

Original Research

Analysis Of Psychiatric Morbidity In Traumatic Brain Injury Patients

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ABSTRACT

Aim: To analyse psychiatric morbidity in traumatic brain injury patients. **Material and methods:** This study cross sectional was done in out-patient department of psychiatry in a tertiary care institute among 152 subjects aged 15-60 years with TBI. General, detailed physical and mental assessment of traumatic brain injury patients was assessed. Scales used were M.I.N.I. 7.0 and MMSE to assess psychiatric morbidity and severity of traumatic brain injury. **Results:** 80 patients (52.6%) had mild injury and 72 patients (47.4%) had moderate injury. 89 subjects (58.6%) had blunt type trauma whereas 63 (41.4%) subjects had penetrating type injury. When MINI diagnosis was correlated with severity of injury, and a statistically significant correlation was found (p value 0.027). Of the total 80 patients with mild injury 42 (52.5%) subjects had Psychiatric Morbidity Absent and 38 (47.5%) subjects had Psychiatric Morbidity Present. Of the total 72 patients with moderate injury 29 (40.3%) subjects had Psychiatric Morbidity Absent and 43 (59.7%) subjects had Psychiatric Morbidity Present. **Conclusion:** In the treatment of head injury, apart from the treatment of physical symptoms, it is also important to treat psychiatric symptoms because psychiatric comorbidity delays the social and functional outcome of the patient. Most of it had been missed by clinicians and it affects the prognosis of the patient, so it is essential to identify the risk factors, understanding the clinical features for better treatment of the patient.

Keywords: Psychiatry, Morbidity Trauma, Brain Injury

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INTRODUCTION

Traumatic brain injury (TBI) is globally, a major issue of public health importance. TBI is best defined as an externally-inflicted blow to the brain with a cause that is not related to any premorbid medical or surgical condition. Traumatic brain injury occurs when a blow or jolt to the head or a penetrating injury results in damage to the brain. India accounts for one-fourth of global deaths due to TBI^[1]. Over a quarter of the world's trauma related deaths occur in India, with TBI forming the leading cause of death and disability associated with trauma.

Approximately 85,000 persons who experience TBI each year develop persistent cognitive, emotional, behavioral, or somatic disabilities^[2]. Psychiatric morbidity such as mood and anxiety disorders, post concussive syndrome, personality change, aggression and psychosis are among the most problems after mild and moderate TBI^[3]. Studies exploring self-reported neurobehavioral complaints after mild traumatic brain

injury indicate that the majority of patients experience full recovery within a couple of weeks to 3 months^[4-6]. However, well-designed prospective studies indicate a small percentage of patients continue to complain of symptoms 12 months after injury^[7]. That is, after Mild Traumatic Brain Injury, disruptions in cognitive functioning may be observed within the first 6 days of injury with rapid improvement observed and patients becoming statistically indistinguishable from controls on cognitive tests at 1 month post-injury^[8]. In a meta-analysis by Belanger and colleagues^[9] investigated the long-term impact concussion has on specific cognitive domains. Within 90 days of injury, their analysis revealed a large impact on memory and verbal fluency with moderate impact on attention, language, and visuospatial ability. In contrast, studies that included litigants and studies that recruited participants from clinical settings both found moderate to large impacts in areas of attention, executive functioning, learning, and delayed memory.

Identifying the extent of psychiatric problems following TBI, particularly mild TBI, may assist in targeting secondary and tertiary prevention efforts for TBI related disability. A large portion of these surviving patients will have cognitive or emotional sequelae and will need psychiatric interventions years after the injury^[10]. It is therefore essential to increase awareness of these sequelae so that psychological intervention is planned as early as possible, in hopes of improving function and limiting disability. The objectives of the study are as follows:

1. To study the psychopathology in patients of mild and moderate traumatic brain injury.
2. To study the effect of severity of traumatic brain injury in psychopathology.

MATERIALS AND METHODS

This study cross sectional was done in out-patient department of psychiatry in a tertiary care institute among 152 subjects aged 15-60 years with TBI.

