Check for updates

ORIGINAL ARTICLE

Quality of life at 3 and 6 months in military personnel with a history of thoracic trauma suffered in combat

Calidad de vida a los 3 y 6 meses en militares con antecedente de trauma torácico sufrido en combate

Alirio Bastidas-Goyes[1], Gustavo A. Hincapié-Díaz[2], Diana M. Díaz-Quijano[3], Eduardo A. Tuta-Quintero[4] and Sandra L. Rodríguez-Rojas[2]*

[1]Department of Internal Medicine and Department of Epidemiology, Faculty of Medicine, University of La Sabana; [2]Department of Pneumology, Central Military Hospital; [3]Department of Epidemiology, Faculty of Medicine, University of La Sabana; [4]School of Medicine, Savannah College. Chia, Cundinamarca, Colombia

Abstract

Objective*: To measure the score and variation in the SF-36 quality of life questionnaire at 3 and 6 months of evaluation in military personnel with a history of chest trauma in combat.* **Method:** *Comparative study between military with chest trauma and healthy military personnel from 2011 to 2016, evaluating the SF-36 quality of life questionnaire.* **Results***: 45 subjects were analyzed, 25 with a history of chest trauma and 10 healthy controls with combat experience. 25 of the cases were evaluated at 3 months and 11 at 6 months. The average age was 28.2 years (standard deviation: 7.22), and 76% had projectile wounds with a high-speed firearm. 44 % (11/25) of the subjects with chest trauma at three months of assessment presented a lot of limitation for the performance of moderate activities (p < 0.001) and only 5% (1/20) of the controls reported a lot of limitation (p < 0.001).* **Conclusions:** *There is significant deterioration in the quality of life in all domains through the SF-36 questionnaire in patients with chest trauma at 3 and 6 months after the evaluation.*

Keywords: *Quality of life. Thoracic injuries. Combat disorders.*

Resumen

Objetivo: *Medir el puntaje y la variación en el cuestionario de calidad de vida SF-36 a los 3 y 6 meses de valoración en militares con antecedente de trauma de tórax en combate.* **Método:** *Estudio comparativo entre militares con trauma de tórax y militares sanos entre los años 2011 y 2016, evaluando el cuestionario de calidad de vida SF-36.* **Resultados:** *Se analizaron 45 sujetos, 25 con antecedente de trauma de tórax y 10 controles sanos con experiencia en combate. De los sujetos con trauma, 25 se evaluaron a los 3 meses y 11 a los 6 meses. El promedio de edad fue de 28.2 años (desviación estándar: 7.22). El 76% tuvieron heridas por proyectil con arma de fuego de alta velocidad. El 44% (11/25) de los sujetos con trauma de tórax, a los 3 meses de valoración, presentaba mucha limitación para la realización de actividades moderadas (p < 0.001) y solo el 5% (1/20) de los controles referían mucha limitación (p < 0.001).* **Conclusiones:** *Hay un deterioro significativo en la calidad de vida en todos los dominios del cuestionario SF-36 en pacientes con trauma de tórax a los 3 y 6 meses de la valoración.*

Palabras clave: *Calidad de vida. Traumatismos torácicos. Trastornos de combate.*

***Correspondence:**
Diana M. Díaz-Quijano
E-mail: diana.diaz1@unisabana.edu.co

Date of reception: 09-02-2021
Date of acceptance: 08-06-2021
DOI: 10.24875/CIRUE.M21000392

Cir Cir (Eng). 2022;90(3):367-373
Contents available at PubMed
www.cirugiaycirujanos.com

2444-0507/© 2021 Academia Mexicana de Cirugía. Published by Permanyer. This is an *open access* article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Introduction

The number of casualties worldwide as a result of war-related injuries was calculated to be over 89.000 in 2017[1], in addition to the thousands of people left behind with physical and psychological long-term effects. In Colombia, the number of casualties resulting from armed conflicts between 1958 and July 2018 was 262.197, and 46.813 of those victims were part of armed groups (armed forces and outside of the law), and 215.005 were civilians[2]. For this reason, armed conflicts are a public health concern with high economic and social costs, affecting both military population and civilians[3]. Military members who survive combat wounds may manifest a wide spectrum of clinical disorders secondary to physical long-term effects associated with direct organ damage, or psychological alterations, such as post-traumatic stress disorder, which negatively impact health-related quality of life (HRQL)[4,5].

