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An Assessment of Cognitive Dysfunction in Delirium Patients: Hospital Based Study.

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ABSTRACT

Delirium is marked with disorientation, cognitive decline and diurnal variations, this study attempts to assess the cognitive dysfunctions in delirium as compared to a control of non delirious patients and its fluctuations across day and night. A total 40 DSM – IV TR identified cases of delirium and equal number of randomly selected control patients without delirium totaling to 80 patients were assessed. Detailed psychosocial and biographical history was obtained and detailed mental status evaluation was carried out, along with Mini Mental Status Examinations and cognitive status estimation test were administered. The mean age of the study group found to be 27.85 ± 13.73 and it was 33.10 ± 11.26 for control group. Among study group of diagnosed delirium, the most common associated diagnosis was drug and alcohol dependence (67.5%). The mean total cognitive score of the study group is found to be 24.18 which are much less than that of control group (62.30). The mean MMSE score for study group during day time was 7.8 ± 3.3 and 2.55 ± 1.8 during night time. The present study concludes that the cognitive dysfunction in delirium patients is significantly higher and also fluctuates significantly across day and night as compared to the control group.
Keywords: Delirium, Cognitive Dysfunction, Diurnal variations.

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INTRODUCTION

Delirium is a widely prevalent acute neuropsychiatric syndrome brought about by potentially reversible direct or indirect cerebral insult. .Besides the underlying systemic disturbance, which has their own potential for enlarging morbidity and mortality, delirium per se can lead to irreversible brain damage. . Currently delirium is conceptualized both as a disease and a syndrome [1]. The syndrome of delirium is described in DSM- IV [2] and ICD-10[3]. Disturbance of consciousness and attention are identified as core symptoms. The associated symptoms consist of a mixture of cognitive disturbances and psychopathological symptoms in the form of delusions, perceptual disturbances, affective symptoms, thought and language disturbances.

Large number of studies have been conducted on delirium in western countries [6-11]. It is a common experience of clinicians that delirium is quite common in the hospital settings of our country. The few published studies in India are sporadic and generally focused to one specific area like hepatic encephalopathy, uraemic encephalopathy and old age. None of the studies appear to have delirium as its primary area of investigation [12]. Further, most of the studies conducted abroad kept delirium occurring in old age patients as their area of interest.

Delirium continues to be understudied, under recognized and under diagnosed. Misdiagnosis is more likely when delirium is hypoactive and when patients are referred from surgical and intensive care settings. Explicit guidelines for the diagnosis of delirium are now available both in ICD 10 [3] and DSM IV TR [2]. Both systems agree on the core symptoms of impairment of consciousness and attention. DSM IV TR mentions impaired memory and language as the cognitive symptoms under criteria B and acute onset under criteria C. ICD – 10 criteria are more exhaustive in that in addition to cognitive symptoms the criteria also includes the categories of psychomotor symptoms, and sleep wake cycle disturbances, emotional disturbances, disturbances of perception and transient delusions which are not considered specific for the diagnosis of delirium. Delirium is an acute disorder of cognition due to impaired brain functioning brought about by multiple etiological factors. The broad clinical picture remains essentially same despite the plethora of condition causing it [2, 3, 17,18]. As a psychopathological condition it emphasises the psychobiological unity and exemplifies psychosomatic disorder as the disturbing factors are definitely "biological" and the manifest disturbances are "mental".[14]

Human brain is critical to minding [20] Cognition refers to the perceptual and intellectual aspects of mental functioning. It refers to the use, handling and manipulation of what is known as perceived and the ability to evaluate what is perceived in terms of what is already known. Essentially cognition consists of the mental processes of attention, concentration, vigilance, memory, orientation, thinking, reasoning, planning, decision making, evaluation, judgement and error correction. The faculties of acquiring, storing, transforming, using and communicating information together constitutes cognition: in short mental processes is cognition.[16]

Consciousness, like all simpler things of life, is difficult to define. Sentience is awareness of environment whereas consciousness involves awareness of self and others. To be conscious is to be alert and aware. The strength of stimulus that is needed to make a person alert and aware determines the level of consciousness [22, 23, 24]. There is much confusion also in the understanding of the term confusion. Confusion denotes inability to think with customary clarity and coherence. Confusion is seen in both organic and nonorganic mental disturbance [23]. The core symptoms of delirium are impaired consciousness and attention. Attention is the process of including an aspect of environment into consciousness. In delirium confusion is caused by impaired consciousness. [23, 24]

