

ORIGINAL ARTICLE

The psychosocial consequences of road traffic accidents: a review article

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ABSTRACT

A road traffic accident (RTA) is one of the main causes of injuries where the number of casualties reaches 10 million every year, and 1.25 million people die annually. An RTA can lead to physical and psychosocial outcomes that can disable the victims. The psychosocial consequences are as important as the physical consequences can affect the recovery process and have a long-term effect. RTA victims reported an impact on familial, social life, and mental health. The current review looks into the psychosocial consequences of an RTA, such as post-traumatic stress disorder, depression, anxiety, work disability, financial problems, or relationship problems, which are devastating and have a variant and substantial impact at the individual, family, and social level.

Keywords: RTA, psychosocial consequences, PTSD, depression, anxiety, work disability.

1. Introduction

Road traffic accidents (RTAs) are considered as a major health concern facing the world's population. RTAs are a leading cause of mortality globally, accounting for 1.25 million deaths annually [1]. According to the World Health Organization, RTAs are one of the principal causes of injuries in which the number of casualties reaches 10 million every year [2]. In 2017, Saudi Arabia's General Directorate of Traffic reported that there were 7,489 deaths and 33,199 injuries caused by RTAs [3]. Pedestrians and cyclists are the most susceptible road users involved in accidents [4]. The severity of the injury is higher for pedestrians and cyclists because of the absence of a vehicle that might give them some protection [5]. Hong et al. [6] showed that elderly women pedestrians are more likely to be involved in RTAs than men. In contrast, Abu-Zidan and Eid [7] showed that injury severity increased in the elderly regardless of their sex. While fatigue driving is one of the main causes of traffic accidents, most people are unaware of its hazards and, therefore, it is known as a silent killer. [8]. Inexperienced drivers, especially males have an increased risk of driving accidents while fatigued [9,10]. In Saudi Arabia, speeding is a major cause of RTAs, accounting for about 43.11% of accidents [11]. The physical and psychological outcomes of RTAs can be disabling to survivors. Tournier et al. [12] found that 25.2% of casualties and 50.6% of people with serious injuries reported an impact on familial life. In accordance with the previous result, Pfeifer et al. [13] found that 42.9% of severely injured patients reported an impact on their social life. Besides, 57% of those affected have been or were still suffering from a psychological disorder

[12]. All of these findings point to the psychosocial consequences of RTAs. Although the consequences of a psychological disorder following an injury are no less important than the physical consequences, most research studies focus on the physical outcomes and fail to consider the psychosocial outcomes. Elbers et al. [14] reported that the psychological consequences following an RTA could be long lasting. The psychological outcomes can affect the healing process of physical injuries, and vice versa [15]. This review describes the prevalence, impact, and other factors that contribute to the psychosocial consequences of RTAs, such as post-traumatic stress disorder (PTSD), depression, anxiety disorder, and adverse social outcomes.

2. The Psychological Disorders Following RTAs

2.1 Post-traumatic stress syndrome: prevalence and predictors

PTSD is considered one of the main psychological consequences for RTA survivors [16]. PTSD is an anxiety disorder that can develop after experiencing a

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traumatic event, such as a serious RTA, war, or natural disaster. Many people with PTSD struggle with their symptoms and may develop more medical problems. The symptoms of this mental health condition after exposure to an RTA are flashbacks, re-experiencing unwanted thoughts, nightmares, avoidance of driving, emotional numbing, isolation, hyperarousal, and difficulty with sleeping or concentrating [17]. PTSD rates following RTAs show significant variations between countries and within each country. Globally, the prevalence of PTSD following an RTA varies from 6% to 45% [16]. Table 1 shows the prevalence of PTSD in different countries. In Japan, 8.5% of people developed PTSD after being involved in RTA that resulted in severe injury [18]. In the USA, 27.5% and 24.3% of people at 6 months and 1 year, respectively, developed PTSD after moderate to severe injuries occurred [19]. In Spain, 32.8% of RTA survivors met the diagnostic criteria for PTSD 4 months after the accident [20]. Another study conducted in France showed that 7.74% of RTA victims developed PTSD at 6 months after the accident [21]. Some studies suggest that local environmental factors, such as socioeconomic status, culture, and health care systems, are responsible for this big variation in the prevalence rates of PTSD [22].

