ORIGINAL ARTICLE

MALADAPTIVE SCHEMA MODES AMONG TRAUMATIC AND NON-TRAUMATIC BRAIN INJURY PATIENTS

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ABSTRACT

Objectives: To explore maladaptive schema modes among traumatic brain injury (TBI) and 'non-traumatic brain injury patients' in the civilian population, particularly in cases of mild and moderate brain injury.

Materials and Methods: A total of 132 patients were studied, of which 96 had been diagnosed with TBI and 36 with non-TBI. All were older than 18. The classification of mild and moderate TBI was determined by the neurosurgeon on the basis of the Glasgow Coma Scale (GCS), MRI, and CT Scan. Data was collected from Pakistan Institute of Medical Sciences Islamabad Pakistan in the month of August and September 2018. A short Urdu version of the Schema Mode Inventory (SMI) was used to establish the relationship between maladaptive schema modes, maladaptive coping style, and adaptive modes among TBI and non-TBI patients.

Results: The results of the mild and moderate TBI patients indicated significant mean differences between the maladaptive coping style and adaptive mode. Similarly, a significant mean difference was seen within the demographic profiles (such as age, education, and occupation) of patients displaying maladaptive and adaptive schemas.

Conclusion: Mild brain injury patients recorded a higher score in the maladaptive coping style category as compared to moderate injury. Patients with a higher score means less coping style. Further, no significant mean differences were reported among TBI and non-TBI patients.

Keywords: Maladaptive ,schema mode, traumatic, non-traumatic, injury

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INTRODUCTION

Brain injury is one of the leading health concerns worldwide and has increased, particularly in developing countries like Pakistan. It can change the core of a person's being, impacting such elements as memory, thinking, behaviour, and personality. Maladaptive schema mode isa psychological construct of nonverbal behaviour related to cognition, emotion, and the behaviour of an individual[1]. Individuals with a maladaptive schema and brain injuries are among the most vulnerable people in society, and have received inadequate attention in the literature. These individuals are likely to experience a variety of difficulties, challenges, and social exclusion in their daily life. Despite the close relation of mental illness with brain injury, the current study tries to explore the maladaptive schema mode among traumatic brain injury (TBI) and non-traumatic brain injury (non-TBI) patients. Brain injury is one of the leading causes of death and disabilities among children and adults[2].The symptoms or consequences may be similar to or different from one another, but these all affect the individual's personal life and family relationships. Furthermore, it may bring neurological complications (dementia, Alzheimer's disease, seizures, and cranial nerve injuries) and psychiatric problems (PTSD, depression, obsessive-compulsive disorder, and anxiety)[3]. Few studies have shown an association between brain injury and psychiatric disorders. Depression and affective disorders are more likely to be diagnosed in brain injury patients, which may reduce the rehabilitation outcomes[4,5].

In addition, TBI is one of the major causes of death among all age groups; approximately 25% of deaths occur due to TBI[6]. It has been observed that about 10 million people are affected by TBI annually all over the world; among these, 5.3 million live in the US[7].

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Moreover, a study revealed that about 52,000 people die and 100,000 people acquire new disabilities from TBI annually[8]. Age, disease, brain tumours, alcohol, and repeated trauma may also develop into risk factors for TBI[3].

The majority of people display a good level of resilience and recover after injury, but some may develop psychological distress such as anxiety, depression, and post-traumatic stress disorder (PTSD). These people are few in number; for example, about one third of people may develop PTSD and depression during one year of trauma[9]. The prevalence of psychological disorders in TBI patients varies: depression 14%-77%, PTSD 3%–27%, obsessive-compulsive disorder 2%–15%, anxiety disorder 3%–28%, panic disorder 4%–17% , and schizophrenia 1%[10].

In the current study, it was hypothesized that TBI and non-TBI patients would be more likely to display maladaptive schema modes and maladaptive coping styles than adaptive mode. It was also presumed that the maladaptive schema and maladaptive coping style would be greater among the TBI patient group than the non-TBI patients.

