

Bachelor's thesis
Degree programme
Nursing
2012

Akinmolusun, O.; Bezabih, Y.; Kaunissaari, S. ; Mugambi, A

DETRIMENTAL EFFECTS OF ENERGY DRINK CONSUMPTION ON ADOLESCENTS



TURUN AMMATTIKORKEAKOULU
TURKU UNIVERSITY OF APPLIED SCIENCES

Akinmolusun, O.; Bezabih, Y.; Kaunissaari, S. ; Mugambi, A.

DETRIMENTAL EFFECTS OF ENERGY DRINK CONSUMPTION ON ADOLESCENTS

Background: In recent years the consumption of readily available energy drinks has increased significantly with young adults forming the largest part of the consumers. Commercial energy drinks are made up of mainly caffeine and many other ingredients many of which have not adequately researched and are little understood, especially excessive consumption of these combinations.

Objective: The objective of this project is to enumerate the detrimental effects of energy drink consumption on adolescents, and present to youth centers through digital storytelling. The project is aimed at increasing the level of awareness of the risk associated with energy drink consumption by adolescents.

Methods: The method used in the study was literature review. We searched scientific articles from the following academic databases: CINAHL, PUBMED AND SCIENCE DIRECT. Articles were also retrieved from Google scholars. The data search was carried between September 2011 and March 2012. Set of criteria were developed to guide the study to the right path. One of the criteria used is to include only the articles published in the year 1987 and above; academic databases, google scholars and books written by health professionals; articles in English language related to health effect of energy drinks or energy drink ingredients on adolescents, and the risk behaviors associated with consuming energy drinks mixed with alcohol. However, digital story was developed as an educational tool to inspire the youth on the detrimental effects of energy drinks. The story is part reality, part fiction using voice and pictures.

Results: Studies show that young people are particularly attracted to the consumption of energy drinks and that energy drink consumption has been associated with adverse effect on multiple body systems such as the cardiovascular system and the neurological system. Fatalities have also been associated with energy drink consumption. In addition the popular trend of mixing alcohol with energy drink increases the risk of adolescents engaging in risky behaviour. Hence, energy drinks have been banned in some countries and sales restricted in some others. The digital story has been shown so far at a MIMO seminar in Turku and at a youth centre in Kiikala with positive reactions from the audience.

Conclusions: Energy drinks have been associated with adverse health effects. Studies indicate that more research needs to be done on the effects of the ingredients on health and especially excessive consumption of a combination of those ingredients as found in energy drinks. Young people need to be educated on this. Digital storytelling is one creative, art based method that can catch the attention of young people and thus achieve the aim of health promotion. Health professionals and policy makers need to draw attention to the caution that is to be exercised in the consumption of these drinks.

KEYWORDS: energy drink, adolescents, children, health effect, alcohol mixed with energy drink, caffeine.

CONTENT

LIST OF ABBREVIATIONS (OR) SYMBOLS	4
1 INTRODUCTION	5
2 ENERGY DRINKS	7
2.1 Contents of energy drink	7
2.2 Energy drink marketing	9
2.3 Physiological effects of ingredients in energy drink	12
2.4 Synergetic effect of ingredients in energy drinks	16
2.5 Cardiovascular effect of energy drink on children and adolescent	18
2.6 Consequencess of mixing alcohol with energy drink	19
3 AIM AND TASK	21
4 METHODS	22
5 EMPIRICAL IMPLICATIONS	24
6 DISCUSSION	29
7 CONCLUSIONS	32
SOURCE MATERIAL	34

PICTURES

Picture 1. Dangerous behaviour	25
Picture 2. Hallucination	26

LIST OF ABBREVIATIONS (OR) SYMBOLS

ED	energy drink
AmED	Alcohol mixed with energy drink
.	
FDA	Food and drug administration

1 INTRODUCTION

Energy drinks are beverages (for example Red Bull, Venom, ED, and Adrenaline Rush) that contain large doses of caffeine and other legal stimulants such as taurine, carbohydrates, glucuronolactone, inositol, niacin, panthenol, and β -complex vitamins (Attila et al. 2009, 316). History of energy dates back to 1987 when Red Bull was introduced in Austria, it became more popular in the 1990s following its introduction to the United States. Since then the sale of this drink has skyrocketed. In 2006, the energy drink market grew by 80%. (Foran et al. 2011, 1.) It is no wonder because manufactures claim this drink can boost energy levels as well as physical endurance, improve concentration and reaction speed (Van den Eynde et al. 2008, 273).

Energy drink are marketed specifically to children and young adults. In recent years the consumption of readily available energy drinks has increased significantly with young adults forming the largest part of the consumers. This product has been used for various reasons for example in a survey conducted among college students, 67% admitted using it to coping with insufficient sleep, 65% mentioned increasing energy and 54 % use it to increase fun at parties. 50% for studying or completing a major course project, 45% used it while driving a car for a long period of time and 17% for treating hangover (Malinauskas et al. 2007, 2).These product has also been used to reduce the depressor effect of alcohol or even to gain social status. (Ferreira et al. 2004, 841; Kaminer et al. 2010,643.)

However, as mentioned earlier, commercial energy drinks are made up of mainly caffeine and many other ingredients many of which have hardly been researched and are little understood, especially excessive consumption of these combination (Reissig et al. 2008, 2). Also since its use has been on the rise among children and young adult, it is of great significance to understand the potential effects it could have on this population (Temple 2009,794).

This project is done in collaboration with MIMO which aims to reach the youth through media education, arts, and other various forms. This project focuses on health promotion awareness using digital story telling to educate the youths.

The task of this project will be to enumerate the detrimental effects of energy drink consumption on adolescents, and present it to Salo youth center through digital storytelling. The aim will be to increase the level of awareness of the risk associated with energy drink consumption among adolescents.

2 ENERGY DRINKS

It has been reported that adolescent consume 60 to 70 mg/day that amounts to 800mg/day on the caffeine intake which is mainly from soda. Also about 28% of 12-14 year olds, 31% of 12-17 year olds and 34% of 18-24year olds do consume energy drinks frequently. In Germany among 1265 adolescents, (94%) knew that the energy drinks existed, 53% had tasted them, 23% drank <1 can per week and 3% drank 1 to 7 cans per week. In the ages 10-13 years, 31% girls and 50% boys had tasted the energy drinks of which 5% girls and 23% boys were reported that they consume them frequently. (Seifert et al. 2011, 513-514.) In addition a survey of energy drink consumption pattern conducted at a state university in the Central Atlantic region of the United States in 2007 revealed that 51% (n=253) out of 496 students selected consumed energy drink more than once a month on average (Malinauskas et al. 2007, 2). Due to the prevalence mentioned it is important to examine the contents and the effects of energy drink.