The severity of the injury is considered as a predictor for developing PTSD as well as the permanence of physical injury 4 months after an RTA, which impedes the healing of PTSD patients and assists the development of PTSD [20]. However, one study suggests that there is no relationship between the injury severity and the prevalence of developing PTSD [23]. Another study conducted in the UK found that 13% of RTA survivors developed PTSD after a minor injury [24]. Some studies discussed the link between gender and PTSD development after an RTA. Although women were less likely to experience an RTA than men, they were more vulnerable to developing PTSD. The likely reason for the gender variation may be because women are more vulnerable to be exposed to multiple traumatic events throughout their whole life beyond the RTA. Therefore, multiple events may increase the risk of developing PTSD following an RTA [25]. In contrast, a study found that there is no significant variation between the sexes in the prevalence of PTSD after an RTA, revealing that 60.5% of women and 53.3% of men met the diagnostic criteria of PTSD [26]. Ryb et al. [19] found that the death of another rider is a predictive factor of PTSD after an RTA, and also pointed

out that there was a history of depression and previous traumatic events related to PTSD development in both univariate and multivariate analysis. Chossegros et al. [27] found that 25% of subjects with PTSD reported that another family member was involved in a car accident, compared to 17% without PTSD. Besides, the occurrence of death by accident increases one's risk to develop PTSD; therefore, when someone has a close relationship with the dead victim, the risk will increase strongly [19]. Besides, some studies found mixed results that linked the physiological reactivity immediately after the accident to PTSD development later on. An increased heart rate in the initial phase after the accident related to the development of PTSD as well [18]. Besides, 72% of RTA survivors who developed acute stress disorder (ASD) or partial ASD shortly after the accident were at higher risk to develop PTSD; accordingly, early intervention and follow up for ASD is effective to preempt PTSD development [18]. Social status affects the development of PTSD, including getting divorced in the year before the accident [27]. Different studies strongly indicated that physical disability was associated with the development of PTSD [18]. PTSD was linked to the survivors who had lower extremity fractures with poor functional outcomes and fractures that prevented the return to their prior lifestyle [19]. The intensity and persistence of pain for 6 months after the accident was reported as a predictive factor for chronic PTSD [27]. A lack of social support was highly correlated with PTSD development [16]. Several studies showed that there is no association between PTSD and the position of the victim in the car, nor is it associated with the use of alcohol or other substance abuse [19–27]. Feelings of not being responsible for the accident were a predictive factor for PTSD; 74% of survivors with PTSD reported that they were not responsible for the accident, compared to 63% without PTSD [27].

3.The Effect of PTSD on Quality of Life and the Importance of Treatment

In general, PTSD has a strong effect on the quality of a patient's life, not only their health but also their relationship with their family and social community [27]. A study confirmed that there is a strong relationship between PTSD and impaired health-related quality of life [28]. Besides, PTSD affects the occupational life of the patients; thus, they face problems returning to work after eight months following the accident [27]. PTSD patients

Table 1. The studies describe the prevalence of PTSD.

Author (year)	Country	Sample size (n)	Prevalence (%)
Coronas R, Gallardo O, Moreno M, Suárez D, García-Parés G, Menchón J. (2011)	Spain	119	32.8 at 4 months After the injury
Berna G, Vaiva G, Ducrocq F, Duhem S, Nandrino J. (2012)	France	155	7.74 at 6 months after the injury
Ryb GE, Dischinger PC, Read KM, Kufera JA. (2009)	USA	367	27.5 at 6 months after the injury
Hamanaka S, Asukai N, Kamijo Y, Hatta K, Kishimoto J, Miyaoka H. (2006)	Japan	100	8.5 at 6 months after the injury

struggle with financial, parenting, and interpersonal problems and may develop different physical and mental health problems, such as substance abuse, insomnia, and comorbid depression, so PTSD patients are at high risk of suicide [29]. Therefore, an early diagnosis is important to prevent the disorder and reduce the long-term consequences related to PTSD [27]. The treatment of PTSD involves both psychological and pharmacological therapies and psychological treatments are recommended as the first-line treatment plan [29]. Table 2 shows the impact of PTSD on the quality of life.

