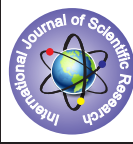


Prevalence of Post-Traumatic Stress Disorders and associated factors among workers attending trauma centers in Jeddah, KSA



Medical Science

KEYWORDS : Occupational injuries; Post-Traumatic Stress Disorder; psychological consequences; Trauma centers.

Fahd Faud Ahmad Qumri

Occupational and Environmental Health Directorate, Jeddah Health Affairs, P. O 34496. Jeddah 21468, Kingdom of Saudi Arabia.

Ahmed Abdella Mohammed Osman

Occupational and Environmental Health Directorate, Jeddah Health Affairs, P. O 34496. Jeddah 21468, Kingdom of Saudi Arabia.

ABSTRACT

Occupational accidents and injuries have health, economic, social and psychological impacts like Post-Traumatic Stress Disorder (PTSD) which develops after a traumatic event. This study including 363 workers referred to the centers due to exposure to a workplace accident or injury. Cronbach alpha coefficient was calculated to assess the reliability of the check lists for psychometric properties: Post-traumatic Stress Disorder Checklist Civilian version, Hamilton Anxiety Scale and Trauma Symptom Checklist. Most of participants are males of age (30 – 40) years. The prevalence of (PTSD) reaching almost one-half of the sample and there is a significant associations between (PTSD) and worker's gender ($p=0.03$), nationality ($p<0.001$), education ($p=0.001$) and smoking status ($p=0.046$). (PTSD) had statistically significant associations with worker's job category ($p<0.001$), and smoking during work ($p=0.02$). (TSC) score was identified as an important independent predictive factor of (PTSD) score.

Introduction

Occupational accidents and injuries have health, economic, social and psychological impacts. Almost all serious occupational accidents in young workers are preventable, and it is an ethical imperative to prevent as many of these injuries as possible.(1) The consequences of occupational injuries on the victim include short and long-term problems that may be physical, social, psychological, or economic or combinations of these. One of the short-term problems that may extend to be a long-term one is the Post-Traumatic Stress Disorder (PTSD). It develops after a traumatic event that involves actual or threatened death or serious injury, or a threat to physical integrity of self or others. Its symptoms involve re-experiencing, avoidance, and hyperarousal disorders.(2)

In (KSA) there is experiencing a surge of industrial development. This is associated with increasing numbers of employees and workers in various types of jobs and industries.

Very few information detected about (PTSD) prevalence in the Gulf area including KSA.

Therefore, this study is an attempt to mitigate the untoward effects of (PTSD) through identification of the magnitude of the problem and associated psychological problems.

Objectives:

To estimate the prevalence of (PTSD) and to identify associated factors among workers referred to trauma centers in Jeddah, KSA.

Post-Traumatic Stress Disorder (PTSD):

The symptoms of (PTSD) fall into three general clusters.(3) These include re-experiencing of the event (repeated nightmares, repeated painful memories, strong physiological response or psychological pain after being exposed to the related scenes of a similar traumatic event), avoidance of feelings or activities related to the traumatic event (does not want to recall the important content of the traumatic event, feel disconnected with others, and pessimistic for the future), and hyperarousal (irritable, difficult to concentrate, excessive startle response).

The prevalence of (PTSD) ranges from (6% - 32%) among police, fire, and emergency service workers.(4)

A number of risk factors have been identified that lead to increased incidence of (PTSD); being unmarried, having low educational attainment and a history of childhood adversity. Appraisals of the experience as involving threat to one's own life and a perception that work in theatre was above an individual's trade and experience were strongly associated with

post-traumatic stress symptoms. Low morale and poor social support within the unit and non-receipt of a home-coming brief (psycho-education) were associated with greater risk of post-traumatic stress symptoms.(5)

Diagnosis:

It depends on clinical features, as well as the use of specific tools like Post-traumatic Stress Disorder Checklist (PCLS) (6), UK- Post-Traumatic Stress Syndrome, Post-traumatic Stress Diagnostic Scale (PDS), Impact of Events Scale (IES) My Mood Monitor checklist.(7), Hamilton Anxiety Scale (HAM-A) (14), and Trauma Symptom Checklist – 40 (TSC-40).(15)

