

Incidence and profile of neurological disorders in alcohol dependents

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Background: Alcohol is one of the most abused substances in the world. Alcohol has been known to produce toxic effects in almost every organ system in the body, many of these medical conditions can be attributed to the direct toxic effect of alcohol and its metabolites, whereas others are indirect sequelae that may result from nutritional deficiency particularly thiamine. A neurological complication of alcohol dependence is extremely common and affects every level of neuroaxis including the Brain-Peripheral nervous system-Muscle. **Aim & Objective:** To quantify the number of different neurological disorders in alcohol-dependent patients and to the established relationship between the frequency of these disorders with type, duration, amount, and frequency of alcohol intake. **Method & Material:** A cross-sectional study was conducted in 100 alcoholics who came to tertiary care centers of central India in the 1-year duration. Demographic data, questions related to their alcohol consumption, and Neurological examination of all patients were done as pre-decided protocol. Informed consent was obtained from all patients. Data was entered and analyzed using appropriate software. **Result:** Study participants were mostly (70%) in the age group of 21 to 40 years, 87% resided in the urban area, 81% were Hindu. 78% were educated up to class 8th and 76% were employed with any kind of jobs. There were 64% of cases that had any kind of neurological manifestation, 20% had peripheral neuropathy and less than 10% has severe manifestation Korsakoff's psychosis, and cerebellar degeneration. **Conclusion:** Neurological manifestations were common among alcohol dependents, but it variably depends on the amount, pattern, chronicity, and type of alcohol consumption. There is a need for further studies that specifically point out alcohol-related nervous manifestations.

Keywords: Alcohol, Neurological manifestations, Peripheral Neuropathy, Korsakoff's Psychosis

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Introduction

The term alcohol refers to 'ethyl alcohol'. The quantity differs among the types of alcoholic beverages. The most-commonly used alcoholic beverages are beer, wine, whiskey, rum, vodka, gin, and brandy and locally brewed beverages like arrack and toddy [1]. Alcohol consumption becomes a problem when the individual engages in problematic drinking pattern that puts him at the risk of developing adverse health events. The pattern of drinking started from social drinking to binge drinking that unknowingly leads to harmful to hazardous drinking that ultimately leads to alcohol dependence [1,2]. When alcoholic beverages are consumed, alcohol gets absorbed from the stomach and small intestine. It is distributed through blood circulation to every organ in the body. The alcohol gets absorbed by the liver at a rapid pace and excreted through the kidneys, which accounts for 95% to 98% of the alcohol consumed [3]. In a study done by Gururaj et al [4], it was concluded that, because of the increase in the alcohol consumption occurring all over the country, the hospital admission rates because of alcohol consumption were also increasing with 20% to 30% of admissions because of direct or indirect problems caused because of alcohol consumption. Alcohol consumption not only affects the individuals but also his family members get affected in one way or the other. The person in an intoxicated state may indulge in domestic violence with his family members; may exhaust the savings of the family, which can negatively affect the education of his children, and the children of alcoholic fathers will have strained relationship with their family members, which can affect their psychological wellbeing [5,6]. The economic impact of alcohol consumption plays a major role in families belonging to lower socioeconomic strata. It was found that alcohol-dependent persons spent more money than they earned, they were forced to take loans to spend for their expenses related to alcohol consumption, on an average, 12.2 working days were lost to the habit and around 60% of the families were financially supported by the income from other family members [8-10]. Although the prohibition of alcohol use is encouraged in the constitution of India, alcohol policy is a state subject. States are having full control of alcohol-related legislation, excise rates, and the production, distribution, and sale of alcohol [7,11,12]. Alcohol has been known to produce toxic effects in almost