4. Depression, Anxiety Disorder, and Travel Phobia after RTAs: Prevalence and Predictors

Traumatic events like RTAs can cause several psychological problems in addition to PTSD, including depression, anxiety, and travel phobia [30,31]. There is significant comorbidity between the psychological consequences of RTAs but, in rare cases, depression can occur without the presence of PTSD or other phobias; 82% of victims with depression were found to have PTSD and 91% of them had a travel phobia [30]. Besides, 10.9% of RTA victims met the criteria for a major depressive episode following the accident and 30.7% had a travel phobia after the accident [30]. Another study found that 55% of RTA survivors who admitted to the hospital immediately developed moderate-to-severe anxiety before being discharged from the hospital, and females were more likely to experience severe anxiety symptoms than males [31]. This study mentioned that the most common symptoms that might be experiencing by victims after RTAs were feeling faint (38.8%), wobbliness in legs (35.5%), and dizziness (33.8%) [31].

5. The Impact of Depression and Anxiety on the Quality of Life After an RTA

The occurrence of a major depressive disorder or anxiety disorder is correlated with a lower quality of life, but PTSD has the most significant effect on the quality of life [32]. A cohort study showed that depression after a minor injury affects the quality of life negatively, even a year after injury [33]. The anxiety disorder symptoms decreased significantly after 6 to 8 months from the time of the injury; therefore, it did not have a long-term impact [31]. Survivors who had moderate to severe depressive symptoms in the month before the accident is at risk for

the poor quality of life because of behavioral, cognitive, and mental health-related causes after a minor brain injury [34]. Depression is considered to be a consequence of chronic pain; victims who have a depressive disorder and intense pain will have a lower physical function, which affects the quality of life negatively [32]. PTSD has a strong and direct impact on the quality of life, whereas a major depressive disorder has an indirect impact through its relationship to higher levels of pain after an RTA [32].

6. Social Outcomes

The social consequences of injury after an RTA are numerous and varied: work disabilities and absences, the loss of economic productivity, impediments to the return to pre-injury activity and participation in life, home and vehicle modifications to meet the victims’ needs, and the need for another person to take care of them [35–37]. A study conducted in Spain found that 22.4% of victims suffer from a work disability, 1.4% and 0.2% need some modifications on their homes and vehicles, respectively, and 2.6% require another person to help them in daily life activities [37].

7. Working and Financial Status after RTA

RTA victims with persistent physical disabilities are vulnerable to losing their jobs or suffering from financial problems [18]. Numerous factors affect the duration of time before returning to work after an RTA [38]. A cohort study conducted in France found that 23% of 1,112 working-age subjects who were working at the time of an accident reported that they delayed returning to work following the RTA [38]. In another study, 37.4% of subjects who had worked before an RTA reported an effect on their job, and 47% of the subjects reported persistent financial problems [12]. In agreement with the previous study, 37% of victims who suffered from a blunt orthopedic trauma reported a persistent financial loss even 10 years following the accident [13]. A study showed that 19% of the subjects with foot injuries changed their work due to their condition [12].

8. Factors Associated with a Late Return to Work Following an RTA

There is a strong association between a delayed return to work after an accident and persistent pain or an impaired health condition at 6 months following the accident and

Table 2. Studies reporting the impact of PTSD.

Authors (year)	Method	Population	Findings
Chossegros L, Hours M, Charnay P, et al. (2011)	A prospective cohort study.	Road traffic accident casualties. Questionnaires were filled after 6 months of injury.	PTSD has a strong effect on the quality of a patient’s life, not only their health but also their relationship with their family and social community. Also, PTSD affects their occupational life.
Baranyi A, Leithgob O, Kreiner B, et al. (2010)	Self-report questionnaires and clinical interviews.	52 accident victims injured severely. Questionnaires were filled after 12 months of injury.	The study confirmed that there is a strong relationship between PTSD and impaired health-related quality of life.

