

## A study of executive function deficits in the cases with alcohol dependence syndrome

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### ABSTRACT

**Background:** Alcohol dependence is a chronic and progressive condition associated with symptoms such as uncontrollable craving as well as repeated use of alcohol. Many studies point out that, alcohol dependence result in impaired executive functioning such as response inhibition, problems of attention, decision-making, problem solving, abstract reasoning and set shifting. The present study was to find out that the alcohol dependence patients showed deficits on executive functioning in comparison to normal control subjects on Wisconsin card sorting test as well as in Comprehensive Trail-making test. **Aim:** Present study has been undertaken to compare the executive functioning deficits between the alcohol dependence and normal control. **Methodology:** Present research is a hospital-based group design with total 60 participants. Out of these 60 participants, 30 participants were of alcohol dependence syndrome taken from RINPAS, Kanke, Ranchi and 30 participants were normal control subjects. **Tools:** Socio-demographic details have been gathered with the help of socio-demographic data sheet. General Health Questionnaire (GHQ) has been used as a screening tool for normal control subjects. Wisconsin card sorting test and Comprehensive Trail-making test have been administered to measure executive functioning of the all the subjects. **Result and Conclusion:** The present study findings concluded that alcohol dependence patients showed executive functioning deficits in comparison to normal control subjects on Wisconsin card sorting test. Furthermore, in comprehensive Trail-making test patients with alcohol dependent syndrome exhibited more number of trials, less number of correct responses, more mistakes and low conceptual level responses as well high errors when compared with the normal control group.

**Keywords:** *Executive Function Deficits, Alcohol Dependence and Normal.*

Executive functioning is a theoretical construct representing a domain of cognitive processes that regulate, control and manage other cognitive processes (Elliott, 2003). The harmful effects of chronic alcohol consumption on the brain and executive as well as cognitive functioning have been well described in the literature over recent decades. Cognitive impairments observed in alcohol-dependent patients without any other neurological complications are increasingly becoming the focus of attention of clinical

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professionals due to their impact on the individual's overall life as well as his/her family. These impairments may vary from mild, moderate to severe but usually remain undiagnosed due to various reasons mainly the unwillingness of the individual himself/herself. However, detailed neuropsychological assessment or screening of these cognitive impairments appears to be fundamental to help such patients with management strategies.

### **METHODOLOGY**

**Aim:** Present study has been undertaken with the aim to assess executive functioning in the cases with alcohol dependence and its comparison with normal control subjects.

#### *Objectives*

**The objectives of the study were as followed:**

- To compare the executive functioning in patients with alcohol dependence and normal control group on Wisconsin Card Sorting Test.
- To compare the executive functioning in patients with alcohol dependence and normal control group on Comprehensive Trail-Making Test.

#### *Sample*

Present research is hospital-based group design comprised of 60 participants. Out of which 30 patients were of alcohol dependence syndrome taken from inpatient department of RINPAS, Kanke, Ranchi and 30 normal control subjects from Ranchi district.

#### *Tools used*

**The following tools were used for data collection:**

1. Socio Demographic and Clinical Data Sheet.
2. General Health Questionnaire (GHQ- 12), Goldberg and Williams (1988)
3. Wisconsin Card Sorting Test, Heaton et al., (1993).
4. Comprehensive Trail-Making Test, Reynolds (2002)

#### *Description of the tools*

- 1. Social Demographic Scale:** The data sheet was specifically designed to record relevant details of each case. It has included information like age, sex, education, marital status, occupation, age of onset, duration of illness, number of admission and treatment history etc.
- 2. General Health Questionnaire (GHQ- 12):** The General Health Questionnaire developed by Goldberg and Williams in 1988 has been used. It is 12 items questionnaires. It is four point scale and scored as 0-0-0-1 the cut off score is >3 is used to identify the psychologically healthy person. It is avidly used to screen for the absence of psychiatric distress. The purpose was Applying GHQ- 12 is to screening psychiatric disorders among the normal control subjects. Reliability coefficient of the questionnaire ranged from 0.78 to 0.95 in different methods.
- 3. Wisconsin Card Sorting Test (WCST) (Heaton et al, 1993):** This is one of the most distinguished neuropsychological tests developed to assess abstract reasoning, cognitive flexibility, perseveration, problem solving, conceptualization, changing the set, ability to test the hypothesis and using feedback, task start and stop strategy and sustainable attentiveness. The WCST allows the clinician to assess the following "frontal" lobe functions: strategic planning, organized searching, utilizing environmental feedback to shift cognitive sets, directing behaviour toward achieving a goal, and modulating impulsive responding. The test is administered to those 6.5 years to 89 years of age (Berg, 1948; Monchi et al, 2001).

