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## Research Article

# Factors Related to Anxiety Among Tuak Drinkers in Lapo Tuak

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### Abstract

**Introduction:** Each region or ethnicity commonly has certain distinguished culinary heritage, including Batak Toba ethnicity, originated from Sumatera Utara province, Indonesia that is also known for their traditional alcoholic beverage, known as Tuak. Consumption of alcohol has been reported to contribute to the occurrence of addiction and other psychiatric syndromes, including anxiety.

**Aim:** This study is intended to investigate factors related to anxiety scores in tuak drinkers.

**Method:** 72 tuak drinkers from 4 districts of Medan were recruited by using cluster sampling method. Anxiety was measured by using Hospital Anxiety and Depression Scale – Anxiety (HADS-A) questionnaire and multiple linear regression was used to determine factors related to anxiety scores.

**Result:** Length of education, monthly income, and total score of Alcohol Use Disorder Identification Test (AUDIT) are found to be independent factors related to anxiety scores in Tuak drinkers (R<sup>2</sup>=82.9%).

**Conclusion:** The result of this study may become important evidence to promote mental wellbeing support in the future.

### Keywords

Tuak, Anxiety, Lapo tuak

## 1. Introduction

The term “alcohol” in organic chemistry is referred to alkyl based substance or hydroxyl (-OH) bound carbonic substance. In general, alcohol is related to ethanol or any beverages containing alcohol. Since the early civilization, human have been indulging alcohol for numerous purpose, including as relaxant and euphoria agent [1]. According to Global Status report on alcohol and Health 2018, it is approximated that nearly 2.5 billion people are alcoholics worldwide with 32.8 g of daily alcohol consumption. In Africa alcohol consumption is 20% higher than that in other parts of the world that accounts to 40 g of daily alcohol consumption, while in the other hand less consumption is found in South East Asia which accounts for approximately 26.3 g/ day [2]. A study from Callagher et al. which was conducted in Irlandia in 2007 involving 97 individuals with alcohol dependence revealed that anxiety and depression symptoms (measured by Beck Anxiety Inventory dan Beck Depression Inventory-II) disappeared after 28 days of treatment. This indicates that there is a profound relationship between alcohol consumption and symptoms of anxiety and depression [3].

Tuak is commonly found in the South East Asia, and is one of traditional staple from Medan. Medan is the capital of Sumatera Utara province that is known for being the third biggest metropolitan in Indonesia. Its area is 26,510 Ha which is divided into 21 districts and 151 sub districts. The heterogeneity of its culture is enormous as it is inhabited by a lot of ethnicities (originally Melayu) and different religions. In 2012 Medan inhabitants accounted for 2.083.,156 people. Batak ethnicity is relatively more acknowledged for their habit of consuming Tuak. Even though any ethnicities may actually consume Tuak, but indulging Tuak was first introduced by Batak [7,8].

Tuak is drawn from a plant called Enau (*Arenga pinnata*) which is also known as “nira”. As the resource from enau is limited, currently tuak is also drawn from coconut. This drawn essence is then mixed with water and Raru bark which further is fermented for couple of days. In Medan, the place that provides tuak is called *Lapo Tuak/ Parter Tuak* [7].

Tuak is relatively more affordable compared to other branded alcohol drinks but this doesn't make tuak is limited only for middle to lower class individuals. Tuak is also presented in various traditional rituals which distinguishes tuak from other kinds of traditional alcohol beverages in South East Asia.

Lapo tuak is not commonly found in the center of the city, probably due to aesthetical aspect, and is usually open only from evening till midnight [7-9]. In Indonesia the government has declared tuak as alcohol beverage group B (highest alcohol/ethanol content of 5% - 20%) along with other traditional alcoholic beverage, such as Balinese *brem*, and ginseng wine [10,11]. Studies that investigate factors related to anxiety in individuals with alcohol consumption is limited as a lot more recent studies only focus on determining factors related alcohol dependency. Hence, this study may become useful to address this gap and may serve as important body of evidence for future appropriate mental wellbeing promotion strategies.