2.1 Contents of energy drink

The popularity of energy drinks and the growth in their consumption among adolescents and young adults have brought worries regarding general health and well being of these consumers. Adolescents and young adults are often uninformed about the content of energy drink. (Rath 2012, 70-76.) Most brand often contain caffeine, Taurine, Guarana, Ginseng, B vitamins, Ginko Biloba, L-carnitine, sugars, Antioxidants, Glucuronolactone, Yerba Mate, Creatine, Acai Berry, Milk Thistle, L-theanine, Inositol and artificial sweeteners (Kavita et al. 2008, 36).

Caffeine is a central nervous system stimulant (Pennay et al. 2011,104). It is found in different plant parts such as beans, leaves and fruits. Caffeine is found in coffee, black tea, and chocolate. Caffeine becomes an additive in many products such as soda, energy drink and pain relievers. The level of caffeine strength varies depending on ways of preparation, as in case of coffee and tea. In addition the amount of caffeine added exogenously determines the strength of caffeine in soda and energy drink. The main sources of caffeine in adults include coffee 70%, soda 16 % tea12%. (Temple 2009, 794). It is known to be the main ingredient in the energy drinks as it contains up to 70-80 mg per 8 oz serving and the also be up to five time greater that than 8oz of cola drinks when it is packaged as energy shots drinks (Seifert et al. 2011, 512).

Guarana or guaranine is another ingredient found in energy drink and comes from the seeds of Paullinia cupanathe which is a South American plant that has stimulating effects (Kavita et al. 2008, 36). This known herbal matter grows in some areas of South America as a climbing plant of the maple family, Sapindaceae. This plant has been used for a very long time by the Amazonians to help to boost alertness and energy and the seeds also have been found to include high levels of caffeine in them. The guarana is known to be absorbed gradually into the gastrointestinal tract thereby having a longer lasting effect unlike the caffeine coming from the coffee beans. (Pennay et al. 2011, 104.)

Sugar is another ingredient in the energy drink and the levels found in it are known to be even higher than those found in the soda. In some sodas like Coca-Cola they have 40.5 milligrams and in Sprite it has 39 milligrams of sugar. The energy drink Citrus has about 78 milligrams of sugar while Full Throttle has 58 milligrams (Dunham 2011).

Taurine is also found in the energy drink. This is an amino acid which modulates cardiac and skeletal muscle contractility. It is also produced naturally by our body but the commercial one is normally chemically synthesised. In some cases taurine could improve brain function and also lower blood pressure. (Pennay et al. 2011, 104-105.) It is also been assumed that it can promote eye and biliary health and prevent congestive heart failure and improve cardiac

contractility (Seifert et al. 2011, 514). In the human being the daily intake is about 40 to 400mg but in most energy drinks they contain more than ten times what a normal person should consume (Pennay et al. 2011, 104-105).

Glucoronolactone is an ingredient found in some energy drinks. This ingredient is a naturally occurring metabolite formed from glucose and is believed it can help to relieve fatigue and provide a sense of well being. The contents of glucoronolactone found in energy drinks has been found to contain more than 250 times the amount found in the food sources. (Pennay et al. 2011, 105.)

Ginseng or *Panax ginseng* is another ingredient which is an Eastern Asian herb which has been used to enhance memory and stamina. When consumed much in the energy drinks is believed to lead to vaginal bleeding, severe headache, diarrhoea and Stevens-Johnson syndrome. (Babu et al. 2008, 36.)

Other ingredients found in popular energy drinks include Carnitine which an amino acid derivative it is found in monster, rockstar, full throttle drinks. This ingredient is believed to help improve one's stamina and to burn out fat. (Gendle 2009, 8.) Yohimbine found in VPX Redline is assumed to help in sexual performance and encourage weight loss. Super Citramax which is found in the drink Go Girl Sugar Free is assumed to help suppress the desire to eat consequently preventing obesity. Inositol found in Go Girl Sugar Free, Red Bull, Monster, Rockstar, Wired B12 Rush is believed to lower the risk of cardiovascular disease and decrease triglyceride and cholesterol level. (Heneman et al. 2007, 2.)

2.2 Energy drink marketing

Since its introduction to united state in 1997, the energy drink market grew about \$400 million per fiscal in 2001. In 2005, energy drink market reached \$4 billion, it is growing in two digit annually by nearly 12%, it is estimated to surpass \$9 billion by 2011. (Delano 2009.)

Red bull has the largest share of the market and its growth is increasing. In 2011, 4.632 billion cans of Red Bull were sold worldwide with increasing rate of 11.4% than 2010. Company turnover increased by 12.4%(4.253 billion Euro) in 2011 (Red Bull website 2012). Nevertheless energy drink market is dominated by Red Bull with 40% share world wide and 42% in United State, other energy drink brands share the market with Monster 14.4%, Rock star 11.4%, Full Thorttle 6.9% and Amp 3.9% in United State (Heckman et al. 2009, 304).

Sociodemographic distribution of energy drink is led by North America, with 37% of global volume in 2008, followed by Asia Pacific with 30% and West Europe with 15%. Asia Pacific was the only region to experience a decline in 2008, with consumption falling by 18% – led by a 41% fall in sales within Thailand.(Palmer 2009.)

Advertisement of energy drink market was not diverse at the beginning. In the United States, energy drinks market was aimed primarily at athletes indicating that energy drink market was directed to specific groups. Recently the energy drinks market expanded and aimed at young adults between 18 to 34 years due to the “go lifestyle” and receptiveness to advertisements to this kind of products. (Lal 2007, 25–31.)

The consumption of energy drink is about 34% of 18 to 24 year old being regular users (O’Brien et al. 2008, 453-60). Another study reported that one half of college students take energy drink minimum once in a month, thinking that energy drink increases energy level, to compensate for a lack of sleep or to mix with alcohol (Miller 2008, 490-497).

The marketing and branding of energy drink indicates the markets in which energy drink companies are targeting. In the advertisement of energy drinks, they have been marketed claims of performance enhancing effect like Red Bull states that on consuming the product it will help to enhanced performance, concentration, reaction speed, and also to boost metabolism (Red Bull Website, 2008) where consumers are made to believe to drink more to get the stated desires. Others namely Full Throttle, AMP Energy and Cocaine advertise that

drinking these products enhance performance and consumers are made to believe to consume more to become better at their performance (Reissing et al. 2009, 4). Besides most energy drinks companies use cross promotional tactics by combining their products with sport events such as the X games or NASCAR and advertising their products in connection with popular music icons. In addition, deliberate defiant names are given to draw the attention of consumers for example Full Throttle, Ammo, Havoc, Hydrive and Morning Spark. (Heckman et al. 2010, 304.) In addition to this, new alcoholic energy drinks with resembling cans to their nonalcoholic counterparts target risk taking youth. Some energy drink products labeled that they may not be safe for children who are caffeine intolerant, pregnant women or nursing women. (Seifer et al. 2011, 520.)

Other energy drinks advertise the unique qualities that make them different from the rest as being natural, organic, gluten-free or as suitable for diabetics or vegetarian. Energy drink industry has proved to be extremely successful and more innovative products can only be expected in the near future. (Heckman et al. 2010,304.)

