

Analysis of personality traits as a risk factor in crash related trauma.

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Abstract:

Background: Due to increasing stress, individual personality traits are becoming a significant contributor to CRT (Crash Related Trauma). In the present study, we hypothesized that there will be no difference in personality characteristics of CRT patients and control subjects and there will be no association between trauma and personality characteristics of CRT patients.

Method: A total of 119 cases and 112 controls of age >18 years were selected as per criteria decided. After obtaining ethical clearance, patients presenting to the emergency orthopedic unit were included in the study. After primary management all enrolled subjects were assessed by ICD 10 module screening questionnaire and analyzed for nine personality traits, subject to written informed consent.

Results: Of all the cases enrolled 82.35% were males. Impulsive personality trait is found in 84.78% (39/46) cases. There were 46 motorcyclists out of 119 cases enrolled. Most of the personality traits showed a statistical significant association ($p < 0.0003$) with CRT.

Conclusion: Majority of CRT victims attending orthopedic emergency unit at trauma center had impulsive and histrionic personality characteristics which accounted for 84.78% and 82.61% cases respectively. These traits showed a statistical significant association with CRT.

Keywords: Crash related trauma, personality traits, motorcyclist.

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Introduction

Crash Related Trauma (CRT) or Road Traffic Accidents (RTA) constitutes a major bulk of non-communicable diseases in the present era¹. They account for around 25% of all deaths from injuries across the globe according to WHO records². The statistics for India are appealing. In India, CRT alone accounts for 63.64% of cases of all the injured³. CRT constitutes the major cause of misery, disability, and deaths worldwide with a disproportionate number occurring in developing countries⁴⁻⁶. It has been estimated that by 2020, CRTs will rank as high as third amongst the causes of disability adjusted life years lost⁶⁻⁸. Most of the CRTs occur in urban regions in developing countries and pedestrians and motorcyclists collec-

tively constitute around 70-90% of deaths due to road traffic injuries. Urban pedestrians account for 55-70% of deaths⁹.

The frequency of these crash related trauma, should be determined by the risk inherent in the activity and/or the situation and should be reflected in a pattern established for chance happenings. When a frequency distribution for these CRT's is analyzed, there are a number of individuals who have a greater proportion of CRT than can be explained by chance alone¹⁰.

Researchers¹¹, suggest that individuals having difficulty related to personal and social demands of living will tend to make repeated driving errors. The term "accident proneness" was proposed in the 1920's to account for the disproportionate distribution of accidents amongst drivers with similar exposure. Proponents of the Accident Proneness Model¹² hypothesized that personality traits rather than individual differences in psychomotor ability determine which individuals are involved in accidents when the exposure to risk is equal¹²⁻¹⁴.

Certain elements of psychological factors cause the law-breaking behaviors including the personality traits such as

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impulsiveness, affectivity, extraversion, individual differences, social and attitudinal factors¹⁵.

Personality characteristics such as impulsivity and adventurousness, aggressiveness, inability to tolerate authority and control hostility, being indifferent to the rights of others, preoccupation with fantasy satisfaction, fear of loss of love and support, inability to tolerate tension, poor self-control and guilt-proneness have been reported to occur frequently in drivers¹⁶.

Generally, the studies¹⁷ indicate that individuals with aggressiveness, impulsiveness, depression, anxiety and extroversion are the 'long term repeaters' for CRTs. Although the evidences is sketchy till now, there seems to be a certain consistency in the traits described as crash related when personality differences are identified. The 'short-term accident repeaters' have been described as possibly suicidal and self-destructive or undergoing temporary life stresses or undergoing an "accident process." This recent concept emphasizes that temporary life stresses cause personality deterioration in individuals and thus lead to CRT. Personality is a moderator between stimuli and behavior. Personality traits may explain the different reactions of different individuals when faced with the same situation. So, it seems logical that differences in personality characteristics of individuals, without any psychiatric illness¹⁸ may result in differing tendencies for CRT. Also, if personality characteristic differences in CRT patients are identified, it could be inferred that differences in various personality characteristics of individuals may lead to CRT proneness.

