

PSYCHIATRIC CONSEQUENCES OF STRESS AFTER A VEHICLE ACCIDENT

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SUMMARY

Background: Vehicle accidents are a common cause of disease and death among people over 30 years of age. Essentially, reaction to stress due to the vehicle accident does not differ from the reaction to other stress factors. There are still no uniform viewpoints about the kind of sequels and their percentage representation after vehicle accidents.

Subjects and methods: The research was provided as a prospective study, included 150 subjects who had vehicle accident minimum 2 years prior to the examination. A questionnaire adjusted to the needs of the research and a battery of psychological tests was used.

Results: Affective disorders occurred in 35.33% of subjects, 65% of persons suffer from travel anxiety, 9% of the total number of examinees doesn't drive any more, 65% have somatisational dysfunctions of the vegetative nervous system, while the posttraumatic stress disorder is present in 36% of subjects.

Conclusion: In 87.4% of persons psychiatric consequences last over two years. Long term consequences in 60% of subjects occur as a combination of multiple psychiatric disorders, so the posttraumatic stress disorder and affective disorders never occur one at a time.

Key words: vehicle accident – psychiatry - consequence

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INTRODUCTION

Vehicle accidents are a common cause of disease and death among people over 30 years of age (Mayou & Brayant 1993). Menacing death, anticipation of potential harm to physical integrity or realistic physical trauma, loss of control over the situation and feeling of horror are commonly met in vehicle accidents. The fact that such accidents are everyday occurrences does not diminish their stress impact. Essentially, reaction to stress due to the vehicle accident does not differ from the reaction to other stress factors. According to the National PTSD Centre from Boston (Blanchard 1998), approximately 1% of American population experiences a vehicle accident, which presents about 3 million persons. Therefore, if just a small percentage of survivors develop stress related disorders, we have a large group that is psycho-traumatised. There are still no uniform viewpoints about the kind of sequels and their representation after vehicle accidents. Posttraumatic stress

disorder (PTSD) is the sequel that was most thoroughly discussed. Even when the examination is balanced in time, results about the PTSD incidence differ: Jones and Ritey (Jones & Ritey 1987) speak about the incidence of 6.7%; Shipherd and Beck (Shipherd & Beck 2000) about 15%; and Murai (Murai 2002) about 70%. Within the literature, number of persons who manifest depressive symptoms varies between 27% to 53.7% (Brantley, Mehan & Thomas 2000). In certain number of examinees, PTSD started with a depressive episode after the vehicle accident (Blanchard 2000). Somatoform disorders are another phenomena mentioned as a sequel of vehicle accidents (Delahanty, Raimonde & Spoonster 2000). Their presentation differs as well, and varies between 1.5% (Large 2001) to 19.5% (Suhood 2000). After the vehicle accident more than 36% of people suffer multiple disorders.

The aim of this paper is to estimate psychiatric consequence of fear after the traffic accident, in several syndromes categories in relation to

prominent psychopathological signs. From the number of clinical and psychological signs, our aim is to find out those factors which are significantly connected with psychopathology. On that way we will be able to define factors which contribute and predict late consequence and to establish criteria for diagnoses of PTSD.

SUBJECTS AND METHODS

The sample consisted of 150 subjects who had a vehicle accident. Our sample includes 150 subjects which fulfil following criteria:

- that they have experienced traffic accident;
- that time of accident and consequence of accident were connected ;
- that no one dint have severe head injuries;
- that no one dint have lost of consciousness more than a minute;
- that they are older from 18 and younger than 65 years .

Testing was conducted minimum two years after the accident, emphasizing by that mainly the late psychiatric sequels. Persons who had psychiatric disorders before and those who suffered head trauma were excluded from the research.

Study procedure

The paper is a prospective two years study. The research has been conducted at the Institute of Psychiatry at the Clinical Centre in Novi Sad. All examinees in the research were processed by the standardised method which comprised of a questionnaire adjusted to the needs of the research

and a battery of psychological tests. The questionnaire covered socio-demographic data, details about the accident and information about current functioning. Current psychiatric disorders were diagnosed according to the ICD 10 (The ICD-10 Classification of mental and behaviour disorders).

Measures

Battery of psychological tests consisted of:

- Minnesota Multiphasic Personality Inventory-MMPI;
- Beck Depression Inventory-BDI;
- State-Trait Anxiety Inventory –STAI;
- Copping skills-scale for the assessment of stress-coping techniques:
- Locus of Control Scale.

