Original Research Article

INVESTIGATION OF HEPATIC AND RENAL PARAMETERSCONTENT IN BLOOD SAMPLES OF SNUFF ADDICTED INDIVIDUALS IN GUSAU METROPOLIS

ABSTRACT

In Nigeria, the use of dry nasal snuff is spreading considerably throughout all age groups in both rural and urban areas. This is due to various ethno-cultural beliefs that have not been scientifically confirmed.Various people do not realize the negative impact of snuff on one's health, such as liver and kidneys failure, elevation of blood pressure, and a higher chance of oral cancer. The hepatotoxicity and nephrotoxicity of the local nasal snuff on snuff addicted individual was poorly understood. This study was carried out on snuff addicted individuals to assess hepatotoxicity and nephrotoxicity of the local nasal snuff.One hundred and fifty individuals used in the study were group into three of fifty people each. Group one served as a control which include individuals who never use snuff, Groups two and three comprise individuals who are addicted to snuff, with ages ranging from 18 to 30, and above thirty, respectively. The hepatotoxicity study revealed that, there were significant ($p<0.05$) increase in concentration of ALT, AST, Total Bilirubin and Direct Bilirubin of group two and group three compared with control. The concentration of ALT, AST, Total Bilirubin and Direct Bilirubin of group three were also significantly ($p<0.05$) higher than that of group two. While there were significant ($p<0.05$) decrease in concentration of total protein and albumin in group two and three compared with control. The nephrotoxicity study revealed that, there were significant ($p<0.05$) increase in concentration of creatinine of group two and group three compared with control. The concentration of creatinine in group three was even significantly higher than that of group two. Whereas, there were significant ($p<0.05$) decrease in concentration of Urea, Sodium, Potassium and Chlorine in group two and three compared with control. This study was concluded that, there was health risks (Hepatotoxicity and Nephrotoxicity) associated with snuff addiction.

Keywords: Hepatotoxicity, Nephrotoxicity, Snuff addiction, ethno-cultural belief and Oral cancer

INTRODUCTION

It is well acknowledged that there is no tobacco product that is risk-free and that the best way to reduce risk is to cease tobacco. For those who choose to use tobacco, reducing exposure to

tobacco toxicants is regarded as one possible approach to diminishing the health risks from such products.Therefore, the type of tobacco product used as well as the manner and frequency of use may significantly affect an individual's level of risk for serious disease(1).Smokeless tobacco (ST) can be defined as various tobacco containing products that are consumed by chewing, keeping in the mouth or sniffing, rather than smoking. ST products of many different sorts are used by people in every inhabited continent of the world. For example, in Africa, toombak and snuff are commonly used, while in South America, chimó is the product of choice. In Australia, indigenous people use pituri or mingkulpa, and in Central Asia, nasvay consumption is very common. In North America, plug or snuff are favoured, and even in Western Europe, where ST products are largely banned, there are exemptions allowing people in Nordic countries to use snus. All the above products vary in their preparation methods, composition and associated health risks(2). The knowledge of chemical composition related to various types of smokeless tobacco, as well as chemical properties of each commercial product is the first step in the assessing the harmful effect of smokeless tobacco products(3)Snuff is a fine aromatic powder composed of dried and thin leaves combined with tobacco, roots, peels, and seeds.Commercial snuff is essentially made from industrialized tobacco without addition of other medicinal plants and without therapeutic or spiritual purposes beyond its indiscriminate and inappropriate use, causing health risks(4).It was reported that smokeless tobacco can lead to pneumonia when used for a long period of time(5). Oral cancer is a highly lethal disease and one of the most debilitating and disfiguring of all malignancies in the world. According to Global Adult Tobacco Survey (GATS) 2010 report, 60% of tobacco users in India use only smokeless tobacco. Among 206 million smokeless tobacco users, 65.1 million are consuming gutkha. In recent years, gutkha is recognized as a life threatening disorder with the serious health consequences(6).In Nigeria, the use of dry nasal snuff is spreading considerably throughout all age groups in both rural and urban areas. This is due to various ethno-cultural beliefs that have not been scientifically confirmed. Various people do not realize the negative impact of snuff on one's health, such as liver and kidneys failure, elevation of blood pressure, and a higher chance of oral cancer. The hepatotoxicity and nephrotoxicity of the local nasal snuff on snuff addicted individual was poorly understood.The aim of this study is to investigate hepatic and renal parameters content in blood samples of snuff addicted individuals in Gusau Metropolis.