Regulation of caffeinated beverages such as energy drink has become challenging because of popular and long lasting use of coffee and tea which are natural components. However many countries have been acting to regulate the labelling, distribution and sales of energy drinks that incorporate high quantities of caffeine. The European Union demands that energy drinks have a "high caffeine content" label on cans. (European Union 2007) Canada warns energy drink consumers to use according to the label instruction on the product which is 500ml per day (Health Canada 2005). Norway limits the sale of Red Bull to be in pharmacies only. Denmark has forbidden the sale of Red Bull totally (Ari Kapner, 2004, 2). Australia also banned Red Bull Energy drink because of high caffeine content (Energy fiend caffeine fix, 2009).

The US Food and Drug Administration (FDA) enforces a limit of 71mg of caffeine per 12fl oz of soda. Energy drink manufacturers declare that their drinks are "natural dietary supplements" and this has made it possible for some manufacturers not to have any warning labels on it, neither are they required to

do any testing on their product before selling them out. Also there is no restriction for sale to minors. Contrarily caffeine stimulants like No-Doz, Parsippany, NJ are forced to put minimum age limit on those who can purchase the product, which is twelve years old. (Seifert et al. 2011, 520.) In addition FDA has not been strict on the regulation of content of caffeine of energy drink. It also does not oblige any warning labels recommending proper use or amount of caffeine in the drink. For example over the counter stimulant drug products are required to have specific labels on them like “do not give to children under the age of 12” or “the recommended dose of this product contain as much caffeine as a cup of coffee” whereas energy drink of 500mg can be marketed without such warnings. (Reissig et al. 2008, 2-3.)

Internationally several countries have either banned or given regulations on the energy drink with some of them like Argentina the Senate has only made a proposal for the banning of the energy drinks in the night clubs. Canada requires all energy drinks to have warning labels on them, they also advise people not to consume energy drinks with alcohol together. Norway limits the sale of Red Bull to pharmacies only, In Uruguay they have forbidden the sale of all energy drink and in Turkey they have also forbidden the sale of high caffeinated energy drinks, whereas in Germany 11 of 16 states have entirely banned the drink after they found out 0.13ug per can of cocaine in the Red Bull Cola. In Finland the regulation is that energy drinks that contain 150mg/L of caffeine must be labelled “high caffeine content and also should have label on them stating that “not recommended for children, pregnant women, or people sensitive to caffeine and what amount can be consumed on a daily basis. (Seifert et al. 2011, 521.)

2.3 Physiological effects of ingredients in energy drink

The media and case studies have linked harmful effects with the consumption of energy drink whereas few researches have examined the consequences of individual ingredients and effect of the ingredients combined. (Seifeit et al. 2011, 519) Many believe more research is required to better understand the complex

effects of their use on various groups of the population. (Reissig et al. 2008, 2). Some of these ingredients contain beneficial and harmful properties.

Caffeine is the main ingredient of energy drinks. Caffeine is a natural alkaloid scientifically classified as 1, 3, 7 –trimethylxantine. Studies have shown that if consumed in moderation, caffeine is not associated with adverse health effects. When ingested caffeine is quickly absorbed through the gastrointestinal tract into the blood stream. It is primarily metabolized in the liver, reaches maximum concentration within one to one and a half hour and it is quickly distributed throughout the body. Its elimination half life ranges from three to seven hour and is influenced by factors like sex and age. (Nawrot et al. 2003, 1-2.)

Ruxton (2009, 42) noted that polyphenols, which are a content of most caffeine containing plant extracts have been linked to positive vascular health and improved blood flow as a result of its anti-oxidant, anti-inflammatory and anti-cancer qualities. He also states that consumption of caffeine within very specific limits from such drinks as tea and coffee can enhance physical performance. Seifert et al. (2011, 514) observe that caffeine is used therapeutically as a treatment for apnea and premature infant bronchopulmonary dysplasia. Some studies have shown that caffeine improves alertness and vigilance while others indicate little or no change in mood (Nawrot et al. 2003, 6).

If consumed in excess caffeine can have adverse effects on health. Toxicity can have a general effect, affect cardiovascular function, other body systems, modify behaviour, cause calcium imbalance, and even cause cancer and death. Studies show conflicting results and evidence suggests that due to the lack of sufficient studies on long term effect of caffeine ingestion on children and adolescents caution in consumption should be exercised. (Nawrot et al. 2003, 23.)

Caffeine antagonises adenosine receptors. In general caffeine toxicity can result in nervousness, irritability, insomnia, cardiac arrhythmias, increased respiration, and headache. In children it can cause serious emesis, tachycardia, central nervous system agitation, gastrointestinal disturbances and dysfunctions

related to muscle, liver and renal systems. (Nawrot et al. 2003, 2; Temple 2009, 800.) and increase ambulatory blood pressure (Temple 2009, 800). Cessation sometimes results in withdrawal symptoms like weakness, sleepiness, and lethargy (Nawrot et al 2003, 2,7). In line with these findings, Holmgren et al. (2003, 71) state that caffeine toxicity can cause vomiting, abdominal pain and central nervous system symptoms like agitation, altered state of consciousness, muscle rigidity and at times seizures. Some studies have shown also an increase level of anxiety in psychotic patients(Nawrot et al. 2003,6). Consumption during such an early stage of brain development can have adverse effects. (Temple 2009, 800; Nawrot 2003, 9). Seifert et al (2011, 514) add hypokalemia, paralysis, insomnia, hallucinations, cerebral edema and rhabdomyolysis to the list of adverse effects of caffeine.

Effects on the cardiovascular system in particular consist of cardiac arrhythmias, and even death from ventricular fibrillation. Even though findings are sometimes contradictory studies have indicated that excess caffeine intake can increase systolic and/ or diastolic blood pressure and the effect is most evident in caffeine-naïve consumers. (Nawrot et al. 2003, 3.)

Fatal outcomes have also been reported. In rats ventricular fibrillation is the cause of fatality resulting from caffeine poisoning. Toxicological analysis in four forensic autopsy cases of 21 to 54 year-old men showed that high doses of caffeine when consumed with alcohol proved fatal. Blood concentration greater than 100 mg/ml is fatal and peak blood caffeine levels are reached between 15 to 45 minutes of consumption orally. This is rapid for such a commonly available substance. (Holmgren et al. 2003, 71-73.)

In relation to other body systems, studies done on adolescents' consumption of caffeine have been reported a negative effect on calcium balance due to increase calcium excretion in urine after a ten hour fast. However, findings on the effects of caffeine on bone metabolism are not conclusive. In addition caffeine consumption has been associated with the development of cancer, reduced fertility in females, reduced sperm motility and increase dead sperms in males. (Nawrot et al. 2003, a 4-5, b 11-13.)