The pathophysiology of delirium is poorly understood [25]. Multiple etiologies for delirium may "funnel" into a final common neural pathway [19]. In view of the above we planned this study to investigate the prevalence of delirium across various etiological diagnostic categories; associated cognitive dysfunctions as compared to non delirious patients and its diurnal variation, that could contribute to more efficient and better care of patients with delirium and will give clinically relevant insights into this 'Everyman's Psychosis'.[15]

MATERIALS AND METHODS

The study was conducted at a tertiary care hospital attached to a university medical college of Pune from 2007 to 2009. Patients from all departments were included those who met inclusion criteria as mentioned below. The study group consisted of 40 DSM – IV TR [2] identified cases of delirium drawn from various departments of the hospital. Equal number of patients without delirium formed the control patients, who were randomly selected from the hospital. The worker introduced himself as the doctor, who was conducting research on delirium, the findings of which were likely to be helpful in managing patients in a better way, and solicited patients cooperation and consent to participate in the study. If the patient was not in a condition to give consent, consent was taken from the caregiver as per the Helsinki guidelines for medical research involving human subjects (World Medical Association-2004).

The investigator was fairly familiar with nursing and teaching staff of other departments of the hospital. He approached them seeking their cooperation. They were requested to administer a screening questionnaire and to refer any case, which was likely to be a case of delirium. Investigator will made his mobile number available to all duty staff in wards so that he could be contacted at any time in the day or night.

Inclusion Criteria

- Patient suffering from delirium and non delirious patients having risk factors of delirium.
- Patients 18 years and above.
- Male gender.
- Any educational status.
- Consent to participate in the study.

- Permission by the primary medical caregiver.

Exclusion Criteria

- Patient is too incapacitated to participate in the study due to poor medical status.
- Grossly disturbed and excited patients

Tools

MMSE

The Mini Mental State Examination (MMSE)[6] was used to identify subjects with cognitive dysfunction [27]. Presence of cognitive decline was defined using a cut-off score of 24 on the MMSE. Patients with a score of <24 out of 30 were categorized as having cognitive decline.

Cognitive Status Estimation Test

This is a specially designed test prepared exclusively for the study keeping the nature of the clientele, who may be illiterate and rural or literate and urban, into consideration. Most items are taken out of standardized tests. Mean in respect of each item, category and total score of patients were obtained and compared with the scores of controls.

Checklist of Etiological Factors

A 20 item checklist of attribution of etiology has been specially prepared as per guidelines of Meagher et al 2007[26], to apportion etiological significance in respect of each item towards causation of delirium. Each item was scored on a continuum of 0 to 3 depending upon the possible contribution etiology. Observer's estimations were validated by experienced clinicians.

Methods of Data Collection

Detailed psychosocial and biographical history was obtained and documented and detailed mental status evaluation was carried out to establish the diagnosis of delirium. The following psychological tests were administered to quantify psychopathology and cognitive status.

All assessments were carried out three times in a 24 hour cycle of day and night. This was done primarily to ascertain the fluctuations in the intensity of symptoms. Highest and lowest scores were recorded for purpose of statistical evaluation.

Statistical Analysis

All continuous variables will be subjected to tests of significance as appropriate. Correlation between cognitive variables and symptomatology were assessed by means of linear correlations (Pearson's Product Moment Corelation). Categorical parameters were evaluated by means of Chi square and Fischer's test as applicable.

RESULTS

Table 1: Socio-demographic profile of the patients

Variables		MEAN	SD	t	df	P
Age	Study	27.85	13.73	1.68	78	>0.05NS
	Control	33.10	11.26			
Education	Study	9.2	3.40	1.85	78	>0.05NS
	Control	8.6	2.20			
		Frequency	%			
Married sample	Study	32	80%			
	Control	20	50%			
Unmarried sample	Study	8	20%			
	Control	20	50%			

Table 2: Different diagnosis of the patients

S.NO	Diagnosis	Control No. (%) N=40	Study group No. (%) N=40
1.	Drug & Alcohol Dependence	8(20%)	27(67.5%)
2.	Schizophrenia	10(25%)	3 (7.5%)
3.	Psychosis NOS	2 (5%)	0 (0%)
4.	Mood disorder	10(25%)	0 (0%)
5.	Neurosis	1 (2.5%)	0 (0%)
6.	Trauma	7(17.5%)	8(20%)
7.	Diabetes mellitus	4(10%)	4(10%)
8.	Infection	2(5%)	1(2.5%)
9.	Tumor	1(2.5%)	1(2.5%)
10.	Degenerative disorder	0(0%)	0(0%)
11.	Post operative	0(0%)	3(7.5%)
12.	Seizure	0(0%)	2 (5%)
13.	Hospital environment(ICU)	0 (0%)	15(%)

NB :   Total numbers do not correspond to sample sizes because of co morbidities and environment factors(ICU).

