

Assessment of liver enzymes (AST, ALT, GGT) in Volatile Substance Abusers in Kosti and Rabak Cities, White Nile State, Sudan

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Abstract

Background: A cross-sectional study was conducted to examine the liver enzymes in homeless adolescent children who abuse volatile substances.

Method: A Total of 62 samples from 31 abused children with at least one year and 31 from a matched control group were collected to participate in this study. Aspartate Aminotransferase (AST), Alanine Aminotransferase (ALT), and Gamma-Glutamyl Transferase (GGT) were analyzed using Biosystem 350.

Result: The mean concentration levels of GGT in volatile abusers (20.4 ± 7.8) show a significant difference compared to the control group (17.0 ± 3.7) with a P-value of 0.03. However, ALT and AST levels (19.6 ± 7.9 , and 19.7 ± 10 , respectively). In volatile Abusers do not exhibit significant differences compared to the control group (17.1 ± 4.9) and 17.1 ± 6.6 , respectively, with P-values of 0.1 and 0.2.

Conclusion: GGT was affected in volatile abusers, but ALT, AST were not significantly affected.

Keywords: liver enzymes, volatile substance abusers, Kosti and Rabak Cities.

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INTRODUCTION

The United Nations Children's Fund (UNICEF) has identified street children as children in challenging circumstances, who make up a small portion of the population and have been overlooked in health research for too long. The street child population is also divided into two overlapping groups: the street children, who are children with no contact with family and rarely return home, and those who often sleep at home but spend their days on the street [1].

The concept of street children falls within multidisciplinary studies focusing on children (under 18 years old) who are either not under any supervision or not properly supervised in society. Street children are widespread in Africa, mainly due to the failed child protection systems that characterize most African states. The UN CRC and ACRWC are essential legal instruments for protecting children in general [2]. The issue of street children is a global social and humanitarian concern. Children who are homeless are particularly vulnerable to threats and deprivation. These children endure unstable and dangerous lives that deprive them of basic needs for safety, care, and supervision, putting them at risk of exploitation and various forms of abuse [3]. It is estimated that tens of millions of street children exist worldwide, and these numbers are likely to grow with urbanization and globalization. Understanding the lives of street children is crucial, both to improve their conditions on the streets and to help them transition successfully off the streets. However, gathering accurate information about their lives can be challenging due to factors such as their mobility, distrust of strangers, and the sensitive or traumatic nature of their experiences [4]. The effects of inhaling substances and their impacts on society and users' health have become major concerns for researchers and governments alike. Reports also indicate an increase in abuse of other volatile substances, such as paint thinners, nail varnish remover, gasoline, and lighter fluids. The term "glue-sniffing" is broadly applied to all types of solvent inhalation abuse. Glue-sniffing is often seen by young children as a precursor to alcohol abuse [5]. Current generations of children are a valuable resource for the future. In Sudan, many children find refuge on the streets, often without much family support. Street-living children are a common sight in Khartoum, the capital, and other parts of the country [6]. Toluene is the primary toxic agent involved in glue sniffing. Solvent abuse and glue-sniffing are becoming increasingly common among adolescents in developing countries, due to factors such as easy availability, low cost, and legal access. Under normal physiological conditions, the liver plays a vital role in regulating metabolism. When hepatic cellular damage occurs, these processes can be disrupted or impaired, leading to changes in plasma enzyme levels. Therefore, measuring plasma enzymes (AST, ALT, GGT) is useful for evaluating the extent of liver damage [7].

MATERIALS AND METHODS

A descriptive cross-sectional study was conducted in two cities (Kosti, Rabak) in White Nile State, Sudan, from October to December 2022.

A total of 62 participants, 31 cases vs 31 controls. The inclusion criteria were homeless adolescents who were volatile substance abusers for at least one year, aged less than 18 years old, both sexes, male and female, were included in this study. Volatile Substance Abuse, less than one year, alcoholism, and adult age were excluded from the study.

A 3.0-milliliter venous blood sample was collected from each participant in a heparin-anticoagulated tube and immediately centrifuged at 15,000 R.P.M. for 5 minutes. AST, ALT, and GGT levels were measured using the Biosystem 350 automatic analyzer.

Table 1: The mean concentration levels of AST, ALT, and GGT among participants (no .62)

Variable	Case(no. 31)	Control(no .31)	P-value	Normal Range
AST(U/L)	19.7.0 ± 10	17.10±6.6	0.2	10-40
ALT(U/L)	19.6±7.9	17.10±4.9	0.1	7-56
GGT(IU/L)	20.4±7.8	17.00±3.7	0.03	0-50

The mean concentration levels of GGT in volatile abusers (20.4 ±7.8) shows significant difference when compared with the control group (17.0±3.7) with P-value (0.03). but ALT, AST (19.6 ±7.9), (19.7 ±10) respectively in volatile abusers no statistically different was found when compared with the control group (17.1±4.9), (17.1 ±6.6) respectively, with P-value (0.1), (0.2) respectively

DISCUSSION

The current study shows that the mean concentration levels of plasma AST and ALT in volatile abusers (19.7), (19.6), respectively, show no significant difference when compared with those of volatile non- abusers (17.10) and (17.10), respectively, with a P-value of 0.2. (0.1) respectively this result agrees to some extent with the study of Tsegay Asefaw et.al carried on Addis Ababa University, Ethiopia at 2020, which shows that the ALT, AST levels of gas station study participants in above six years' period of exposure to the gasoline showed a significant increase compared with study participants exposed for less than six years [8]. Nevertheless, our results differ from those of Abdelgadir Eltom's study in March 2017 in Sudan, which showed a significant increase in means. of serum AST and ALT activities among gasoline station workers when compared to the control group, P. value = (0.001), (0.01), respectively [9]. Our study shows that the mean level of GGT (20.4) in volatile abusers was significantly increased when compared with volatile non- abusers (17.0). This is comparable with Ali Yurtseven *et al. al* .2017 in Turkey [10].

Our study highlights that the mean concentration levels of GGT in volatile abusers is significantly different compared to the control group, though ALT and AST levels in volatile Abusers do not exhibit significant differences compared to the control group.

Conflict of interest

The authors declare no conflict of interest
Fund
none

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