Hence, in the present study, we worked on two research questions:

- 1) Whether there was any difference in personality characteristic of RTA cases and control subjects?
- 2) Whether there was any association between mode of causation of trauma and personality characteristics? For this we formulated two null hypothesis as-
 - 1) There will be no difference in personality characteristics of RTA patients and control subjects; and 2) There will be no association between mode of causation of trauma and personality characteristics of RTA patients.So, we conducted this study to evaluate the patterns of non-fatal orthopaedic injuries in CRT patients attending a tertiary care center and to find their association with the various personality characteristics of the injured patients.

Material and methods

The study included fully conscious and oriented patients of > 18 years, suffering from non-fatal orthopaedic injuries (taken as those cases who were conscious, fully oriented in time, place and person and did not require any intensive measure at the time of presentation, as these subjects could safely and reliably be subjected to screening procedure) as a result of CRT and attending orthopaedic emergency unit, trauma center of a tertiary referral center, subject to written informed consent. The patients for this study were enrolled on only two days in a week which was decided prior to the study. The duration of enrolment was August 2014 to July 2015. Patients with significant psychiatric illness, under the influence alcohol or other drugs that could alter his/ her alertness were excluded from the study. The attendants of the cases with similar socio-economic profile and matched for their age and sex, except injury were taken as controls. Controls were non trauma subjects who gave informed consent without any psychiatric illness and intake of drugs that could alter their alertness. This study was a hospital based open ended case control study.

After the ethical approval from institutional ethics committee and written informed consent, all cases were clinically assessed and managed accordingly. Thereafter all the cases and controls satisfying our inclusion – exclusion criteria were given a personality assessment questionnaire, namely International Personality Disorder Examination ICD-10 Module Screening Questionnaire^{19,20}. Our study primarily involved North Indian population where Hindi is the primary language for conversation. In our questionnaire, therefore we used the Hindi version of the questionnaire which is validated as per the study performed by Sharan P et al²¹. The study population was capable of understanding the local language although not all were literate enough to read it. The patients who were not able to read were assisted by a trained resident who performed the evaluation as per questionnaire under the guidance of a qualified clinical psychologist.

Nine personality characteristics diagnosed in response to screening questionnaire were studied in both cases and controls and association of any of these characteristics with CRT was evaluated for statistical significance. All the statistical tests were performed with graph Pad prism 5.0 software. Chi square test was used to determine the significance of difference in the two groups.

Results

In this study we registered a total of 119 cases and 112 controls as per inclusion-exclusion criteria. There were 82.35% males (98/119). Of all patients 38.66% were motorcyclists (46/119). Fractures constituted 94.95% (113/119) of total injuries, of which 61.34% (69/112) were closed and in that too 45.75% (97/212) were lower

limb fractures with AO sub-type 42A having the most frequent occurrence. Various personality traits in cases and controls were assessed with the help of standard screening questionnaire and their frequency of occurrence is shown in Table 1. Of all the CRT occurring in motorcyclists, 84.78% (39/46) cases were associated with their impulsive personality trait.

Table-1: Personality characteristics of CRT cases and control subjects

Personality characteristics	Pedestrian (33)	Motorcyclists (46)	LMVD (12)	HMVD (28)	Total number of cases (119)	Percentage of cases (%)	Number of controls (112)	Percentage of controls (%)
Paranoid	23	28	6	9	66	55.46	45	40.18
Schizoid	10	3	1	3	17	14.28	23	20.53
Dissocial	17	34	6	22	79	66.39	29	25.89
Impulsive	23	39	8	15	85	71.43	29	25.89
Borderline	17	28	8	14	67	56.30	24	21.43
Histrionic	21	38	9	14	82	68.91	25	22.32
Anankastic	12	15	2	4	33	27.73	33	29.46
Anxious	16	25	5	12	58	48.73	78	69.64
Dependent	12	11	none	9	32	26.89	57	50.89

LMVD: Light Motor Vehicle Drivers; HMVD: Heavy Motor Vehicle Drivers

We analyzed the personality characteristics of cases and controls, and statistical significance of their presence in

cases as compared to controls by applying chi-square test as shown in Table-2.