The incidence of firearm injuries affecting the thoracic area is thought to be 42%, and mortality is higher than 70% as a result of compromised vital organs in this area[6]. This type of injuries is associated with hemothorax and pneumothorax in 36% of cases, diaphragmatic injury in 59%, and pulmonary contusion around the wound caused by a high and low-velocity firearm projectile in 43%[7]; cardiac compromise is rare in healthcare facilities due to its high rate of mortality immediately at the time of injury[6]. In armed conflict situations, a fourth of the victims is evacuated alive, and 15% of them have a thoracotomy, triggering a significant load of physical, psychological, and mental alterations[8,9]. Several authors mention limited medical evidence focused on evaluating HRQL in patients with a history of chest trauma in combat[10-12].

Subjects who suffer injuries during an armed conflict are left with some type of temporary or permanent disability, and they represent over 15% of all reported disabilities in the world[13]. In the last few years, the evaluation of HRQL for patients with health issues has gained great relevance[14]. This evaluation provides more complete information regarding the health status of individuals, and it can be used as a measuring tool in other relevant aspects of patient care, such as the quality of the healthcare services provided, doctor-patient relationship, and effectiveness of treatments and management for the population. However, there is little information regarding the quality of life of subjects who have survived combat chest injuries. Therefore, the purpose of this study is to evaluate the impact on HRQL at 3 and 6 months in military personnel who suffered this type of injuries and received care.

Method

A comparative studies was conducted among subjects with chest trauma in combat and healthy active military personnel in Hospital Militar Central (Bogota, Colombia). Both groups were evaluated using the SF-36 questionnaire *(Short Form-36 Health Survey)* in order to measure HRQL between 2011 and 2016.

Eligibility criteria

It included military population older than 18 and younger than 55 with any type of chest trauma who had received medical or surgical management. It excluded any associated injury (such as cranioencephalic, spinal, abdominal, vascular, ear, or eye trauma), traumatic amputation of any limb, post-intubation tracheal stenosis, and permanent inability to communicate. Trauma victims were evaluated for quality of life at 3 and 6 months after the injury; once the patient was admitted with trauma, a control was sought.

Quality of life evaluation

The SF-36 questionnaire was used, including 8 areas that assess physical functioning, physical role, bodily pain, general health, vitality, social functioning, emotional role, and mental health. This survey is valid, reliable, and reproducible, which allows to evaluate the health status of the general population and specific subgroups. In each category, items are coded, added, and converted in a scale from 0 to 100, where the highest score indicates better HRQL, using the algorithms of the scoring and interpretation manual of the questionnaire. Additionally, the SF-36 includes a transition item asking about the change in general health status compared to the previous year[15]. Its Spanish translation has been validated, aimed at people over 14, and it can be self-applied or conducted during an in-person or phone interview[15,16].

Variables

The following information was gathered from both groups: date of birth, military degree, level of education, history of tobacco use and name of packs per

Table 1. Baseline characteristics of the study population

	Total population (n = 45)	Wounded in combat (n = 25)	Healthy (n = 20)	p
Age in years, mean (SD)	28 (7.22)	24.1 (4.99)	33 (6.75)	< 0.001
Cigarette use, n (%)	14 (31.1)	8 (32)	6 (30)	0.885
Pack per year rate, mean (SD)	4.9 (9.89)	6.1 (12.14)	3 (1.91)	0.151
PAS use, n (%)	1 (2.2)	1 (4)	0 (0)	< 0.001
Military degree, n (%)				
Soldier	25 (55.6)	20 (80)	5 (25)	0.001
Non-commissioned officer	15 (33.3)	3 (12)	12 (60)	0.001
Officer	5 (11.1)	2 (8)	3 (15)	0.001
Level of education, n (%)				
Primary	12 (26.7)	12 (48)	0 (0)	0.019
Highschool	18 (40)	6 (24)	12 (60)	0.019
Technical	6 (13.3)	4 (16)	2 (10)	0.019
University	9 (20)	3 (12)	6 (30)	0.019
Type of weapon, n (%)				
HVFA	1 (2.2)	1 (4)	0 (0)	-
LVFA	19 (42.2)	19 (76)	0 (0)	-
Explosive agent	2 (4.4)	2 (8)	0 (0)	-
Projectile and explosive agent	3 (6.7)	3 (12)	0 (0)	-

HVFA: High-velocity firearm; LVFA: Low-velocity firearm; SD: Standard Deviation; PAS: Psychoactive substances.

year, date of trauma, type of weapon, and Injury Severity Score *(ISS).* Socio-demographic and clinical information was obtained from the clinical history of the patients and a guided interview. The information was collected directly by researchers at the time of enrollment of subject in the study and during the follow up; the data obtained was reviewed by at least two of the researchers in order to avoid transcription errors.