## 2. Method

### *Population and Demographical Study*

This study was approved by the Health Research Ethical Committee of Medical Faculty of Sumatera Utara University (Number 920/TGL/KEPK FK USU-RSUPHAM/2019) and conducted in Medan from May to June 2020. Sample were recruited by using probability cluster sampling method by randomly selecting three lapo for each four districts; Medan Petisah, Medan Selayang, Medan Amplas, and Medan Denai. In each districts, 20 samples were recruited and a total of 80 samples were gathered in this study. Written informed consent was provided by participants prior to their enrollment. Participants were allowed to terminate their involvement in the study at any time they desired. Eligible subject criteria are 25 – 60 years old man (as nearly 99% of lapo tuak visitors are men) who drinks tuak, understands Indonesian language, and has consumed tuak  $\geq 2x$  in a month (not recreational use). We excluded those with ongoing psychiatric disorders, such as anxiety, depression, or psychotic disorder. Individuals with any medical disorders were also excluded [12,13].

Eligible participants were appointed to return to lapo tuak the day after. Measurement was conducted within the first 48 hours from the last drink in steady and fully conscious mental state. Subjects who did not fulfill the appointment or have taken another drink within that 48 hour interval period were excluded from the research.

Thus, we were able to gather 80 subjects (20 subjects from each districts) from previously 97 individuals. Study was conducted by the researcher, 4 residents doctors, and 8 assistants. In order to prevent the transmission of COVID-19, study was conducted in regards to COVID-19 prevention protocols.

### *Hospital Anxiety and Depression Scale (HADS)*

Hospital Anxiety and Depression Scale consists of 14 questions that is divided into 2 subscale; 7 questions for anxiety screening and the other remaining questions for depression screening. The scoring of these questions comprises of number from 0 (never) to 3 (very often) that results in minimal score of 0 and maximum score of 21 for each subscale. Validity and reliability of HADS has been reported in Indonesia from a study conducted by Widyadharma et al. in 2015. Interrater agreement of HADS-A is 0.706 (cut off 0.61 - 0.80) that indicates good reliability. HADS is also known to be reliable and valid to be implemented in general population, and is known for its simplicity as it can be completed within only 2- 5 minutes [14,15].

### *Pittsburgh Sleep Quality Index (PSQI)*

Pittsburgh Sleep Quality Index evaluates seven components of sleep quality, such as subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbance, use of sleeping medication, and any daily disfunction caused by sleep deprivation. PSQI has sensitivity of 89.6% and specificity of 86.5% [16,17].

Its validity and reliability in Indonesia has been reported in a study from Ikbal in 2015. The study involving chronic kidney disease patients revealed that PSQI has a good internal consistency (Cronbach's alpha = 0.85). Pearson correlation also indicates a good correlation for each component of PSQI ( $r = 0.50 - 0.80$ ,  $p < 0.001$ ) [18].

### Alcohol Use Disorder Identification Test (AUDIT)

AUDIT is developed in the purpose of helping clinicians to screen individuals suspected for excessive consumption of alcohol. It consists of ten questions which is scored as 0-4. AUDIT has been validated in Indonesian version with Cronbach's alpha = 0.859 with  $r = 0.559-0.795$  dan  $p < 0,001$  [19,20].

### Statistical Analysis

Predictive multiple linear regression is used in the study in regard to the fulfillment of all required conditions, such as linearity, normal distribution of residue (as proven in histogram, plot, or normality test), zero mean (proven by descriptive statistic), no outlier (proven by case wise diagnostic), homoscedasticity (shown in scatter), and independency (proven by *Durbin-Watson* test). Independent variable has to show no multicollinearity (proven by Pearson and tolerance test). Only variable with  $p < 0.25$  is accepted for this analysis [12]. Independent categorical variables are analyzed by t test independent or Mann Whitney U test depending on normality of data distribution. In the other hand independent numerical variables are analyzed by using Pearson correlation. All data were then analyzed by using SPSS version 23.

### 3. Results

This study involved 80 tuak drinkers from a total of 4 districts in Medan. Categorical data in this study are smoking behavior and marital status. Categorical data are presented in number (n) and percentage (%).