MATERIALS AND METHODS

A total of 132 patients with TBI and non-TBI were recruited. The diagnoses were performed by a neurosurgeon on the basis of the Glasgow Coma Scale and Magnetic Resonance Image "MRI". Among 132 patients, 96 had been diagnosed with TBI and 36with non-TBI. Of this sample, 94 were male and 38 females. The sample population included patients with a history of both mild and moderate TBI and non-TBI. Patients with a trauma historyof less than one month and more than six months were excluded. Furthermore, patients with brain injury and skull fracture were included, while patients having pelvic and spine fracture, chest injury, and other medical problems were excluded from the study. In the non-TBI group, only brain tumour and stroke patients were included.

The presence of maladaptive schema modes was assessed with the Schema Mode Inventory (SMI). For measuring the maladaptive schema modes, a short Urdu version of the SMI was used, which consisted of 124 items[11].The SMI measures 14 schema modes: angry child, impulsive child, enraged child, happy child, vulnerable child, undisciplined child, detached protector, detached self-soother, self-aggrandizer, bully and attack, demanding parents, punitive parent, and healthy adult. These 14 schema modes are categorized into four clusters: child mode, dysfunctional coping mode, adaptive mode, and maladaptive punitive parent mode. These modes are measured on a six-point Likert scale ranging from 'never to always'[12]. Cross Sectional research method were used .

All the participants were recruited in a public hospital of Pakistan (Pakistan Institute of Medical Science) in Islamabad in the month of August and September. All the ethical procedures were followed during data collection such as permission from concerned department and consent form, from patients. A "Paired Sample t-test" was performed to compare the Schema Mode Inventory score of TBI and non-TBI patients. Cohen's d was calculated to examine the effect size. Additionally, an analysis of variance (ANOVA) was used to compare the SMI score for the demographic profile. All analyses were performed on SPSS.

RESULTS

The mean scores, standard deviation, p-values and "t-values" obtained are presented in Table 3. Males showed no significant mean difference compared to females for maladaptive schema mode, maladaptive coping mode and adaptive mode. Similarly, no significant mean differences were found for other demographic characteristics, such as marital status. Moreover, the results demonstrate that TBI showed no significant mean compared to non-TBI on SMI. Further, the t-test showed that mild brain injury patients have significantly higher scores for maladaptive coping style than moderate brain injury patients. Table 4 shows that maladaptive schema mode was higher in younger people aged 18–40 years compared to people aged 50 years or older. Similarly, students with brain injuries have higher scores for maladaptive schema mode than employed and unemployed patients. A significant mean difference was seen for adaptive mode and demographic characteristics such as occupation and education level. The finding shows that patients with lower educational levels had higher rates of maladaptive schema mode and lower adaptive schema. Furthermore, ANOVA was performed on different demographic variables to examine whether the demographic variables play any role in maladaptive mode, maladaptive coping style and adaptive mode among TBI and non-TBI patients.

DISCUSSION

This study aimed to examine the maladaptive schema modes among TBI and non-TBI patients. Schema mode is the combination of cognitive, behavioural and emotional states of an individual; they are often used in daily life. As hypothesised, maladaptive schema mode was greater in TBI than non-TBI patients. The results indicated no significant mean difference among TBI and non-TBI patients for maladaptive and adaptive schemas. Similarly, no significant mean differences were seen between male and female patients for maladaptive and adaptive schemas. Another study

Table 1: Demographic Characteristics of Participants (N =132)

Variables	Categories	N	%
Gender			
	Male	94	71.2
	Female	38	28.8
Marital Status			
	Married	91	68.9
	Unmarried	41	31.1
Age			
	18-40	65	49.2
	41-55	40	30.3
	Above 55	27	20.5
Education			
	SSC (16 Year)	49	37.1
	HSSC (18 Year)	33	25.0
	Graduate or Above	50	37.9
Occupation			
	Employed	37	28.0
	Unemployed	58	43.9
	Students	37	28.0
Monthly Income			
	Below 25000	61	46.2
	26000-50000	58	43.9
	Above,50000	13	9.8

Age mean 35.01 (SD=12.70) Min 18 Max 67

Table 2: Clinical Characteristics of Participants (N=132)

Variables	Categories	N	%
Disease Types			
	Traumatic brain injury	96	72.7
	Non-traumatic brain injury	36	27.3
Injury Severity			
	Mild	83	62.9
	Moderate	49	37.1
Non-traumatic brain injury			
	Brain tumor	13	36.11
	Strokes	18	50.00
	Brain abscess	04	11.11
	Hypoxia	01	2.63

provided support to the current hypotheses, which revealed that cognitive dysfunction, such as attention seeking , issues solving problems, executive functioning impairment and psycho-behavioural disorders, are more common after TBI[13].

