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Post-traumatic stress disorder among the accident survivors: A study in Bengaluru

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Abstract
The Road traffic injuries are a major but neglected global public health problem, requiring concerted efforts for effective and sustainable prevention. Of all the systems that people have to deal with on a daily basis, road transport is the most complex and the most dangerous. Going by the national statistics, every year the lives of approximately 1.35 million people are cut short as a result of a road traffic crash. Between 20 and 50 million more people suffer non-fatal injuries, with many incurring a disability as a result of their injury. The post traffic accident experiences of the individuals surviving the accident has psychological, social and economic implications. The present study introspects the psychological imperatives of the accident survivors and trauma they undergo.

Keywords: Trauma, accident, injury

Introduction
The tragedy behind the road traffic crashes and accidents regularly attracts less media attention than other, less frequent but more unusual types of tragedy. The majority of the road accident fatality are currently among "vulnerable road users"- pedestrians, pedal cyclists and motorcyclists. The first major report issued on road injury prevention jointly by the World Health Organisation (WHO) and the World Bank contends that, first the level of road deaths and injuries is unacceptable and second that it is to a large extent avoidable.
In reality, RTAs has a major impact on the poor and middle class society of India as they are killed, injured and disabled in large members; do not have access of quality care, do not receive timely compensation; are unable to work and generate; and hence lead poor quality of life. This economic burden and impact indicates the seriousness of the problem and the consequent difficulty in leading life after the accident. The individuals in the city of Bengaluru travel from their residence to various pursuits irrespective of their gender. Women employment across various sectors have led to the necessity of multiple modes of travel ranging from private, Para- transit to public transport. The patterns of Road traffic accidents are more likely with the male counter parts.
Post-traumatic stress disorder is a typical response to consequences of road accidents. Despite the existence of a post-traumatic theory, psychological manifestations in people who suffered road accidents with various consequences for their life and health are still poorly studied. In the context of a theory of stress, a psychological trauma is considered to be a special form of general response to external factors, including road accidents. Traumatic stress is quite intense and subjects psychological, physiological and adaptive capabilities of a person to additional load, destroys psychological defenses, causes anxiety and often results in deterioration of somatic health (Zashchirinskaia, 2018).

Review of Literature
Zaved Ahmed Khan (2010) [21] opine that stress reactions after a road accident may include the diagnosis of post-traumatic stress disorder (PTSD), depression and anxiety disorders, as well as other psychiatric conditions such as prolonged grief reactions, somatisation and substance abuse. This paper reviews the approach, considers the viability and offers a framework for applying energy psychology in treating road accident trauma patients. Energy psychologies have been dubbed "power therapies" because they work so quickly compared to the traditional talk therapy.

This appears to be partially because they target the more primitive parts of the brain - the limbic system, medulla oblongata and Enkephalin system, which is in every cell of the body (Zaved Ahmed Khan, 2010) [21].

Dinabandhu Mahataa (2019) [22] analyses the trends and patterns of RTAs in India during 2000–2015. It portrays the pattern of RTAs in major Indian cities in 2015. Every day 1374 road traffic accidents (RTAs) and 400 deaths take place in India. Accordingly, the number of deaths in RTAs would increase to 662 persons per day in 2030 and will not begin to decline until 2042, among other things, this poses serious public health and challenge (Dinabandhu Mahataa, 2019).

Ali Ahmed Mohammed *et al.* (2019) [23] propounds that traffic accidents cause many losses especially of human life, property damages, and loss of resources. Indeed, even in strife influenced countries such as Afghanistan, Libya, Pakistan, and Yemen, road traffic remains the most common cause of fatal injuries, causing between two and eight times more fatalities than war and lawful mediation. Fatalities and injuries resulting from road traffic accidents are an essential and developing general medical, social as well as economical issue in India. Consistently almost 2,650 people die and 9,000 per year get injured due to traffic accidents. In 2013, the most recent year for which data is accessible, 137,423 people died and 469,900 people got injured due to road accidents in India (Mohammed, 2019) [23].