Table-2: Personality characteristics of CRT cases and controls

Personality characteristics	Cases	Controls	p-value
Paranoid	66	45	0.2023
Schizoid	17	23	0.3093
Dissocial	79	29	0.0002*
Impulsive	85	29	< 0.0001*
Borderline	67	24	< 0.0003*
Histrionic	82	25	< 0.0001*
Anankastic	33	33	0.8893
Anxious	39	78	< 0.0001*
Dependent	26	57	< 0.0001*

*Significant

It is inferred that persons with personality characteristics like impulsiveness, borderline, dissocial, histrionic and paranoid were significantly associated ($p < 0.0003$) with CRT when compared with normal control subjects and personality characteristics of anxiety and dependency were protective in nature showing a statistically significant negative association.

On analyzing the personality traits in motorcyclists encountering CRT by applying chi-square test (Table –3), we found that dissocial, histrionic and impulsive traits were shown to have statistical significant association with CRT

amongst cases and controls i.e these traits are pro-trauma in motorcycle riders whereas cases with schizoid, anankastic, anxious and dependent traits showed a statically negative association, meaning that these traits are protective in nature, thus preventing CRT's in motorcyclists as they are seen significantly more common in controls.

It is inferred that persons with personality characteristics like impulsiveness, borderline, dissocial and histrionic were significantly associated with CRT when compared with normal control subjects and personality characteristics of anxiety and dependency were protective in nature showing a statistically significant association.

Table- 3: Personality characteristics of motorcyclists CRT victims

Personality characteristics	Present	Absent	Percentage %	p-value
Paranoid	28	18	60.87%	0.159
Schizoid	3	43	6.52%	<0.0001*
Dissocial	34	12	73.91%	0.001*
Impulsive	39	7	84.78%	<0.0001*
Borderline	28	18	60.87%	0.159
Histrionic	38	8	82.61%	<0.0001*
Anankastic	15	31	32.61%	0.018*
Anxious	14	32	30.43%	0.007*
Dependent	6	40	13.04%	<0.0001*

*Significant

Dissocial personality characteristic is 5-6 times strongly associated with cases compared to controls, impulsive and histrionic personality characteristics are 7 times more

strongly associated to cases compared to controls whereas anxious and dependant personality characteristics were 1/5 times associated with cases compared to controls (Table- 4).

Table-4: Personality characteristics of CRT cases and controls

Personality characteristics	Cases	Controls	p-value	Odd's ratio	Confidence interval
Paranoid	66	45	0.2023	1.854	0.998 – 3.128
Schizoid	17	23	0.3093	0.644	0.324 – 1.284
Dissocial	79	29	0.0002*	5.653*	3.200 – 9.980
Impulsive	85	29	< 0.0001*	7.155*	4.004 – 12.787
Borderline	67	24	< 0.0003*	4.724*	2.648 – 8.428
Histrionic	82	25	< 0.0001*	7.712*	4.273 – 13.920
Anankastic	33	33	0.8893	0.918	0.518– 1.626
Anxious	39	78	< 0.0001*	0.212 *	0.121 – 0.370
Dependent	26	57	< 0.0001*	0.269*	0.152 – 0.477

*Significant

Discussion

In real life scenario, some people are prone to CRT by virtue of multiple factors which probably define personality traits of the individual in some way. These traits are of equal importance in all situations where CRT's may occur, the implication being that a comparatively small group of individuals is responsible for the majority of such trauma.

The quality of motives, feelings, attitudes, beliefs and value system and a set of individual and social behaviors could be considered as the major factor in traffic phenomenon. In this regard, the personality and psychological characteristics of drivers, conditions governing the cognitive field and their emotional, behavioral and sensory- motor feelings could play the highest role in traffic and CRT.

In our study, majority of CRT victims attending orthopedics emergency unit at trauma center were having impulsive and histrionic personality characteristics which accounted for 71.43% and 68.91% cases respectively. Other common personality characteristics of CRT victims were paranoid, dissocial and borderline personality characteristics which were present in 55.46%, 66.39% and 56.30% cases respectively. Schizoid, dependent, anxious and anankastic personality characteristics were relatively

rarer where as in control subjects who were attendants of CRT victims, anxious personality characteristic was most common (69.64%) followed by dependent and paranoid personality characteristic in 50.89 % and 40.18% controls respectively. Other personality traits like impulsiveness, histrionic trait, dissociative behavior, and borderline traits were relatively rare in controls.