Method

Data was collected from people aged 15-60 years, coming to tertiary care Hospital. The hospital where the study was conducted serves a population of approximately 90,000 annually. Each traumatic brain injury patient was screened for psychiatric morbidity and data was collected from people between age group of 15-60 years, among the collected data, 152 (sample size) data was taken randomly and analyzed. Permission of the required authority was also taken priorly. All subjects in the sample were informed beforehand about the purpose of the study.

Inclusion Criteria

- Patients of 15 to 60 years, both male and female.
- Patients giving written informed consent.
- Patient was evaluated at the end of around 3 months after the Traumatic brain injury.

Exclusion Criteria

- Patient above 60 years of age.

- Mental incapacity to provide information (e.g. mental retardation and aphasia)
- Patients with past psychiatric illness.
- Severe head injury patients.

After obtaining the written informed consent they were interviewed using a pre-structured and pre-tested questionnaire adopted from WHO. All records and patient's information was also kept strictly confidential. Under any circumstances patient's identity was not revealed.

Step 1: Information on socio-demographic variables.

Step 2: General and detailed physical and mental assessment of traumatic brain injury patients

Scales Used

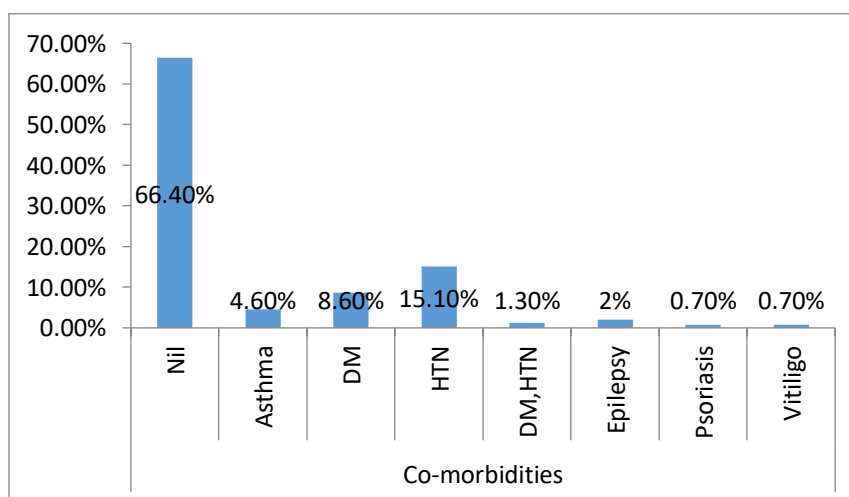
- M.I.N.I. 7.0
- MMSE

Statistical analysis

Data was analyzed by excel spread sheet; results were documented in proportions and percentages with appropriate statistical tests by using appropriate statistical software.

