Original Article

Psychiatry Section

Comparative Study of Delirium in Emergency and Consultation Liaison- A Tertiary Care Hospital Based Study in Northern India

PRINKA[1], ARVIND SHARMA[2]

ABSTRACT

Introduction: Delirium is an acute and often fluctuating disturbance in level of consciousness and thought process (cognition) that develops over a short period of time and is a significant change from previous level of functioning. Its prevalence increases with age, complexity of medical co-morbidities and number of medications prescribed.

Aim: To compare the cause and severity of delirium in patients in emergency and consultation liaison psychiatry group.

Materials and Methods: A cross-sectional, tertiary care hospital based study was conducted on the patients who presented with delirium from emergency department (50) and consultation-liaison psychiatry groups (50), over a period of one year. The diagnosis was made on the basis of DSM- 5 criteria. The Delirium Rating Scale (DRS-R-98) was applied to know the severity of delirium, cognitive and non-cognitive symptoms of delirium in patients. The results were subjected to appropriate statistical analysis.

Results: In emergency group, 42% patients had metabolic abnormalities, while in consultation-liaison, 38% patients had hyponatremia and hypokalemia and the difference was found to be statistically non-significant (p>0.05). In emergency group, 21(42%) patients were diagnosed as delirium due to other medical condition, followed by 13 (26%) and 8(16%) patients, who were diagnosed as delirium due to multiple aetiologies and substance intoxication each respectively. In only 33(66%) cases in consultation liaison group patients had delirium secondary to other medical conditions. As per DRS-R98 Scale, mean severity score was found to be statistically significant (p<0.05) in consultation liaison group as compared to emergency department group (p> 0.05).

Conclusion: Delirium is multifactorial aetiological disease, with variable but preventable outcome. Approach should be aimed at finding the treatable causes to reduce morbidity and mortality.

Keywords: Acute confusional state, Cognition, Consciousness

INTRODUCTION

Delirium is an acute confusional state with causal relation to organic mental disorders and characterised by an acute impairment of consciousness [1].

There are three main types of delirium: hyperactive, hypoactive and mixed [2]. However, there is growing evidence that hypoactive delirium is associated with worse outcomes compared to the other subtypes in elderly patients with dementia [3]. The prevalence in hospitalized patients varies from 6-56% according to DSM-5. [4]. Delirium is undetected and misdiagnosed in the clinical setting [5-7]. In spite of improved standardised research instruments, diagnosis of delirium is under-recognised [8].

The prevalence of delirium varies with the population that is being studied [9]. Delirium is a relatively common disorder, especially in older people with physical illness. Community rates of delirium are reported to vary from 0.4% to 2% [10]. Delirium in old patients undergoing cardiac surgery varies from 23 to 32% [11]. Prevalence rates for delirium are from 10% to 31% at admission and between 3% to 29% during admission in medical inpatients [12,13]. Outcome of delirium can be serious with longer admissions, increased morbidity and mortality, a greater likelihood of admission to institutional care and increased hospital costs [14].

The limited number of published studies from India has focused on the prevalence of delirium in psychiatric referrals and specialized groups. Bhattacharya studied 50 cases of puerperal sepsis and observed that 76% had infection as main etiological factor, 80% patients were in age range of 15-30 years and from rural area respectively. They found schizophrenia in 76% as commonest

presentation [15]. Sabhesan too conducted a study on post traumatic hyperactive delirium and pointed out that it is a common problem following head injury. Longitudinal study on 29 patients, diagnosed with hyperactive delirium, were compared with control group. Alcohol dependence was significantly more among the patients than control group. A follow-up of the patients showed that psychiatric problems were more common among them [16].

A prospective study was carried out on 221 patients undergoing cataractomy, who were followed up for 2 years. Post Cataractomy Delirium (PCD) was diagnosed as per Summers and Reich criteria. The incidence of delirium was found to be 1.8%. While in one case it was due to anticholinergic toxicity, sensory deprivation was present in two cases. They emphasised the recognition of aetiology of delirium for better outcome [17]. Delirium is common diagnostic category in different case scenarios discussed above, So more studies are needed in order to enhance our knowledge in various aspects of delirium in different groups.

AIM

To compare the cause and severity of delirium in patients in emergency and consultation liaison psychiatry group.

MATERIALS AND METHODS

Present study was a cross-sectional tertiary care hospital based study including patients each presenting with delirium, 50 each from the emergency department and consultation-liaison psychiatry department of Guru Gobind Singh Medical College and Hospital, Faridkot. This study had the approval of the institutional research ethics committee. Sample was collected by random sampling after

taking the valid consent from the patients and relatives. The data collection lasted from 1st March 2014 to 30th August 2015.

