalankan untuk menentukan nilai sebenar masalah yang timbul dari pengambilan ini. Fakta dan angka menunjukkan bahawa ianya semakin bertambah setiap tahun. Penyalahgunaan alkohol yang utama di Malaysia ialah dalam bentuk minuman dan memandu semasa mabuk. Ini kerana alkohol mudah didapati dan murah, mampu dibeli oleh semua. Kesan utama alkohol ialah terhadap otak manusia iaitu “pusat mekanisme pemrosesan” untuk proses-proses kognitif seperti persepsi, tumpuan, kesedaran, berfikir, penyimpanan ingatan dan mengingat semula, perkembangan kognisi, penyelesaian masalah dan kecerdasan. Kesan yang dialami mungkin jangka pendek tau mempunyai implikasi berpanjangan bukan sahaja kepada peminum tapi keluarga mereka dan negara. Semua orang harus peka tentang kesan teruk alkohol terutamanya kepada kanak-kanak kerana otak mereka masih berkembang dan boleh dipengaruhi stimulasi dari persekitaran. Mendidik rakyat adalah satu cara untuk menghapus masalah penggunaan alkohol. Semua agama mengharamkan pengambilan alkohol kerana kesannya ke atas kesihatan mental dan psikologi kita.

### **1.0 Introduction**

Malaysia is the tenth largest consumer of alcohol in the world .Like other developing countries, Malaysia is facing an increasing problem of alcohol abuse. The precise magnitude of the problem is difficult to know because so few studies have been carried out. However one indicator to show this is the volume of alcohol sold. The taxes on alcohol beverages collected for the year 1996 rose to RM817 million from 769 million

in 1994. Similarly in 1995 there were 2,360 public premises licensed to sell alcoholic drinks. In 1996, this number has doubled. Each year Malaysians spend over RM 2 billion on alcohol in the form of beer and cheap spirits known locally as samsu. The amount is almost four times the annual budget for health services. Samsu production is an active local industry worth approximately RM 180 million per year. The average alcohol content of samsu is 38 percent and are widely and easily available illegally from outlets such as sundry shops and private residences. The smallest bottle of samsu costs a mere RM 1.50 which is affordable to everybody, even school children. Alcoholic drinks are easily available in coffee shops, supermarkets, sundry shops and plantations, together with aggressive advertising and promotions are driving more Malaysians to drink. With the saturation of the American and European markets, alcohol companies are looking towards Asia and other developing countries not just to expand their markets but also to set up production facilities. According to The Globe Magazine, Carlsberg AS of Denmark, the biggest brewer in the world has its largest market in Asia and views Malaysia as a "very important and attractive market". It has invested about US\$ 20 million to expand production by 25 percent to 125 million litres a year. The facts and figures on alcohol consumption is showing an increase in Malaysia. An estimated 1 percent of the population are alcoholics. Its effect on Malaysian society can be seen directly in the number of fatal accidents due to drunk driving or indirectly in the psychological effects on family members of alcoholics. It is hoped that this article will benefit the youths of the nation, parents, politicians, law makers teachers and everybody, opened their eyes to the effects of alcohol abuse on cognition: the ability to acquire,

store, retrieve and use information which is the central processing mechanisms of humans.

## **2.0 What is alcohol?**

Alcohol is a name given to a family of organic substances containing the elements carbon, hydrogen and oxygen. The most known and widely used alcohol is ethanol. It is a colourless liquid at room temperature with low boiling point so it vapourises easily giving a distinctive smell of people who are drunk because of heavy intake of alcohol. Ethanol is widely used industrially as solvents for paint, perfume, varnish, dyes, cough mixtures, food additives, printing ink and as an antiseptic. It can also be used as fuel but its use is limited due to its high production costs. Ethanol is also used in the production of other substances like synthetic rubber, vinegar and other solvents. Ethanol is the main content of alcoholic beverages and the amount is measured by the percentage of alcohol by volume.