Meanwhile, the numerical variable discussed in **Table 1** is the age of the tuak drinkers, education level, monthly income, duration of drinking tuak, frequency of drinking tuak, total tuak consumption at one time, total AUDIT score, and total PSQI score. Numerical data are presented in concentration (median) and spread (minimum and maximum) due to abnormality of data distribution as shown from the result of the Kolmogorov-Smirnov test ( $n = 80$ ), where  $p < 0.05$  for each variable [13].

**Table 1:** Demographic characteristics.

Variable (n = 72)	Value
Age (in years) Median (min-max)	33.50 (25-45)
Gender (number and percentage)	80 (100%)
- Man	0 (0%)
- Women	
Marital Status (number and percentage)	53 (66.25%)
- Married	27 (33.75%)
- Not Married	
Smoking behavior (number and percentage)	66 (82.5%)
- Smoking	14 (17.5%)
- Not smoking	
Education level (in years)	14 (17.5%)
- Primary school	44 (55%)
- Middle school	22 (27.5%)
- Higher education	
Monthly income (in million) Median (min-max)	3 (2-4.5)
Duration of drinking tuak (in months) Median (min-max)	2.75 (1-7.50)
Total consumption of tuak at one time (in a glass) Median (min-max)	7 (5-12)
Total AUDIT Score Median (min-max)	15 (5-28)
Total PSQI Score Median (min-max)	10 (5-15)

In this study, there are 9 independent variables as in the following; age, education level, monthly income, smoking behavior, marital status, total consumption of tuak in one night, duration of drinking tuak, total PSQI score, and total AUDIT score. After conducting bivariate analysis and ensuring all requirements for regression analysis are achieved, the multivariate analysis is carried out. By using backward method, a linear regression equation is obtained in which the HADS-A Score =  $-0.712 + 2.21 * \text{length of education for tuak drinkers} + 0.977 * \text{monthly income of tuak drinkers} + 0.381 * \text{total AUDIT score}$ .

All linear regression assumptions, such as linearity, normality, mean zero residue, no outliers residue, independent, constant/homoscedasticity and no multicollinearity are achieved.

**Table 2:** Multivariate Regression.

HADS-A Score Variable	Correlation Coefficients	Multivariate Regression $\beta$	P
<b>Konstan</b>		3.978	<0.0001
Primary vs Middle school	-0.255	-2.416	<0.0001
Higher education vs Middle school	0.285	2.294	<0.0001
Monthly income	0.196	0.965	<0.0001
Total AUDIT score	0.466	0.243	<0.0001

In accordance to **Table 2**, education level, monthly income, and total AUDIT score are independent factors related to HADS-A scores ( $p < 0.05$ ).

#### 4. Discussion

Our study suggested that level of education is related to anxiety scores with  $r = 0.285$  and  $r = -0.255$  for primary and higher education respectively ( $p < 0.0001$ ) which indicates that higher education is positively correlated with HADS-A score. This is in contrast to a study by Bjelland et al. that was conducted in Norway which indicated that in general, having high education is a protective factor for anxiety. In the other hand, the higher the level of education of a person, the more anxiety is found [14]. This contradictory possibility can be explained by the fact that individuals with higher education are expected to acknowledge and experience more things, thus reflected in stronger ambitions which makes these individuals at more risk of experiencing anxiety [14].

We also found an association between monthly income and anxiety scores ( $r = 0.185$  and  $p$  value = 0.05). This is consistent with a study conducted by Li et al in 2017 by comparing Norwegian and Chinese data [4]. This may be interpreted because the amount of income does not always dictate a person's expenditure. In the other hand, the maximum monthly income we found among our sample is considered low, that accounts for IDR 4.5 million. Furthermore, we found a significant relationship between total AUDIT score and anxiety score in tuak drinkers with a value of  $r = 0.752$  and  $p$  value  $< 0.0001$ , that indicates a very significant and very strong positive correlation. This indicates that the higher the AUDIT score is, the higher the level of anxiety that will be experienced by these individuals [5, 19].

This study did not find any association between age of tuak drinkers and anxiety scores which is in contrast to a study conducted by Bjelland et al. in 2017 in Norway that investigate HADS-A scores in wine drinkers. We also found no relationship between marital status and anxiety scores in tuak drinkers. Literatures revealed that married individuals are tend to experience more emotional and financial burden [23-25]. Smoking behavior also shows no relationship with anxiety scores that is in contrast to a study from Wiener et al. in 2018 in Brazil [5]. PSQI score also shows no association with anxiety scores among our samples despite the fact that sleep deprivation leads to anxiety symptoms [26-27].