Taurine is another ingredient of energy drinks. According to Seifert et al. (2011, 514) taurine is considered safe and has been used therapeutically to promote infant development treat alcohol withdrawal symptoms, cardiovascular and other disorders. However, the Federal Institute of Risk Assessment (2008, 6-8) observed that taurine has been shown to worsen hypoglycaemia and decrease epileptic seizure threshold in patients with a past history of epilepsy, and that the consumption of taurine by patients with chronic renal haemodialysis led to severe dizziness. They highlight the inadequate amount of knowledge related to appropriate daily intake amount of taurine, its interactions with caffeine and alcohol, especially when combined with physical effort. (New Human Data On The Assessment of Energy Drink 2008, 6-8.)

Popular energy drinks contain more ingredient than mentioned above of which little or no research has been done and our knowledge of the effects of the interactions between above compounds is still very limited (New Human Data On The Assessment of Energy Drink, 2008, 6-10).

Ginseng, guarana, ginko biloba

Findings in two case studies of adult male maxillofacial surgery patients reviewed in a medical journal by Foran et al. (2011,1-3) showed that ginseng and guarana extract which are common ingredients in energy drinks have been found to inhibit platelet aggregation and hence to prolong blood coagulation. Ginko biloba which is another common herbal supplement in commercial energy drinks was found in another case to led to a severe reduction in the red blood cell count of a post-operation patient and surgeons were thus advised to strongly discourage the consumption of energy drinks after a medical operation. Ginseng has also been reported to be connected to cases of rashes, insomnia, hypertension, vaginal bleeding and agranulocytosis (Seifert et al. 2011, 514).

However, the report indicated that these symptoms were related to phenylbutazone and aminopyrine contamination during processing (Seifert et al. 2011, 514). Iyadurai and Chung (2007, 504-507) present findings in case studies of 3 adult men and an adult woman who were brought into the

emergency rooms after having seizures. In all cases, the patients had had multiple seizures in the past after consuming large quantities of energy drinks and it was later found that Guarana and other herbal extracts such as Ginseng and Ginko were associated with adverse effects on the central nervous system and led to a lowering of the seizure threshold. All patients were seizure-free after abstaining from energy drink consumption. L-Carnitine can, in high doses, cause vomiting, diarrhoea and abdominal pain. Another compound, Yohimbine in usual doses was found to be related to cases of hypertension in and in high doses can caused hypotension and even death. (Seifert et al. 2011, 514.)

2.4 Synergetic effect of ingredients in energy drinks

Some studies done on the effects of energy drink on adults have shown improved mental alertness, reaction times, and concentration (Seifert et al. 2011, 519). Whereas German Poison Information And Treatment Center has linked consumption of energy drink to tachycardia and cardiac dysrhythmias (New Human Data On The Assessment of Energy Drink 2008, 10). Steinke et al. (2009, 596) in a study have observed an increase in heart rates and blood pressures of participants after consumption of energy drink containing 1000mg of taurine and 100mg of caffeine. Wiklund et al. (2008, 74-77) also carried out a research following the death of three young Swedish adults to examine the effect of energy drink on post exercise heart rate recovery and heart rate variability. The study found out that consumption of energy drink and energy drink mixed with alcohol before exercise resulted in higher heart rate and correspondingly reduced heart rate variability after exercise compared to exercise alone.(Wiklund et al. 2008, 74-77.)

Generally, physical exercise reduces the heart rate variability by parasympathetic withdrawal and increase of sympathetic activity to the heart leading to increase in heart rate (Javorka et al. 2003, 23). And upon cessation of exercise, vagal reactivation rapidly reduces the heart rate and successively increases heart rate variability. But intake of energy drink before exercise leads to slower vagal reactivation after exercise. This is responsible for the higher

heart rate observed in the study resulting in a delay in heart rate recovery. (Wiklund et al. 2008, 76). Therefore subjects with reduce ability to increase vagal activity are at higher risk of sudden death during recovery period following an exercise (Jouven et al. 2005, 1956). In addition since intake of energy drink has been anecdotally linked with sudden cardiac death, Worthley et al. (2010,185) in a study involving 50 healthy individuals between the ages of 20 to 24 carried out a research to determine the effect of energy drink on platelet aggregation and endothelial function since these two parameter are strongly linked to heart attack. The study observe a significant increase in platelet aggregation and mean arterial pressure and a decrease in endothelial function shortly after consumption of energy drink which suggest an increase in risk of sudden cardiac death (Worthley et al. 2010, 185-186).

Another study examined 297 case reports relating to consumption of energy drink found out that 7 percent had signs of serious cardiac or neurological toxicity that includes hallucination, seizure, agitation and tremor (Gunja and Brown 2012, 46-49). Also recent report suggests that these drinks could be associated with acute mania and cerebral vasculopathy (Stanley et al. 2007, 504). Caffeine can worsen psychosis in schizophrenia and can result in psychosis in healthy people (Hedges et al .2009,127-129). Although a direct link between energy drink and seizure is yet to be established, Jones et al . 2007 reported four case studies of adult patients presenting new-onset of seizure episodes with no evidence of intracranial or EEG abnormalities. These four patients had all consumed fairly large amount of energy drink before their seizure. This finding suggests a possible link between energy drink and seizure. (Jones et al. 2007, 506).

Moreover, two studies (O'Brien et al, 2008, 458; Woolsey, 2010, 41) have also examined the risk behaviour and alcohol related consequences associated with the combine use of energy drink mixed with alcohol. O'Brien et al .(2008, 458) in a survey among 4271 college student observes that students mixing alcohol with energy drink were more involved with heavy episodic drinking and had twice as many episodes of weekly drunkenness. Woolsey (2010, 41) also

reported higher percentage of alcohol binge and energy binge drinking among combine users of energy drink and alcohol. As regards the consequences such as 'was taken advantage of sexually', 'took advantage of another sexually', 'rode with a driver who was under the influence of alcohol', 'was hurt or injured', 'required medical treatment', O'Brien et al. (2008,458) reported that student who mix alcohol with energy drink had significantly higher prevalence of these consequences. Woolsey (2010,57) as well reported that men under the influence of alcohol and energy drink are more likely to drive a motor vehicle and act more aggressively.

Above all, two other studies (Holmgren et al . 2004,72; New Human Data On The Assessment Of Energy Drinks 2008, 5-6) examined the coherence between some reported death cases and consumption of energy drink among different age groups. One study reported four deaths resulting from caffeine intoxication and in all the four cases caffeine was found in concentration that could be considered lethal (Holmgren et al. 2004, 72). The other one which is a Swedish study examine four fatalities and observe a possible link to energy drink consumption because the individuals had all consumed alcohol and energy drinks (New Human Data On The Assessment Of Energy Drinks 2008, 5-6).

