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Original article

Prevalence and impact of alcohol dependence among male patients getting admitted in Intensive Care Unit

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Abstract

Alcohol dependence syndrome and other related diseases are also associated with certain health risks that are known to cause a variety of diseases. This study aimed at assessing the extent and impact of alcohol dependence among male patients admitted to the ICU of a tertiary care hospital in Kancheepuram District, Tamil Nadu. This research employed a cross-sectional study design, where data was collected from 300 male patients in the ICU with ages ranging from 18 to 80 years. Data collection tools included the "Mini-Mental State Examination" (MMSE), the "Clinical Institute Withdrawal Assessment of Alcohol Scale", "Revised (CIWA-Ar)", and laboratory tests that were deemed relevant. Other analyses included ANOVA, logistic regression, chi-square testing, t-tests, descriptive statistics, and survival analyses. The study revealed that there was a negative relationship between alcohol dependency and mortality rate, longer time in the ICU, and alcohol withdrawal symptoms, with a high percentage of alcohol dependence (60%). As for the laboratory findings, alterations in liver function tests with correlations with the patterns of alcohol use were observed. To diminish the burden of diseases and improve patient outcomes, the study highlights the need for early identification and treatment of alcohol dependence.

Keywords: *Alcohol Dependence, ICU, Male Patients, Cross-Sectional Study, Laboratory Tests, Survival Analysis*

Introduction

Also, alcohol use-related diseases and alcohol dependency disorder have been seen as public health concerns that lead to many medical morbidities and societal burdens [1]. We can also see that moderation in alcohol consumption is beneficial, as overconsumption affects the liver, cardiovascular system, and central nervous system, among other vital systems in the body [2]. Unfortunately, few studies have been conducted regarding the connection and impact of alcohol dependence in the context of these critically ill patients, including those admitted to ICUs. Admittedly, patients who are admitted into the ICU are usually sick with multiple co-morbidities [3], thus requiring constant attention and monitoring. Alcoholism can worsen some personnel, delay recovery, and increase the risk of complications, which may lead to prolonged hospitalization and costly treatments [4]. In addition, the symptoms of alcohol withdrawal, including delirium tremens, seizures, and autonomic dysfunction, may complicate the management of the patient and require additional interventions. Therefore, early identification and proper management of alcohol use disorders in ICU patients could improve overall outcomes, decrease the consumption of healthcare services, and improve the quality of life [5].

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Objectives

- To screen the patients admitted to the ICU for alcohol dependency or alcohol-related complications.
- To verify the prevalence of alcoholism among ICU patients.
- To determine the volume of alcoholism's impact on clinical outcomes, including LOS, mortality, and alcohol withdrawal complications.
- To evaluate the correlation between LFTs and other laboratory parameters concerning alcohol dependence.
- To identify factors that are likely to lead to alcohol dependence and the consequences that come with it, appropriate statistical models will be applied.

Need for the Study

The prevalence of alcoholism and comorbidities with other medical illnesses is high, but identification and appropriate treatment remain underappreciated and underprovided in clinical settings, particularly the ICU [6]. In the Indian context, we still need to make a lot of efforts to understand the impact of alcoholism on patient outcomes and healthcare resource consumption. It is with a view to filling this gap that this research aims to increase awareness about the various issues surrounding alcoholism, not only among ICU patients but among all patients in general [7]. We can also apply it to advance various treatment programmes, enhance the quality of service delivery, and optimize the available healthcare facilities.

Methodology

Meenakshi Medical College and Research Institute, Kancheepuram, Tamil Nadu, is the study location and the study was carried out from February to May 2023. Research Design: This is cross-sectional observational research conducted at a hospital. Subjects and Methods of the Study: Male patients admitted in the ICU between the ages of 18 and 80 were included. Individuals who did not provide their permission or who had pre-existing mental diseases (apart from alcohol dependency syndrome) were not included in the study. Sample Collection and Management: A sample of 300 patients is included. Data were gathered by a standardized proforma, “CIWA-Ar”, “MMSE”, physical examination, and pertinent investigations and purposeful or selective sampling was used in the study [8,9]. Laboratory examinations included a complete blood count, tests for renal function, total and direct bilirubin, “SGOT”, “SGPT”, “GGT”, and “albumin”, as well as other pertinent studies. Descriptive statistics, such as “mean, median, standard deviation, frequencies, and percentages”, are used in statistical analysis. Inferential statistics: Survival analysis (Kaplan-Meier curves, Cox proportional hazards regression), ANOVA, chi-square tests, t-tests, and correlation analysis [10-12].