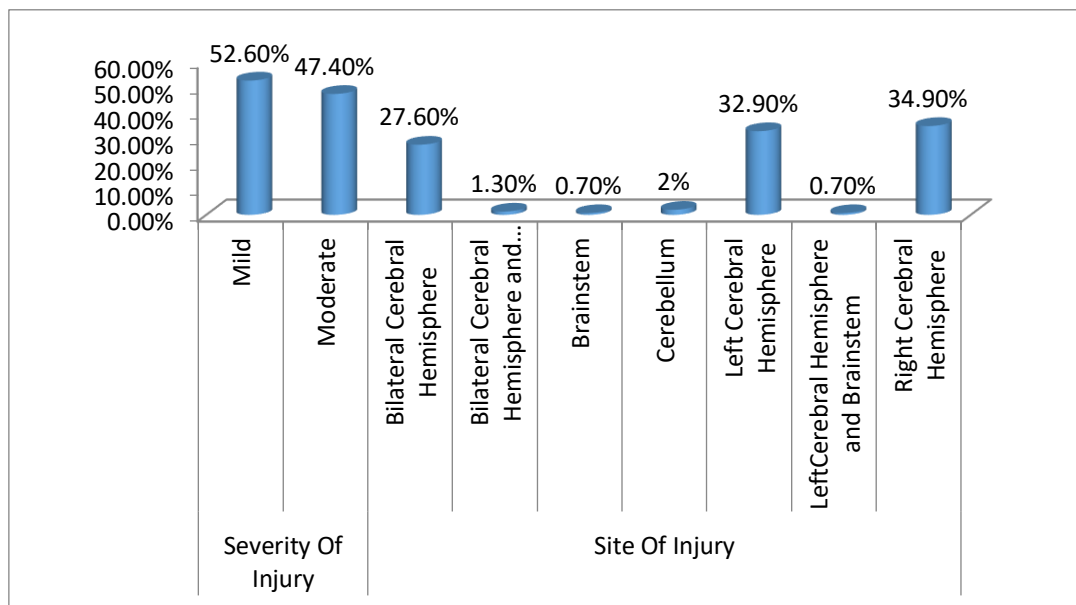
RESULTS

In the present study maximum patient belong to 19-30 years age group (n= 53, 34.87%), followed by 31-40 years age group (n= 38, 25%). 31 patient belong to 41-50 years age group (20.39%). 23 patient belong to >50 years age group (15.13%). Least were in <18 years age group (n=7, 4.61%). Among the study subjects maximum were male i.e., 110 patients (72.4%) and rest were females (n=42, 27.6%). Male to female ratio was 2.62:1. 101 subjects did not give any past medical history (66.4%). 23 patients (15.1%) had history of hypertension (HTN). 13 patients (8.6%) had history of diabetes mellitus (DM). 7 subjects (4.6%) gave history of asthma. 3 patients (2%) gave history of previous epileptic episodes. There were only two 2 patients with history of DM and HTN both. There were 1 patient (0.7%) each with history of Psoriasis and Vitiligo. (Graph 1)



Graph 1: Past co-morbidities history

89 subjects (58.6%) had blunt type trauma whereas 63 (41.4%) subjects had penetrating type injury. 80 patients (52.6%) had mild injury and 72 patients (47.4%) had moderate injury. According to site of Injury maximum patients had Right Cerebral Hemisphere injury (n=53, 34.9%), followed by left cerebral hemisphere injury (n=50, 32.9%). 42 subjects (27.6%) had bilateral cerebral hemisphere injury. There were only 3 subjects (2%) with cerebellum injury, 2 (1.3%) with bilateral cerebral hemisphere and brainstem injury and 1 each (0.7%) had brainstem and left cerebral hemisphere and brainstem injury. (Graph 2)



Graph 2: Severity of injury and site of injury as per neuroimaging finding among the study subjects

According to M.I.N.I. 7.0 scale, 71 subjects (46.7%) had no signs of Psychiatric Morbidity. Whereas in 81 subjects (53.3%) Psychiatric Morbidity signs were present. Among these 81 subjects, maximum had Major Depressive Disorder (n=33, 21.7%), followed by Panic Disorder (n=12,7.9%), Primary Insomnia (n=11, 7.2%), 9 subjects (5.9%) had Adjustment Disorder, 7 subjects (4.6%) showed Brief Psychotic Episode. 4 subjects (2.6%) each had Obsessive Compulsive Disorder and Social Phobia. There was only 1 subject (0.7%) with Major Depressive Disorder with Anxious Distress. (Table 1)

Table 1: MINI diagnosis among the study subjects

Diagnosis	N	%
1.Psychiatric Morbidity Absent	71	46.7
2.Psychiatric Morbidity Present	81	53.3
a)Adjustment Disorder	9	5.9
b)Brief Psychotic Episode	7	4.6
c)Primary Insomnia	11	7.2
d)Major Depressive Disorder	33	21.7
e)Major Depressive Disorder With Anxious Distress	1	0.7
f)Obsessive Compulsive Disorder	4	2.6
g)Panic Disorder	12	7.9
h)Social Phobia	4	2.6
Total	152	100.0

According to MMSE scale 144 subjects (94.74%) were normal and only 8 subjects (5.26%) had mild cognitive impairment. The mean MMSE score was 27.43±2.21. In the present trial, when MMSE scale score was correlated with severity of injury, there was no significant relation found. The mean MMSE score in mild injury cases was 27.51±2.256 and in Moderate injury cases was 27.35±2.170. (Table 2)

