



	Gema WIRALODRA
	Editor-in-Chief: Yudhi Mahmud
	 Publisher: Universitas Wiralodra

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Indra Prastiwi Jamaluddin^a, Ratri Yasmin^b, Ardhanita Qalbani Putri^c, Safitri Andriani Almi^d

^aPoliteknik Kesehatan Megarezky, Makassar, Indonesia, Indraprastiwijamaluddin@gmail.com

^bUniversitas Muhammadiyah Gorontalo, Gorontalo, ratriy@umgo.ac.id

^cProgram Studi Farmasi, Universitas PGRI Sumenep, Sumenep, Indonesia, ardhaqalbani10@gmail.com

^d Universitas Muhammadiyah Semarang, Semarang, Indonesia, Safitrialijabar@gmail.com

To cite this article:

Jamaluddin, I. P., Yasmin, R., Putri, A. Q., & Almi, S. A. (2025). Profile of SGOT and SGPT Levels among Glue Sniffers on Jalan Dg Tata Raya, Makassar. *Gema Wiralodra*, 16(2), 346 – 350.

To link to this article:

<https://gemawiralodra.unwir.ac.id/index.php/gemawiralodra/issue/view/57>

Published by:

Universitas Wiralodra

Jln. Ir. H. Juanda Km 3 Indramayu, West Java, Indonesia

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^aPoliteknik Kesehatan Megarezky, Makassar, Indonesia, Indraprastiwijamaluddin@gmail.com

^bUniversitas Muhammadiyah Gorontalo, Gorontalo, ratriy@umgo.ac.id

^cProgram Studi Farmasi, Universitas PGRI Sumenep, Sumenep, Indonesia, ardhaqalbani10@gmail.com

^dUniversitas Muhammadiyah Semarang, Semarang, Indonesia, Safitrialijabar@gmail.com

*Correspondence: ratriy@umgo.ac.id

Abstract

Inhalant abuse, particularly glue sniffing, constitutes a major social and public health concern, predominantly affecting adolescents and street children. The toxic chemical constituents of glue have the potential to impair vital organs, most notably the liver, as indicated by elevated serum levels of hepatic enzymes, namely SGOT and SGPT. The present study aimed to evaluate SGOT and SGPT concentrations among individuals engaged in glue inhalation on Jalan Dg Tata Raya area of Makassar. A descriptive observational design was employed, and laboratory analyses of SGOT and SGPT were conducted using the IFCC kinetic enzymatic method. The study population comprised individuals with a confirmed history of glue inhalation. Findings revealed that 50% of participants exhibited SGOT and SGPT values exceeding the upper reference limit, whereas the remaining 50% demonstrated levels within the normal range. The elevation of hepatic enzyme activity is presumed to result from toxic chemical exposure leading to hepatocellular injury, while the maintenance of normal enzyme levels in other participants may be attributable to variability in exposure duration, frequency of inhalant use, and interindividual differences in hepatic metabolic capacity. Glue inhalation, therefore, poses a considerable risk for hepatic dysfunction, emphasizing the urgent need for preventive strategies and community-based educational interventions, particularly among adolescents, to mitigate the health consequences of inhalant abuse.

Keywords: SGOT, SGPT, Inhalant Abuse, Glue Sniffing, Liver Function

1. Introduction

Substance abuse remains a serious public health problem, one manifestation of which is glue sniffing as an alternative to narcotics. Glue is classified as an addictive substance, and glue sniffing is considered deviant behavior because it violates legal regulations and contradicts prevailing social and religious norms (Setiawan & Nursalim, 2020). This phenomenon is influenced by internal factors such as curiosity and the desire to experiment, as well as external factors including family conditions, peer influence, and unsupportive social environments (Hasni et al., 2018).

Inhalants belong to the category of psychoactive substances (NAPZA) and are administered through inhalation, directly affecting the central nervous system. Repeated glue use may induce temporary euphoria, hallucinations, and impairment of vital organ function due to exposure to hazardous chemical compounds (Djafar et al., 2021 ; Yunus, 2018). Such chemical exposure has the potential to cause organ damage, particularly to the liver, which plays a critical role in metabolism and detoxification of foreign substances (Dumanauw et al., 2015).