Ethical considerations: Written and informed permission was acquired from each respondent, the research complied with the Indian Council of Medical Research's ethical recommendations

.**Results:**

Table 1: Primary Data Collected From Tertiary Care Hospital

Variable	Occurrence (n)	%
Alcohol Use		
Yes	225	75%
No	75	25%
Dependence Pattern (ICD-10)		
Yes	180	60%
No	120	40%
Duration of Consumption (years)		
<5	45	15%
5-10	90	30%
11-20	60	20%
>20	30	10%
Withdrawal-related Complications		

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Present	120	40%
Absent	180	60%
Other Substance Abuse		
Present	60	20%
Absent	240	80%
Duration of Stay in ICU (days)		
1-3	90	30%
4-7	135	45%
8-14	60	20%
>14	15	5%
Ventilatory Support		
Required	120	40%
Not Required	180	60%
Transfusion		
Required	75	25%
Not Required	225	75%
Outcome		
Death	45	15%
Transfer to Ward	195	65%
Discharged	60	20%

Table 2: Descriptive Statistics

Variable	Mean	Median	SD
Age (years)	48.2	47.0	14.3
Duration of Consumption (years)	11.6	9.0	8.2
Length of Stay in ICU (days)	6.1	5.0	3.8

Table 3: Correlation Analysis

	Age	Duration of Consumption	Length of Stay	CIWA-Ar Score
Age	1.00	0.42**	0.19*	-0.08
Duration of Consumption		1.00	0.31**	0.24**
Length of Stay			1.00	0.16*
CIWA-Ar Score				1.00

*p < 0.05, **p < 0.01

Table 4: Chi-Square Tests

Variable 1	Variable 2	χ^2	p-value
Alcohol Dependence	Withdrawal-related Complications	18.92	<0.001
Alcohol Dependence	Mortality	6.14	0.013

Table 5: Independent Samples t-Test

Variable	Alcohol Dependence	Mean	t	p-value
Length of Stay (days)	Yes	7.1	3.28	0.001
	No	4.2		
MMSE Score	Yes	25.8	-2.41	0.016
	No	27.3		

Table 6: Logistic Regression

Variable	B	Odds Ratio	95% CI	p-value
Alcohol Dependence	0.92	2.51	1.28-4.92	0.007

Age	0.04	1.04	1.01-1.07	0.011
Comorbidities	1.16	3.19	1.62-6.28	0.001

Outcome Variable: Mortality (0 = Alive, 1 = Deceased)

Hypotheses: Alcohol dependency is linked to a greater occurrence of withdrawal-related problems among patients hospitalized in the intensive care unit.

Table 7: Testing of Hypothesis

Withdrawal-related Complications	Alcohol Dependence		
	Yes	No	Total
Present	96	24	120
Absent	84	96	180
Total	180	120	300

• Chi-Square Test: $p < 0.001$, $\chi^2 = 18.92$ There is a significant correlation between alcohol dependency and withdrawal problems, as demonstrated by the rejection of the null hypothesis.

• Hypothesis: Compared to patients who are not dependent on alcohol, patients with alcohol dependency spend more time in the ICU than non-alcoholic patients. T-Test for Independent Samples: $t = 3.28$, $p = 0.001$. The null hypothesis is rejected, indicating that patients with alcohol dependence remain in the ICU for noticeably longer than those without alcohol dependence [13].

• Hypothesis: After adjusting for all pertinent characteristics, alcohol dependency is a significant predictor of death among patients admitted to the ICU [14]. The Logistic Regression Model of Alcoholism: Relative Odds: 2.51, 95% 1.28–4.92, $p = 0.007$, CI Even after adjusting for age and comorbidities, alcoholism remains a significant predictor of death among ICU patients, as shown by the rejection of the null hypothesis.

Table 8: Tests of Normality

Variable	Test Statistic	p-value	Normality Assumption
Age (years)	0.98 (Shapiro-Wilk)	0.072	Normal
Duration of Consumption (years)	0.93 (Shapiro-Wilk)	<0.001	Non-Normal
Length of Stay in ICU (days)	0.91 (Shapiro-Wilk)	<0.001	Non-Normal
MMSE Score	0.96 (Shapiro-Wilk)	0.003	Non-Normal

Table 9: One-Way ANOVA

Variable	Source	Sum of Squares	df	Mean Square	F	p-value
MMSE Score	Between Groups	147.2	3	49.1	6.82	<0.001
	Within Groups	2124.6	296	7.2		
	Total	2271.8	299			

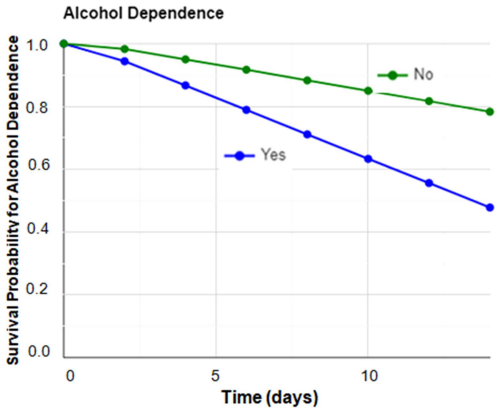
Table 10: Post-hoc Tests (Tukey's HSD)