the physical sequelae [38]. However, Gopinath et al. [36] found that the injury severity was not considered as a predictive factor for delaying the return to work over the 24 months after an RTA. Besides, Berecki-Gisolf et al. [39] showed that the duration of sick leave and work disability was highly correlated with the length of the hospital stay, which is considered a strong predictor of disability duration. An advanced age markedly increased the risk of long-term work disability 6 months after the RTA, which might be due to the slow process of tissue repair following trauma and the high risk of co-morbid health diseases that might affect the healing process [39]. In contrast, Fort et al. (2011) found that gender and age did not have a strong association with the duration of work disability [38]. Gopinath et al. [36] showed that the subjects who did not have any chronic disease before the accident, such as cancer, cardiac disease, or psychiatric problems, were 21% more likely to return to work 24 months following the trauma. Survivors who suffered from psychological behaviors related to PTSD, anxiety, and depression, such as being hyper-aroused or engaged in avoidance behavior, were more likely to delay return to work after the injury. Poor mental health might also lead to work disability and increase the duration of sick leave by decreasing the efficacy of treatment and rehabilitation programs [36]. A cohort study found that the types of trauma that are most frequently correlating with a long-term work disability are mild cranial trauma and lower-limb trauma [38]. In agreement with the previous study, 50% of brain trauma survivors delayed return to work for 2 years following the trauma [12]. Table 3 shows the risk factors of a late return to work after RTA.

9. Impact of a Late Return to Work on the RTA Survivors

Prolonged work absences after an RTA had a negative impact on survivors' economic status, including their income, job promotion, and future earnings; considerable financial hardship was apparent for employees because of an inadequate amount of sick leave or accrued annual leave to cover the long absences from work [35]. In addition, survivors who were jobless before the accident or survivors who were not covered by income protection insurance were at risk for considerable financial

hardship after an injury [35]. The workplace, employers, and return to work programs have an important role in facilitating the return to work and reducing the financial burden [35].

10. Impact of RTAs on the Survivors' Families and Relationships

The impact and the burden of an RTA extend to the family of the victim [37]. A significant decrease in the standard of living and quality of life was reported by 90% of the families of dead casualties and 85% of the families of disabled victims [37]. Another study showed that 25% of all victims and 50.6% of those with severe trauma declared an impact on the family [12]. Many families of people who were involved in an RTA were driven further into poverty by the prolonged medical care, the death of the breadwinner after an RTA or the burden of caring for an injured family member [1]. A study showed that patients younger than 18-year old are more likely to lose friendships; 82.1% of patients younger than 18 years reported that the number of their friends declined, while 29.9% of patients between 19 to 50 years and 6.9% of patients older than 50 reported a reduction in the number of their friends which might be due to the restricted contact with friends during long hospital stays and prolonged rehabilitation processes [13]. The family of the RTA survivor had an important and necessary role in supporting the victim to overcome their injuries for periods that may extend up to 2 years after the RTA [12].

11. Conclusion

The psychosocial consequences are as important as the physical consequences for victims of RTAs. PTSD, depression, anxiety, work disability, financial problems, and relationship problems are devastating and affect the recovery process. They have a variant and substantial impact on the individual, family, and social levels. Clinicians and policymakers need to consider the factors contributing to these consequences when developing optimal interventions and maximizing clinical outcomes. While social and insurance mechanisms have a role in victim recovery, victims need a rehabilitation organization for a better life.

Table 3. Studies describing the risk factors of a late return to work after RTA.

Authors (year)	Population	Risk factors
Gopinath B, Jagnoor J, Harris I, et al. (2015)	364 of trauma survivors with mild to moderate musculoskeletal injuries	PTSD Anxiety Depression
Berecki-Gisolf J, Collie A, McClure R. (2013)	5970 of RTA survivors with musculoskeletal injuries	Advanced age Length of hospital stay
Fort E, Bouffard E, Charnay P, et al. (2011)	608 of road accident victims	Mild cranial trauma Lower-limb trauma Persistence of pain and impaired health condition at 6 months after the accident

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List of Abbreviations

ASD Acute stress disorder
 PTSD Post-traumatic stress disorder
 RTA Road traffic accident

Conflict of interest

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