Furthermore, the study hypothesised that maladaptive schema mode was higher in moderate brain injury patients compared to mild brain injury patients. The results indicated that no significant mean difference is reported between mild and moderate injury on maladaptive schema mode, but individuals with moderate

Table 3: t-test of different variables on maladaptive schema mode, maladaptive coping style and adaptive mode (N=132)

	Male n=94		Female n=38					95% CI	Cohen's d
Variables	**M**	**SD**	**M**	**SD**	**t (130)**	**p**	**LL**	**UL**	
MM	141.87	11.23	142.87	11.11	.46	.64	-3.26	5.25	.08
MCS	100.25	11.24	103.33	10.15	1.47	.15	-1.07	7.24	.28
AM	59.67	9.33	59.61	6.89	-.03	.97	-3.37	3.24	.00
	Married n=91		Unmarried n=41						
MM	141.88	11.58	142.78	10.29	-.43	.67	-5.06	3.26	.08
MCS	100.79	9.64	101.93	13.62	-.55	.59	-5.23	2.96	.09
AM	60.04	8.46	58.78	9.19	.77	.44	-1.97	4.49	.14
	TBI n=96		Non-TBI n=36						
MM	142.44	11.22	141.42	11.14	.47	.64	-3.30	5.35	.09
MCS	101.23	11.37	100.92	9.19	.15	.89	-3.95	4.58	.02
AM	59.57	8.37	59.86	9.57	-.17	.87	-3.65	3.07	.03
	Mild		Moderate						
MM	140.95	10.38	144.20	12.21	-1.6	.11	-7.20	.70	.28
MCS	102.94	10.29	98.10	11.56	2.5	.01*	.99	8.66	.44
AM	58.09	8.28	62.29	8.78	-2.7	.007**	-7.20	-1.17	.49

Note. *p <. 05, **p < .01, ***p < .001; M=Mean; SD=Standard Deviation; MCS=Maladaptive Coping Style; AM=-Adaptive Mode; ns= not significant; TBI=Traumatic brain Injury; NTBI= Non-Traumatic Brain Injury

Table 4: ANOVA was computed to see score of different demographic variable on maladaptiveschema, and adaptive mode.

Variables	**df**	**F**	**2**		**Post-hoc (Hochberg GT2)**			**95%CI**	
MM	**2,129**	**3.26***	**.05**	**Age**	**M (SD)**	**Age**	**M (SD)**	**LL**	**UL**
				18-40y	143.97(11.40)	41-55y	142.33(9.31)	-3.69	6.98
						Above 55y*	137.56(12.15)	.33	12.48
				41-55y	142.33(9.31)	Above 55y	137.56(12.15)	-1.84	11.38
MCS	2,129	1.15	.02	18-40y	102.11(10.00)	41-55y	98.95(12.93)	-2.18	8.49
						Above 55y*	102.07(10.04)	-6.04	6.11
				41-55y	102.11(10.00)	Above 55y	102.07(10.04)	-9.74	3.49
AM	2,129	1.59	.02	18-40y	58.31(8.87)	41-55y	61.20(8.76)	-7.09	1.31
						Above 55y	60.59(7.37)	-7.07	2.50
					61.20(8.76)	Above 55y	60.59(7.37)	-4.59	5.80
MM	2,129	2.87*	.04	Occupation		Occupa-tion			
				Employed	140.76(11.32)	Unem-ployed	140.71(11.22)	-5.55	5.64
						Students	145.84(10.33)	-11.26	1.10