Every organ system in the body, many of these medical conditions can be attributed to the direct toxic effect of alcohol and its metabolites, whereas others are indirect sequelae that may result from nutritional deficiency particularly thiamine [11-12]. Physiological dependence on alcohol is indicated by evidence of tolerance and symptom of withdrawal. Alcohol consumption causes various problems related to different body systems. The main systems which are affected by this are gastrointestinal system, genitourinary system, and muscular system [13-16]. Neurological and psychiatric complication of alcohol dependence is extremely common and affect every level of neuraxis including Brain-Peripheral nervous system-Muscle. Intoxication results from the acute pharmacological effect of alcohol and enhancement of neurotransmission in the γ aminobutyric acid system. The short-term effects of alcohol consumption that can get relieved after stopping alcohol consumption include blackouts, blurred vision, impaired memory, and slower reaction times [17-18]. In a study done by Peng et al [19], it was found that chronic alcohol use can lead to the development of alcoholic tremors, myopathy, Wernicke's encephalopathy, and cerebellar degeneration [19]. With this background, this study aims to quantify different neurological disorders in alcohol-dependent patients and their clinical profile, relationship with type, duration, amount, and frequency of alcohol intake.

Material and method

Setting: Tertiary care center located in central India.

Type and duration of study- Cross-sectional Study conducted from March 2018 to February 2019.

Sampling Methods: Patients were selected randomly without any bias for age, sex, religion, and type of alcohol consumption.

Sample Size calculation: This study included 100 patients of alcohol dependence. All the patients coming in the center must be included based on inclusion criteria.

Inclusion criteria: All patients who gave informed consent to participate were included in the study.

Exclusion criteria: The alcoholics previously diagnosed and on treatment from the current institute were excluded.

Data collection procedure: Criteria for alcohol dependence are according to DSM- IV. The presence

Or absence of neurological disorders in a subject was determined by a special questionnaire and physical examination. While registering the patient-specific inquiries were made about occupation, education, monthly income, and family history. Patients were also classified into various socioeconomic statuses based on the BG Prasad method of social classification. It is difficult to measure the alcohol intake in Indians because of the type and the alcohol content present in them.

Study Procedure: Scores were constructed based on attributes of type, quantity, frequency and duration of alcohol intake based on alcohol consumption of subject [20] Inquiries were made from the subjects and their family members about their diet and regarding different type of food consumed. Assessment of the nutritional status of the patient was done by measuring weight and height and body mass index (BMI) was calculated. CAGE scoring was done in every patient as a screening test for alcoholism and a score of more than one was considered diagnostic for alcoholism. After getting a detailed history, patients were examined in detail with special stress on nutrition. Subjective symptoms of peripheral neuropathy like tingling, paresthesias, numbness, and atrophy were noted. the diagnosis of alcoholic peripheral neuropathy was made in the presence of impaired ankle jerk and vibration sense. Patients were also examined for cerebellar signs by Romberg test, difficulty in tandem walking, etc. in absence of peripheral neuropathy patients having positive cerebellar signs were considered to have cerebellar degeneration. Patients were also examined for other system abnormality and routine laboratory investigation were also done

Ethical consideration and Permission: Written informed consent were obtained from all participants and this study was approved by the institutional ethical committee.

Statistical Analysis: All data was entered in Microsoft office excel and presented in the form of frequency and percentage.

Results

This study was conducted in 100 alcohol-dependent cases to quantify various neurological disorders in them. In this study, all participants were Males. The patients are from different age groups, 70 (70%) patients were from the age group of 21 to 40 years, 21% of patients were in the 41-50 age group, and

Table-1: Demographic data of all patients (n=100).

	Variable	Frequency (Percentage)
Age Group	<20 years	4 (4%)
	21-30 years	31 (31%)
	31-40 years	39 (39%)
	41-50 years	21 (21%)
	>50 years	5 (5%)
Sex	Male	100 (100%)
	Female	0
Area	Rural	13 (13%)
	Urban	87 (87%)
Marital Status	Married	62 (62%)
	Unmarried	38 (38%)
Religion	Hindu	81 (81%)
	Muslim	4 (4%)
	Other	15 (15%)
Education Status	Uneducated	08 (08%)
	Up to Primary Level	33 (33%)
	Up to Secondary Level	38 (38%)
	Up to High School Level	15 (15%)
	Higher secondary & Above	06 (06%)
Employment Status	Employed	76 (76%)
	Unemployed	24 (24%)
Type of Liquor consumed	Country	68 (68%)
	Foreign	32 (32%)
Hunger in last 3 month due to lack of money	Yes	06 (06%)
	No	94 (94%)
Frequency of Alcohol Consumption	Monthly or less than monthly	20 (20%)
	2 to 4 times in a month	37 (37%)
	2 to 3 times in a week	16 (16%)
	4 to 5 times in a week	27 (27%)
Frequency of Heavy drinking	Never	26 (26%)
	Less than monthly	19 (19%)
	Monthly	14 (14%)
	Weekly	20 (20%)
	Daily	21 (21%)

