

Original research article

A Prospective Study on Cognitive Dysfunction in Abstinent Alcohol Dependent Patients

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Abstract

Introduction: Alcohol is the world's oldest known drug. Drinking alcohol and related beverages in social gatherings is a common feature in many parts of the world and in some parts of the world drinking alcohol is a part of cultures and societies.

Materials and Methods: The study sample included 74 eligible alcohol dependent male patients. 26 patients out of the study sample were patients who were admitted in Pondicherry Institute of Medical Sciences, Puducherry. 48 patients were recruited from TTK Hospital, Chennai. The study period was from October 2008 to March 2010

Result: The patients had overall average cognition and intelligence score. Duration of abstinence had an effect on visuo-spatial and perception skills, intelligence scores and some of WCST scores. The global cognitive profile as measured by MMSE was predicted by age of the patient, age at first use of alcohol and duration of use of alcohol. It was established that starting alcohol consumption at a younger age would result in cognitive problems and the odds was 33% higher compared to people who started drinking in the recent past. Unskilled workers had more deficits in visuospatial coordination and perception skills compared to people in the other working category.

Conclusions: In the study it was found that compared to the higher years of dependence, people with lower years of dependence had more correct responses in WCST test.

Key words: Alcohol, dependence, drug

Introduction

Alcohol use is a major public health problem in different geographic settings in India and has been shown that many of the drinking patterns are detrimental to health and potentially cause harm, both immediately and on a long-term [1]. Alcohol is the world's oldest known drug. Drinking alcohol and related beverages in social gatherings is a common feature in many parts of the world and in some parts of the world drinking alcohol is a part of cultures and societies. The effects that alcohol can have on an individual, one's family and one's society are plenty.

30% of men and less than 2% of women consume alcohol in India and the average age at which drinking initiation occurs has reduced from 28 years in the 80s to 20 years in the recent years^[2]. The amount of drinking increases with age and duration. Alcohol accounts for 15-20% of premature mortality in adult men. 25% of those hospitalized with stroke had long term alcohol use. The rate of abstainers among the adult population in India in 2000-2001 is 79.1% (Males 67.1% and Females 89.1%) from the regional survey done as part of National Family Health Survey. But still every year there is a steady rise in alcohol consumption in most of the countries in the world including India. Sales of alcohol have seen a growth rate of 8% in the past 3 years in India and 21% of adult men and around 2% of women drink^[3]. The harmful use of alcohol is one of the most important risks to health and the leading risk factor for many diseases in developing countries according to the World Health Report 2002. Alcohol consumption poses risk of adverse health and social consequences due to the intoxicating, toxic and dependence-producing properties of alcohol. Alcohol at moderate levels has some positive and negative effects on health. Health professionals agree on the fact that every organ in the human body can get affected with alcohol. A meta-analysis showed that alcohol is linked with 60 disease conditions^[4]. Alcohol consumption has negative effects like increased risk of liver diseases such as cirrhosis and cancers like esophageal cancer and pancreatitis. Chronic alcohol misuse and abuse has serious effects on physical and mental health of a person. This can even lead to different neuropsychiatric impairment, cardiovascular disease, liver disease, and strokes^[5,6]. There are several psychiatric disorders associated with alcoholism which includes depression, dysthymia, mania, hypomania, panic disorder, phobias, generalized anxiety disorder, personality disorders, schizophrenia and suicide. Apart from chronic diseases that may develop in those who drink large amounts of alcohol over a number of years, alcohol use is also associated with an increased risk of acute health conditions, such as injuries, including from traffic accidents. Social problems associated with alcohol use like traffic accidents, workplace-related problems, family and domestic problems, and interpersonal violence affects the drinker, the drinker's environment and the society as a whole^[7]. Alcohol is one of the leading causes of death and disability globally and recognized risk factor for ill-health. About two billion people worldwide consume alcoholic beverages and one-third (nearly 76.3 million) is likely to have one or more diagnosable alcohol use disorders^[8]. Worldwide alcohol causes 2.5 million deaths (3.8 % of total) and 69.4 million (4.5 % of total) of Disability-Adjusted Life Years (DALYs). 3.2% of all deaths are attributed to alcohol and results in a loss of 4% of total DALYs (58 million)^[9]. Countries which had low alcohol consumption levels are now reported to have an increasing consumption pattern^[8]. WHO estimates for the South East Asian countries indicate that one-fourth to one-third of male population drink alcohol^[2] with increasing trend among women^[10].

Materials and Methods:

The study sample included 74 eligible alcohol dependent male patients. 26 patients out of the study sample were patients who were admitted in Pondicherry Institute of Medical Sciences, Puducherry. 48 patients were recruited from TTK Hospital, Chennai. The study period was from October 2008 to March 2010.

Method of selection:

All alcohol dependent patients who fulfilled the inclusion criteria were included in the study. Physical examinations including detailed neurological examination and routine laboratory investigations were done at the time of admission. Patients were explained about the study in their regional language. Written informed consent was taken prior to the recruitment of the persons.