				Unemployed	140.71(11.22)	Students*	145.84(10.33)	-10.73	.46
MCS	2,129	.02	.00	Employed	100.95(9.88)	Unemployed	101.09(10.55)	-5.77	5.49
						Students	101.43(1283)	-6.71	5.73
				Unemployed	101.09(10.55)	Students	101.43(1283)	-5.98	5.28
AM	2,129	4.70*	.07	Employed	63.00(10.12)	Unemployed*	59.14(7.67)	-.43	8.15
						Students*	57.11(7.74)	1.14	10.63
				Unemployed	59.14(7.67)	Students	57.11(7.74)	-8.16	.43
MM	2,129	.88	.01	Education		Education			
				SSC	143.55(11.89)	HSSC	140.21(10.86)	-2.74	9.42
						Graduation	142.08(10.64)	-3.96	6.90
				HSSC	140.21(10.86)	Graduation	142.08(10.64)	-7.92	4.19
MCS	2,129	.73	.01	SSC	100.61(10.92)	HSSC	103.15(9.42)	-8.53	3.45
						Graduation	100.34(12.02)	-5.08	5.62
				HSSC	103.15(9.42)	Graduation	100.34(12.02)	-3.16	8.78
AM	2,129	6.96**	.09	SSC	57.04(7.39)	HSSC	58.39(7.36)	-5.87	3.17
						Graduation**	63.04(9.62)	-10.03	-1.96
				HSSC	58.39(7.36)	Graduation*	63.04(9.62)	-9.15	-.14
MM	2,129	.07	.00	MI(PKR)		MI(PKR)			
				Below 25th	141.77(11.13)	26th-50th	142.43(11.94)	-5.64	4.32
						Above 50th	142.77(7.85)	-9.30	7.30
				26th-50th	142.43(11.94)	Above 50th	142.77(7.85)	-8.68	8.00
MCS	2,129	1.62	.02	Below 25th	99.67(11.33)	26th-50th	101.74(10.88)	-6.92	2.78
						Above 50th	105.38(9.09)	-13.79	2.36
				26th-50th	101.74(10.88)	Above 50th	105.38(9.09)	-11.76	4.48
AM	2,129	.20	.00	Below 25th	59.42(8.95)	26th-50th	59.56(8.51)	-4.01	3.72
						Above 50th	61.08(8.64)	-8.09	4.79
				26th-50th	59.56(8.51)	Above 50th	61.08(8.64)	-7.98	4.96

Note. *p <. 05, **p < .01, ***p < .001; M=Mean; SD=Standard Deviation; LL= Lower Limit; Upper Limit; MM= Maladaptive Modes; MCS= maladaptive coping style AM=Adaptive Mode; MI; month income; PKR=Pakistani rupees Y=Year; SSC=Secondary School Certificate (16 Year Education); HSSC= Higher Secondary School Certificate (18 Year Education); Graduation+= (above 18 Year Education)

injury scored significantly lower on maladaptive coping style compared to mild injury. It demonstrates that the maladaptive coping strategies ratio was higher in mild brain injury patients than in moderate brain injury patients. It has been observed in a previous study that maladaptive coping style was higher in moderate brain injury patients[14], whereas the finding of the current study deviates from the previous one. A possible explanation of the low score for maladaptive coping strategies of moderate brain injury patients is that external variables, such as cultural influence, family support system and religious beliefs, could not be controlled.

Limitations

Firstly, the results of the current study are carefully interpreted and are limited to the cultural context. Secondly, the location of a brain injury is important for any psychological problem, whereas in in the current study, the focus was on brain injury in general rather than any specific area of brain injury.

In the context of Pakistan, there is a lack of published research work on brain injuries and maladaptive schema mode. The present study will help to provide evaluation and information on TBI and non-TBI patients. The study may also be helpful in diagnosing and identifying pre-existing psychiatric illness or symptoms of dysfunctional schema modes of survivors that go undiagnosed and untreated after their brain injury

CONCLUSION

Mild brain injury had high score on maladaptive coping style as compared to moderate injury. Further No significant mean differences were reported among TBI and non-TBI patients.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

Zaman S: Conception, design, data collection and entering, and manuscript writing.
Arouj K: Conception and final approval of manuscript, and statistical analysis.
Khan M: Manuscript writing and editing manuscript.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.