2.5 Cardiovascular effect of energy drink on children and adolescent

Not many studies have been done on the effect energy drink on cardiovascular system of children, and concern has been raised by parents, physicians and guardians about the effect drink could have on their children since they are the fastest growing population of caffeine users (Harnack et al.1999, 436-441). Depending on the amount of caffeine consumed for example, when taken in moderation caffeine could bring about enhanced feelings of wellbeing , increase energy and improve concentration whereas high doses of over 400mg of caffeine may lead to feelings of anxiety, nausea, jitteriness, and nervousness (Temple 2008, 795). It can also exacerbate cardiac condition for example in children with hypertrophic cardiomyopathy and ion channelopathy due to its

stimulant effects and could increase risk of syncope, arrhythmias, hypertension, and sudden death (Seifert et al. 2011, 520).

2.6 Consequences of mixing alcohol with energy drink

Currently, underage and binge drinking has been increasing among college students in college campuses across the United States. Heavy drinking incidents have been mentioned as the leading public health problem, and is a major source of preventable morbidity and mortality for more than six million college students in USA. (Wechsler et al.1995, 921-26.) One reason that may be exacerbating binge drinking among adolescent people is the new trend of mixing alcohol and energy drink. In a non-probability sampling of American college students and found out that 73 percent American college students had consumed alcohol mixed with energy drink. (Malinauskas et al. 2007.) Oteri et al. (2007,1677-80) studied (N=500) the consumption of energy drink with alcoholic beverages at school of medicine of university of Messina. The researchers found out that 48.4% frequently consumed ED and alcohol. Specifically 35.8% of alcohol mixed with energy drink users consumed ED with alcohol more than 3 times in last month. Consumption of AmED can be riskier than consuming alcohol alone (Marczinski et al. 2011, 1282).

Young people consumed alcohol mixed with energy drink for different reasons. O'Brien et al. (2008, 453-60) found out that college students drink alcohol mixed with energy drink to hide the flavor of alcohol, to drink more and not to feel drunk, nor get hangover. Another study found out that adolescents consume AmED because they feel less tired, think AmED is a common alcoholic drink, get drunk faster and to drink more (Marczinski 2011, 3240). In addition, young people's belief that alcohol mixed with energy drink can delay the depressant effect of alcohol is one reason for consuming alcohol mixed with energy drinks(Ferreira et al. 2004,1408).

Nowadays consumption of alcohol mixed with energy drink increases dramatically. Mixing alcohol with energy drink may change the perception of intoxication and can cause individuals to think that they can stay longer period

and can drink more. (Marczinski et al. 2011, 1282.) O'Brien et al. (2008, 453-460) mentioned that 25% of the past 30-day alcohol drinker consumed at least 1 AmED consumption during past month. Thombs et al. (2010, 327) studied the event level associations between energy drink consumption and alcohol related incidents. The study revealed that patron who drank alcohol mixed with energy drinks left the bar later, involved in drinking for longer time, and had three fold higher level of alcohol intoxication. In addition the study reported that bar patrons who consumed alcohol mixed with energy drink showed four times risk of intending to drive home than other drinking patrons.(Thombs et al. 2010, 327.)

Studies showed that adolescents drink considerably more alcohol when it was ingested with energy drink. Consumption of energy drink increases stimulation for more alcohol while inhibitory control remains reduced by alcohol. (Marczinski et al. 2011, 1282.) Studies also showed that subjective symptoms of intoxication (dizziness, fatigue, headache, trouble walking) were improved when an energy drink was co-administrated along with alcohol. Performance of motor coordination and visual reaction times was not different among those who drank alcohol only, or ingested alcohol mixed with energy drink but students who consumed AmED were highly vulnerable to alcohol related consequences. (O'brien et al. 2008 ,453-60.) In addition, a cross-sectional self report survey of (N= 602) under graduate students indicated that frequency of energy drink consumption was positively linked with different risk behaviors, such as marijuana use, sexual risk taking, fighting, and not wearing a seatbelt when driving a car (Miller 2008 , 490-497).

3 AIM AND TASK

The task of this project will be to enumerate the detrimental effects of energy drink consumption on adolescents, and present it to Salo youth center through digital storytelling. The aim will be to increase the level of awareness of the risk associated with energy drink consumption among adolescents.

4 METHODS

Digital storytelling is a short form of digital film making using computer- based tools to tell stories. Generally digital stories focus on a specific subject and a certain point of view. It employs the use of images, texts; video clips recorded audio narration and music. (University of Houston 2011.) Stories in this form have been utilized to increase awareness, understanding and values.

In the making of digital story, it encompasses the use of software tools that can be found from the internet or in some libraries (Czarnecki 2009, 31) and hardware tools namely speakers, digital camera, and video camera and a multimedia computer (Howell and Howell 2003,41).

Video editing software like VideoStudio Pro, Final Cut Pro, Pinnacle Studio is used to enable someone to merge media animation, images, video, sound into one story. One needs to have video web applications like Audacity, VoiceThread, Animoto-which enables one to capture the images, sounds, texts, videos and music soundtrack that analyzes them before making it to a video. Use of photo editing is another essential programme used which encompasses iPhoto, Adobe Photoshop, Corel Draw. Lastly music and sound software like iTunes, FindSounds among others. (Czarnecki 2009, 31-36.) By making their own digital stories teenagers are able to learn and know how stories in the media are made. (Howell and Howell, 2003, 40).

Digital storytelling can be used as a health education tool through it we can present facts, share research based findings and help people to remember for a long time. Matthews-DeNatale states: “tell me a fact and I’ll learn, tell me a truth and I’ll believe, tell me a story and I’ll remember it forever”. This form of storytelling offers great opportunities for self reflection. (Matthews-DeNatale 2008, 2-3).

It is possible to use digital stories to build community capacity, appraise health needs, promote peer education and identify health resources that a community might have. In addition they can be used to assess the health of the community as well as that of an individual. It also can be used to promote healing and

leadership in connection to health issues, and influence policy. (Centre for Digital Storytelling 2012.)

Digital story can also be used as a learning tool for teenagers in a classroom setting. Students find it more enjoyable and captivating as their attention is fixed on texts that are intended to educate them. Through the digital video that is read-aloud, listeners get a chance to enter the narrative world, they are able to integrate knowledge within the reading of the wordings given which is achieved by the storyteller narrating the story as the recording of the video whereby the person incorporates commentary and ideas that keep them captivated throughout the story. (Malin 2010, 121-125.) Youth are captivated also from inactive to active in the learning environment where stories become unforgettable (Howell & Howell, 2003,41).

People born in the mid 1990s up to the 2000s are considered to be learners who have advanced visual-spatial skills. They appear to prefer images to text and can communicate easily through images. Digital storytelling, therefore, is a suitable tool for communicating factual information to young people. When making digital stories there are a range of applications for video editing that can be employed. The creator can use Windows application like PhotoStory3, Movie Maker and Animoto. These are just examples of possible applications, there are other programmes that can be used. These programmes can be used with not much difficulties and so contribute in stimulating interest in the creation of digital stories to meet educational needs of students. (Sheneman 2010, 40-41.)