Inclusion criteria:

- Age between 18-60 years
- Patients who fulfill DSM IV TR criteria for alcohol dependence
- Patients who have studied at least up to 8th standard in school

Exclusion criteria:

- Patients with psychiatric comorbidity other than nicotine use
- Patients with pre-existing neurological disorders
- Patients with gross visual and hearing impairment

Data analysis:

The collected data was coded and entered into a excel spread sheet. Data distributions were examined and analyzed using descriptive statistics such as frequencies, means and standard deviation. Chi square tests were done to see if the socio-demographic variables and drinking parameters were associated. Bivariate correlation analysis using the Pearson's correlation coefficient was used to find out significant correlations of neuropsychological tests and socioeconomic and drinking variables.

Results

A total of 74 patients were identified for the study purpose. All the study subjects were male. Statistical tests were applied to see if the sample from both centres were different. The participants from both the centres did not show any significant statistical differences with respect to their demographic characteristics and drinking patterns (Table 5.1). None of the variables showed a significant difference in the basic parameters which meant that the participants could be analysed together as one sample.

Table 1: Mean of demographic and drinking variables of both centres:

Exam sites	PIMS (N=26)	TTK (N=48)	X ² , P
Age	39.8	37.6	X ² =1.8, P=0.62
Education	9.3	12.4	X ² =1.03, P = 0.072
Age at first use	22.3	20.8	X ² =28.90, P = 0.071
Duration of use	16.3	16.3	X ² =2.66, P=0.265
Duration of dependence	4.6	3.1	X ² =16.08, P= 0.065

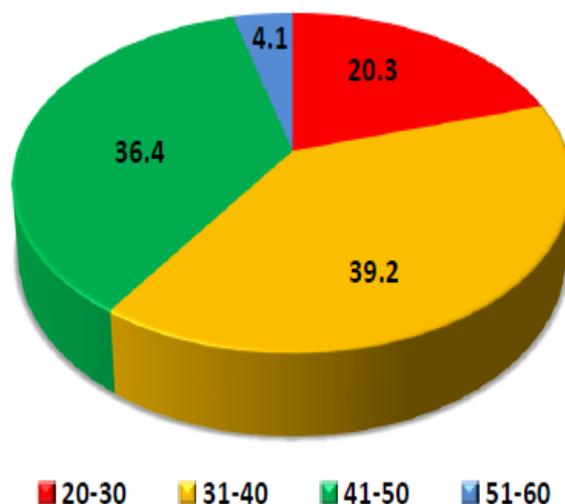
Demographic characteristics and drinking patterns of the participants:

Table 2: presents demographic and alcohol use variables for all participants. The variables are represented in mean and standard deviation. The mean age of the participants was 38.4 years, mean education was 11.3 years of education and the mean age at first use of alcohol was 21.3 years. Duration of use of alcohol was 16.3 years Patients had been alcohol-dependent for an average of 3.6 ± 2.4 years with durations of dependence between 1 and 11 years.

Table 2: Mean, standard deviation and range of demographic and drinking parameters:

Variables	Abstinent alcoholics	Range
Demographic variables		
Age	38.4 ± 8.5	20-59
Years of Education	11.3 ± 3.5	2-20
Alcohol use variables		
Duration of use (years)	16.3 ± 7.1	2-38
Duration of dependence (years)	3.6 ± 2.4	1-11
Age at first use	21.3 ± 6.4	12-50

Age category: Figure 1 shows the age distribution of patients who participated in the study. 80% were more than age 30. 20% were younger group (20-30). 75.7% constituted 30-40 year old group. The age group above 50 years constituted only 4%.

Figure 1: Percentage distribution of age categories of participants

Types of Alcohol

The common type of drink consumed was brandy. About 50% of the people consumed brandy on a daily basis. Whisky and rum contributed together 30% of the drinking. More than 60% of the patients consumed multiple types of drink. 40% of the people consumed one type of drink, in that 90% consumed brandy and 10% consumed locally made drink like toddy or arrack

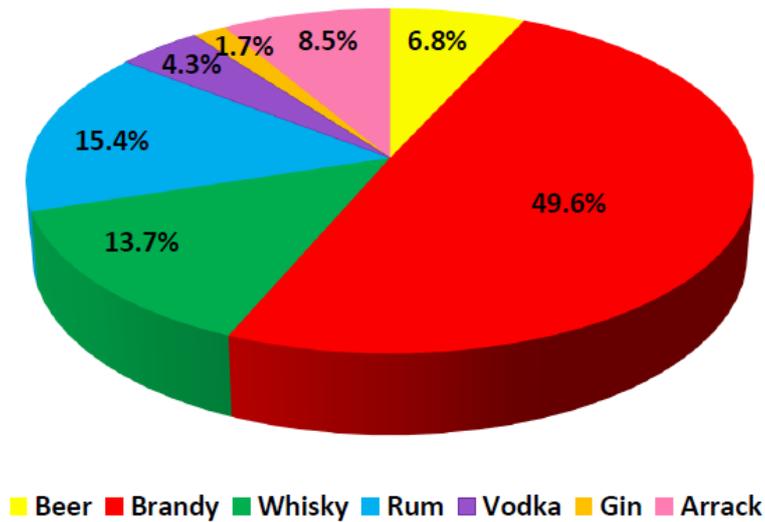
Figure 2: Distribution of type of alcohol consumed**Neuropsychological tests (BGT):**