Management:

Critical Incident Stress Debriefing (CISD) is one intervention that is currently employed with emergency service.(8) multiple-session psychological interventions and trauma-focused Cognitive-Behavioral Therapy (CBT).(9) Besides a number of medications which have been used with different levels of effectiveness like Disulfiram treatment.(10) selective serotonin reuptake inhibitors, D-cycloserine (DCS) and Topiramate.(11)

Improvements in primary care may help in prevention and management of (PTSD). The care facilitator assists primary care providers with follow-up, symptom monitoring, and treatment adjustment and enhances the primary care interface with specialty mental health services. (12)

Methods:

Study Design: A cross-sectional hospital based.

Study area: The study was carried out in trauma centers belonged to Ministry of Health in Jeddah, KSA.

Study Population: Consisted of any Adult (age 18 or older) referred to the centers due to exposure to a workplace accident or injury. Workers with diagnosed psychiatric problems before exposure to the accident were excluded.

Sampling and sample technique: The sample size was calculated to estimate a prevalence of (PTSD) of 32 % (4), with a 15% SE and a 95% level of confidence. Using the single proportion equation for dichotomous variables in Epi-Info 6.04 statistical software package, the required sample size is 363 workers. This was increased to 400 workers to compensate for a missing/dropout rate of about 10%. A consecutive sampling technique was applied in recruiting participants from the attendants of the center till the required sample size was fulfilled.

Data collection tool: We used a questionnaire that consisted of Socio-demographic data, Job details, and details of the sentinel

accident/injury, check lists for psychometric properties: (PCL), (HAM-A) and (TSC-40).

Pilot study: A pilot study was carried out on 50 workers. According to the pilot data, the tools were finalized and the timetable for data collection set. Also the pilot study served in assessing the reliability of the scales used in the data collection form. This was done through testing the internal consistency. The reliability of the four scales proved to be high given the high Cronbach alpha coefficients as shown in the following table.

Scale	Number of Items	Cronbach's Alpha Coefficients
PTSD	17	0.94
Anxiety	14	0.896
TSC	40	0.959

Limitation of the study:

Researchers did not enable to classify the workers according to the KSA classification of job sectors is due to deficient information regarding the work sector.

Ethical considerations: Ethical clearance and authority to carry out this study was obtained from Joint Program of Family and Community Medicine in Jeddah.

Prior to any interview, the participants were given an explanation on the purpose, nature and benefits from the study, if they agreed to participate, then verbal consent was taken. Confidentiality on data and privacy were rigorously protected. Access to the confidential data would be limited to the researchers. The participants were informed about their right to refuse or withdraw at any time.

Statistical analysis: Data entry and statistical analysis were done using SPSS 17.0 statistical software package. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables, and means and standard deviations and medians for quantitative variables. Cronbach alpha coefficient was calculated to assess the reliability of the tools through the internal consistency. Qualitative categorical variables were compared using chi-square test and Fisher exact test. Spearman rank correlation analysis was used for assessment of the inter-relationships among quantitative variables and ranked ones. Multiple linear regression analysis was used after testing for normal distribution, linearity, and homoscedasticity and analysis of variance for the full regression models were done.

Results: A total of 353 surveys were completed out of 400, accounting for a response rate of 88.3%.

Table 1: Socio-demographic characteristics of workers (n=353):

Characteristics		Freq	%
Age (years)	<30	83	23.5
	30-	199	56.4
	40+	71	20.1
Gender	Male	212	60.1
	Female	141	39.9
Nationality	Saudi	181	51.3
	Non-Saudi	172	48.7
Education	Basic	57	16.1
	Secondary	45	12.7
	College	163	46.2
	University	88	24.9
Current marital status	Unmarried	149	42.2
	Married	204	57.8
Crowding index	<=1	210	59.5
	>1	143	40.5

Monthly income (SR)	<5000	126	35.7
	5000-	173	49.0
	10000+	54	15.3
Smoking	None	174	49.3
	Current	162	45.9
	Ex-	17	4.8
Substance abuse	None	339	96.0
	Current	10	2.8
	Ex-	4	1.1

The age of participants ranged between 21 and 56 years, with a higher percentage of males (60.1%), married (57.8%), and slightly more Saudis (51.3%). More than two thirds of the sample had college or higher education. The crowding index was less or equal to one person per room in 58.6% of the cases. The monthly income ranged between SR 1500 and 55000, with a median 5500. Concerning participants' smoking habits, approximately half of the sample were non-smokers (49.3%), 2.8% were current substance abusers.