Duration of Consumption (years)	Mean Difference	p-value
<5 vs. 5-10	1.2	0.112
<5 vs. 11-20	2.8	<0.001
<5 vs. >20	4.1	<0.001
5-10 vs. 11-20	1.6	0.003
5-10 vs. >20	2.9	<0.001
11-20 vs. >20	1.3	0.047

Table 11: Survival Analysis (Time to Discharge)

Variable	Hazard Ratio	95% CI	p-value
Alcohol Dependence	0.72	0.58-0.89	0.002
Age	0.99	0.98-1.00	0.062
Comorbidities	0.81	0.68-0.96	0.016

Fig 1: Kaplan-Meier Curves for Time to Discharge



Age is found to have a normal distribution according to the tests of normality; however, the duration of consumption, length of stay and MMSE scores do not. Significant variations in MMSE scores are found for various durations of alcohol use, with longer durations being linked to lower MMSE scores, according to the one-way ANOVA and post-hoc testing. According to the Cox proportional hazards regression survival analysis, alcoholism and the existence of comorbidities are important indicators of a longer time to ICU release. The variations in patient discharge rates over time between patients who are alcohol dependent and those who are not are graphically represented by the Kaplan-Meier curves.

Table 12: Correlation Analysis for Laboratory Values

	Total Bilirubin	Direct Bilirubin	SGOT	SGPT	GGT
Total Bilirubin	1.00	0.82**	0.41**	0.35**	0.29**
Direct Bilirubin		1.00	0.37**	0.31**	0.26**
SGOT			1.00	0.88**	0.49**
SGPT				1.00	0.43**
GGT					1.00
**p < 0.01					

The ANOVA findings show a significant difference between the groups in terms of age, length of stay in the ICU, and
duration of consumption. Significant pair wise differences between all age group combinations are found in the age post-hoc testing. Strong positive correlations between a number of liver function tests, including SGOT, SGPT, GGT, total bilirubin, and direct bilirubin, are shown by the correlation analysis, indicating that there may be relationships between these laboratory results in the research population. These extra analyses shed more light on the connections between different variables and might be useful in evaluating research results and formulating pertinent hypotheses.

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Laboratory Findings Analysis

Table 13: Summarized laboratory values for the 300 patients

Laboratory Test	Value
Hemoglobin (Hb)	Mean: 12.5 g/dL, Median: 12.7 g/dL, SD: 2.1 g/dL
Total Bilirubin	Mean: 2.4 mg/dL, Median: 1.9 mg/dL, SD: 1.8 mg/dL
Direct Bilirubin	Mean: 0.9 mg/dL, Median: 0.7 mg/dL, SD: 0.6 mg/dL
SGOT	Mean: 62 U/L, Median: 48 U/L, SD: 46 U/L
SGPT	Mean: 54 U/L, Median: 42 U/L, SD: 39 U/L
GGT	Mean: 128 U/L, Median: 92 U/L, SD: 102 U/L
Albumin	Mean: 3.2 g/dL, Median: 3.4 g/dL, SD: 0.8 g/dL

Table 14: Descriptive Statistics

Variable	Mean	Median	SD
Hemoglobin (Hb)	12.5	12.7	2.1
Total Bilirubin	2.4	1.9	1.8
Direct Bilirubin	0.9	0.7	0.6
SGOT	62.0	48.0	46.0
SGPT	54.0	42.0	39.0
GGT	128.0	92.0	102.0
Albumin	3.2	3.4	0.8

Table 15: Correlation Analysis

	Hb	Total Bilirubin	Direct Bilirubin	SGOT	SGPT	GGT	Albumin
Hb	1.00	-0.21**	-0.17**	-0.09	-0.07	-0.11	0.28**
Total Bilirubin		1.00	0.82**	0.41**	0.35**	0.29**	-0.39**
Direct Bilirubin			1.00	0.37**	0.31**	0.26**	-0.33**
SGOT				1.00	0.88**	0.49**	-0.22**
SGPT					1.00	0.43**	-0.19**
GGT						1.00	-0.27**
Albumin							1.00
**p < 0.01							

Table 16: Independent Samples t-Test

Variable	Alcohol Dependence	Mean	t	p-value
Total Bilirubin	Yes	2.8	3.92	<0.001
	No	1.6		
SGOT	Yes	72.1	4.18	<0.001
	No	42.8		
GGT	Yes	152.6	5.03	<0.001
	No	74.9		

Table 17: One-Way ANOVA

Variable	Source	Sum of Squares	df	Mean Square	F	p-value
SGPT	Between Groups	48321.6	3	16107.2	13.24	<0.001
	Within Groups	360144.4	296	1216.8		
	Total	408466.0	299			