Bishnu P Choulagai (2015) [24] observes that nearly 1.3 million people die each year as a result of Road Traffic Accidents (RTAs). More than nine in every ten (91%) of the world's RTA fatalities were from low and middle income countries such as Nepal. The study describe epidemiology of RTAs and reasons for delayed post-crash response in one of the major highways in Nepal. Truck, trippers and scooters were vehicles involved in majority of accidents. Roads with severe turning, lack of adequate street lighting and the festival seasons were main reasons for RTAs. Establishing trauma centres and strengthening trauma units of tertiary care hospitals, establishing rescue teams at every 10-kilometer long road segment of the highway and formation of effective coordination committees at local level would strengthen post-crash response (Bishnu P Choulagai, 2015) [24].

Table 1: Burden of road traffic injuries (RTIs) in population-based surveys

	Year	Place	Sample size	Remarks
Author (Sathyasekaran, 1991) [16]	1991	Government general hospital, Chennai	670 RTI patients	35% of all accident trauma case 59% with serious injuries only 32% reported to police
	1993	LLRM medical college, Meerut	385 head injury patients	64% of head injuries due to RTIs
	1993	One year survey of 8 hospitals in Bangalore	1,784 brain injured persons	52% of total brain injuries due to RTIs
	1993-1993	Government medical College, Patiala	2,482 deaths	45% of total injury deaths due to RTIs
	1996	Chennai	Survey of 4333 persons from 800 households in urban slums	Incidence: 1600/million population/year; highest in 15–29 years age group; 10% were
	1996	Deaths registered by police, New Delhi	3,623 postmortem analysis	40% of deaths due to RTIs
	1998	PHC Palla, Faridabad	Survey of 38 909 people from 7135 households from 24 villages	29% of injured were traffic accidents, two-third of injuries occurred on village roads
	1998	Bangalore	Survey of 21 357 individuals from 4822 households	16% of households had an injured person; RTIs accounted for 47% of injury deaths; 20% of injuries due to RTIs; of those hospitalized 15% for >24 hours
	2000	23 hospitals in Bangalore	3,105 hospital subject in Emergency Departments	12% of casualty; 52% of total injuries; 6% of ER deaths and 35% injury deaths due to RTI
	2003	Haryana	Survey of rural population of 25 000	18% of injuries were transport-related; Incidence: 649/million population
	2003	Post graduate institute of medical education and research, Chandigarh	5933 deaths postmortem analysis	50.3% of deaths due to RTI
	2004	Bangalore	Survey of 96 569 individuals from 19 919 households in urban, rural and slum populations	47% of total injuries; RTI mortality and incidence: 340 and 6490 per million population, respectively
	2005b	3 years study at NIMHANS, Bangalore	6,700 brain injured person due to RTI	60% of brain injuries due to RTI
	2006	Hyderabad	Community survey of 4019 pedestrians and 4183 motorized two-wheeler (MTW) drivers for 17 454 and 17 242 household members	Annual incidence of RTI for a pedestrian or MTW driver was 22 880 per million population based on 3-month recall period. Fatal and non-fatal RTI rate was 173/per million population. Among injured 13% treated as inpatients, 3% could not return to work and 1% lost their jobs

Multiple impacts of road injury

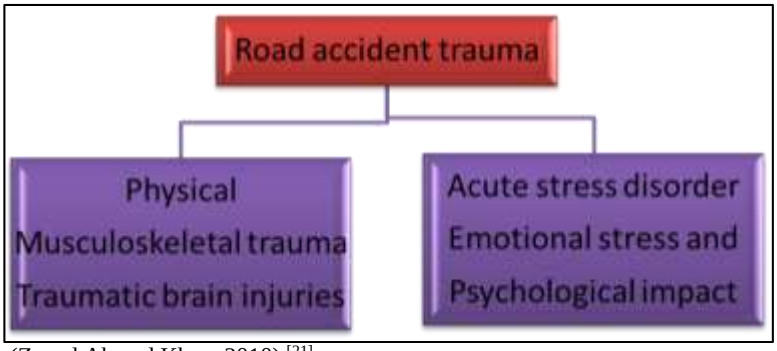
Road injury impacts on the indigenous community at multiple levels. Direct effects can be measured in terms of deaths, hospitalisations and associated disabilities. Additional effects include emotional stress and psychological impact of the injury on individuals, family

members and close-knit community groups. Particularly when long-term care is needed, secondary impacts can result in reduced quality of life for carers. Financial stress can also occur as a result from loss of labour, medical and legal costs and vehicle repairs. The impact can be particularly immense if a driver is killed or seriously (Zaved Ahmed Khan, 2010) [21].