Inclusion Criteria
Patients in the age range of 16-60 years with diagnosis of delirium according to DSM-5.

Exclusion Criteria
Patients or relatives, who refused to give consent, were not included in the study. Patients, who were diagnosed dementia, having mental retardation and any other chronic mental illness, were not included.

Requirement and Procedure
A) Instruments
1. Psychiatric proforma
This is a "semi-structured proforma", made by Department of Psychiatry. It was used for the collection of the relevant socio-demographic and clinical information required for the purpose of this study about the subjects.

2. DSM- 5 criteria
The diagnosis was made on the basis of DSM 5 criteria. (Diagnostic and Statistical manual-5) [18].

3. Delirium Rating Scale
The severity of delirium was assessed by The Delirium Rating Scale-Revised 98.

The DRS–R98 is a widely-used instrument used to measure symptom severity as well as to diagnose delirium. It is a 16-item, clinician-rated scale, with 13 severity and 3 diagnostic items and it is a valid measure of delirium severity over a broad range of symptoms. The 13-item severity section can be scored separately from the 3-item diagnostic section; their sum constitutes the total scale score. The severity of individual items is rated from 0 to 3 points, and each item is anchored by text descriptions as guides for rating along a continuum from normal to severely impaired. Thus DRS–R-98 severity scores range from 0 to 39, with higher scores indicating more severe delirium and a cut-off score 15 consistent with a diagnosis of delirium. Attention, orientation, long term memory, short term memory, visuo-spatial ability, thought process and language constitute the cognitive symptoms of DRS-R98 scale while rest other severity items constitute non-cognitive symptom items. For determination of item frequencies in this study, any item scoring at least 1 was considered present. The total scale enhances differential diagnosis by capturing characteristic features of delirium, such as acute onset and fluctuation of symptom severity. The instrument is ideally used to rate delirium over 24 hours, so as to improve recognition of intermittent symptoms and, for the purpose of this study, was applied biweekly to encompass the previous 3–4 day period since the previous assessment. This scale has high validity and reliability to distinguish delirium from various functional psychiatric disorders [19].

B) Procedure
All the patients were interviewed and detailed history was taken based on psychiatric thesis proforma. Laboratory investigations like liver function test, renal function test, haemoglobin, complete blood count, serum electrolytes, etc as suggested by attending consultants were done, depending upon individual cases. The diagnosis was made on the basis of DSM- 5 criteria and was confirmed by the consultants of the department. The DRS-R98 was applied to know the severity of delirium, cognitive and non-cognitive symptoms of delirium in patients.

STATISTICAL ANALYSIS
Descriptive statistics, in terms of percentage were used to describe the categorical variable. To test the association between variable and disease, Chi-Square test was used. The p-values were determined from chi-square test and p-values <0.05 were considered significant. To compare the scores of DRS-R98 in both groups t-test was used.

RESULTS
In the present study, mean age of emergency group and consultation liaison group patients was 37.0 y and 42.0 y respectively and the difference between two was statistically significant ($p<0.05$) [Table/Fig-1].

In emergency group and consultation liaison group, difference between the type of the family they were living, difference between the education level and occupation among emergency group and consultation-liaison group was statistically significant ($p<0.05$) but difference in marital status as well as monthly income among the two groups was statistically non-significant ($p>0.05$). In emergency group, 33 patients were from rural areas while in consultation-liaison group 28 patients were from rural areas and the difference was statistically non significant ($p>0.05$) [Table/Fig-1].

In emergency group, majority of patients 13 (26%) were of head injury, followed by 11 (22%) patients were of acute poisoning and 21 patients (42%) had raised Liver Function Test Renal Function Test's and Total Leukocytes Count. In this group, 21(42%) patients were diagnosed as delirium due to other medical condition while in consultation-liaison group, majority of the patients 26 (52%) had encephalopathy, 19 (38%) patients had both hyponatremia and hypokalemia and 33(66%) of patients were diagnosed as delirium due to other medical condition [Table/Fig-2].