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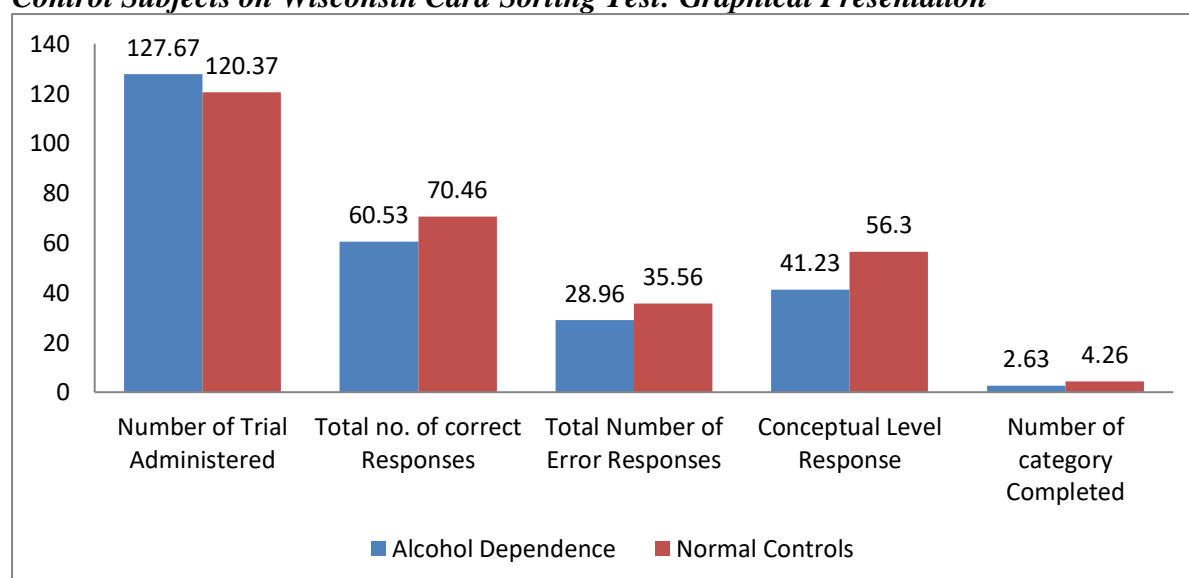
4. **Comprehensive Trail Making Test:** The CTMT is developed by Reynolds in 2002. The CTMT comprises a standardized set of five visual search and sequencing tasks that are heavily influenced by attention, concentration, resistance to distraction and cognitive flexibility (or set shifting), into more obvious visual search and sequencing demands of the tasks. The basic tasks of trail making, and thus of CTMT, is to connect a series of stimuli (numbers, expressed as numerals or in word form, and letters) in a specified order. The CTMT is made up of a standardized set of five "visual search and sequencing tasks" that are influenced by attention, concentration, resistance to distraction, and cognitive flexibility. These tasks are referred to as trail making. Reliability of scores for each individual trail is high and the composite score has a reliability coefficient of .90 or higher.

### Procedure

In this present study 60 participants who were meeting the inclusion and exclusion criterion were selected through purposive sampling technique. Out of these 60 participants, 30 participants were alcohol dependence and 30 were normal controls. ADS patients were selected from the inpatient department of Ranchi Institute of Neuro-Psychiatry and Allied Sciences, Kanke, Ranchi and normal controls were selected from different locality of Ranchi. After the selection of participants detailed socio demographic data was collected from all participants by using Socio-demographic and clinical data sheet. Normal control subjects were administered GHQ for screening of psychiatric problems if any. Thereafter, Wisconsin Card Sorting Test and Comprehensive Trail-Making Test were administered on both the group of subjects.

## RESULT

**Figure 1: Performance of the Cases with Alcohol Dependence Syndrome and Normal Control Subjects on Wisconsin Card Sorting Test: Graphical Presentation**