METHODOLOGY

Sampling Technique:

The study used a non-probability sampling technique, specifically purposive sampling, to select participants who meet the inclusion criteria. Participants were snuff-addicted individuals aged 18 years and above residing in Gusau Metropolis.

Sample Size:

The sample size for this study was determined using the formula for calculating the sample size for a cross-sectional study. The estimated minimum sample size is 150 participants.

Data Collection:

Data were collected through the following methods:

a) Questionnaire: A structured questionnaire was used to collect data on demographic characteristics, smoking habits, and snuff consumption patterns.

b) Blood sample collection: Blood samples were collected from participants using standard venipuncture techniques. The blood samples were analyzed for hepatic and renal parameters content.

Data Analysis:

The collected data were analyzed using appropriate statistical software. Descriptive statistics such as frequencies, means, and standard deviations were used to summarize the data. Inferential statistic "ONE WAY ANOVA" was used to test for associations and differences between variables.

Ethical Considerations:

This study was adhered to ethical principles. Theobjectives and procedures of the study were explained to participants. Informed consent will be obtained from participants before data collection, and confidentiality and anonymity were assured. The study was also obtain ethical clearance from the relevant institutional review board before commencing data collection

RESULT AND DISCUSSION

Result of Hepatic and Renal Parameters in Blood Samples of Snuff Addicted Individuals in Gusau Metropolis were summarized in table 1 and table 2 respectively.

Table 1: Result of Hepatic Parameters (ALT, AST, Total Proteins, Albumin, Total Bilirubin and Direct Bilirubin) in Blood Samples of Snuff Addicted Individuals in Gusau Metropolis

Group	ALT (U/L)	AST (U/L)	T. Proteins (mmol/L)	Albumin (mmol/L)	T. Bilirubin (µmol/L)	D. Bilirubin (µmol/L)
Group1 N=50	18.38±1.21[a]	20.10±8.66[b]	79.35±1.82[c]	41.60±0.73[d]	17.70±1.09[e]	03.50±0.66[f]
Group2 N=50	60.07±3.70[a]	45.45±2.86[b]	67.83±5.14[c]	37.69±5.04[d]	25.15±3.25[e]	05.54±0.59[f]
Group3 N=50	73.03±12.48[a]	60.76±5.76[b]	51.67±3.26[c]	18.34±2.41[d]	35.12±4.52[e]	07.19±0.97[f]

Values are expressed as mean ± standard deviation. **Group1** = Blood samples of people who never use snuff**, Group2** = Blood Samples of People in the 18–30 Age Group Who were Addicted to Snuff, **Group3**=Blood Samples of People older than Thirty (30 years) who were Addicted to Snuff**, N**= number of Sample. Values with the same superscript are significantly different **at P<0.05**

Table 2: Result of Renal Parameters (Creatinine, Urea, Sodium, Potassium and Chlorine) in Blood Samples of Snuff Addicted Individuals in Gusau Metropolis

Group	Creatinine (µmol/L)	Urea (µmol/L)	Sodium (mmol/L)	Potassium (mmol/L)	Chlorine (mmol/L)
Group1 N=50	89.26±7.60[a]	6.44±1.75[b]	137.93±3.16[c]	5.22±0.32[d]	102.28±0.65[e]
Group2 N=50	123.25±2.71[a]	2.79±0.71[b]	108.67±4.92[c]	3.24±0.35[d]	96.77±3.71[e]
Group3 N=50	132.80±7.14[a]	1.72±0.32[b]	94.55±4.31[c]	1.40±0.25[d]	75.57±5.48[e]

Values are expressed as mean ± standard deviation. **Group1** = Blood samples of people who never use snuff**, Group2** = Blood Samples of People in the 18–30 Age Group Who were Addicted to Snuff, **Group3**=BloodSamples of People older than Thirty (30 years) who were Addicted to Snuff**, N**= number of Sample. Values with the same superscript are significantly different **at P<0.05**

The result of hepatic Parameters (ALT, AST, Total Proteins, Albumin, Total Bilirubin and Direct Bilirubin) in blood samples of snuff addicted individuals in Gusau metropolis shown in table 1, indicated that, concentration of ALT, AST, Total Bilirubin and Direct Bilirubin in bloodsamples of people in the 18–30 age group who were addicted to snuff were significantly($p<0.05$) higher than concentration of ALT, AST, Total Bilirubin and Direct Bilirubin in blood samples of people who never use snuff.