Table 2: Job characteristics of workers (n=353):

Characteristics		Freq	%
Work sector	Industrial	48	13.6
	Construction	14	4.0
	Agriculture/hunting	19	5.4
	Finance/real estate	8	2.3
	Service	41	11.6
	Commercial	4	1.1
	Mining/quarrying	5	1.4
	Power and water	15	4.2
	Transportation	18	5.1
	Other	181	51.3
Job category	Managerial	25	7.1
	Professional	68	19.3
	Technical	56	15.9
	Clerical	11	3.1
	Manual skilled	132	37.4
Work duration (years)	<5	87	24.6
	5-	128	36.3
	10+	138	39.1
Work hours/ week	<=48	306	86.7
	>48	47	13.3

We found that (13.6%) of the workers were working in the industrial sector, and about one-tenth in the service sector (11.6%), skilled (37.4%) or unskilled (17.3%). The duration of work ranged between 1 and 35 years, with median 8 years. As for the daily working hours, the median was 42 hours.

Table 3: Workplace safety measures as reported by workers (n=353):

Characteristics	Freq	%
Pre-employment exam	339	96.0
Regular periodic exam	175	49.6
Suitable personal protective equipment	225	63.7
Training in use of personal protection	48	13.6
Training in job hazards	2	0.6
Monitoring for application of safety	38	10.8
Technical training on job	5	1.4
Enforcement of safety policies	51	14.4
Training in first aid	117	33.1
Good regular maintenance	12	3.4
Good medical services	70	19.8
Use of personal protective equipment (PPE):		
Not available	48	13.6

Never	48	13.6
Sometimes	198	56.1
Always	59	16.7
Smoke during work	157	44.5

Almost all workers had a pre-employment examination (96.0%), less than half of them had a periodic examination (49.6%), and less than one-fifth reported good medical services (19.8%). The lowest preventive measure was training whether for job hazards (0.6%) or technical training (1.4%). Only (16.7%) of the workers were always using (PPE). Meanwhile, almost all workers reported eating (96.0%) and (44.5%) reported smoking during work.

Table 4: (PTSD) Symptoms among workers in the study sample (n=353):

Symptoms	Scale	Frequency	%
Re-experiencing problems	0	96	27.2
	1-2	74	21.0
	3-5	183	51.8
Avoidance problems	0	63	17.8
	1-2	101	28.6
	3-7	189	53.5
Hyper-arousal problems	0	75	21.2
	1-2	61	17.3
	3-5	217	61.5

Regarding to (PTSD) Symptoms among the workers, one-half or more of them had three or more re-experiencing (51.8%), avoidance (53.5%) and hyper-arousal (61.5%) problems

Table 5: Prevalence of (PTSD) among workers in the study sample (n=353):

(PTSD)	NO of patients	%
Present	165	46.7
Absent	188	53.3
Total	353	100%

Overall (46.7%) of the workers were suffering from (PTSD).