5 EMPIRICAL IMPLICATIONS

This topic was chosen because of the high prevalence of energy drink consumption among children, adolescents and young adults. Studies show that energy drink consumption is associated with adverse effects such as cardiac abnormalities such as increased blood pressure, cardiac dysrhythmias, heart rate, delay in heart rate recovery if taken before exercise. Further, energy drink ingredients increase platelet aggregation, neurological toxicity which leads to seizures, agitation, tremor, worsen psychosis and can lead to psychosis among health individual. (Siefert et al. 2011, 511; Hedges et al. 2009,127-9; Steinke et al. 2009,596 ; New Human Data On The Assessment Of Energy Drinks, 2008.)

In addition the popular trend of mixing alcohol with energy drink increases the risk of adolescents being hurt, taking sexual advantage, riding with an intoxicated driver, marijuana use, fighting, and not wearing a seatbelt when driving a car. (O'brien et al. 2008, 453-60; Miller 2008, 490-497; Marczinski 2011, 3233). Information on the adverse effect of energy drink helps to increase the awareness of health care professional so that nurses and doctors will be able to identify the vulnerable population. Increased awareness of energy drink effect will enable health care professionals to screen vulnerable group and to educate families. In addition, health care professional play their own role on policy and decision making regarding age limitation for consumption of energy drink. This is because energy drink consumption can lead to caffeine intoxication on non habitual caffeine users like children and adolescents who have low tolerance to caffeine. (Reissig et al. 2009,1.)

The story for the digital storytelling has fictional and real part which focuses on 19 years boy living in Salo City. The story was developed after evidence based articles were analysed. The fictional part of the story features common activities in which adolescents engage in such as partying, going to the gym, playing ice hockey, driving around with friends and studying for exams. The story was presented as personal experience of Tommi. We believe that presenting digital

storytelling in a form of personal experience helps people to learn facts, believe truth and remember facts easily.

The factual part of the digital storytelling focused on main findings such as cardiac dysrhythmias, increased heart rate, delay in heart rate recovery if taken before exercise, increased blood pressure, increased platelet aggregation, neurological in toxicity, agitation and tremor and risk behaviors associated with consumption of alcohol mixed with energy drink such as heavy episodic drinking, being hurt or injured, being taken sexual advantage of, driving under the influence of alcohol, requiring medical treatment or even death as reported in some studies.

Some of the images which show activities common to adolescents were selected from appropriate websites and some of them were produced by the group. These images include party activities, sport and studying where energy drink is consumed quite often. Images that show the side effects of energy drink are also achieved in a similar way. In addition, images that illustrate events that have happened after consumption of energy drink and consequences of alcohol mixed with energy drink are included in this short documentary.



Picture 1. Dangerous behaviour

To avoid copy right issues, we created our own scene and produced images which are relevant to the story. Members of energy drink group, classmates and friends volunteered to appear in the images used in the story.



Picture 2. Hallucination

In addition to images captured by ourselves, some images were made by Corel Draw application by a member of the project group such as the image for increased heart rate. Some images which were free from copy right were also included in the digital story. Some free images from some website which requested credit to be used in this documentary were used after we gave them credit.

Once the story was created and images captured, the next step was narrating the story. One of our group member narrated the story. We used Video Pad Editor to combine the images and narration and to produce the digital story. Finally music was added to the digital story as sound track.

We searched scientific articles From data bases CINAHL, PUBMED AND SCIENCE DIRECT by using search words “energy drink”, “adolescents”, “children”, “health effect”, “alcohol mixed with energy drink”, “caffeine”. We searched the articles either by combining the above search words or single words. Our search was limited to English language article from different countries across the globe. The articles we searched were relevant to the health effect of energy drink or energy drink ingredients on adolescents and the risk behaviors associated with alcohol mixed with energy drink. We also searched articles from Google. We review articles from the above sources from September 2011 until March 2012.

Based on our findings the most serious adverse effect of energy drinks were included in the digital story. In addition, risk behaviors associated with consumption of alcohol mixed with energy drink like heavy episodic drinking resulting in significantly higher prevalence of alcohol-related consequences were also included in the digital story telling.

The primary focus of this digital storytelling is to inform adolescents about the adverse effect of energy drink on health and to bring about attitude change. The digital story has been presented at the MIMO seminar in Turku, youth centers of Kiikala and Pernio and will be presented at the Salo youth center. We travel to the the youth centres with one of our teachers who provides assistance in the form of translation and transportation. When we arrive the at the youth centres, we meet the social workers there who introduce us to the youth and assist in assembling them in the common room before the video is presented. Our presentations start with personal introduction both in Finnish and English, we move to discussions during which we ask open ended questions like “ what do you know about energy drink?”, “why do you drink”. We ask these questions to to assess general awareness of youth about enegy drink. Almost all the youths drink energy drink but their reason to consume varies. Some drink because they want to cheer up, others to enhance sport performance, others because their friends are drinking.

We go with the intention of using the youth center television to show the video but our experience so far is that we used the T.V. once and on the other occasion we could not because of technical problems and we ended up using the computer. However, the medium of presentation did not interfere with the understanding of contents of the video. The video presentation is followed by discussions session during which we inquire from the youth what they understood from the video, what constructive feedback they have on story format. From their feedback we learn that they think it is unhealthy to consume ED and what other enegy source options are available for them. Recommendations were made to include texts both in Finnish and English about our findings in the video. The feed back we get about the video has been

positive so far. The language used in the video was difficult to understand for some of them but it was translated with the help of the teacher.

These presentations are done in collaboration with social work students from Turku University Of Applied Sciences. We had earlier met with these students and agreed on what dates would be appropriate for visits to the youth centers. During sessions to the youth centers they present recipes on pumpkin and sunflower seeds as a delicious and nutritious alternative to energy drink consumption. In a way this complements our own presentation. This is because pumpkin and sunflower seeds have better nutritional value.

6 DISCUSSION

The aim of this project work was find out if energy drink has a detrimental effect on adolescents or young adults. In the process we review different studies done to investigate the various effects this drink could have on adolescents or young adults. First, few studies have been done on the physiologic and psychological impact energy drink could have on this population. Also it should be noted that inconsistent effects have been reported in different studies for example some studies reported increase in heart rates. (Steinke et al. 2009,596-602.) whereas some studies show decrease in heart rate or even no change at all (Seifert et al 2011, 514). This might have been because of the various ingredients contained in different brands of energy drink and as well the amount of these ingredients consumed during a study as Stinke et al. (2009, 4) pointed out . For example taurine a common component of energy drink can reduce heart rate and it has even been used for treatment of palpitation (Seifert et al. 2011, 514). Therefore any study involving a brand of energy drink containing higher amount of taurine might not produce the same effects as those containing less amount.

Another important factor to keep in mind is the synergetic effects of these components which could hardly be explained. Few studies have observed increase in blood pressure as a result of caffeine intake (Temple 2009,74). Also homogeneous result has shown that the intake of energy drink before exercise actually result in slower heart rate recovery after exercise (Ferreira et al. 2004, 1410; wiklund et al. 2009 ,76). Although this might not seems to be significant or relevant for adolescents with very good heart condition but for those with undiagnosed condition such as hypertrophic cardiomyopathy or coronary anomalies it could enormously increase the risk of sudden cardiac death as observe in the death of those Swedish students following their consumption of energy drink and exercise.