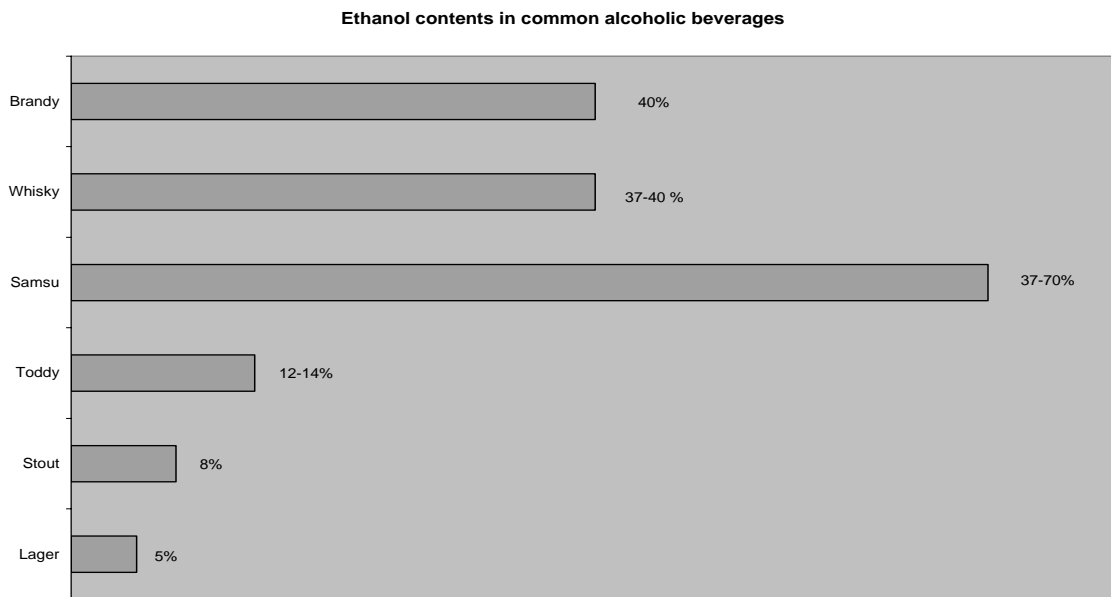
Ethanol can be produced in two ways:

- (i) by the fermentation of sugars in grapes and malt in brewing and wine-making
- (ii) by the addition of steam (water) to ethene which is a product of petroleum

In the preparation of ethanol, both fermentation and ethene + steam methods can be carried out on a massive industrial scale. Fermentation is too slow so the second way is used to produce ethanol for use other than in drinks.

### **2.1 Alcohol gets into the human body**

Ethanol is used as solvent in products like soap, dyes and hairspray. The active ingredients in aftershaves, perfumes and cosmetics are dissolved in ethanol and is 'splashed' all over the body. The ethanol which evaporates can enter through the respiratory trach. Alcohol gets into the human body mostly through consumption in the form of alcoholic beverages.The ethanol contents in some common alcoholic beverages is shown below.



Once drunk, ethanol passes through the stomach and is rapidly absorbed through the walls of the intestines. It then passes into the blood stream and transported through the the various organs of the body. The main organ that processes alcohol is the liver. It is then transported to the heart and the blood with alcohol is then pumped to the whole body. Alcohol's most important effects are on the brain and the central nervous system.

## 2.2 Types of alcohol abuse

- High intake of alcohol

- Consumption of alcoholic beverages while driving
- Underage drinking
- Prolong consumption of alcohol
- Consumption of alcohol during pregnancy
- Consumption of alcohol with drugs and other medications

### **2.3 Factors contributing to alcohol abuse**

- Peer group influence and want to try new things
- Personal problems such as boredom and family problems
- Easy availability of alcoholic beverages and affordable (cheap)
- Aggressive promotional activities of alcoholic drinks
- The results expected is fast (more confident and able to socialise better)
- A little or no exposure to the harmful effects of alcohol by parents, families or the society
- Poor or lack of religious knowledge

### **3.0 Effects of alcohol on cognition**

Alcohol appears to have major effects upon the hippocampus, an area in the brain associated with learning and the regulation of emotion, sensory processing, appetite and stress (Torr J.D.,2000:5) Alcohol kills brain cells. This is because the alcohol causes some red blood cells to clump together into sticky wads called sludge which is slow moving. These red blood cells are unable to carry oxygen through the capillaries to the brain cells which require large amount of oxygen continuously. Due to lack of oxygen reaching the brain, the brain cells will die due to deprivation of oxygen. Unlike other

cells in the body, brain cells are irreplaceable. Any damage to the brain is permanent and on the long run, alcohol causes the brain itself to shrink. The table below shows the alcohol level per 100 ml of blood and its effects on the brain.

Alcohol level in blood (mg/100 ml)	Effects
20	Ability to socialise increases
30	Euforia
50	Muscle and physical coordination is reduced
80	Loss of body balance, blurred vision and slurred speech
100	Loss of muscle coordination
300	Sleepy and vomiting
400	Coma, loss of consciousness and amnesia
500	Suffocation (respiratory failure) and death

### 3.1 Perception and pattern recognition

Perception refers to the detection and interpretation of environmental stimuli like signposts which are distinguishable by the colour, location, shape and so on and they are perceived as part of a more meaningful pattern such as reading (R.L. Solso, 1995;7). When driving under the influence of alcohol, a driver's perception of the environment is impaired. His vision is blurred and reading and judgement of other vehicles and road barricade is poor. This will lead to accidents. The road safety council estimated in 1994 that 30% of accidents nation wide were caused by drinking and driving. A study

conducted by the Kuala Lumpur General Hospital in 1991 showed that 2 out of 5 Malaysians killed in road accidents were under the influence of alcohol.