Table 6: Relation between workers' (PTSD) and their socio-demographic characteristics:

Characteristics		(PTSD)				p-value
	Absent		Present			
	No.	%	No.	%		
Age (years)	<30	40	48.2	43	51.8	
	30-	109	54.8	90	45.2	0.57
	40+	39	54.9	32	45.1	
Gender	Male	103	48.6	109	51.4	
	Female	85	60.3	56	39.7	0.03*
Nationality	Saudi	117	64.6	64	35.4	
	Non-Saudi	71	41.3	101	58.7	<0.001*
Education	Basic	29	50.9	28	49.1	
	Secondary	13	28.9	32	71.1	0.001*
	College	101	62.0	62	38.0	
	University	45	51.1	43	48.9	
Marital status	Single	53	53.0	47	47.0	
	Married	108	52.9	96	47.1	0.96
	Divorced/ widow	27	55.1	22	44.9	

Current marital status	Unmarried	80	53.7	69	46.3	0.89
	Married	108	52.9	96	47.1	
Crowding index	<=1	119	56.7	91	43.3	0.12
	>1	69	48.3	74	51.7	
Living	With family	132	63.8	75	36.2	<0.001*
	With friends	42	34.1	81	65.9	
	Alone	14	60.9	9	39.1	
Monthly income (SR)	<5000	58	46.0	68	54.0	0.13
	5000-	99	57.2	74	42.8	
	10000+	31	57.4	23	42.6	
Smoking	Never	102	58.6	72	41.4	0.046*
	Ex-current	86	48.0	93	52.0	
Substance abuse	Never	179	52.8	160	47.2	0.40
	Ex-current	9	64.3	5	35.7	

(*) Statistically significant at $p < 0.05$

(PTSD) had statistically significant associations with worker's gender ($p=0.03$), nationality ($p<0.001$), education ($p=0.001$), and mode of living ($p<0.001$), and smoking status ($p=0.046$). As the table indicates, the frequency of (PTSD) was higher among males, non-Saudis, with secondary education, living with friends, and ex/current smokers.

Table 7: Relation between workers' (PTSD) and their job characteristics:

Job Charac- teristics		(PTSD)				p-value
	Absent		Present			
	No.	%	No.	%		
Job category	Managerial	15	60.0	10	40.0	
	Professional	41	60.3	27	39.7	
	Technical	41	73.2	15	26.8	<0.001*
	Clerical	9	81.8	2	18.2	
	Manual skilled	52	39.4	80	60.6	
	Manual unskilled	30	49.2	31	50.8	
Work duration (years)	<5	51	58.6	36	41.4	
	5-	62	48.4	66	51.6	0.32
	10+	75	54.3	63	45.7	
Work hours/ week	<=48	161	52.6	145	47.4	
	>48	27	57.4	20	42.6	0.54
Work shifts	No	70	49.3	72	50.7	
	Yes	118	55.9	93	44.1	0.22
Use (PPE)	Not available	24	50.0	24	50.0	
	Never	26	54.2	22	45.8	0.97
	Sometimes	106	53.5	92	46.5	
	Always	32	54.2	27	45.8	
Smoke during work	No	115	58.7	81	41.3	
	Yes	73	46.5	84	53.5	0.02*
Eat during work	No	9	64.3	5	35.7	
	Yes	179	52.8	160	47.2	0.40

(*) Statistically significant at $p < 0.05$

(PTSD) had statistically significant associations with worker's job category ($p<0.001$), and smoking during work ($p=0.02$). It is evident from the table that the frequency of PTSD was higher among manual workers whether skilled or unskilled, and those who smoke at work.

Table 8: Best fitting multiple linear regression model for (PTSD) scores:

Characteristics	Unstandardized Coefficients		Standardized Coefficients	p-value
	B	SE		
Constant	25.08	8.83		0.005
Age	-0.86	0.24	-0.39	0.000
Nationality (ref.: Saudi)	5.55	1.72	0.18	0.001
Education (ref.: low)	3.00	0.98	0.24	0.002
Smoking (ref.: none)	3.43	1.54	0.11	0.027
Job (ref.: highest)	4.04	0.64	0.43	0.000
Job duration	0.52	0.24	0.24	0.032
Work shifts	-3.34	1.63	-0.11	0.041
Total preventive measures	1.14	0.52	0.13	0.028
Have disability	4.17	1.99	0.11	0.037

r-square=0.17

Model ANOVA: F=8.057, $p<0.001$

It shows that younger age, non-Saudi nationality, higher level of education and monthly income, smoking, lower job category, longer work duration, no working shifts, more preventive measures, and consequent disability are the statistically significant independent predictors of the (PTSD) score. As the standardized coefficient indicates, the job category and age are the most influential factors.