The Epidat 4.0 software was used to calculate the sample size. Considering the difference in standardized means of 2 for independent groups, 80% power, and a reliability level of 95%, a minimum of 21 subjects was set for each study group.

Statistical analysis

An initial descriptive analysis summarized the qualitative variables by means of absolute and relative frequencies, and quantitative variables by means of averages and standard deviations if the distribution was normal, and by means and interquartile ranges if it was not normal. A bivariate analysis was performed using the study variables in subjects with chest trauma compared to healthy subjects; qualitative variables were compared to the chi-square test, and quantitative variables to Student's t test or Mann-Whitney's U test, depending on their distribution. Quality of life was evaluated in each of the areas of the SF-36 questionnaire for military members with chest trauma at 3 and 6 months; for the group of healthy military members only one measurement was performed. A $p < 0.05$ was considered significant. The statistical analysis was performed using the SPSS version 25 licensed program.

Ethical considerations

The protocol was submitted to the ethics committee of the institution, and it was approved. Before enrolling subjects in the study, an explanation of the informed consent was provided.

Results

45 subjects were analyzed, 25 with a history of chest trauma and 20 healthy controls with combat experience. Among the subjects with trauma, 25 of the cases were evaluated for HRQL at 3 months and 11 at 6 months. The average age was 28.2 years (standard deviation: 7.22). Among those injured in combat, 80% were soldiers, and 48% had a primary education level ($p = 0.019$). Among subjects injured in combat with chest trauma, 76% sustained wounds caused by a high-velocity firearm projectile. The mean ISS was 6.9 (standard deviation: 3.50) in the 25 subjects with trauma at 3 months, and 8.1 (standard deviation: 4.25) in the 11 subjects that completed the follow up at 6 months. The characteristics of the general population are shown in table 1.

Physical functioning, physical role, and emotional role

After 3 months, 60% (15/25) of subjects with trauma expressed great limitations when performing intense activities, 44% (11/25) expressed great limitation to perform

moderate activities, 40% (10/25) great limitation to climb several flights of steps, 20% (5/25) great limitation to bend over, and 8% (2/25) great limitations when bathing. This impairment was significant compared to subjects with no trauma, where only 5% expressed great limitations when performing some of these activities (p < 0.001). At the 6-month follow up a significant limitation persisted when performing the aforementioned activities at a similar rate as the 3-month follow up.

Regarding the physical and emotional roles, at the 3-month evaluation, 88% (22/25) of subjects with a history of trauma reduced the amount of time dedicated to work, and experienced greater difficulty to perform it, compared to 5% of control subjects that expressed this same limitation (p < 0.001). 68% (17/25) of subjects with trauma expressed that they had performed their job with less care, and this situation persisted at the 6-month follow up.

Vitality, mental and general health

At 3 months, 28% (7/25) of subjects with chest trauma felt full of life in the last 4 weeks, compared to 60% (12/20) of control subjects (p = 0.079). In terms of mental health, 16% (4/25) of subjects with trauma expressed feeling sad all the time, and this situation did not exist in any control subject (p = 0.118). Lastly, in terms of general health, 8% (2/25) of subjects with trauma expressed having excellent health, compared to 75% (15/20) of subjects with no trauma (p < 0.001).

Bodily pain, social functioning, and health transition

At 3 months, 36% (9/25) of subjects with trauma expressed feeling great physical pain in the last 4 weeks, and this was not present in any control subjects (p = 0.003). In terms of social functioning, at the 3-month follow up, 24% (6/25) of subjects with trauma expressed that their physical and emotional problems always affected their social relationships, compared to 5% of control subject with the same limitation (p < 0.017). The perception of the general health status at the time of the study compared to a year before the study was somewhat worse in 52% (13/25), and 45% (5/11) of subjects with trauma at 3 and 6 months of evaluation, respectively, in contrast with 5% of control subjects, expressed feeling somewhat worse compared to the previous year (p < 0.001). These changes remain at 6 months.