To the best of our knowledge, no study has been done in reference to the parameter of our study. People have tried to correlate various types of personalities, personality traits, and behavior with many other aspects of CRT and its proneness in the past. Jonah¹⁵ in a meta-analysis of 40 studies found that only 4 studies did not find significant positive relationships between Sensation Seeking (SS) and some aspect of risky driving. Overall, Jonah evidenced that high sensation seeker patients were more likely to experience collisions and violations than low sensation seekers. In our study, sensation seeking as a personality trait was not considered as it is not defined by the ICD-10 module screening questionnaire. On contrary, persons with impulsiveness and histrionic personality characteristic were more prone to CRT probably due to loss of self-control. Histrionic trait in some way pertains to sensation seeking trait and is defined as a melodramatic behavior designed to attract attention. Thus our study findings are

in accordance with and are well supported by the study conclusion of Jonah et al. Our study also seeks support from Blanchard, Barton and Malta²² who analyzed amongst different personality traits that SS trait is a good predictor of self-reported driving violations.

Our study findings support the observations of Manglam M K et al.²³ who found significantly higher frequency of breaking rules, crossing speed limits and a trend towards a higher frequency of carrying extra persons (i.e., more than recommended) in accident-prone drivers. Histrionic personality trait followed by dissocial trait constitutes all these tendencies of CRT proneness and in our study had a significant positive association with CRTs. They also observed that emotional lability was more common in crash prone drivers, which is in accordance with borderline personality characteristic of our study. Apprehension was described as a protective trait by them where as anxiety as a trait in our study also revealed a negative association with CRTs and anxiety in a way pertains to apprehension.

Further, in our study, majority of motorcyclists who were CRT victims were having predominance of impulsive and histrionic personality characteristics accounting for 84.78% and 82.61% cases respectively followed by anti-social, paranoid and borderline personality characteristics which were 73.91%, 60.87% and 60.87% respectively and least common personality trait type was schizoid. Our study further seeks its support from the study findings of Beirness, D.J.²⁴ who found that one factor accounting for crash involvement was a reduced capacity to manage or control hostility. He observed that the greatest numbers of traffic CRT were reported by a subgroup characterized by aggressive and un-socialized tendencies. This pertains in our study that having an impulsive personality characteristic prone for CRTs.

Thus we conclude that individuals with certain personality characteristics are prone to CRT. We recommend that these individuals may be identified and counseled at the time of disbursing of driving licenses; which in turn may lead to a lower prevalence of CRT. However determinants of CRT include a combination of environmental, vehicle and human factors. Other factors also need to be studied and controlled to make a significant reduction in the prevalence of road traffic accident prevalence.

Our study is limited by its small sample size, included patients from a single center, limitations of IPDE ICD-10 module screening questionnaire and the fact that we limited our study to only non-fatal injuries. Limitations of IPDE ICD-10 questionnaire include the assumption that a person is capable of providing a valid description of disturbances in his personality. However, an individual may be unaware of some of his traits.

He or she may also be resistant to acknowledging behavior, if it is socially undesirable or if he thinks its disclosure is likely to adversely affect his best interests. This is especially likely to occur in patients who wish to terminate treatment prematurely, or in those about to be discharged from a mental health facility. Others may exaggerate disturbances in their behavior. This is sometimes observed in those who are frantically seeking help, or who are dissatisfied with their treatment or the amount of attention they are receiving. It may also be a reflection of certain personality traits.

Multi-centric studies including other relevant emergency surgical specialties, with larger sample size are further needed to gather strong support and validate the findings of our study. We would definitely like to stress upon the fact that the causation of CRT is multi-factorial and in this study we have focused only on one aspect (personality trait) of it, which might be one of the possible associations and should not definitely be attributed as a sole cause for it.

We also have not included or measured any driving behaviors like breaking rules, crossing speed limits and trend towards a higher frequency of carrying extra persons. So we also recommend further studies taking into consideration the above mentioned parameters for future research and better understanding of injury patterns in CRT.

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Conflict of interest

None

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