Discussion

The aim of this study is to estimate the prevalence of (PTSD) and associated factors among workers referred to trauma centers in Jeddah, KSA. The study revealed a high prevalence of (PTSD) reaching almost one-half of the sample. The rate is very close to previously reported studies.(16) (TSC) score was identified as an important independent predictive factor of (PTSD) score, along with some personal and work-related factors. The present study revealed a number of personal, injury, and workplace factors significantly influencing the presence of (PTSD). In univariate analysis, the frequency of (PTSD) was higher among males, non-Saudis, with secondary education, living with friends, and ex/current smokers. It is more common among manual workers, and those who smoke at work. It has a significant association with subsequent disability and more sick leave days. Study sample generally reflects the working population in terms of age and gender, with some preponderance of males. This might reflect the workforce structure in the Kingdom of Saudi Arabia (KSA) where employment of women is still growing. However, this may also reflect the relative frequency of occupational injuries since the sample was drawn from the trauma center which receives all trauma cases including individuals with occupational injuries. Previous literature showed a higher risk of occupational injuries among males than females.(17,18) However, these higher rates among men might be due to the fact that they generally work in more risky jobs compared to women. The highest occupational injuries are in age group 30 to <40 years these findings are in congruence with previous studies.(17,20)

The age and gender structures may be influenced by the fact that a large part of the workforce in KSA consists of non-Saudis. In fact, they constitute almost one-half of the present study.

Being expatriates, the non-Saudi workers are generally in the younger age groups.

Most of workers had college or higher education participants. This also reflects the high level of literacy in the Saudi working population as well as the expatriate workers due to selection. Therefore, this distribution of the level of education may not truly reflect the relation between occupational injuries and education, which has been reported to be an inverse one with more injuries associated with poor education, given that higher levels of education help reduce the incidence of accidents occurring at the workplace.(21) However, the very low percentage of substance abuse in the present study may reflect under-reporting due to the legal aspects forbidding the use of such substances. Nonetheless, the high rates of smoking are expected given its relation to occupational injuries as previously reported in many studies.(22)

Most of workers found to be manual workers, either skilled or unskilled. This high proportion may reflect a higher risk of occupational injuries in this job category. However, such association may be confounded by many personal factors as education and income as well as job factors related to risky exposures at work. In agreement with this.(23)

About three-fifth of the workers in the sample had shift work. These might be at higher risk for occupational injuries due to fatigue, and disturbed sleep and biological rhythms. Similar results were found.(24) Regarding workplace preventive measures, about (90.1%) of the workplaces were applying less than half of these tested measures. The findings revealed that almost all participants had a pre-employment examination. This is certainly due to the fact that this examination is mandatory by law. Meanwhile, the practice of periodic examination was low, reaching only about half of the cases. Few of participants had training in job hazards or technical training. This is quite alarming given the importance of "know-how" and job knowledge in preventing occupational injuries and diseases. Such knowledge is important because it shows that preventive measures concerning these factors can be carried out for all professional activities and not limited to certain sectors only.(25)

Good medical services at the workplace were rated as good by only less than one-fifth of the participants. These finding reflects a major deficiency in the health services provided to these workers, both preventive and curative, which may be associated with high rates of occupational injuries and diseases.(26) Moreover, the use of (PPE) was reported to be very low. This may undoubtedly be attributed to the lack of training in their use, the lack of monitoring of their application, and the lack of enforcement of safety measures as the study findings revealed. In agreement with this, previous studies were identified.(27,28)

Almost all workers reported eating at work and approximately half of them (almost all the smokers) had smoking at work. This again might be related to lack of enforcement of safety policies. Such unhealthy job practices were found to be associated with higher risks of occupational accidents and injuries.(29)

There is a high rate of subsequent disability reaching almost one-fifth of the participants. Moreover, in about one-fourth of these cases the disability was permanent (a rate of about 5%). This rate is very close to that reported previously.(30,31) The hyper-arousal problems of (PTSD) were the highest while re-experiencing and avoidance problems were less among workers with occupational injuries. The finding is in agreement with previous study.(32)