Statistical analyses

Statistical analyses included parametric and nonparametric tests: hi square with Yates correction, t-test, and Fischer exact test. Factorial analysis was used as a multivariate statistic procedure.

RESULTS

From the total number of persons who participated in vehicle accidents, 62% were men. The age of examinees was, most frequently, between 20-49 (72%), while regarding the education level, the majority were persons with secondary school (75.5%). Two thirds of vehicle accident participants, according to our results, are employed (Table 1).

Table 1. Socio-demographic characteristics of examinees

Variable	Modalities	Presence
Gender	Male	93 (62%)
	Female	57 (38%)
Age	20 – 29	47 (31%)
	30 – 39	32 (21%)
	40 – 49	43 (28%)
	50 – 59	21 (15%)
	60 -	7 (5%)
Education level	Primary	21 (14.5%)
	Secondary	114 (75.5%)
	Higher/high	15 (10%)
Employment status	Employed	96 (64%)
	Unemployed	34 (23%)
	Retired	20 (13%)

Mental disorders appeared two years after the vehicle accident, as one particular disorder or as a combination of multiple disorders.

Particular disorders: particular disorders appeared in 41 persons (27%), in the form of somatisational dysfunctions of vegetative nervous system in 29 persons (19%), and travel anxiety 12 persons (8%). Affective disorders and PTSD did not appear independently.

Comorbidity - two mental disorders: appeared in 33 persons (22%): PTSD and travel anxiety in 8 examinees (5%), travel anxiety and affective disorders in 12 persons (8%), travel anxiety and somatisational dysfunction of vegetative nervous system in 13 persons (9%).

Comorbidity - three mental disorders: were noticed in 34 persons (23%).

PTSD, travel anxiety and affective disorders in 1 examinee (1%); PTSD, travel anxiety and somatisational dysfunctions of vegetative nervous system in 16 examinees (10%); PTSD, affective disorders and somatisational dysfunctions of vegetative nervous system in 5 examinees (3%); and travel anxiety, affective disorders and somatisational dysfunction of vegetative nervous system in 12 examinees (8%).

Comorbidity - four mental disorders were registered in 23 examinees (15%), while 19 examinees (13%) were with no mental disorders.

Affective disorders

In the 150 subjects' sample, affective disorders were registered in 53 examinees, which is 35.33% in the following distribution: mixed Anxiety-Depressive disorder (F 43.1 by ICD 10) in 39 persons, Generalised Anxiety Disorder (F 41.1 by ICD 10) in 8 persons and Dysthymia (F 34.1 by ICD 10) in 6 examinees. Affective disorders were developing exclusively combined with other disorders, much more often in women (among 57 women 26 had this disorder, while among 93 male examinees it only occurred in 27). Employment decreased the risk of affective disorders (among 97 employed persons, anxiety-depressive condition appeared in 23). Examinees with these complaints had disturbed interpersonal and sexual relationships, and lower level of satisfaction in entertainment and leisure (Table 2). These examinees showed poorer achievements in Beck Depression Inventory (Table 6).

Table 2. Discriminative analysis of anxiety-depressive states; Wilks' Lambda : 0.46110, F=6.746

Variables	Wilks' lambda	F	p
Changes in entertainment and laisure	0.552	25.159	0.000002
Changes in relations with surrounding	0.553	25.380	0.000002
Employment	0.509	13.405	0.000360
Changes in sexual behavior	0.503	11.593	0.000880
Gender	0.484	6.472	0.012100

Table 3. Discriminative analysis of anxiety-depressive states; Wilks' Lambda : 0.46110, F=6.746

Variables	Wilks' lambda	F	p
Severity of injuries	0.364	15.094	0.000001
Kind of participation in the accident	0.362	14.485	0.000002
Gender	0.354	12.867	0.000008
Kind of treatment	0.339	9.599	0.000100
Was there someone else with you	0.328	7.260	0.001000
Treatment outcome	0.321	5.761	0.004000

Table 4. Discriminative analysis of somatisational dysfunctions of vegetative nervous system; Wilks' Lambda: 0.71612, F=2.2883