Even though the total AUDIT score is related to the anxiety score in this study, this study does not show that the duration of tuak drinking is related to level of anxiety, which is also in line with a study by Callagher in 2017 [3]. This indicates that the duration of tuak drinking does not always relate to the level of alcohol dependence. The total AUDIT score which affects the anxiety score, is also not related to the amount of tuak consumption in one night as in accordance to a study by Hayness et al. in 2005 in the UK [28]. This phenomenon could probably be explained by the diverse variation of alcohol concentration, varying from 5 – 20%, in various different alcohol beverages found worldwide. As traditional alcohol, including tuak is not standardized, the effect may be different from well-known modern alcohol products.

Another implication of the study is the fact that during family gathering parents are not bothered by their children's substance use, even if they are perceived as youngsters. The fact that substances (alcohol and cigarette) are kept in abundance being not supervised that makes them contributors to their children, whether parents were aware that their children were partaking in alcohol consumption.

### 5. Strengths and Limitations of Study

The strengths of this study is the fact that this type of study or any other study with similar methods and measuring instruments, has not been conducted in Asia and that confounding factors are successfully controlled. In the other hand, the limitation of our study is that it is not carried out in multicenter approach due to limited resources.

### 6. Conclusion and Future Direction

From this study, we found that factors related to anxiety score of individuals with tuak consumption are the level of education, monthly income, and total AUDIT score. By knowing the factors associated with the HADS-A score in individuals with consumption in Medan, it is hoped that clinicians and public policy regulators are able to give more attention to tuak drinkers who are at risk of experiencing anxiety disorders. This study may serve as important body of evidence to further tighten the regulations on alcoholic beverages.

### 7. Conflict of Interest

Authors declare no conflict of interest.

### References

1. M. M. Thakkar, R. Sharma, P. Sahota, *Alcohol Disrupts Sleep Homeostasis*, Alcohol J, 30 (2014), 1-12.
2. World Health Organization, *Global status report on alcohol and health*, (2018), 1-447.
3. C. Callagher, Z. Radmall, C. O`Gara, T. Burke, *Anxiety and depression among patients with alcohol dependence: co-morbid or substance-related problems?*, Ir J Psychol Med, 35 (2018), 121-126.
4. J. Li, B. Wu, G. Selbaek, S. Krokstad, A. S. Helvik, *Factors associated with consumption of alcohol in older adults - a comparison between two cultures, China and Norway: the CLHLS and the HUNT-study*, BMC Geriatr, 17 (2017), 172.
5. C. D. Wiener, F. P. Moreira, A. Zago, L. M. Souza, J. C. Branco, J. F. de Oliveira, et al., *Mood disorder, anxiety, and suicide risk among subjects with alcohol abuse and/or dependence: a population-based study*, Braz J Psychiatry, 40 (2018), 1-5.
6. D. Cipta Karya Kota Medan, P. Kota Medan, *Bantuan Teknis Rpi2jm Kota Medan 2015 -2019 Dalam Implementasi Kebijakan Keterpaduan Program Bidang Cipta Karya*, (2013).
7. S. Ikegami, *Tuak in the Toba Batak Society: A Preliminary Report on the Socio-cultural Aspect of Palm Wine Consumption*, Annual Report of the University of Shizouka, Hamamatsu College,11 (1997), 1-8.
8. B. Melga, K. K. Adi, *Designing brand identity for batak toba Tuak in Medan City*, 6th Bandung Creative Movement International Conference in Creative Industries, (2019).
9. Thirstmag. *Tuak, the ancient culture in Borneo*, (2013).
10. Ministry of Law and Human Rights of Republic of Indonesia. Presidential Regulations of Republic of Indonesia. Number 74. Control and Supervisional Control of Alcoholic Drinks, (2013).
11. Ministry of Trade of the Republic of Indonesia. Ministerial Regulation, *Supervisional Control of Alcoholic Drinks*, Number 20. (2014).
12. M. S. Dahlan, *Linier Regression*, Seri 10 Edisi 2. Jakarta: Epidemiologi Indonesia, (2018).
13. S. Sastroasmoro, S. Ismael, *Dasar-dasar Metodologi Penelitian Klinis*, Jakarta: Sagung Seto, (2016).
14. I. Bjelland, A. A. Dahl, T. T. Haug, D. Neckelmann, *The validity of The Hospital Anxiety and Depression Scale an updated literature review*, J Psychosomatic Res, (2002), 69-77. R. P. Snaith, *The Hospital Anxiety and Depression Scale, Health and Quality life Outcomes*, (2003).
15. M. Rudy, P. E. Widyadharma, I. M. Adnyana, *Reliability Indonesian Version Of The Hospital Anxiety And Depression Scale (HADS) Of Stroke Patients In Sanglah Hospital Denpasar*, (2015).