The foregoing present study findings are in congruence with previous studies linking poor economic situation characteristic of victims and the poor psychic and general health characteristic of survivors of occupational injuries to (PTSD).(33)

However, multivariate analysis identified the (PTSD) independent predictors as younger age, non-Saudi nationality, higher level of education and monthly income, smoking, lower job cate-

gory; longer work duration, no working shifts, more preventive measures, and consequent disability. The exclusion of the effect of gender on (PTSD) by multivariate analysis is in line with the previous debate regarding the association of female gender with (PTSD) shown in some studies (34, 35) but not in others. (36) The regression model was much improved by the inclusion of the (TSC). This increased the model prediction (r-square) from (17%) to (72%). The model also excluded nationality and smoking and added the number of sites injured as independent predictors of the (PTSD) score. These findings indicate the usefulness of the (TSC) in predicting (PTSD), which may have a direct clinical application in the early detection, prompt intervention, and mitigation of the disorder. The finding is in line with previous study (37) showed that the odds of developing (PTSD) following traumatic injury are approximately eight times higher than following injury-free trauma. These are expected to have high TSC scores, with higher risk of developing (PTSD).

Conclusion

In the light of the study findings, it is concluded that:

The prevalence of (PTSD) is high among the workers who had injuries related to their work, with higher rates of hyper-arousal problems among them. The majority of the workers scored high in the (TSC). All four scales are strongly and positively correlated.

The rates of smoking and eating during work are high, along with low compliance to the use of personal protective equipment (PPE). The workplace preventive measures are generally deficient, except for the pre-employment examination, with almost no training in safety and job hazards. Approximately one-fifth of the workers have subsequent disability, one-fourth of it is permanent. The me-

dian of sick leave days for the injury is about two weeks.

The independent predictors of (PTSD) score are younger age, non-Saudi nationality, higher level of education and monthly income, smoking, lower job category, longer work duration, no working shifts, more preventive measures, and consequent disability. The addition of the (TSC) score improves model prediction.

Recommendations:

The occupational health department in the Ministry of Health should develop and implement a comprehensive program for the psychological care of the workers exposed to occupational or work-related injuries comprise the following activities:

Immediate and follow-up assessment of any related disorders such as (PTSD) using simple rapid assessment tools for diagnosis, assessment of the effectiveness of interventions, and follow-up. The program must define the role of occupational health specialist in the prevention and management of (PTSD) and related psychological disorders. Prevention of (PTSD) and related psychological co-morbidities through early diagnosis and proper management, taking into account the factors that increase the probability of their occurrence. The workplaces' administration must deploy more efforts to improve the safety culture in the work environment through setting and enforcing policies and procedures, along with workers' educational programs.

Further researches are needed to investigate the role and performance of general practitioner in primary health care sitting regarding occupational health in general and (PTSD) in specific.