Only 5% of patients in the age group of > 50 years. 87% of patients have resided in the urban area and 62 (62%) were married. 81% patients were Hindu by religion, 4 (4%) were Muslim and 15% were from other religion especially of Christians community. 8 patients were uneducated, 33%

Educated up to primary level, 38% educated up to secondary level and only 6% were educated more than higher secondary. 76% were employed with any kind of job and 24% were unemployed. 53% of patients had body mass index (BMI) less than 18.5, 31% had normal BMI 18.5 – 24.9, and 16% had a BMI of more than 25. According to BG Prasad classification, 16% of patients belong to Class I, 36% in Class II, 42% in Class III, 6% in Class IV socio-economic Status. In this study, 6(6%) patients suffered from hunger in the last 3 months due to a lack of money. 20 (20%) Patients had the frequency of alcohol intake monthly and less than monthly while 27% of patients had 4 to 5 times in a week and 16% of patients were taking 2 to 3 times a week. When we asked about the frequency of heavy drinking 26 (26%) patients never had an episode of heavy drinking while 19 (19%) had less than monthly, 14 (14%) monthly, 20 (20%) weekly and 21 (21%) had a daily episode of heavy drinking. 68% of patients drunk country liquor while 32% of patients frequently drunk with foreign liquor like Rum or Whiskey. The incidence of neurological disorders showed a positive correlation with the frequency and quantity of alcohol intake and there was a negative correlation between body mass index and frequency of neurological disorders. CAGE scoring was the most efficient screening test for the development of alcohol-related problems. Maximum 46% patient had CAGE score 3. In the present study of cases, 64 cases were found to have neurological involvement comprising of peripheral neuropathy 20 (20%), hand tremor 16 (16%), hallucinations 14 (14%), delirium tremens 14 (14%), withdrawal seizure 10 (10%), blackouts 12 (12%), dementia 4 (4%), Korsakoff’s psychosis 4 (4%), & cerebellar degeneration 6 (6%). Most of the patients had more than one manifestation among the withdrawal syndrome, insomnia was the most common (50% cases). The peripheral neuropathy included mostly tingling and numbness which presents in 80% cases. The most common sensory disturbance was the loss of vibration sense in 20% cases. 20% of cases had objective evidence of peripheral neuropathy with diminished or absent ankle jerk being the most consistent finding, and distal sensory-motor neuropathy was the single most common type, present in 20% cases. Patients were classified according to their alcohol intake status based on the scoring system of alcohol consumption of subjects [20]. The majority (74%) of patients had heavy alcohol consumption (score of 10-12) while 26% had moderate alcohol consumption (score 4-8), and there was a positive correlation

Between the severity of alcohol intake and frequency neurological disorders. ($r = 0.447$, $p < 0.001$ is highly significant) (Table 2).

Table-2: Distribution of different neurological problems among patients (n=100).

Neurological Problems	Frequency (Percentage)
Peripheral Neuropathy	20 (20%)
Hand Tremor	16 (16%)
Hallucinations	14 (14%)
Delirium Tremens	14 (14%)
Withdrawal Seizure	10 (10%)
Blackouts	12 (12%)
Dementia	04 (04%)
Korsakoff's Psychosis	04 (04%)
Cerebellar degeneration	06 (06%)

Mean quantity of alcohol consumption inpatient with the neurological disorder was 413.89 ml (t -value = 3.782 and p -value < 0.0001 which is highly significant) and showed a positive correlation between the quantity of alcohol consumption & the presence of neurological disorder and mean frequency of alcohol intake in patients with the neurological disorder was 23.61 days as compared to patients without the neurological disorder (16.56 days) (t value = 3.244 and p -value < 0.0025 which is significant).