Hepatocellular injury is characterized by elevated levels of SGOT and SGPT in the blood. These enzymes are commonly used clinical indicators of liver function, and increased concentrations reflect hepatocellular damage or dysfunction (Tsani et al., 2017).

Previous research by Hasni et al., (2018) reported no significant elevation of SGOT and SGPT levels among glue sniffers in Makassar City. However, that study did not examine the relationship between liver enzyme levels and duration of glue use, leaving a research gap regarding the impact of prolonged exposure on liver function. Therefore, further investigation is warranted to clarify the effect of glue consumption duration on SGOT and SGPT levels. Accordingly, this study aims to describe SGOT and SGPT levels among glue sniffers in Jalan Dg Tata Raya, Makassar, based on duration of use.

2. Method

This descriptive observational study was conducted from May 20 to 27, 2025, in Jalan Dg Tata Raya, Makassar, to assess SGOT and SGPT levels among glue sniffers based on duration of use using the IFCC enzymatic kinetic method. A total of 10 respondents were selected through simple random sampling due to the limited number of eligible participants and willingness to participate. Inclusion criteria comprised active glue sniffers aged ≥ 15 years, while exclusion criteria included a history of liver disease or use of medications affecting liver function. Venous blood samples (± 3 mL) were analyzed at the Clinical Pathology Laboratory of Muhammadiyah Polytechnic Makassar. Ethical approval was obtained prior to data collection, with informed consent secured from all participants and confidentiality maintained. Data were analyzed descriptively.

3. Results and Discussion

Results

Table 1. Frequency Distribution of SGOT and SGPT Examination Results among Glue Sniffers in Jalan Dg Tata Raya, Makassar

Parameter	Sex	Normal, n (%)	Elevated, n (%)	Value range (μ /L)
SGOT	Male (n=9)	4 (44,4)	5 (55,6)	16–66
	Female (n=1)	1 (100)	0 (0)	30
SGPT	Male (n=9)	6 (66,7)	3 (33,3)	11–48
	Female (n=1)	1 (100)	0 (0)	18

Notes:

SGOT reference values: males < 37 μ /L, females ≤ 31 μ /L.

SGPT reference values: males ≤ 41 μ /L, females ≤ 31 μ /L

The results presented in Table 1 indicate that of the total 10 respondents, the majority were male (n = 9; 90%), with only one female participant (10%). SGOT examination revealed elevated levels in five male respondents (55.6%), while the female respondent remained within the normal range. Similarly, SGPT elevation was observed in three male respondents (33.3%), whereas the female participant showed normal values.

Discussion

This study analyzed SGOT and SGPT levels among glue sniffers in the Hartaco Complex, Makassar. The objective was to determine whether elevations in SGOT and SGPT occurred among individuals engaging in glue inhalation. The findings indicate that a proportion of participants exhibited increased SGOT and SGPT levels, suggesting potential hepatocellular dysfunction. However, such elevations were not observed in all respondents, indicating interindividual variability in response to inhalant exposure, which may be influenced by factors such as duration of use, intensity of exposure, and individual biological conditions.

The toxic effects of glue inhalation are primarily attributed to volatile organic compounds such as toluene and other easily evaporated solvents, which have been reported to cause liver damage in cases of acute or chronic exposure. Recent case reports have also demonstrated that glue inhalation can lead to toxic hepatitis and damage to other organs in heavily exposed individuals (Khadhar et al., 2024).

Other studies support the association between exposure to volatile organic compounds (VOCs) and indicators of liver injury, including elevated liver enzyme levels, in the general population. For example, large-scale studies have demonstrated that environmental VOC exposure is significantly associated with alterations in liver injury biomarkers, suggesting that volatile substances may impair liver function even at low doses outside industrial occupational settings. However, some findings indicate that not all exposure to volatile chemicals results in increased SGOT and SGPT levels. Observational studies in the general population have revealed that biological differences, such as sex, along with lifestyle factors, may influence liver enzyme responses to volatile exposure, highlighting the need for more comprehensive multivariate analyses in larger populations (Wahlang et al., 2021).