Table 2. Total scores of the areas of SF-36 at the 3-month evaluation

	Total population (n = 45) Mean (SD)	3-month trauma evaluation (n = 25) Mean (SD)	Healthy evaluation (n = 20) Mean (SD)	p
Physical functioning	72.71 (31.62)	55.48 (28.02)	94.25 (21.11)	< 0.001
Physical role	51.27 (47.58)	14.28 (29.08)	97.50 (11.18)	< 0.001
Bodily pain	69.09 (32.11)	50.68 (29.90)	92.10 (15.98)	< 0.001
General health	68.47 (25.96)	54.88 (25.36)	85.45 (14.23)	< 0.001
Vitality	65.62 (23.80)	52.52 (22.12)	82.00 (13.61)	< 0.001
Social functioning	75.69 (31.54)	62.25 (34.64)	92.50 (15.92)	< 0.001
Emotional role	59.26 (48.14)	30.67 (44.01)	95.00 (22.36)	< 0.001
Mental health	73.44 (26.15)	63.08 (29.63)	86.40 (12.54)	< 0.001

SD: standard deviation.

Differences in HRQL scores between trauma and control subjects at 3 months

The areas of mental health and social functioning in subjects with chest trauma received scored of 63.08 (SD: 29.63) and 62.25 (SD: 34.64), compared to the scores of mental health in healthy control subjects of 86.40 (SD: 12.54) and social functioning of 92.50 (SD: 15.92) (p < 0.001). The physical role had a lower scored among the areas of quality of life in subjects with trauma: 14.28 (SD: 29.08), compared to the control subjects: 97.50 (SD: 11.18) (p < 0.001) (Table 2).

Differences in HRQL scores between trauma and control subjects at 6 months

The total scores in subjects with chest trauma in the areas of physical functioning and bodily pain were 48.64 (SD: 25.31) and 44.55 (SD: 24.09), respectively, with statistically significant differences compared to the physical functioning and bodily pain scores in control subjects, which were 94.25 (SD: 21.11) and 92.10 (SD: 15.98) (p < 0.001). The physical role had the lowest score, 9.09 (SD: 23.11) among the quality of life areas, with significant differences with the physical role score of control subjects 97.50 (SD: 11.18) (p < 0.001) (Table 3).

Table 3. Total scores of the areas of SF-36 at the 6-month evaluation

	Total population (n = 31) Mean (SD)	6-month evaluation (n = 11) Mean (SD)	Healthy evaluation (n = 20) Mean (SD)	p
Physical functioning	78.06 (31.43)	48.64 (25.31)	94.25 (21.11)	< 0.001
Physical role	66.13 (45.89)	9.09 (23.11)	97.50 (11.18)	< 0.001
Bodily pain	75.23 (29.83)	44.55 (24.09)	92.10 (15.98)	< 0.001
General health	69.74 (29)	41.18 (27.34)	85.45 (14.23)	< 0.001
Vitality	68.55 (23.35)	44.09 (16.25)	82 (13.61)	< 0.001
Social functioning	77.42 (29.12)	50 (16.25)	92.50 (15.92)	< 0.001
Emotional role	69.89 (45.02)	24.24 (39.69)	95 (22.36)	< 0.001
Mental health	74.42 (23.54)	52.64 (23.54)	86.40 (12.54)	< 0.001

SD: standard deviation.

Table 4. Total scores of the areas of SF-36 at the 3-month and 6-month evaluations

	Number of evaluations (n = 36) Mean (SD)	3-month evaluation (n = 25) Mean (SD)	6-month evaluation (n = 11) Mean (SD)	p
Physical functioning	53.39 (27.05)	55.48 (28.02)	48.64 (25.31)	0.395
Physical role	12.69 (27.18)	14.28 (29.08)	9.09 (23.11)	0.508
Bodily pain	48.81 (28.05)	50.68 (29.90)	44.55 (24.09)	0.877
General health	50.69 (26)	54.88 (25.36)	41.18 (27.34)	0.687
Vitality	49.94 (20.65)	52.52 (22.12)	44 (16.25)	0.774
Social functioning	58.51 (32.84)	62 (34.64)	50 (27.95)	0.790
Emotional role	28.70 (42.28)	30.67 (44.01)	24 (39.69)	0.952
Mental health	59.89 (28)	63.08 (29.63)	52.64 (23.54)	0.791

SD: standard deviation.