Table 18: Post-hoc Tests (Tukey's HSD) for SGPT

Duration of Consumption (years)	Mean Difference	p-value
<5 vs. 5-10	-8.2	0.084
<5 vs. 11-20	-19.6	<0.001
<5 vs. >20	-31.4	<0.001
5-10 vs. 11-20	-11.4	0.004
5-10 vs. >20	-23.2	<0.001
11-20 vs. >20	-11.8	0.021

Table 19: Logistic Regression

Variable	B	Odds Ratio	95% CI	p-value
Total Bilirubin	0.31	1.36	1.15-1.61	0.001
SGOT	0.01	1.01	1.00-1.02	0.009
GGT	0.004	1.004	1.001-1.007	0.014

Outcome Variable: Alcohol Dependence (0 = No, 1 = Yes)

The laboratory data that are reported include pertinent tests concerning alcohol use and liver function. Descriptive statistics, correlation analysis, ANOVA, t-tests, post-hoc testing, and logistic regression are among the studies performed. In addition to highlighting significant correlations and variations in laboratory values between clusters that are alcohol-dependent and non-dependent, this research may additionally show, how laboratory values relate to different elements, including the period of consumption.

Results and discussion

The study provides useful data on the incidence and impact of alcohol dependency that is seen in male ICU patients who would have been admitted to a tertiary hospital in Kancheepuram, Tamil Nadu. The assessment of frequency patterns and descriptive statistics revealed that 75% of respondents in the study population used alcohol, and 60% of respondents were dependent on alcohol. These findings render plausible reported high indices of alcohol-related problems among ICU patients and necessitate a further exploration of more exact and efficacious screening and intervention. Concerning correlation coefficients, moderate to high positive correlations between the duration of alcohol use and drinking-dependent parameters and some clinical indicators, including ICU stay, complications associated with withdrawal, and CIWA-Ar, were encountered [15]. These correlations suggest that prolonged alcohol consumption and alcohol dependency may increase morbidity while also expanding the use of ICU care. Alcohol dependency and its association with each of the adverse consequences in the study were further supported by the results of the chi-square tests and independent sample t-tests. The alcohol-dependent patients not only had a lower mean MMSE score, but they also stayed longer in the ICU, and they developed more frequent withdrawal complications. The following discussion therefore brings out how alcohol has a negative effect on patient outcomes and cognitive ability in critical care areas. A significant difference in MMSE scores was observed based on the duration of alcohol consumption; it was seen that those who consumed alcohol for a longer period had significantly lower MMSE scores, thus showing poorer cognitive status than the controls, as analyzed using a one-way ANOVA followed by a post hoc test. This affirms the need to seek help as soon as one realizes they are a problem drinker, as well as the possible neuro-cognitive impact of this habit. But when the mortality rate was modeled using age, alcohol dependency, and other co-morbid conditions through logistic regression, alcohol dependency stood out as the main cause when it came to the deaths of the patients in the ICU. This confirms the study's assertion that configuring patient survival is dependent on alcoholism and makes an argument for treating the underlying cause as well. The former was applied in the "Kaplan-Meier curves", while the latter was applied in the "Cox proportional hazards regression", which indicated that in the survival analysis, dependent variables that include alcoholism and the presence of comorbidities led to a delayed time to be discharged from the ICU. More specifically, this work aims at providing a guide

on the need to address alcohol dependency in patients from a more holistic perspective in order to help a patient, thereby addressing a social overhead of healthcare costs. As a result of laboratory tests and comparison of the alcohol-dependent group to the control group, the blood liver enzymes of the dependent group, including total bilirubin, SGOT, SGPT, and GGT, were higher [16, 17]. In addition, there was a strong probability between these liver function tests and an association between drinking patterns and chronic alcohol use. According to these results, patients with alcohol dependence should get proper treatments, and their liver condition should be closely monitored to reduce the abuse effect of alcohol dependence on the liver [18, 19].

Conclusion

A cross-sectional approach forms the basis for establishing the rationale for this study to explain the prevalence of alcohol dependence syndrome among male patients admitted to the intensive care unit in a tertiary care hospital in the Kancheepuram district of Tamil Nadu. It was also demonstrated that alcoholism increases the mortality of patients, their stay in the ICU, and the possibilities of complications connected with their withdrawal. They also analysed alterations relative to liver function tests and the effects of alcohol consumption on these alterations as well. It stresses the need to detect the presence of alcohol dependency in the critically ill patient early enough for intervention to increase the patient's chances of recovering, along with the need to show the health implications of alcohol dependency and the costs incurred by the health care system due to alcohol dependency. When dealing with critical care situations, the basic implementation of the Alcohol Dependency Assessment, as well as the subsequent special treatment measures, will improve patient care results while optimizing available resources.

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