Table 2: Identified challenges and barriers to road safety and trauma care

	Knowledge	Attitude	Engagement	Management	Capacity	Infrastructure
Government (all sectors)	Limited knowledge of road safety interventions	Unaware that road safety is a government problem	Lack of political will Corruption	Absence of lead agency Investment in ineffective campaigns	Inadequate finances Under-funded police forces	Lack of systematic planning of transport systems
health	Unclear estimates of burden of trauma on health sector	Road safety not perceived as a health sector issue	Health is not a partner in larger transport and infrastructure development programs	No systems approach to road safety and trauma care Silo management of activities by different sectors	Inadequate post-crash care Growing costs of trauma care Under-funded rehabilitation services	Lack of national policies and programs on trauma care Lack of integrated trauma facilities No EMS system
Community	Limited knowledge of first aid	Fatalistic attitudes	Need for CSOs/NGOs to take ownership of road safety initiatives	Few CSOs focused on road safety	Lack of training for CSOs/ NGOs in RTI prevention and post-crash care	Rapid urbanization increased demand on infrastructure and car dependency
Academia	Lack of translational and cost data		Resistance/barriers to engaging with policy-makers and government		Road safety research poorly funded	
Private sector		Focus on business case for engagement	Lack of corporate social responsibility to improve road safety	Non-standardization of safety regulations Weak local safety standards Industry competition de specification of safety features		Surge in demand for cars

Allen, D. P. (2013) [1]. Road Traffic injury and Trauma Care: Innovations for Policy (Road Trip). Wish Road Traffic Injury Report, 1 - 47.



(Zaved Ahmed Khan, 2010) [21]

Road Accident Trauma

Post- traumatic stress disorder

Clinically-diagnosed PTSD can be best described as an extreme reaction to exposure to trauma. PTSD may develop following either direct or indirect exposure to actual or threatened death, serious injury or sexual violence. Direct exposure may occur through experiencing singular or multiple traumatic events or through witnessing such an event happen to others. Indirect exposure may occur when learning about a traumatic event that has affected close relatives/friends or when exposed to details about an event through work. Traumatic experiences may include natural disasters, crimes, accidents, war or conflict, or other threats to life or safety (Ottawa, 2019) [13].

According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), PTSD is characterized by a variety of symptoms that can generally be grouped into four categories:

- Re-experiencing (nightmares, flashbacks, and other intense or prolonged psychological distress);
- Avoidance (avoidance of distressing memories, thoughts, feelings, or external reminders of the traumatic event)
- Negative cognitions and mood (represents feelings which may include: persistent and distorted sense of blame of self or others, estrangement from others or markedly diminished interest in activities, and/or inability to remember key aspects of the event)
- Arousal (hyper vigilance, reckless or self-destructive behavior, irritability or angry outbursts, and sleep disturbances).

A diagnosis of PTSD requires that a certain proportion of these symptoms be present for more than one month and cause significant distress or impairment of functioning. As with most mental disorders, the biological processes involved in PTSD are not fully understood. It cannot be explained why people who experience the same event might either develop PTSD or experience no symptoms. OSI is not a diagnosable mental disorder, but may be used to refer to one or more specific diagnosable mental health disorders or to another mental health problem (Ottawa, 2019) [13].

Table 3: Patients experience 3 'clusters' of PTSD symptoms

Symptom cluster	Symptoms
Re-experiencing (≥1 required)	• Distressing recollections of the trauma • Distressing dreams of the trauma • Acting/feeling as if the trauma were recurring • Psychological distress upon confronting trauma cues • Physiologic reactivity upon confronting trauma cues
Avoidance/numbing (≥3 required)	• Avoiding trauma-related thoughts, feelings, or conversations • Avoiding activities, places, or people reminiscent of the trauma • Inability to recall an important aspect of the trauma • Diminished interest or participation in significant activities • Feeling of detachment or estrangement from others • Restricted range of affect • Sense of foreshortened future
Hyperarousal (≥2 required)	• Sleep difficulties • Irritability or outbursts of anger • Difficulty concentrating • Hypervigilance • Exaggerated startle response

Hickling, E. K. (2007) [9]. Treating posttraumatic stress in motor vehicle accident survivors. Current Psychiatry, 17 - 27.