### **3.2 Attention and consciousness**

Attention is defined as the 'concentration of mental effort on sensory or mental events' which covers five major aspects: processing capacity and selective attention, level of arousal (control), automatic processing, neurocognition and consciousness (R.L. Solso 1995: 23). To pay attention, one must be able to receive the audio and visual signals via the sensory organs which is then processed by the brain, which transmits messages to the organ for us to react physically. In other words attention is the concentration of mental effort on sensory or mental events. Consciousness on the other hand is the awareness of internal and external information (R.L. Solso 1995: 149). In the case of drinking and driving, alcohol can impair attention and consciousness where drivers while driving are not conscious of their surroundings which can lead to accidents. But the worst is yet to come when teenagers of the nations under the influence of alcohol cannot pay attention especially at schools and higher institutions of learning with feeling of sleepiness and hallucination which make them unconscious of their surroundings. The American Medical Association reported that the average age of a child's first drink in USA is now 12 and neuropsychological deficits exist in early to middle adolescents (ages 15 and 16) if use of alcohol is extensive. This is also happening to school children of Sabah and Sarawak as shown by recent findings. The ugly truth is that Malaysians are starting to drink alcohol at an early age (Consumers' Association of Penang, 1996; 27)



### **3.3 Memory, thinking, decision making and problem solving**

Memory refers to the intellectual process of storing and retrieving what have been learnt (Sharifah Alwiyah,1968) and is divided into short term and long term memory. Information of one's memory usually comes from the sensory organ like the eyes, ears, nose and the skin. Through these sensory organs, humans can put and store as much information or data possible for retrieval (use) when needed. Alcohol can cause loss of short term memory due to lack of serotonin in the brain. This can lead to drunks forgetting what had happened before or when they are drunk. Research findings by American Medical Association reported that adolescent drinkers scored worst than non users on vocabulary, general information, memory, memory retrieval and at least three other tests. Verbal and nonverbal information recall was most heavily affected, with a 10 percent performance decrease in alcohol users.

Thinking is a process by which a new mental representation is formed through the transformation of information by complex interaction of the mental processes of judging, abstracting, reasoning, imagining and problem solving. It is a process that involves some manipulation of knowledge in the cognitive system, occurs "internally" in the mind but is inferred or seen from behaviour. Thinking is directed and results in behaviour that tries to solve a problem or to produce a solution. According to neuropathologists at Sydney University, Australia, people who drink socially have shown to have brain shrinking and a subtle lack of certain brain function such as abstract thinking, problem solving, and memory (Consumers Association, 1996: 19). The inability to think rationally can lead to loss of productivity to the country through loss of job skills, accidents at work and absenteeism. According to Yayasan Alkohol Malaysia, the work

performance of alcoholics is 25% below average, 3.5 times more likely to be involved in accidents in the workplace and are 16 times more likely to be absent from their jobs.

If alcohols are consumed by teenagers who are still studying, the impact will be devastating. They will lose short term memory so the learning process will be disrupted. Truancy from school will happen and can lead to crime such as theft, arson and vandalism. In an examination of more than 3000 crimes reported in 11 countries, nearly two thirds of violent offenders were drinking alcohols at the time of crime. Alcohol abuse can also lead to murder and rape. In the USA drinking is a factor in nearly half of all murders and rapes. It can also lead to suicide. As alcohol slows the cognitive processes of the brain such as thinking rationally and ability to make decision, people become less 'clear headed', increased the risk of unprotected sex and may lead to unwanted pregnancies, or even venereal diseases and HIV/AIDS.

Husbands who are alcoholics don't think rationally and makes decision that can wreck marriages and family life and it is the children who suffer most, often financially and from physical abuse. Children with alcoholic parents can often show symptoms of depression, anxiety, aggressiveness, tiredness, headaches, nervousness and nausea. They can also be left with permanent emotional scars for life, as they develop into immature, unstable, neurotic or alienated adults.

### **3.4 Cognitive development and human intelligence.**

Cognition development concerns changes that occur in a more or less orderly fashion across the lifespan of individuals. The brain develops from simple to complex throughout the early life of an individual and is subject to environmental stimulation and

biological constraints. Underlying all cognitive function are neurological structures and processes. Some of these processes are ; the ability to acquire, recall and use knowledge to understand concrete and abstract concepts and the relationships among objects and ideas, and to use knowledge in a meaningful way is the working definition for intelligence. This ability lies in the brain.