Also finding reveals that the majority of those who die from sudden cardiac death have a pre-existing disease with more than half of these cases presenting hypertrophic cardiomyopathy or coronary anomalies (Maron et al.1996, 850-856).

Not to be ignored is the attitude of adolescents that practice mixing energy drink with alcohol, various surveys has shown the greater risks these ones put themselves into, possibly as a result of thinking that alcohol effect could be masked by energy drink. Whereas a double blind study by Ferreira et al. (2004, 1408) shows that energy drink has no impact on the effect of alcohol. Although more studies still have to be done on this.

The digital story was based on the results of this literature review. All the effects we could gather from the reviews were developed into a story that was narrated in the video. So the information from digital story could be said to be reliable because they are based on studies done on the consumption of energy drink. The digital story approach is design to capture and hold the attention of the listeners. The target population which in this case youths and children of salo environs would be able to remember clearly and for a longer time the effect this drink could have on them.

Reliability and Validity

The adverse effect of energy drink is searched from scientific data bases such as CINHALL, PUB MED, and SCIENCE DIRECT. These scientific data bases have evidences based scientific journals. The effects of energy drink consumption on health found in the journals during the literature review correspond to what the digital story presented. In addition, the journals we use are conducted after 1995 which shows that the information used to make the digital story telling is recent information and it corresponds to the real world.

The digital storytelling video can be used as health promotional tool to educate adolescents, young adults and children since the story was made based on scientific findings. Health care professional can use our digital storytelling video as teaching material to enumerate the consequence of energy drink and alcohol mixed with energy drink consumption.

Ethical Considerations.

The story was narrated by one of our group members on his will. All the images were taken after oral agreement is given. To avoid copyright issues, most of the pictures created by the group. Few images were taken from copy right free website with references and credits given as required. The pictures used where not obscene, minding the audience who are going to view it. Plagiarism which is an academic offence was taken into consideration as no quotation was done directly from the research articles at hand.

7 CONCLUSIONS

In line with studies done on the health effects of energy drinks on young people and which are reviewed in this project it can be concluded that energy drinks have many adverse effects on health. Energy drinks contain mostly caffeine and a combination of other ingredients (Attila et al. 2009, 316). In controlled doses some of these ingredients have beneficial effects (Nawrot et al. 2003, 6; Seifert et al (2011, 514). But energy drinks usually contain high unregulated doses of these ingredients especially caffeine. Energy drinks have been associated with adverse health effects and the claims made by manufacturers about the benefits of energy drinks do not highlight risks associated with excessive consumption of a combination of the ingredients contain in energy drinks. Long term effects of energy drinks consumption children and young people have not been adequately studied. (Seifert et al. 2011, 522.) Studies indicate that more research needs to be done on the effects of the ingredients on health and especially excessive consumption of a combination of those ingredients (Reissig et al. 2008, 2) especially in relation to children and adolescents. The issue is further complicated by the fact that there is a tendency for young people to mix energy drinks with alcohol (Marczinski et al. 2011, 1282). Young people need to be educated on this and awareness of the health risks need to be increased. There is not appropriate policies to regulate amount of the contents of energy drinks. Health professionals and policy makers need to draw attention to the caution that is to be exercised in the consumption of these drinks. (Seifert et al, 2011, 522.)

A tool that can be used to increase awareness of among young people and the community is digital storytelling. Digital storytelling is a creative, art based method that can be particularly attractive to adolescents and thus achieve the aim of health promotion. According to the Centre for Digital Storytelling (2012), it is possible to use digital storytelling to achieve the goal of building community capacity, encourage leadership, identify community resources and promote both individual and community health. Young people born in the mid 90s and 2000s are known to be learners who have advanced visual-spatial skills.

(Sheneman 2010, 40-41.) Therefore digital storytelling is a suitable tool for communicating factual information to young people. Feedback from presentations of this project at some youth centres confirms its effectiveness as a means of raising awareness. Further studies could be done in other communities; explore some cultural issues related to energy drink consumption and explore the use of other art forms to increase awareness, or explore alternatives to energy drinks consumption.

SOURCE MATERIAL

Harnack, L., Stang, J., Story, M., 1999. Soft drink consumption among US children and adolescents: nutritional consequences. *Journal of American Dietetic Association*, Vol. 99, No. 4 436–441.

Attila, S. & Çakir, B. 2011. Energy-drink consumption in college students and associated factors. *Nutrition*, Vol. 27, No. 3, 316-322.

Foran, M.; Strickland, F.; Perkins, K.; Smith, J. A. 2011. Excessive Intraoperative Bleeding With Chronic Energy Drink Consumption. *Journal of Oral and Maxillofacial Surgery*. 1-3.

Van den Eynde, F.; Van Baelen, P.C.; Portzky, M. & Audenaert, K. 2008. The effects of energy drinks on cognitive performance. *Psychiatric*. Vol. 50, No. 5, 273-281.

Kaminer, Y. 2010. Problematic use of energy drinks by adolescents. *Child and Adolescent Psychiatric Clinics of North America*. Vol. 19, No. 3, 643-650.

Ferreira, E.S.; Hartmann Quadrosi, M.I.; Trindade, A.A.; Takahashi, S.; Koyama, G.R.; Souza-Formigoni, O.M. 2004. Can energy drinks reduce the depressor effect of ethanol? An experimental study in mice. *Physiology & Behaviour*, Vol. 82, No.5, 841-847.

Malinauskas, B. M.; Aeby, V.G.; Overton, R.F.; Carpenter-Aeby, T. & Barber-Heidal, K. 2007. A survey of energy drink consumption patterns among college students. *Nutritional Journal*. Vol. 6, 1-7.

Maron, B.J. ; Thompson, P. D.; Puffer, J. C.; McGrew, C. A.; Strong, W. B.; Douglas, P. S.; Clark, L. T.; Mitten, M. J.; Crawford, M. H.; Atkins, D.L.; Driscoll, D. J. & Epstein, A. E. 1996. Cardiovascular preparticipation screening of competitive athletes. A statement for health professionals from the Sudden Death Committee (clinical cardiology) and Congenital Cardiac Defects Committee (cardiovascular disease in the young), American Heart Association. Vol. 94, 850–856.

Pennay, A. ; Lubman, I. D. & Miller, P. 2011. Combining Energy Drinks and Alcohol. *Australian Family Physician*. Vol. 40, 104-105

Seifert, S.M. ; Schaechter, J.L.; Hershonin, E.R. & Lipshultz, S.E. 2011. Health Effects of Energy Drinks on Children, Adolescents, and Young Adults. *Pediatrics*. Official Journal of the American Academy of Pediatrics. Vol. 127 No. 3, 511-528. Consulted 27.02.2012. <http://pediatrics.aappublications.org/>.