Variables	Wilks' lambda	F	p
Changes in sexual functioning	0.749	5.832	0.017
Financial status	0.741	4.638	0.027
Kind of participation in the accident	0.738	4.184	0.031
Education level	0.711	3.904	0.039

Table 5. Discriminative analysis of PTSD; 0.53659, F=4.7311

Variables	Wilks' lambda	F	p
Change of family relations	0.572	8.429	0.004
Entertainment and leisure	0.562	5.981	0.015
Examinee's age	0.561	5.935	0.016
Examinee's gender	0.554	4.313	0.039

Table 6. Canonical analyses of applied tests

	Anx.-depresss. states	Travel anxiety	Somatisat. disorders	PTSD
STAI	-0.483068	0.300862	0.478402	-0.816512
Locus	-0.266213	-0.271912	0.394003	-0.226702
Coping	-0.353760	0.485915	0.232878	-0.242467
BDI	-0.869611	0.608923	0.274509	-0.699494
MMPI	0.548159	-0.420250	-0.921144	0.397688

Travel anxiety

For this diagnosis the examinees had to meet diagnostic criterion for Specific Phobias (F 40.2 by ICD 10). After the vehicle accident, 35% of persons have no difficulties to engage in traffic. Out of 65% of people who experience difficulties, 13 persons or 9% of all examinees do not drive any more. Travel anxiety was more frequently met in men (63 out of 93 men were experiencing travel anxiety) who had the accident as drivers and those who were alone in the vehicle (only 3 of 34 persons who were alone have no fear). These psychological consequences occur more often in persons who got afflicted by severe physical injuries (out of 68 persons with severe physical injuries 48 have travel anxiety), who undergone hospital treatment due to those injuries (44 out of 63 subjects who were hospitalised suffer travel anxiety) and those who remained with certain physical sequels (Table 3). Persons with travel anxiety display greater sensitivity in Beck Depression Inventory (Table 6).

Somatisational dysfunctions of autonomous nervous system

In the total sample, 65% of examinees have somatisational dysfunctions of autonomous nervous system, in following distribution (23% have gastric disturbances, 17% headache, 16% hypertension and 9% bronchitis). Those are mainly persons with lower education level (16 out of 21 persons with primary school have somatisational dysfunctions of autonomous nervous system), poor material situation (37 out of 43 examinees with low income suffer from somatisational dysfunctions of vegetative nervous system) and those who

in vehicle accidents participated mainly as co-drivers (Table 4). MMPI showed to be most sensitive for detection of somatisational dysfunctions of autonomous nervous system, disclosing somatisational personalities (Table 6).

Posttraumatic Stress Disorder (F 43.1 by ICD 10)

PTSD is present in 36% of examinees. More than half women who were tested have it (53%), while in the group of men PTSD was registered in 26%. Out of 46 subjects aged between 20 and 29, 8 of them have PTSD, which means every eighth person. Every third person of 40-49 years of age has PTSD, and after the age of 50, two out of three persons have PTSD. These persons have poorer family relations and lower level of satisfaction in entertainment and leisure (Table 5). Both anxiety and depression scales made statistically significant difference among examinees with and without PTSD (Table 6).

Factorial analysis (Varimax normalized) showed 4 factors through variables that have saturation over 0.30 (Tables 7-10).

Table 7. Factor 1 (19.66%)

PTSD	0.54
Employment	-0.47
Family relations	0.82
Relat. with surrounding	0.85
Sexual relations	0.66
Entertainment and leisure	0.86
Stai	0.68
Locus of control	0.55
BDI	0.61
Anx.-depress. disturbances	** 0.38

Table 8. Factor 2 (11.90%)

Were there injured pers.	0.50
Severity of injuries	0.93
Treatment outcome	0.87
Kind of treatment	0.88
Duration of hospital treatment	0.78
Surgeries	0.73

Table 9. Factor 3 (3.20%)

First aid	-0.45
Driving disturbances	0.72
Coping techniques	0.52
MMPI	-0.42
Anx.-depress. conditions	0.48
Acute stress reaction	0.54
PTSD	** 0.45
Was someone with you	** -0.36
Locus of controle	** -0.32

Table 10. Factor 4 (2.39%)

Gender	0.54
Was one alone	0.61
Financial status	0.59
Psychosomatic difficulties	0.65
Legal procedure	0.35
Was one driver/passenger	** 0.69
MMPI	** -0.34

Variables with stars were grouped in the given factor, but are more significant in other ones.