Repeated inhalant abuse, including glue sniffing, has also been associated with various systemic effects such as central nervous system damage, respiratory disturbances, and potential chronic organ injury with prolonged use. Scientific evidence from two decades of review indicates that inhalant abuse represents a serious public health concern with widespread impacts on both physical and mental health (Cruz & Bowen, 2021).

In this study, 50% of the total samples showed elevated SGOT and SGPT levels. This finding is consistent with (Wicaksana et al., 2021) who reported that increased SGOT and SGPT levels occur due to impaired liver cell function, as indicated by elevated concentrations of these enzymes. One contributing factor is exposure to addictive substances. SGOT and SGPT are liver enzymes that play a role in binding chemical compounds in the bloodstream. When these enzymes are released from hepatocytes, their levels in the blood serum increase. According to (Brauner et al., 2020) a study on workers exposed to solvents demonstrated a significant increase in liver enzyme levels compared to the control group. Repeated exposure to organic solvents, which are included in several types of inhalants, may trigger a hepatotoxic response and elevate SGOT and SGPT levels.

Meanwhile, the remaining 50% of the total samples did not exhibit elevated levels of SGOT and SGPT, remaining within the normal range. This condition may be attributed to mild exposure, in which the body was potentially able to metabolize and neutralize the toxic compounds without inducing hepatic injury (Chang et al., 2013). Individual biological factors also play an important role, such as differences in hepatic metabolic capacity, genetic variations in cytochrome P450 enzymes, and the regenerative ability of the liver, which contribute to interindividual variability in the response to toxins. Studies on street children using inhalants have even demonstrated that some hepatic biochemical parameters remain within normal limits despite a history of inhalant exposure (Kaukiainen et al., 2004). Therefore, the variability in liver enzyme levels may be explained by differences in exposure intensity and interindividual biological responses.

This discussion also acknowledges several study limitations, including the small sample size, descriptive design without a control group, and the absence of quantitative assessment of substance exposure. These limitations restrict the strength of causal inferences between glue use and impaired liver function. Future studies employing analytical designs, larger sample sizes, and more precise exposure measurements are warranted to strengthen these findings.

From a public health and policy perspective, although evidence remains limited, existing data suggest that inhalant abuse may adversely affect liver function and overall health. Comprehensive preventive interventions, including community education, routine health

screening, rehabilitation services, and policies regulating access to volatile substances, should be strengthened to mitigate long-term health consequences, particularly among vulnerable populations such as street children.

4. Conclusion

The present study demonstrated that 50% of glue inhalant users exhibited elevated SGOT and SGPT levels, while the remaining 50% maintained normal enzyme levels. The variation in outcomes is likely attributable to differences in exposure frequency and the body's ability to metabolize and neutralize the toxic compounds present in glue. These findings highlight the potential hepatotoxic effects of glue inhalation and emphasize the importance of preventive measures to mitigate the associated health risks. Moreover, the study contributes to public health literacy by raising awareness regarding the detrimental consequences of glue inhalation.

Acknowledgments

We would like to express our gratitude to the Laboratory staff and all parties who granted permission and provided assistance in the process of examining SGOT and SGPT levels among glue sniffers on Jalan Dg Tata Raya, Makassar. Our sincere appreciation is also extended to all respondents who willingly participated in this study.

Declarations

Author Contribution : Author 1: Conceptualization, Writing - Original Draft, Editing and Visualization; Author 2: Writing - Review & Editing, Formal analysis, and Methodology; Author 3: Validation and Supervision ; Author 4: Translator and assisted in manuscript editing (<https://www.elsevier.com/authors/policies-and-guidelines/credit-author-statement>).

Funding Statement:

This research did not receive any external funding, and all expenses were personally borne by the authors.

Conflict of Interest:

The authors declare that there is no conflict of interest regarding the research, authorship, or publication of this article.

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