Dunham, D. 2011. What are the main ingredients in energy drinks? Consulted 12.03.2012.<http://www.livestrong.com/article/24642-main-ingredients-energy-drinks/>

Gendle, H. Mathew.2009. Attention and Reaction Time in University Students Following the Consumption of Red Bull. *The open nutritional Journal*,Vol. 3, 8-10.

Babu, M. Kavita M.D.; Church, J. Richard, M.D.; Lewander, William, M.D. 2008. Energy Drinks: The New Eye-Opener For Adolescents. *Clinical Paediatric Emergency Medicine*, Vol.9 No.1,35-40.

Heneman, K.; Zidenberg-Cherr, S.; 2007. Nutrition and Health Info-Sheet: Energy drinks. Nutrition Science Specialist Department of Nutrition University of California Davis, CA 1-7.

Wiklund, U.; Karlson ,M. ; Ö ström, M. & Messner,T. 2008. Influence of energy drinks and alcohol on post-exercise heart rate recovery and heart rate variability.*Scandinavian Society of clinical physiology and Nuclear medicine*, Vol. 29, 74–80.

Javorka, M.; Zila, I.; Balharek T. & Javorka K. 2003. On- and off-responses of heart rate to exercise – relations to heart rate variability.*The scandinavian society of clinical physiology and Nuclear Medicine*, Vol. 23, No.1,1–8.

Jouven, X.; Empana, JP.; Schwartz, P.J; Desnos, M.; Courbon, D. & Ducimetiere,P. 2005. Heart-rate profile during exercise as a predictor of sudden death.*The New England Journal of Medicine* ;Vol. 352,1951–1958.

Steinke, L.; Lanfear, DE.; Dhanapal, V. &Kalus, JS.2009. effects” Energy Drink” consumption on Hemodynamic and Electrocardiographic parameters in healthy Young adults.*The Annals of pharmacotherapy*, Vol. 43,No.4, 596-602.

Worthley, MI.; Prabhu, A.; De Sciscio, P.; Schultz, C.; Sanders, P. & Willoughby SR. 2010. Detrimental effects of energy drink consumption on platelet and endothelial function. *The American Journal of Medicine*, Vol. 123, No. 2, 184-187

Cerimele, J.M.; Stern, A.P. & Jutras-Aswad, D. 2010. Psychosis Following Excessive Ingestion of Energy Drinks in a Patient With Schizophrenia. *American Journal of Psychiatry*,Vol.167, No. 3, 353-353.

Hedges, D.W.; Woon, F.L. & Hoopes, S.P. 2009. Caffeine induced psychosis. *CNS spectr.* Vol.14,No. 3, 127-9.

Gunja, N. & Brown, A.J. 2012. Energy drinks: health risks and toxicity Medical Journal Of Australia, Vol. 196, No. 1, 46-49.

Holmgren, P.; Norden-Pettersson, L. & Ahlner, J. 2003. Caffeine Fatalities- four case reports. Forensic science International, Vol. 139, 71-73.

Woolsey, C. 2010. Energy Drink Cocktails: A Dangerous Combination for Athletes and Beyond: Journal of Alcohol & Drug Education Publisher: American Alcohol & Drug Information Foundation Audience: Academic; 2010 American Alcohol & Drug Information Foundation ISSN: Vol. 54, 41-68

O'brien, M.C.; McCoy, T.P.; Rhodes, S.D.; Wagoner, A. & Wolfson, M. 2008. Caffeinated Cocktails :Energy Drink Consumption, High-Risk Drinking, And Alcohol-Related Consequences Among College Students. Academic Emergency Medicine, Vol. 15, No. 5, 453-60.

Iyadurai, S.J. P. & Chung, S.S. 2007. New-onset seizures in adults: Possible association with consumption of popular energy . Epilepsy & Behavior, Vol. 10, 504–508

New Human Data On The Assessment Of Energy Drinks , 2008. Federal Institute For Risk Assessment BfR Information, No. 016. 11- 19. Consulted on 15.03.2012.

http://www.bfr.bund.de/cm/349/new_human_data_on_the_assessment_of_energy_drinks.pdf .

Reissig, C.J.; Strain, E.C.; Griffiths, R.R. 2008. Caffeinated energy drinks – A growing problem. Drug and Alcohol Dependence, Vol. 99, 1-10.

Ari, K. Daniel. 2008. Ephedra and Energy Drinks on College Campuses. Higher Education Center for Alcohol and Other Drug Abuse and Violence Prevention.

European Union, 2007. Commission Directive 2002/67/Ec of 18 July 2002 on the labelling of foodstuffs containing quinine, and of foodstuffs containing caffeine. Consulted on 14.03.2012. available at <http://www.fsai.ie/uploadedFiles/Dir2002.67.pdf>.

Food and Drug Administration, 2003. Substances Generally Recognized as Safe. Code of Federal Regulations. Title 21, vol.3. Sec.182.1180. Consulted on 14.03.2012 available at <http://coffeefaq.com/site/node/13>.

Energyfiend website.2009. Cocaine Energy Drink Banned in Australia.

Consulted on 14.03.2012.

<http://www.energyfiend.com/cocaine-energy-drink-banned-in-australia>.

Health Canada, 2005. Safe Use of Energy Drinks.

<http://www.bchockey.net/Files/Safe%20use%20of%20Energy%20Drinks%202009-02-11.pdf>
Consulted 14.03.2012.

Matthews-DeNatale, G. 2008. Digital Storytelling Tips and Resources. Simmons College Boston, MA. 1-22. consulted on 21.03.2012.

<http://net.educause.edu/ir/library/pdf/ELI08167B.pdf>.

Digital Storytelling in Healthcare. Centre for Digital Storytelling.
<http://storycenter.org/healthcare.html>. Consulted 21.3. 2012.

Centre for Digital Story Telling. 2012. Consulted on 21.03.2012. Available at
<http://storycenter.org/healthcare.html>.

Sheneman, L. 2010. Digital storytelling: how to get the best results. School library monthly, vol. XXVII(1) 40-42. Consulted 25.3.2012. Available at

<http://web2integration.pbworks.com/f/Digital+Storytelling-+How+to+Get+the+Best+Results.pdf>.

Malin, G. 2008. Is Still Considered Reading? Using Digital Video Storytelling to Engage Adolescent Readers. The Clearing House, Vol. 83, 121-125.

Czarnecki, K. 2009. Software for Digital Storytelling. Digital Storytelling in Practice. ALA TechSource. Consulted on 27.03.2012. Available at <http://www.alatechsource.org/library-technology-reports/digital-storytelling-in-practice>

Howell, D. & Howell, D. 2003. What's Your Digital Story? Library Media Connection. 40-41.

Rath, M. (2012). Energy drinks: What is all the hype? The dangers of energy drink consumption. Journal Of The American Academy Of Nurse Practitioners, Vol. 24, No. 2, 70-76