16. D. J. Buysse, *The Pittsburgh Sleep quality index: a new instrument for psychiatric practice and research*, *Psychiatry Res*, (1989), 193-213.
17. T. Shocat, O. Tzischinsky, A. Oksenberg, R. Peled, *Validation of the Pittsburgh sleep quality index Hebrew translation (PSQI-H) in a sleep clinic sample*, *Isr Med Assoc J*, 9 (2007), 853-856.
18. Z. I. Alim, *Uji Validitas dan Reliabilitas Instrumen Pittsburgh Sleep Quality Index Versi Bahasa Indonesia*, Universitas Indonesia, (2015).
19. F. T. Babor, J. C. Higgins-Biddle, J. B. Saunders, M. G. Monteiro, *The Alcohol Use Disorders Identification Test : Guidelines for Use in Primary Care, Second Edition*, World Health Organizationm, (2001), 1- 40.
20. H. Yulianto, H. Pohan, I. Suproyanto, S. H. Ismanto, C. R. Marchira, *Validation of the alcohol use disorders identification test (audit) as a screening instrument for alcohol use disorders among prisoners in Lapas Narkotika Klas IIA Yogyakarta*, (2017).
21. A. G. Bullock, J. V. Williams, D. H. Lavorato, S. B. Patten, *The depression and marital status relationship is modified by both age and gender*, *J Affective Disord*, (2017).
22. A. Sharma, *Why Marriage Becomes A Burden?*, *Boldsky*, 31 (2011).
23. A. L. Souza, R. A. Guimarães, D. de Araujo Vilela, R. M. de Assis, L. M. de Almeida Cavalcante Oliveira, M. R. Souza, *Factors associated with the burden of family caregivers of patients with mental disorders: a cross-sectional study*, *BMC Psychiatry*, 17 (2017), 353.
24. T. W. Uhde, B. M. Cortese, *Anxiety and sleep problems: emerging concepts and theoretical treatment implications*, *J Current Psychiatry report*, (2009).
25. T. A. Mellmann, *Sleep and anxiety disorders*, *J Psychiatric Clinics of North America*, (2006), 1047-1058.
26. J. C. Haynes, M. Farrell, N. Singleton, H. Meltzer, R. Araya, G. Lewis, et al. *Alcohol consumption as a risk factor for anxiety Alcohol consumption as a risk factor for anxiety and depression Results from the longitudinal follow-up of the National Results; from the longitudinal follow-up of the National Psychiatric Morbidity Survey Psychiatric Morbidity Survey*, *Psychol Med*, 38 (2008), 451-455.
27. J. P. Smith, C. L. Randall, *Anxiety and alcohol use disorders comorbidity and treatment considerations*, *Alcohol Res*, 34 (2012), 414-431.
28. B. J. Sadock, V. A. Sadock, P. Ruiz, *Generalized Anxiety Disorder*, In *Kaplan & Sadock's Synopsis of Psychiatry Behavioral Sciences/Clinical Psychiatry*, 11th edtn. Philadelphia: Lippincott Williams & Wilkins, (2015), 407-412.
29. S. M. Stahl, *Essential Textbook of Psychopharmacology*, (2014).
30. American Psychiatric Association, *Substance/Medication-Induced Mental Disorder*, In: *Diagnostic and Statistical Manual of Mental Disorder*, American Psychiatric Publishing, (2013).

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