Differences in HRQL scores at 3 and 6 months in subjects with chest trauma

At 6 months, the score was lower in all areas in subjects who were evaluated; however, there were no statistically significant differences between these scores. The area in which the score of subjects with trauma decreased the most was general health, with 13.7 points.

Table 4 shows the evaluation of the quality of life in subjects with trauma at 3 and 6 months.

Discussion

Military subjects with injuries in the thoracic area had lower HRQL in all the areas of the SF-36 questionnaire; physical and psychological alterations coexist in these patients. The highest scores were found in the areas of mental health, and the lowest scores in the physical role during he evaluations at 3 months; the deterioration of quality of life persists at 6 months. Subjects with deterioration of their quality of life associated with chest trauma were severely compromised because of the injury.

Subjects evaluated in this study, similar to those in other populations in other areas of the world where there is conflict, area young individuals with chest injuries associated with a series of secondary clinical disorders, from physical sequelae to psychological alterations[17,18] Overgaard et al.[19], Kiely et al.[20] and Wad et al.[21] found a decrease in the quality of life of patients with chest trauma at 6 months, with a slight improvement at 6 months and up to 15 years.

The results show a decline in the scores of all measurements at 3 and 6 months, and this situation is not only related to the trauma, but also with the surgical management, rehabilitation, complications, and mental health of patients evaluated[12,22-24]. Although no differences in the quality of life were found among subjects that were referred to rehabilitation and those who were not, the sample size was too small to draw definitive conclusions. On the other hand, despite the limitations of the SF-36 questionnaire to determine the physical and emotional conditions of the subjects of the study before the traumatic event[15], a changed was noted in the general health status compared to the previous year in the control group.

Multiple aspects impact quality of life: biological, sociocultural, and demographical, among others. Mental health issues in the military population range between 9% and 26%[25-27]. Oznur et al.[25] analyzed 258 SF-36 questionnaires completed by Turkish military members who participated in armed conflicts in Afghanistan, and found the lowest scores in the areas of mental health (59.14 ± 18.56) and vitality (59.25 ± 21.17). These authors mention that those results are due to the difficulties derived from being exposed to trauma outside of their country of origin, without the company and the physical and mental support of family or a close social circle, which negatively impacts psychiatric symptoms and quality of life. In Colombia, military members who were evaluated did not require being moved to another

country, and the scores obtained in the area of mental health were the highest among subjects with a history of trauma at 3 and 6 months. Vitality scores were lower compared to those found by Oznur et al.[25] in their study.

The majority of subjects studied suffered one or several high-velocity firearm projectile wounds. These injuries in the thoracic area, generally cause a decrease in lung and rib cage distensibility, which is manifested functionally as restrictive pathologies, depending on the severity of the injury, and a pronounced decline in the capacity to perform physical activities or work[10,28]. The physical role was the most affected area and it remained that way at the 6-month follow up, suggesting that, in addition to organ compromise, physical therapy and other factors, such as the social environment, significantly affect physical and psychological recovery.

Despite the fact that all patients were interviewed personally, we had a short evaluation period, of 3 to 6 months, which decreased the ability to recover from physical injuries and psychological conditions, overestimating the results of the HRQL.

Han et al.[29], in a series of 80 patients with mild chest trauma, found a pronounced improvement in pain and forced vital capacity of 235.54 to 374 ml, within the 7 first days after the trauma occurred ($p < 0.001$), reaching 410 ml after 30 days ($p < 0.001$) of management with non-steroidal anti-inflammatory drugs. Although the time elapsed after the injury is essential for an adequate clinical outcome, due to pain management and physical therapy, our results show a significant decline in bodily pain in the group of subjects with trauma compared to healthy subjects, with worse scores in the areas of physical functioning, physical role, and bodily pain at 3 and 6 months after the physical therapy program; additionally, a stress, anxiety, and depression component due to physical incapacity can lead to somatization and accentuate this symptom.

The results of this study show that, despite being young subjects and receiving surgical medical management for chest trauma, the quality of life remains affected during the entire time they are being monitored, and it is necessary for these patients to enter a multidisciplinary and inclusive rehabilitation plan that approaches all the possible issues that can be derived from a trauma event suffered in combat. In the last few years, in countries like Colombia, this type of centers have been created in order to improve the quality of life of combat veteran, where training processes can be conducted for family, social, cultural, and work inclusion[30,31].