The brain goes through dynamic change during adolescence, and alcohol can seriously damage long and short term growth processes. Alcohol also disrupted release of hormones necessary for growth and maturation.

Pregnant women who drank are actually giving their babies alcoholic drink too. This is because the alcohol is absorbed in the blood stream which is then transported across the placenta to the fetus. Women who drank heavily while pregnant are more likely to give birth to babies with serious birth defects including Foetal Alcohol Syndrome (FAS). Babies born have stunted limbs and growth, brain damage, lowered intelligence and nervous disorders. Alcohol also passes in mother's milk so when mothers who takes alcoholic drinks breastfeed, the alcohol will be passed to their babies. If the harmful effects of alcohol on adult cognition is bad, it will be devastating to the babies cognitive development.

Cognitive development is subject to environmental stimulation and alcoholic drinks such as beer companies are very aware of this fact. Alcoholic beverages advertisement has very successfully portrayed the importance of alcohol as part of any occasion as for example in the Gawai celebration in Sarawak and as a status symbol and sophistication.

Beer companies are also beginning to sponsor concerts by record company artists in Malaysia and promoting up and coming new local bands which particularly appeal to teenagers. They have been advertising with the use of mobile cinemas, free film shows to the public at various kampungs and estates in remote areas of Malaysia. The ulterior motive is in between the films, the advertisements are repeatedly inserted like television commercial breaks, appearing 7 to 8 times on the screen. The majority of the audiences are usually children and youths who are very vulnerable to the glamorization of alcohol and its portrayal as a ticket to sophisticated or Western lifestyle, which most of them can never hope to achieve. The young children exposed to the advertisement of alcohols are made aware of it an early age and will have the brand names imprinted on their mind through cognitive processes and they are the potential alcohol consumers.

#### **4.0 Conclusion**

Alcohol has been reported by many research findings all over the world to have adverse effects on the brain and cognition. Its harmful effects and lasting implications should wake us up to the fact that it is a serious problem. Everybody in the society should help in eradicating alcohol abuse because it is the root of social problems and crimes faced by the country. We can propose some action to the government and legislators:

- ban all forms of alcohol advertising directly or indirectly,
- ban all sponsorship by alcohol companies
- ban all alcohol special offers and sales gimmicks
- impose heavier taxes on alcohol

- enforce the use of beer licences and making regular spot checks on premises selling alcohol
- ban the sale of liquor in small bottles
- implement education programmes on the dangers of alcohol in schools and electronic media.

In fact man has been forbidden to drink alcohol since ages ago. Most religion of the world forbids its intake among its followers.

Islam forbids the taking and selling of alcohol. In the Koran, the Surah Al-Maidah 5:90.91 says “Wine and games of chance are abominations devised by the devil. Avoid them so that you may prosper. The devil seeks to up enmity and hatred among you by means of wine and gambling, and to keep you from the remembrance of Allah and from your prayers. Will you not abstain from them?”

One of the Eight Precepts of Buddhism states very clearly, “Buddhists should abstain from liquor.” Buddha also objected to selling liquor for a living.

In the Bible, the Book of Proverbs Chapter 23:29-33 advises, “Do not look at wine when it is red, when it sparkles in the cup and goes down smoothly. At the last it bites like a serpent, and stings like an adder. Your eyes will see strange things, and your mind utter perverse things”

The primary goal of a Hindu is to become one with God. This can only be achieved through a healthy body and mind. The Hindu sage Thiruvalluvar says, “... they that drink liquor are no other than poison drinkers and therefore do not differ from dead man.”

## **Bibliography and Source Material**

Alcoholism, Current Controversies, Greenhaven Press, USA 2000

Cognitive Psychology, Robert L. Solso, Allyn and Bacon, 1995

Critical Psychology, An Introduction, Dennis Fox and Isaac Prilleltensky, Sage Publications, UK 1997

Health Encyclopedia, The Complete Medical Reference Library, Dr Robert Youngson

Psikologi Kognitif, Muhamed Awang, DBP, 1999

Psychology, An Integrated Approach, Michael Eysenck, Longman, Singapore 1998

The Hangover, After Effects of Alcohol on You, Family and Society, Consumers' Association of Penang, 1996

## **Websites**

[Alcoholism.about.com](http://Alcoholism.about.com)

[Chemlink.com](http://Chemlink.com)

<http://www.alwahidah.com>

<http://www2.potsdam.edu/alcohol-info>

<http://www.pm2.usm.my/mainsite/buletin/kosmik>

<http://www.members.aol.com/changChem3/>

[http://www.geocities.com/dew\\_peace/pelarut](http://www.geocities.com/dew_peace/pelarut)