Table 2: MMSE according to severity of injury

Severity Of Injury	Mean	SD	p value
Mild	27.51	2.256	0.65
Moderate	27.35	2.170	

In the present study, MINI diagnosis was correlated with severity of injury, and a statistically significant correlation was found (p value 0.027). Among 71 subjects (46.7%) who had no signs of Psychiatric Morbidity,

mild injury was present in 42 subjects (52.5%) and moderate injury was present in 29 subjects (40.3%). Among the 81 subjects in whom Psychiatric Morbidity signs were present, maximum had Major Depressive Disorder (n=33, 21.7%) of them mild injury was present in 14 subjects (17.5%) and moderate in 19 subjects (26.4%), followed by Panic Disorder (n=12, 7.9%) of them mild injury was present in 5 subjects (6.2%) and moderate in 7 subjects (9.7%), Primary Insomnia in 11 subjects of them mild injury was present in 6 subjects (7.5%) and moderate injury in 5 subjects (6.9%), 9 subjects had Adjustment Disorder of them mild injury was present in 3 subjects (3.8%) and moderate injury in 6 subjects (8.3%), 7 subjects showed Brief Psychotic Episode of them mild injury was present in 5 subjects (6.2%) and moderate injury in 2 subjects (2.8%) . 4 subjects (2.6%) each had Obsessive Compulsive Disorder and Social Phobia of them mild injury was present in 2 subjects (2.5%) and moderate injury in 2 subjects (2.8%) of each group. There was only 1 subject (0.7%) with Major Depressive Disorder with Anxious Distress which had mild injury (1.2%). (Table 4)

Table 4: MINI diagnosis according to severity of injury

		Severity Of Injury		Total
		Mild	Moderate	
MINI Diagnosis	1. Psychiatric Morbidity Absent	N 42	29	71
		% 52.5%	40.3%	46.7%
	2. Psychiatric Morbidity Present	N 38	43	81
		% 47.5	59.7	53.3
	a) Adjustment Disorder	N 3	6	9
		% 3.8%	8.3%	5.9%
	b) Brief Psychotic Episode	N 5	2	7
		% 6.2%	2.8%	4.6%
	c) Primary Insomnia	N 6	5	11
		% 7.5%	6.9%	7.2%
	d) Major Depressive Disorder	N 14	19	33
		% 17.5%	26.4%	21.7%
	e) Major Depressive Disorder With Anxious Distress	N 1	0	1
		% 1.2%	0.0%	0.7%
f) Obsessive Compulsive Disorder	N 2	2	4	
	% 2.5%	2.8%	2.6%	
g) Panic Disorder	N 5	7	12	
	% 6.2%	9.7%	7.9%	
h) Social Phobia	N 2	2	4	
	% 2.5%	2.8%	2.6%	
Total	N 80	72	152	
	% 100.0%	100.0%	100.0%	
Chi square		6.81		
p value		0.027*		

*: statistically significant

DISCUSSION

Psychotic Disorder Due to Traumatic Brain Injury (PDTBI) is the current DSM-IV diagnosis given to individuals who develop a psychosis after a traumatic brain injury (TBI).^[105] Diagnostic criteria include 1) presence of hallucinations or delusions; 2) evidence (history, physical, or laboratory) that the psychosis is a direct physiological consequence of TBI; 3) psychosis is not better accounted for by another mental disorder; and 4) psychosis does not occur exclusively during a state of delirium. Ahmed and Fujii^[11] argue that PDTBI is often difficult to diagnose because criteria are vague. This contention is supported by the wide range of incidence rates for PDTBI cited in the literature. For example, retrospective chart reviews of World War II soldiers have yielded incidence rates of 0.7%, 7.5%, and 8.9%.^[12-14] By contrast, a study with closed head