DISCUSSION

Mental disorders have manifested themselves in 87.4% of persons after the vehicle accident, while no observed psychiatric condition has been registered in 12.6%. Popularly speaking, that would mean that only every tenth person who experiences a vehicle accident has no disturbances. To this we must add that subjects included experienced a vehicle accident more than two years prior to the research.

Vehicle accidents carry multiple problems. Firstly, there is a large number of persons who feel mental consequences even two years later. Another problem is that an isolated disorder occurs in 27.3% of examinees, while the remaining 60% suffer two or three comorbidity disorders simultaneously. This percentage is higher than the one found in a research made by Suhood and

which was little bit over 30% (Suhood 2000). This combination of disorders increases the number and the duration of sequels and presents a problem in analytical work, since groups get heterogeneous character. Mayou (Mayou 1997) spoke about this problem, referring chiefly to the PTSD group heterogeneity. We can now say that the heterogeneity of groups is caused by multiple mental disorders which occur simultaneously and that it does not refer only to people with PTSD, but almost all conditions that appear after a vehicle accident.

This work disputes the existence of isolated PTSD and isolated affective disorders. That means that in persons with PTSD one should always look for other disorders.

Factorial analysis results give possibility to define several disorder classes or categories. Classes differ among themselves, mainly regarding the leading psychological or physical trauma.

PTSD stands out in factors 1 and 3, meaning in two different combinations of constellatory elements. In factor 1, change in social functioning is grouped with subjective and affective disorders verified on tests. Persons with such a disorder are characterised by an outer locus of control.

In factor 3 PTSD is grouped around drivers with anxiety states, with acute stress reactions after the accident who now have travel anxiety. As it can be seen, the leading symptom here is anxiety, while the PTSD is in the second place. Social functioning is not severely harmed. Regarding the participation type, they are dominant drivers. Psychologically, those are passive-dependant personality structures, with internal locus of control, and avoidance as a way of problem solving.

Affective disorders are concentrated in factors 1 and 3. Its constellation in factor 1 is less important than in factor 3 and has already been explained. In factor 3 it appears together with travel anxiety, and is preceded by an acute stress reaction. Factorial analysis did not confirm existence of individual travel anxiety. It appears with PTSD or with affective disorders. Since it is related to it, it can be considered an indicator of acute stress reactions.

Somatisational dysfunctions of autonomous nervous system are within the factor 4. Structure of factor 4 has previously been explained. Somatisational dysfunctions of autonomous nervous

system are not related to other psychopathological conditions, social disturbances or physical traumas. They are related to legal procedures, or otherwise with the rent tendency. It gathers female persons of poorer financial situation and somatisational personality structure. It is important to emphasise that the ongoing trial shows critical saturation level only in this factor. That demonstrates that psychiatric consequences after a vehicle accident (except somatisational dysfunctions of vegetative nervous system) should not be understood as rent tendencies.

Factor 2 is factor of physical traumatism. No psychopathological condition has been related to this factor, which means there are no typical psychiatric disorders and psychical disturbances that accompany physical trauma. At the same time, presence of injuries and their severity have not been registered, not even as a secondary variable. Explanation is that all psychopathological conditions can occur without physical injuries, in other words that the relation of physical and psychological is not in the most direct dynamic interaction.

CONCLUSION

In 87.4% of persons psychiatric consequences last over two years after a vehicle accident.

Psychiatric sequels appear in form of four psychiatric entities: somatisational dysfunctions of autonomous nervous system, affective disorders, travel anxiety and posttraumatic stress disorder.

Long term consequences in 60% of subjects occur as a combination of multiple psychiatric disorders, so the posttraumatic stress disorder and affective disorders never occur one at a time.

Psychiatric disorders most often develop in form of three combinations:

Posttraumatic stress disorder with affective disorder and disturbances in wider social functioning. In this group of disorders, consequences of the survived fear are greatest, since it is basically posttraumatic stress disorder with consequential social deprivation.

Affective disorders with travel anxiety and accompanying PTSD symptoms have lesser repercussions for social functioning, consequences are of medium intensity, in other words milder than in the first group.

Somatisational dysfunctions of vegetative nervous system are prognostically best group and accordingly have the lowest level of traumatisation.

Physical traumatism has not been related to psychiatric-psychological states.

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