Discussions

The present study was conducted in 100 alcohol-dependent patients admitted to a tertiary care center of central India. This study had the aim to quantify the occurrence of various neurological symptoms in these alcohols dependent and relate these symptoms with various factors. Alcohol drinking not only affects its health but also causes many social problems. Alcohol drinking increased in a tremendous way in the last two decades. The Problem is also depending on the quantity of drinking, the pattern of consumption (frequency of use, drinking to intoxication, binge drinking, chronic use). The bulk of neuro-positive case in this study comprised of relatively benign and minor illnesses like headache, giddiness mild peripheral neuropathy, cramps, and withdrawal symptoms, etc. severe disabling symptoms and major or specific neurological disease were uncommon. In this study all patients were male, alcohol dependence was not found in any female patients. This shows the greater prevalence of alcohol abuse in males, this is also due to the lower prevalence of alcohol drinking in females and particularly females of the low socio-

Economic group which constitutes major parts of admission in our hospital, also socio-cultural factors inhibit them from reporting this in the hospital. All most all studies showed similar results [21-27]. This study showed most patients (70%) belong to the age group of 21-40 years and only 5% belong to age more than 55 years. Studies done in various parts of the country showed a similar kind of results [9,10,17,18]. The majority of patients 87% belong to the urban area. This percentage ranges from 20 to 40 % in various studies [28-29]. Some studies showed that chronic health problems are more common in rural areas while alcohol intoxication is more common in the urban population [3]. The overall percentage of alcoholics affected with neurological disorders was 64%. The most common neurological derangement was peripheral neuropathy which was present in 20% of cases. A similar result was observed in various studies. Peripheral neuropathy was the most common and earliest kind of disorder present in alcoholics. The severity of this disease may depend on the amount, pattern, and chronicity of alcohol drinking [30-35]. Other neurological disorders are also reported in this study. There are fewer studies related to alcohol-related neurological disorders, most of the studies are on the prevalence and pattern of alcohol consumption [36-37]. These alcohol-dependent patients first came in contact with primary level health workers or physicians so initial interventions could take place at this level. There should be the availability of screening of these patients at primary and secondary level health facilities. Also, all health workers should be trained in screening and primary management of these patients. Counseling place an important role in the diagnosis and management of these patients. If necessary, then these patients should be referred to a higher facility for further care and management. This field also needs broad programmatic management and a National health program/policy with specific objectives like alcohol control, production, and promotion policy. In developing countries like India, Multicentric community-based research studies must be conducted at a regular interval to understand the problem in a better way. Our society needed a sensitization program and health education campaign related to the consequences of chronic alcoholism. The major limitation of this study was that it is an institution-based study, not a community-based study and the sample size is small. A larger community-based survey will give a better result about commoner or rarer type neurological disorder.

Conclusion

The conclusions derived from the observations made are summarized as follows-all patients were male and most of the patients were in the age group of 36-45 years and most of the patients belong to low socioeconomic status, 68% of patients consumed country liquor and 24% were consuming whiskey, rum, etc. Peripheral neuropathy is a common neurological manifestation related to alcohol disorders, but another kind of manifestation is also reported. Alcoholics of this study had low literacy levels, low BMI levels, and belong to low socioeconomic status. Several studies in various parts of the country showed similar results. Many times, due to chronic alcoholism, this will lead to a downgrading of their socio-economic status. So Many factors like age, sex, initiation of drinking, Status of living, education, influences, and social life may affect drinking patterns.

What does the study add to the existing knowledge

This study showed that neurological complications are common among chronic alcoholics and there is better management is possible only when the early diagnosis of these disorders could be done. Early diagnosis is possible only when these diagnosis facilities were provided at the farthest point of the community.

Author's contribution

Dr. Vijay Singh Baghel: Concept, study design **Dr. Vasant Shrivastava:** Data analysis, manuscript preparation

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