Note: In addition to having the minimum number of symptoms from each cluster as indicated above, for a patient to meet PTSD criteria, symptoms must cause clinically signifi cant distress and impairment in functioning. PTSD: posttraumatic stress disorder Source: DSM-IV-TR

Definition of terms

Trauma

The word "trauma" is used to describe an injury to living tissue caused by an extrinsic agent. An injury is defined as damage or harm caused to the structure or function of the body by an outside agent or force, which may be physical, chemical, or even psychological (Lojpur).

Table 4: Signs of Secondary Trauma

Physical Symptoms	• Headaches • Stomach problems • Sleep problems • Weight gain or loss • Lack of energy Behavioral
Behavioral Symptoms	• Increased drinking or smoking • procrastination • Feeling overly critical • Avoiding other people
Emotional Symtoms	• Anxiety • Frequent crying • Irritability • Loneliness • Depression
Cognitive symptoms	• Inability to concentrate • Forgetfulness • loss of human fun • Inability to make decisions

Parenting a Child Who Has Experienced Trauma. (2014) [14]. Child welfare Information Gateway, 1-7.

Incidence of injuries

In developed countries, every year a serious trauma experiences about 3% of the total population. Trauma affects significantly more males (more than 60%). Of the total number of injured 4% of them being permanently disabled and 1.5% die. It is important to note that death and disability due to trauma affecting mostly young adult segment of the population, people ages 1-45.

The injuries are a major source of health care costs. An annual price of providing for injured gets to an amount which is almost a double price of providing for cardiovascular and malignant diseases together.

Causes of injuries

Anything that can damage the body can cause an injury: blunt or sharp objects, impact at high speed, falls, animal or insect bites, fire or extreme heat, and exposure to chemicals

and toxins. According to the cause the injury can be divided into:

- Mechanical injury - injury to any portion of the body from a blow, crush, cut, or penetrating force (bullet)
- Thermal injury - injury caused by exposure to excess heat and excess cold sufficient to cause damage to the skin, and possibly deeper tissue
- Electrical injury - injuries caused by exposure to natural lightning or electricity in the home or workplace, and
- Injury produced by ionizing radiation

Symptoms and signs of injuries

Injury symptoms and signs vary depending on the parts of the body involved and the type and severity of the injury itself.

Table 5: The parts of the body, symptoms and signs of injury

Head	Neck	Shoulder and chest	Abdomen and pelvis	Arms and legs	Back and spine
• Bleeding • Fractures • Bruising • Swelling • Tenderness or pain • Cerebral spinal fluid (CSF) from ears	• Bleeding • Fractures • Bruising • Swelling • deformity • Tenderness or pain • Numbness or tingling	• Bruising • Swelling • Gently • Tenderness or pain when gently 'spring' the ribs unequal rise of the chest with each breath	• Rigidity • Tenderness or pain • Swelling	• Bleeding • Fractures • Soft tissue • Injuries • Tenderness or pain • Loss of strength	• Bleeding • Deformity • Tenderness or pain • Paralysis or inability to move a body part

Lojpur, M. (n.d.). First Aid to the Injured. 1 -27 [11].

Research methodology

This paper is basically descriptive and analytical in nature. In this paper an attempt has been made to analyze the post-accident trauma and stress disorder among the accident survivors of road accidents in the city of Bengaluru. The study used data both from primary and secondary sources.

Table 6: Author's compilation from various sources

Maladaptive Processes	Specifics of Perception of Own Life	Emotional State Peculiarities	Social Attitudes	Attitude Towards Oneself
I don't have an influence on my own life It's hard to remedy the situation Angry I put myself at risk Victimization of other people Revictimization Guilt No future Somatization Health problems I don't pay attention to safety Shame Aggressive Hypochondriac fears No passion for work I'm suppressing anger Loss of reality Feeling of isolation Reappraisal of values I'm losing temper Avoiding contacts I'm having accidents Lack of trust	The fate is merciful It's dangerous to trust I'm lucky I'm unlucky I can avoid bad luck I don't count on luck I'm unfortunate People aren't friendly People cannot be trusted I'm not very lucky Life is hard to control I was lucky in the past I'm cautious to trust I don't trust people at all You cannot trust people	Depression I'm remembering images Solitude I'm remembering the event unintentionally The feelings returned I'm easily get scared Guilty conscience Annoyance Fear Mood swings Tense muscles I have trouble sleeping Fearfulness Reminders The feelings have got stronger Night terrors Physical response It's hard to concentrate I dreamt of the accident	I'd hit somebody Fate is favorable to good people I deliver maximum results All misfortunes are due to mistakes I'm trying to forget the event I'm annoyed Good people are lucky I tried not to talk about the accident Annoyance I have powerful emotions, but I didn't think about it	People cannot be trusted Guilty conscience I have many merits I appreciate myself I like myself I'm no good Low self-esteem