Mean age of study and control group were 27.85 yrs and 33.10 yrs respectively. The study and control group were found to be matched for age and years of education but not for marital status (Table 1). Table 2 shows that Control group consisted of 31 psychiatric cases. Psychotic cases formed 30 %. Mood disorder, Drug dependence cases and head trauma contributed 25%, 20% and 17.5% respectively to the control group. In the study group drug dependence cases formed the bulk (67.5%). Head trauma, Diabetes Mellitus, Postoperative

cases be contributed to 20%, 10% and 7.5% of cases. Schizophrenia cases formed 7.5% of study group. The study group and control group differed in cognitive scores (MMSE) in a highly significant manner. It is to be noted that there are 31 psychiatric cases in the control group. The difference between highest and lowest score is highly significant in case of study group, strongly indicating fluctuating intensity (Table 3). The mean total cognitive score of the study is found to be 24.18 which is much less than that of control group (62.30). This difference is highly significant statistically (Table 4).

Table 3: Mean and Standard Deviation of MMSE scores of the patients

	MMSE score (Day)		MMSE score (Night)		t (paired)
	Mean	S.D	Mean	S.D	
STUDY (N=40)	7.8	3.3	2.55	1.8	11.93 (p = <0.001***)
CONTROL (N=40)	27.7	1.9	27.35	1.69	1.25 (p = >0.05)

Table 4: Total Cognitive score – control and study group

	Mean	S.D	Df	t	P value
Study group	24.18	6.42	78	30.99	<0.001***
Control group	62.30	4.42			

DISCUSSION

The present work represents an explorative study to ascertain the phenomenology of delirium by objectively assessing the various cognitive functions. Delirium falls in the noman's land between psychiatry and other fields of medicine and surgery. Hence psychiatric investigators, particularly in this century, have not ventured into this area with any degree of seriousness which in fact the condition demands. Because of its core features it impairs help seeking and communication of change in symptoms resulting in misdiagnosis and delayed intervention with implications for increased mortality and morbidity, [5, 6, 19, 25]. The rationale for this study was to test the hypothesis that the diagnosis of delirium in the general hospital setup is an independent factor of cognitive impairment as compared to other lesser known diagnostic groups like psychiatric disorders, trauma or other etiological factors like hospital (ICU) environment. We assessed the cognitive dysfunctions using a combination of MMSE and other objective neuropsychological tests and found statistically significant cognitive dysfunctions in group of patients with delirium.

The protocol of the study did not envisage comparison of findings with matched controls but it turned out that the study group and control group were matched for age. The psychiatric patients of the controls had higher age (Mean age 32). Overall both the study and control groups are young adults. The mean age of this study group was 27.85 (SD 13.73) thus representing the younger sample as compared to studies conducted earlier focusing on the elderly [5,19,25]. The lower age represents exclusion of senile deterioration of cognitive functions or dementia, thus the assessed cognitive dysfunctions are fully attributable to the

delirium. In fact DSM-IV [2] and ICD – 10 [3] highlight the occurrence of delirium in the elderly.

The most of the population (67.5 %) of this study group belonged to the diagnosis of drug and alcohol dependence (table 2), which highlights the ratio of preventable cause of the delirium. Delirium is a disorder of global cognition [2, 3, 19, 25] and disturbed attention is its defining feature [19]. Attention is a process by which an aspect of environment is included into consciousness and is fundamental to all cognitive functions. It is expected therefore that impaired attention will impact other cognitive functions. Across the board all listed cognitive functions were severely affected in the present study. The listed functions included attention, concentration, vigilance, recent memory, remote memory, visual retention, visual recognition, orientation and language. This is in contrast to Meagher et al (2007) who reported differential impairment of cognitive functions. They found disorientation was the least frequent symptom [19]. The findings of the present study assumed importance because of the fact that the 92 % of the control group consisted of schizophrenia, mood disorders, drug dependence and head trauma; conditions known to have cognitive impairments.

This study highlights the level of cognitive dysfunction and diurnal variation among young patients, which is the cardinal feature of the delirium. Limitation of this study includes sample of only male gender, which limits its scope to generalize across gender.

CONCLUSION

The present study concludes that the cognitive dysfunction in delirium patients is higher as well as fluctuates across day time and night time compared to the control group.

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