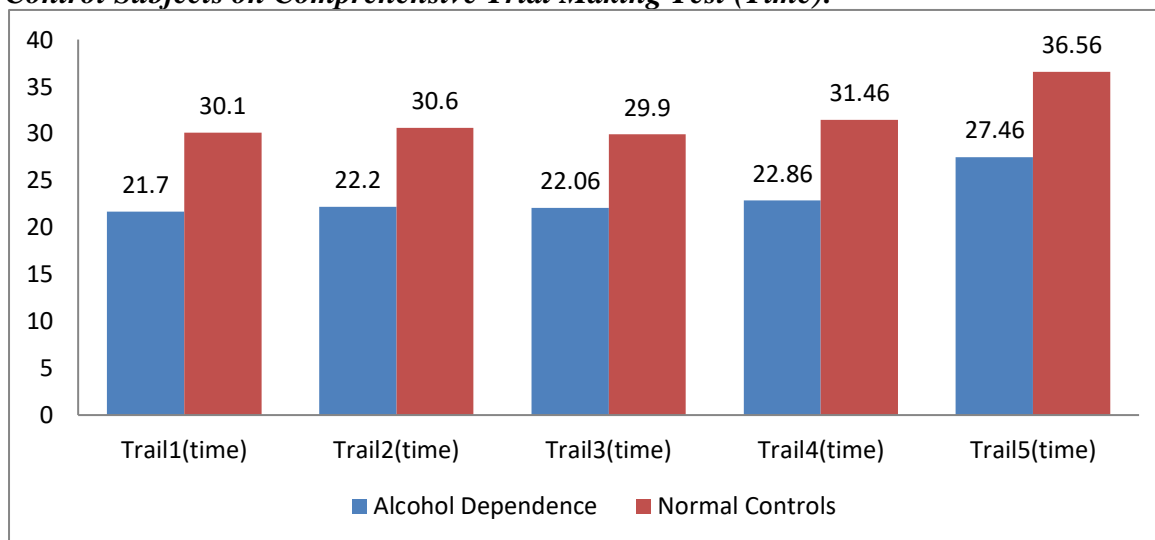


**Figure 1:** The present study demonstrates that cases with alcohol dependence syndrome showed deficits in their executive functioning on Wisconsin Card Sorting Test in comparison to normal control subjects. Patients with alcohol dependent syndrome exhibited impairments in terms of using more number of trials, they demonstrated less number of correct responses, committed more error as well as low scores, they gave less conceptual level response and they could complete less number of category. Findings of the present

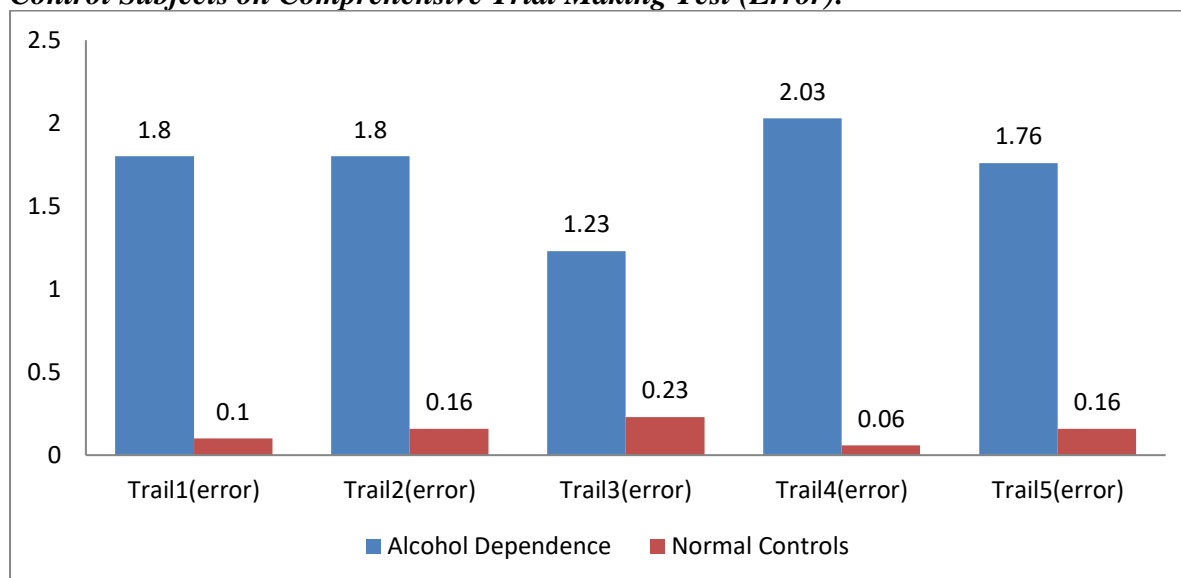
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study signify that persons with ADS exhibit deficit in executive functioning in comparison to person without ADS. The findings of the present study are in agreement with the results of Ghosh et al., (2018), Brion et al., (2017), Jha and Sinha (2015), MacKillop & Wit (2013), Potvin & Pelletier (2012) and Nowakowska et al., (2008) and they found that alcohol is the cause of executive function.

**Figure 2a: Performance of the Cases with Alcohol Dependence Syndrome and Normal Control Subjects on Comprehensive Trial Making Test (Time):**



**Figure 2b: Performance of the Cases with Alcohol Dependence Syndrome and Normal Control Subjects on Comprehensive Trial Making Test (Error):**



## RESULT AND DISCUSSION

**Figure 2a & 2b:** Further it has been found that Alcohol dependence patients showed deficits on executive functioning in comparison to normal control subjects on Comprehensive Trial Making Test. It has been observed that normal control subjects achieved high score in compared to alcohol dependent cases. It has also been noted that the patients with alcohol dependent syndrome yielded high number of errors on all trails. It has been suggested that alcohol dependence patients showed deficits on executive functioning in comparison to

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normal control subjects. The findings of the study are in agreement with the results of Ghosh et al., (2018), Al- Hekmat et al., (2011), Zahrani & sayed (2009). These finding also supported by Potvin & Pelletier (2012), Cottencin et al. (2009) and Martin et al., (2007), they found that executive function are deficits due to use of alcohol.

### CONCLUSION

The Results of the present study reveals that the alcohol dependence patients showed deficits on executive functioning in comparison to normal control subjects on Wisconsin card sorting test as well as in Comprehensive Trail-making test. The clinical group took more number of trials, produced lesser number of correct response and committed more mistakes with low conceptual level responses and low number of category completed as well as low scores and high errors on CTMT. Thus, it can be concluded that executive function deficits can be attributed to alcohol dependence syndrome.

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### ***Conflict of Interest***

The author declared no conflict of interest.

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