Variable		Emergency (N= 50)	Consultation-liaison (N= 50)	Chi-square	df	p-value
Age (in yrs)	16-30	16	10	5.857	2	0.045*
	31-45	18	12			
	46-60	16	28			
Gender	Male	30	27	0.367	1	0.686NS
	Female	20	23			
Region	Rural	33	28	1.051	1	0.412NS
	Urban	17	22			
Family type	Nuclear	14	30	10.390	1	0.002*
	Joint	36	20			
Occupation	Unemployed	9	2	9.551	4	0.049*
	Labourer	13	23			
	Farmer	15	9			
	Pvt./Govt. Employee	9	9			
	Housewife	4	7			
Family income (in Rs)	5000-10000	19	13	2.625	3	0.453NS
	11000-15000	14	18			
	16000-20000	10	14			
	>20000	07	5			
Marital Status	Married	33	36	0.660	2	0.719NS
	Unmarried	10	7			
	Widow	07	7			
Education	Illiterate	10	19	17.741	5	0.003*
	Primary	18	2			
	Middle	9	16			
	High School	7	6			
	High Secondary	4	5			
	Graduate	2	2			

[Table/Fig-1]: Comparison of emergency and consultation liaison group as per socio-demographic characteristics.
NS (not significant), p > 0.05; *p<0.05, Significant; **p<0.001, Highly significant
(Where cell have value < 5, fisher test is applied inbuilt in statistical software used and it does not give wrong values for the chi-square test)

In emergency group, the DRS–R98 mean severity score was 21.48 (3.501), While in consultation liaison group, the DRS–R98 mean severity score was 19.68 (3.722) and difference was found to be statistically significant (p<0.05). Among emergency group and consultation liaison group, difference of mean cognitive score was found to be highly statistically significant (p<0.001) but difference in non cognitive score was found to be statistically non-significant among them (p>0.05) [Table/Fig-3].

In emergency group, mean severity scores was highest for attention (2.78) while in consultation liaison group mean severity scores was highest for disturbance in visuo-spatial ability (2.54). The difference was found to be statistically significant only in mean scores of

Variable		Emergency (N= 50)	Consultation-liaison (N= 50)	Chi-square	df	p-value
Biochemical abnormalities	Raised RFTs	4	3	4.273	5	0.511 NS
	Hyponatremia	6	6			
	Hypokalemia	5	5			
	Raised LFTs	2	4			
	Raised (LFTs + RFTs + TLC)	21	13			
	Hyponatremia + hypokalemia	12	19			
DSM-5 causes	Substances intoxication	13	3	30.917	4	<0.001**
	Substance withdrawal	3	6			
	Medication induced	0	8			
	Delirium due to other medical condition	21	33			
	Delirium due to multiple aetiologies	13	0			
Causes	Poisoning	11	0	82.183	11	<0.001**
	Encephalopathy	3	26			
	CHF	3	0			
	Head injury	13	0			
	Seizure disorder	6	0			
	Sepsis	3	0			
	Substance withdrawal	3	1			
	Substance intoxication	2	0			
	Eclampsia	1	6			
	Sepsis + encephalopathy	5	0			
	Post-operative	0	16			
	Stroke	0	1			

[Table/Fig-2]: Comparison of emergency and consultation liaison group as per clinical characteristics.
NS (Not significant), p > 0.05; *p<0.05, Significant; **p<0.001, Highly significant. (where cell have value < 5, fisher test is applied inbuilt in statistical software used and it does not give wrong values for the chi-square test)

Variables	Emergency (N=50)	Consultation-liaison (N=50)	t value	df	p-value
	Mean (±S.D)	Mean (±S.D)			
Total score	28.08(3.680)	26.28(3.637)	2.460	98	0.016*
Severity Score	21.48(3.501)	19.68(3.722)	2.491	98	0.014*
Diagnostic Score	6.60(.670)	6.68(.513)	-0.670	98	0.504 NS
Cognitive score	15.98(3.496)	13.76(3.140)	3.340	98	0.001**
Non-Cognitive score	12.04(1.840)	12.50(2.102)	-1.164	98	0.247 NS

[Table/Fig-3]: Comparison of mean score of drs-r98 in emergency and consultation-liaison group.
NS (Not Significant): p > 0.05; *p<0.05:Significant; **p<0.001: Highly significant

language and thought process abnormalities in both emergency and consultation liaison groups (p<0.05). In emergency group, the least-common were lability of affect (22%), while in consultation liaison group, the least-common were lability of affect (18%) and delusions (18%). Thus, the frequencies generally paralleled the pattern for mean severities [Table/Fig-4].