injury medical patients reported a 20% incidence rate.^[15] According to Ahmed and Fujii, diagnostic difficulties hinge on two aspects of the criteria: 1) establishing that the psychosis is a direct physiological consequence of TBI and 2) determining that the psychosis is not due to another mental disorder.^[11] The present study was conducted including 152 traumatic brain injury patient who came to the hospital and was screened for psychiatric morbidity. Information on socio-demographic variables were noted for each subject. A General and detailed physical and mental assessment of traumatic brain injury patients was performed. M.I.N.I.7. and MMSE scale were used in the study to reach to diagnosis. The significance is also assessed by comparison of MINI diagnosis according to severity of injury, MINI Diagnosis according to Site of Injury and MMSE according to severity of injury. Following

were the main observations of the study. In the present study maximum patients belong to 19-30 years age group (n=53, 34.87%) and least were in <18 years age group (n=7, 4.61%). This was almost in accordance to study of Vikane et al (2019)^[16] who found median age of patients with TBI was 33 years. According to Fujii D et al. (2002)^[17] the mean age for sustaining a TBI was 29.1±17.6 years. This might be because of the fact at young age people tend to drive fast and have a very careless attitude, which can lead to more traumatic injuries. In present study Male to female ratio was 2.62:1. This was in accordance to study of Fujii D et al. (2002)^[17] where males to females ratio was 2:1, which they explained by the fact that, the significant majority of their subjects sustained TBI from motor vehicles accidents (67%). According to study done by Vikane et al (2019)^[16] 63% of the participants were men. According to severity of injury, 80 patients (52.6%) had mild injury and 72 patients (47.4%) had moderate injury. According to study of Fujii D et al. (2002)^[17] a significant proportion of subjects sustained moderate to severe head injuries ($\chi^2=7.75$, $df=1$, $P<0.10$). According to site of injury, maximum patients had Right Cerebral Hemisphere injury (n=53, 34.9%) and least were of Brainstem and Left Cerebral Hemisphere and Brainstem injury (1 each). Among pre-injury variables, lower education, psychiatric diagnosis the last year before injury and pre-injury self-reported anxiety were associated with the development of psychological distress after a Mild traumatic brain injury. Singh et al. found an association between pre-injury and post-injury depression among more severe TBI cases where 55% of the patients had a moderate or severe TBI.^[18] In the present study, 89 subjects (58.6%) had blunt type trauma whereas 63 (41.4%) subjects had penetrating type injury. According to study of Fujii D et al. (2002)^[17] 47 closed head injury; 4 open head injury.

In the present trial, MINI diagnosis was correlated with severity of injury, and a statistically significant correlation was found (p value 0.027). Of the total 80 patients with mild injury 42 (52.5%) subjects had Psychiatric Morbidity Absent and 38 (47.5%) subjects had Psychiatric Morbidity Present. Of the total 72 patients with moderate injury 29 (40.3%) subjects had Psychiatric Morbidity Absent and 43 (59.7%) subjects had Psychiatric Morbidity Present. When MINI diagnosis was correlated with site of injury, no significant relation was found. This study had some methodological limitations that need to be considered when interpreting the results. Small sample size of the study may be a limitation as its result cannot be generalized. Outcomes are presented for only adults and maybe not be generalizable to pediatric populations. Only patients able to give consent during admission were enrolled, thus severely injured patients were excluded resulting in a sample of not very severely injured participants. This may therefore lead to underestimation of the

neuropsychological outcomes of TBI. So further studies with larger sample size including pediatric patients and if possible including patients with severe injury should be done.

CONCLUSION

In the treatment of head injury, apart from the treatment of physical symptoms, it is also important to treat psychiatric symptoms because psychiatric comorbidity delays the social and functional outcome of the patient. Most of it had been missed by clinicians and it affects the prognosis of the patient, so it is essential to identify the risk factors, understanding the clinical features for better treatment of the patient. Not a single can predict the risk of psychiatric comorbidity and also found it has no relationship with the severity and laterality of lesions consistently. Treatment of the illness involves a multi disciplinary approach with the psychiatrist in liaison with neurosurgeon and family. Treatment should follow from a clearly articulated diagnostic scheme and should be time limited and re-evaluated in the presence of poor or incomplete response.

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