Source: Author's compilation from various sources

Analysis and interpretation of primary data

The primary data is collected from 50 sample respondents who have survived road accidents in the city of Bengaluru.

Table 7: Profile of the Respondents

Variables	Frequency	Percentage
Age in years		
25-30	11	22.0
30-35	12	24.0
35-40	13	26.0
40-45	8	16.0
45 and above	6	12.0
Gender		
Male	31	62.0
Female	19	38.0
Type of Injury suffered		
Minor injury	32	64.0
Moderate injury	10	20.0
Severe injury	8	16.0
Psychological Problem suffering		
Depression	20	40
Anxiety	3	6
Depressive mood	19	38
Post-traumatic stress disorder	5	10
Phobia	3	6

11 respondents are in the age category of 25-30 years. 6 respondents are aged 45 years and above. The gender composition indicates that 62% of the respondents are male. 64% have survived minor injury. One-fifth of the respondents have moderate injury. 16% of the respondents are in the severe injury category.

Question regarding the psychological problem suffered post road accident was posed to the respondents. Four-tenth of the respondents express that they suffered depression. 10% of the respondents have contended to experience post-traumatic stress disorder.

Hypothesis

Ho: There is no relationship between the Type of Accident and the Presence of maladaptive processes

Table 8: Influence of the Type of Accident and the Psychological issues

		Sum of Squares	df	Mean Square	F	Sig.
Presence of Maladaptive Processes	Between Groups	.963	1	.963	.858	.000
	Within Groups	53.917	48	1.123		
	Total	54.880	49			
Specifics of Perception of Own Life	Between Groups	1.841	1	1.841	90.240	.000
	Within Groups	.979	48	.020		
	Total	2.820	49			
Emotional State Peculiarities	Between Groups	75.363	2	37.682	69.136	.000
	Within Groups	25.617	47	.545		
	Total	100.980	49			
Social Attitudes	Between Groups	25.153	2	12.577	66.666	.000
	Within Groups	8.867	47	.189		
	Total	34.020	49			

The Anova result shows the relationship between the Type of Accident on the Psychological issues for the accident survivors. The results of the sample respondents for the Type of Accident differ significantly ($p<0.05$) with respect to Psychological issues for the accident survivors.

Table 9: One-Sample Test Influence of the Type of Accident on the Psychological issues for the accident survivors

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Presence of maladaptive processes	28.864	49	.000	4.320	4.02	4.62
Specifics of perception of own life	145.608	49	.000	4.940	4.87	5.01
Emotional state peculiarities	177.180	49	.000	4.960	4.90	5.02
Social attitudes	177.180	49	.000	4.960	4.90	5.02

The T-test result shows the relationship between the Type of Accident on the Psychological issues for the accident survivors. The results of the sample respondents for the Type of Accident differ significantly ($p<0.05$) with respect to Psychological issues for the accident survivors.

Conclusion

The specifics of the traumatic experience descriptions composed by drivers who were involved in road accidents include the features of maladaptive processes, emotional state, specifics of perception of own life, social attitudes and attitude towards oneself. After an accident, positive self-

acceptance and support of family members and friends contribute to a decrease in the post-traumatic stress disorder duration and reduce the deferred psychological traumatization. Energy therapies free these feelings of powerlessness from a road accident patient especially handicapped after the accident so he/she is no longer stuck in immobility. There is no doubt that energy psychology has a powerful impact on those who experience trauma. Anyone who works with the therapy witnesses its success daily. Energy methodology, though just beginning to have the research to back it up, does have enough evidence to support its use for those who desperately need it. It is time to take it to the victims of road accident so that they may move on with their lives and be productive citizens in their society. The implications of the energy psychology intervention described in the case study can be used for research, health policy formation and education of clinicians.

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