	DRS-R98 Items	Emergency (N= 50)	Consultation-liaison (N=50)	t-value	Df	p-value
		Mean (±S.D)	Mean (±S.D)			
1	Sleep wake Cycle disturbance	2.30 (0.676)	2.22 (0.764)	0.554	98	0.581
2	Perceptual Disturbance	0.76 (0.870)	1.06 (1.038)	-1.566	98	0.121
3	Delusions	0.10 (0.303)	0.18 (0.388)	-1.149	98	0.253
4	Lability of Affect	0.30 (0.647)	0.20 (0.452)	0.896	98	0.372
5	Language	1.68 (1.0390)	1.04 (0.903)	3.288	98	0.001**
6	Thought Process Abnormalities	1.52 (1.054)	1.06 (0.867)	2.383	98	0.019*
7	Motor Agitation	1.88 (0.950)	2 (0.948)	-0.636	98	0.526
8	Motor Retardation	0.22 (0.708)	0.22 (0.648)	0.000	98	1.000
9	Orientation	2.58 (0.499)	2.32 (0.471)	2.680	98	1.009
10	Attention	2.78 (0.505)	2.42(0.673)	2.353	98	0.021
11	Short-termMemory	2.70 (0.463)	2.50(.580)	1.905	98	0.060
12	Long-term Memory	2.24 (0.657)	2.08 (0.695)	1.183	98	0.240
13	Visuo-spatial Ability	2.52 (0.580)	2.54 (0.613)	-0.168	98	0.867

[Table/Fig-4]: Comparison of mean scores of DRS-R98 items in Emergency and Consultation-liaison group.
NS (notsignificant), p > 0.05; *p<0.05, Significant; **p<0.001, Highly significant.

DISCUSSION

Mean age in our study was considerably younger as compared to western studies where subjects were more than 65 years [20]. Mean age of emergency group and consultation liaison group patients was 37.0 years and 42.0 years respectively. In both groups,18 patients were in age group of 31-45 years, while 28 patients were in age group of 45-60 years and the difference between two was statistically significant (p<0.05). Nath S et al., also reported mean age of patients of organic mental disorders was 34.2 years and majority were males [21]. Maximum number of patients were in the age group of 21-30 years. Inouye et al., also reported demographic characteristics like age 65 years and older and male sex were predisposing factors for delirium in his study [2]. Our study excluded patients over 60 years of age as it can be a predisposing condition for the delirium itself especially when underlying dementia is present. These differences in the age possibly reflect the kind of patients admitted to the MICU in developed and developing countries. Infectious diseases and acute poisoning are the leading causes in developing countries while malignancies and terminal illnesses are the leading cause in developed countries.

30 out of 50 were males in emergency group while 27 out of 50 were males in consultation-liaison group and the difference between two was statistically non-significant (p>0.05) [Table/Fig-1]. A similar study was carried out by Meagher et al., mean age of the group was 70.1 yrs (SD= ±11.5) and half of the 100 patients in that study were men [22]. Grover et al., also carried out a similar study in which majority of the patients were males. This could be attributed to the fact that male patients diagnosed with hyperactive delirium may be more agitated and difficult to be controlled than their female counterparts, thus triggering a referral in emergency and consultation liaison [23].

All socio-demographic variables in both groups had statistically non-significant association with delirium mean scores (p >0.05). A similar study was carried out by Kishi et al., had male gender 19 (73.1%), education in years mean 12.3(SD= ±2.6), married 20 (76.9%), employed 8 (30.8%) [24]. This was also statistically

Variable	r value		p-value	
	Consultation group	Emergency group	Consultation group	Emergency group
Cognitive score --- Total score	0.0816	0.865	<0.001**	<0.001**
Cognitive score --- Severity score	0.0807	0.880	<0.001**	<0.001**

[Table/Fig-5]: Correlation of cognitive score with total score and severity score of DRS-R98 with in consultation group and emergency group (N=50).
NS (Not Significant): p > 0.05; *p<0.05, Significant; **p<0.001, Highly significant.
r: Coefficient of correlation.

insignificant. Clinicians treating the delirious patients should keep in mind that all the socio demographic factors are confounding variables and can affect the outcome of the disease rather than having a direct impact on disease itself. It varies with the study sample in consideration.

The difference between two groups regarding aetiological factors was statistically significant (p<0.05). A similar study conducted by Goulia et al., in Greece revealed aetiological factors associated with delirium were fluid and electrolyte imbalance (29%), postoperative (28%), and sepsis (24%), with 36% of the cases having two or more causes [25]. Shivanandh et al., also reported infections (65%) followed by intentional poisonings (19%), metabolic causes (10%) and substance abuse (6%) were the important aetiological causes [26]. Kishi et al., also reported opioid-related delirium was the most common causes of missed delirium (31%) [24].