Table 3: represents BGT test responses. The prevalence of inadequate visuo-motor and perception skills was 10.8%. 89.2% had adequate visuo-spatial function. 87.8% had average recall memory and 12.2% had below average recall memory

Table 3: Percentage distribution of BGT score:

BGT	N	Percent
Adequate	66	89.2%
Inadequate	8	10.8%
<u>BGT-recall</u>		
Average	65	87.8%
Below average	9	12.2%

Mean and standard deviation of other neuropsychological tests (MMSE, Bhatia, WMS):

The table 4: represents mean and standard deviation of tests MMSE, Bhatia test and WMS. The mean global cognitive function score was 29. This shows overall cognition was above average. Prevalence of below average global cognitive function was 9.5% (Mean=23.2, CI=21.3, 25.3). Over all mean score of intelligent quotient were 95.8 which shows that overall intelligent score was average. Prevalence of borderline intelligence score was 21.6% (Mean=76.1, CI=72.9, 78.3). Overall mean memory quotient was 88.5 which shows that the memory quotient of the patients were average. Prevalence of borderline memory quotient score was 37.8% (Mean 32.5, CI=32.2, 39.2).

Table 4: Mean and standard deviation and category percentage of neuropsychological tests:

Test scores	Mean (SD)(%)	Range
MMSE	29.0 (1.9)	18-30
Average	90.5%	
Below average	9.5%	
Bhatia (IQ)	95.8 (14.5)	70-130
Borderline	21.6%	
Average	78.4%	
WMS (MQ)	88.5 (10.5)	66-108
Borderline	37.8%	
Average	62.2%	

Mean and standard deviation of WCST variables:

Table 5: shows the mean and standard deviation of WCST variables. The WCST shows the mean percent of correct responses was 69.1%. The mean percent of errors was 35%. Perseverative response was 21.2%, perseverative errors were 18.9%, and conceptual errors were 53.4%.

Table 5: Mean, standard deviation and range of WCST parameters:

Variables	Mean	SD	Range
Errors	41.1	25.0	2 - 106
Perseverative response	24.2	17.9	2 - 81
Perseverative error	22.2	15.5	2 - 68
Non perseverative error	20.5	16.5	2 - 76
Conceptual level responses	55.8	19.6	3 - 88
Trials correct	69.1	14.5	22- 98

Discussion

Alcohol is one of the recognized risk factors for ill-health ^[12]. Alcohol consumption causes socio-economic impact and other public health problems. Studies on alcohol in India varied in their methodology and used different definitions for alcohol use. There are variations in the instruments, methods and definitions usage in different studies conducted in India about alcohol usage, abuse, dependence and the cognition involved with that. The current study gave a chance to study the cognitive profile of alcoholic dependent patients of Pondicherry and Chennai. Some of the cognitive deficits found in the study were associated with socio-economic parameters and alcohol consumption patterns. Our study evaluated the performance

of abstinent alcohol dependents in neurocognitive domains such as intelligence, visuo-motor skills and perception and recall, memory and other cognitive skills by means of neuropsychological tests like BGT, MMSE, Bhatia revised short battery, WMS and WCST. In our study some of the factors showed cognitive impairment. The age at initiation of alcohol consumption is very important in deciding policies. One third of the patients in the current study started alcohol consumption at early ages. This is consistent with some studies in India. WHO's report on global status on alcohol consumption showed that the average age of initiation has reduced from 28 years during the 1980s to 20 years in the recent times^[12]. The age at which consumption of alcohol starts thus has reduced over the years in India^[11]. Type of alcohol consumed is another major factor which has public health impact. About 80% of alcohol consumption in India is in the form of hard liquor or distilled spirits showing that the majority drink beverages with a high concentration of alcohol^[11]. In the current study also hard liquors seem to be preferred drink amongst types of drink with majority consuming single types of alcohol. Early identification of the dysfunctions would provide considerable benefit to the patients and suggest ways to coping with the dysfunctions. There were no significant differences between the participants from the two study sites. The study helped to assess multiple neuropsychological domains on the same sample. The study could administer WCST which has not been widely used in India. The limitation of the study was that there was no follow up of the patients and there were no controls

Conclusion

The study looked at cognitive deficits in alcohol dependent persons in two centres in Pondicherry and Chennai. The study sample included 74 subjects who fulfilled DSM IV-TR criteria for alcohol dependence. The study was descriptive in its design. In the study it was found that compared to the higher years of dependence, people with lower years of dependence had more correct responses in WCST test. Further the percentage of errors and perseverative responses were more in people who had less years of education compared to higher years of education. There was negative correlation between intelligence quotient and duration of dependence.

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