Whereas, the concentration of ALT, AST, Total Bilirubin and Direct Bilirubin in blood samples of people older than Thirty (30 years) who were Addicted to snuff were significantly ($p<0.05$) higher than concentration of ALT, AST, Total Bilirubin and Direct Bilirubin in blood samples of people in the 18–30 age group who were addicted to snuff.

The elevation of the ALT and AST in a blood sample is a signal of liver injury (7). The ratio ALT and AST plays a significant role in the identification of liver damages. Increasing the amount of the substances which are produced by liver indicate a dysfunction occur in liver cell(8).

However, the concentration of Total Proteins and Albumin in blood samples of people in the 18–30 age group who were addicted to snuff were significantly($p<0.05$) lower than the concentration of Total Proteins and Albumin in blood samples of people who never use snuff. Whereas, the concentration of Total Proteins and Albumin in blood samples of people older than Thirty (30 years) who were Addicted to snuff were significantly ($p<0.05$) lower than concentration of Total Proteins and Albumin in blood samples of people in the 18–30 age group who were addicted to snuff.

The Result of Renal Parameters (Creatinine, Urea, Sodium, Potassium and Chlorine) in Blood Samples of Snuff Addicted Individuals shown in table 2 revealed that, concentration of creatinine in blood samples of people in the 18–30 age group who were addicted to snuff were significantly ($p<0.05$) higher than concentration of creatinine in blood samples of people who never use snuff. Whereas, the concentration of creatinine in blood samples of people older than Thirty (30 years) who were Addicted to snuff were significantly ($p<0.05$) higher than concentration of creatinine in blood samples of people in the 18–30 age group who were addicted to snuff.

However, the concentration of Urea, Sodium, Potassium and Chlorine in blood samples of people in the 18–30 age group who were addicted to snuff were significantly ($p<0.05$) lower than the concentration of Urea, Sodium, Potassium and Chlorine in blood samples of people who never use snuff. Whereas, the concentration of Urea, Sodium, Potassium and Chlorine in blood samples of people older than Thirty (30 years) who were Addicted to snuff were significantly ($p<0.05$) lower than concentration of Urea, Sodium, Potassium and Chlorine in blood samples of people in the 18–30 age group who were addicted to snuff.

It was reported that, Creatinine and estimated glomerular filtration rate are first-line laboratory parameters in the diagnosis of various renal diseases. Though in recent decades, cystatin C has furthered the laboratory repertoire regarding renal status assessment and has been implemented in many clinical guidelines, the creatinine remained one the parameters that indicated nephrotoxicity(9)

Moreover, This study is in conjunction with (10), which reported that, higher sub-chronic doses of the aqueous extract of the nasal snuff can contribute to adverse effects on the liver and kidneys and induces an oxidative stress in the test animals.

Anything that can alter the concentration of electrolyte (Sodium (Na^+), Potassium (K^+), and Chloride (Cl^-) may lead to a variety of problems if not appropriately managed. Changes in electrolyte concentration and or ratio of anions and cations will cause changes in cell activity that can endanger life (11)

CONCLUSION

This study was concluded that, there was health risks (Hepatotoxicity and Nephrotoxicity) associated with snuff addiction.According to this research, the effect of snuff is also age dependent, due to significant ($p<0.05$) increase in concentration of ALT, AST, Total Bilirubin, Direct Bilirubin and Creatinine of People older than Thirty (30 years) who were Addicted to Snuff compared withPeople in the18–30 Age Group. The preventive measures have to be taken to minimize the negative effects of snuff consumption among individuals in Gusau Metropolis.

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