The difference among biochemical abnormalities was statistically non-significant (p>0.05). Therefore a number of aetiological causes were implicated in the development of delirium reflecting a variety of diagnoses made to patients admitted in the medical ward. It bears note that multiple aetiological factors should be looked into for delirious patients. Dubois et al., reported abnormal bilirubin level was found to be significantly associated with delirium [27]. Sagawa et al., reported most frequent biochemical abnormalities of delirium were opioids (29%), inflammation (27%), dehydration and sodium level abnormalities (15%). While two or more causes were identified in 40% or more of the cases, the cause of delirium was not identified in 20% of the patients [28]. Results of this study with delirium to be multifactorial aetiology are according to our study results. Khurana et al., also reported risk factors associated with delirium, of which, metabolic abnormalities, neurological illnesses, urinary tract infections, visual impairment and hearing impairment were most commonly reported [29]. The difference between two groups was statistically significant (p<0.05) in terms of factors determining outcome of delirium. Solai et al., found that delirium was most common among bipolar disorder which had the highest incidence (35.5%) [20].

Antiparkinsonian medications (medication induced) were the only medications significantly associated with delirium. Chaudhary et al., also reported in his study that delirium was due to anticholinergic toxicity in cases of post cataractomy delirium [17]. Patti et al., reported advanced age, a history of postoperative delirium (POD), alcohol abuse; lower blood albumin concentration, intra-operative hypotension, elevated infusion volume and excessive blood loss were significantly related to the development of POD [30]. This becomes important for the attending clinician to know the details of the factors identified. Removing or correcting the abnormalities implicated can reverse delirium and give an approximate idea about time duration for that. It also helps in giving time frame of recovery to the family members. Mattoo et al., conducted similar study in which the DRS–R98 Severity score was 21.0 (3.4), and the DRS–R98 total score was 25.6 (3.6); range was 19 –34 [31].

Turkel et al., reported that children experience a similar range of symptoms as adults, but with less-frequent delusions and greater symptom fluctuation, sleep–wake cycle disturbance, affective lability and agitation, although this finding needs to be interpreted with caution because of study-design limitations and comparisons with the adult literature [32]. But important point remains that delirium is polymorphic in nature in context of the presentation. Treating clinician should keep possibilities psychiatric manifestation as a presenting complaint for delirium and before referring a patient to a psychiatrist, detailed work up for delirium should be made. Leentjens et al., found more severe cognitive symptoms in geriatric delirium, as compared with adults, and more severe hallucinations, delusions, sleep–wake cycle disturbance, and lability of mood in paediatric age-groups [33]. Mattoo et al., conducted a similar study reported the most common delirium features present at any severity level were disturbances in orientation, attention, sleep, and long-term memory, lability of affect, motor agitation, visuo-spatial disturbance, thought process abnormality, and language disturbance (90%–100%) and the least-common were perceptual abnormalities (35%) and delusions (14%) [31]. A similar study conducted by Franco et al., reported most consistent impaired ratings on the DRS–R-98 and/or the CTD, inattention, impaired vigilance, and sleep–wake cycle disturbance in 90% of patients [34].

In both emergency and consultation liaison groups, there was strong correlation of cognitive with total score as well as severity score (r is closer to 1) [Table/Fig-5]. This clearly reflects to the core feature of delirium i.e fluctuating level of consciousness and altered higher mental functions. Severity of delirium is more when the higher mental functions in any domain are more deranged and reversal of delirium is associated with return of these functions to baseline.

LIMITATION
The sample size was small and the sample was recruited from a tertiary care center; hence, the findings could not be generalized to other treatment settings. Our study was cross-sectional study; hence evolution of symptom of delirium over a period of time could not be assessed. The effect of treatment and management of underlying causes on delirium outcomes warrant further study.

CONCLUSION
The present study suggests that delirium forms the largest diagnostic category in emergency and Consultation liasion referrals from various medical and surgical wards across all age groups. Therefore, a number of aetiological causes were implicated in the development of delirium reflecting a variety of diagnosis made to patients admitted in medical ward. Thus, knowledge of the various factors contributing to delirium should be kept in mind while attending the emergencies and liaison in other department. Knowledge of various factors contributing to same would help in early detection and prevention of delirium in such situations and mortality from such a preventable cause can be avoided.

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PARTICULARS OF CONTRIBUTORS:
1. Student, Department of Psychiatry, Guru Gobind Singh Medical College and Hospital, Faridkot, Punjab, India.
2. Professor and Head, Department of Psychiatry, Guru Gobind Singh Medical College and Hospital, Faridkot, Punjab, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Arvind Sharma,
Professor and Head, Department of Psychiatry, Guru Gobind Singh Medical College and Hospital,
Faridkot-151203, Punjab, India.
E-mail: sharma_adr@yahoo.com, arvindsharma7557@gmail.com