REFERENCE

- 1 CDC. Nonfatal occupational injuries and illnesses among workers treated in hospital emergency departments — United States, 2003. Morbidity and Mortality Weekly Report (MMWR). (Online) (Cited 2006 April 28). Available from URL: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5516a>. | 2 Yao S.N., Cottraux J., Note I., De Mey-Guillard C., Mollard E., and Venturera V. (2003): Evaluation of Post-traumatic Stress Disorder: validation of a measure, the PCL.S. *Encephale*; 29(3 Pt 1):232-8. | 3 DSM-IV (1994): Diagnostic and statistical Manual of mental disorder: fourth edition. American Psychiatry Association 1994: 427-9. | 4 McFarlane A.C., Williamson P., and Barton C.A. (2009): The impact of traumatic stressors in civilian occupational settings. *J Public Health Policy*; 30(3):311-27. | 5 Iversen A.C., Fear N.T., Ehlers A., Hacker Hughes J., Hull L., Earnshaw M., Greenberg N., Rona R., Wessely S., Hotopf M. (2008): Risk factors for post-traumatic stress disorder among UK Armed Forces personnel. *Psychol Med*; 38(4):511-22. | 6 Allen J., Annells M. (2009): A literature review of the application of the Geriatric Depression Scale, Depression Anxiety Stress Scales and Post-traumatic Stress Disorder Checklist to community nursing cohorts. *J Clin Nurs*; 18(7):949-59. | 7 Gaynes BN, Deveaugh-Geiss J, Weir S, Gu H, Macpherson C, Schulberg HC, Culpepper L, Rubinow DR (2010): Feasibility and diagnostic validity of the m-3 checklist: a brief, self-rated screen for depressive, bipolar, anxiety, and post-traumatic stress disorders in primary care. *Ann Fam Med*. 2010 Mar-Apr;8(2):160-9. | 8 D'Andrea L.M., and Waters C. (2000): Predicting post-incident stress in emergency personnel: a guide for mental health professionals on critical incident stress management teams. *Int J Emerg Ment Health*; 2(1):33-41. | 9 Roberts N.P., Kitchiner N.J., Kenardy J., Bisson J.I. (2009): Systematic review and meta-analysis of multiple-session early interventions following traumatic events. *Am J Psychiatry*; 166(3):293-301. | 10 Barth K.S., and Malcolm R.J. (2010): Disulfiram: an old therapeutic with new applications. *CNS Neurol Disord Drug Targets*; 9(1):5-12. | 11 Mello M.F., Yeh M.S., Barbosa Neto J., Braga L.L., Fiks J.P., Mendes D.D., Moriyama T.S., Valente N.L., Costa M.C., Mattos P., Bressan R.A., Andreoli S.B., and Mari J.J. (2009): A randomized, double-blind, placebo-controlled trial to assess the efficacy of topiramate in the treatment of post-traumatic stress disorder. *BMC Psychiatry*; 9:28. | 12 Engel C.C., Oxman T., Yamamoto C., Gould D., Barry S., Stewart P., Kroenke K., Williams J.W., Jr, and Dietrich A.J. (2008): RE-SPECT-Mil: feasibility of a systems-level collaborative care approach to depression and post-traumatic stress disorder in military primary care. *Mil Med*; 173(10):935-40. | 13 Foa E.B. (1995): Posttraumatic stress diagnostic scale manual. NCS Pearson, Inc.; Minneapolis, MN. | 14 Hamilton, M. The assessment of anxiety states by rating. *British Journal of Medical Psychology* 32:50-55, 1959. | 15 Briere, J., & Runtz, M. (1989). The Trauma Symptom Checklist (TSC-33): Early data on a new scale. *Journal of Interpersonal Violence*, 4, 151-163. | 16 MacDonald HA, Colotta V, Flamer S, Karlinsky H. Post-traumatic Stress Disorder (PTSD) in the workplace: a descriptive study of workers experiencing PTSD resulting from work injury. *Journal of Occupational Rehabilitation* 2003; 13: 63-77. | 17 Baker D.G., Nievergelt C.M., and Risbrough V.B. (2009): Post-traumatic stress disorder: emerging concepts of pharmacotherapy. *Expert Opin Emerg Drugs*; 14(2):251-72. | 18 Ozkan S, Kiliç S, Durukan P, Akdur O, Vardar A, Geyik S, İkizeli I. Occupational injuries admitted to the Emergency Department. *Ulus Travma Acil Cerrahi Derg* 2010; 16: 241-7. | 19 Ince H, Ince N, Ozyildirim BA. Occupational accidents and forensic medicine in Turkey. *J Clin Forensic Med* 2006; 13: 326-30. | 20 Breslin FC, Smith P. Age-related differences in work injuries: a multivariate, population-based study. *Am J Ind Med* 2005; 48: 50-6. | 21 Karagüven M. The Relationships Between Work Accident, Educational Backgrounds and Stress Levels of Textile Workers. *European Conference on Educational Research*. 22 - 25 September 1999, Lahti, Finland. | 22 Chau N, Ravaut JF, Otero Sierra. Prevalence of impairments and social inequalities: a community-based study in Lorraine. *Rev Epidemiol Sante Publique* 2005; 53:614-628. | 23 Breslin F C, P Smith, and R Zhao: Young people and work injuries: an examination of jurisdictional variation within Canada. *Injury prev*. 2006, 2(12): 105-110. | 24 Boix-Ferrando P, Gil Alcamí J, Velarde Collado JM, García MI, Daniou Vargas X. Tasks, roles and expectations of safety practitioners at free-standing occupational health and safety services in Spain. *Arch Prev Riesgos Labor*. 2013 Jan to Mar; 16(1):17-23. Spanish. | 25 Bhattacherjee A, N Chau, C Otero Sierra, B Legras, L Benamghar, J-P Michael, AK Ghosh, F Guillemin, J-F Ravaut, J-M Mur, and Lorhandicap Group: Relationships of Job and Some Individual Characteristics to Occupational Injuries in Employed People: A Community-Based Study. *J Occup Health* 2003; 45: 382-391. | 26 Boix-Ferrando P, Gil Alcamí J, Velarde Collado JM, García MI, Daniou Vargas X. Tasks, roles and expectations of safety practitioners at free-standing occupational health and safety services in Spain. *Arch Prev Riesgos Labor*. 2013 Jan to Mar; 16(1):17-23. Spanish. | 27 Lombardi DA, Sorock GS, Holander L, Mittleman MA. A case-crossover study of transient risk factors for occupational hand trauma by gender. *J Occup Environ Hyg* 2007; 4:790-7. | 28 Serinken M, İ Türkçüer, B Dağlı, Ö Karcioglu, M Zencir, and E Uyankı: Work-related injuries in textile industry workers in Turkey. *Ulus Travma Acil Cerrahi Derg* 2012; 18 (1):31-36. | 29 Akınori N, I Tomoko, T Masaya, H Takashi, H Minoru, F Yosei, and A Shunichi: Non-fatal occupational injury among active and passive smokers in small- and medium-scale manufacturing enterprises in Japan. *Journal Social Science & Medicine*. Volume (Year): 63 (2006) Issue (Month): 9 (November) Pages: 2452-2463. | 30 Xiang H, J Shi, B Lu, K Wheeler, W Zhao, JR Wilkins, and GA Smith: Medical expenditures associated with nonfatal occupational injuries among immigrant and U.S.-born workers. *BMC Public Health* 2012, 12:678. | 31 Santana VS, Araújo-Filho JB, Albuquerque-Oliveira PR, Barbosa Branco A. Acidentes de trabalho: custos previdenciários e dias de trabalho perdidos. *Rev Saude Publica*. 2006; 40(6):1004-12. DOI: 10.1590/S0034-89102006000700007 | 32 Baker D.G., Nievergelt C.M., and Risbrough V.B. (2009): Post-traumatic stress disorder: emerging concepts of pharmacotherapy. *Expert Opin Emerg Drugs*; 14(2):251-72. | 33 Hepp U, H Moergeli, S Buchi, H Bruchhaus-Steinert, B Kraemer, T Sensky, and U Schnyder: Post-traumatic stress disorder in serious accidental injury: 3-year follow-up study. *The British Journal of Psychiatry* (2008) 192, 376-383. | 34 Udwin O, Boyle S, Yule W, Bolton D, O'Ryan D. Risk factors for long-term psychological effects of a disaster experienced in adolescence: Predictors of post-traumatic stress disorder. *J Child Psychol Psychiatry*. 2000; 41:969-979. | 35 Hoven CW, Duarte CS, Mandell DJ. Children's mental health after disasters: the impact of the World Trade Center attack. *Curr Psychiatry Rep*. 2003; 5:101-107. | 36 Proctor LJ, Fauchier A, Oliver PH, Ramos MC, Rios MA, Margolin G. Family context and young children's responses to earthquake. *J Child Psychiatry*. 102 2007; 48:941-949. | 37 Koren D, D Norman, A Cohen, J Berman, and E.M. Klein: Increased PTSD Risk With Combat-Related Injury: A Matched Comparison Study of Injured and Uninjured Soldiers Experiencing the Same Combat Events. *Am J Psychiatry* 2005; 162:276-28. |