The study is limited by its small population and the lack of evaluation of the quality of life before the trauma event for comparison purposes. All surveys were analyzed by the same group of physicians, which reduces variations between observers. In addition, it was difficult to compare these results with previous studies due to the evaluation period, the sample size, and the use of different tools to measure HRQL, such as *St. George's Respiratory Questionnaire,* the *Nottingham Health Profile* and the EQ-5D-5L, among others[10,19,21,32]. More prospective studies with longer times and a wider population are necessary.

Conclusions

In general, a decline in the quality of life of patients with chest trauma is observed at 3 and 6 months after hospital discharge, with all areas being significantly affected, which suggests the importance of an integral management for these patients.

Funding

This project received financing from Hospital Militar Central in Bogotá, Colombia.

Conflicts of interest

There are no conflicts of interest for the publication of this work.

Ethical disclosures

Protection of people and animals. The authors declare that no experiments have been made on human beings or animals for this research.

Data confidentiality. The authors declare that they have followed the protocols of their work center regarding the publication of patient data.

Right to privacy and informed consent. The authors have obtained the informed consent of the patients and/or subjects referred to in the article. This document is in the possession of the corresponding author.

References

1. WAFA. Sharp rise in number of people with disabilities in Gaza strip in the last 10 years-statistics. WAFA; 2018. (Viewed on 09-01-2022.) Available: http://english.wafa.ps/page.aspx?id=o5gr9ja106662958710ao5gr9j.
2. Colombia Centro Nacional de Memoria Histórica. «262.197 muertos dejó el conflicto armado." Centro Nacional de Memoria Histórica, 9 de agosto de 2018. Available at: http://www.centrodememoriahistorica.gov.co/no-ticias/noticias-cmh/262-197-muertos-dejo-el-conflicto-armado.

3. Bowsher G, Bogue P, Patel P, Boyle P, Sullivan R. Small and light arms violence reduction as a public health measure: the case of Libya. Confl Health. 2018;12:29.
4. Asensio JA, Ogun OA, Mazzini FN, Pérez-Alonso AJ, García-Núñez LM, Petrone P. Predictors of outcome in 101 patients requiring emergent thoracotomy for penetrating pulmonary injuries. Eur J Trauma Emerg Surg. 2018;44:55-61.
5. Nugent SM, Freeman M, Ayers CK, Winchell KA, Press AM, O'Neil ME, et al. A systematic review of therapeutic interventions and management strategies for Gulf War illness. Mil Med. 2020;usaa260.
6. Zgheib H, Shayya S, Wakil C, Bachir R, El Sayed MJ. Gunshot injuries in Lebanon: does intent affect characteristics, injury patterns, and outcomes in victims? J Emerg Trauma Shock. 2019;12:117-22.
7. Onat S, Ulku R, Avci A, Ates G, Ozcelik C. Urgent thoracotomy for penetrating chest trauma: analysis of 158 patients of a single center. Injury. 2011;42:900-4.
8. Lichte P, Oberbeck R, Binnebösel M, Wildenauer R, Pape HC, Kobbe P. A civilian perspective on ballistic trauma and gunshot injuries. Scand J Trauma Resusc Emerg Med. 2010;18:35.
9. Daw MA, El-Bouzedi AH, Dau AA. Trends and patterns of deaths, injuries and intentional disabilities within the Libyan armed conflict: 2012-2017. PLoS One. 2019;14:e0216061.
10. Leone M, Brégeon F, Antonini F, Chaumoître K, Charvet A, Ban LH, et al. Long-term outcome in chest trauma. Anesthesiology. 2008;109:864-71.
11. Schnurr PP, Lunney CA, Bovin MJ, Marx BP. Posttraumatic stress disorder and quality of life: extension of findings to veterans of the wars in Iraq and Afghanistan. Clin Psychol Rev. 2009;29:727-35.
12. Brasel KJ, Deroon-Cassini T, Bradley CT. Injury severity and quality of life: whose perspective is important? J Trauma. 2010;68:263-8.
13. Mosleh M, Dalal K, Aljeesh Y, Svanström L. The burden of war-injury in the Palestinian health care sector in Gaza Strip. BMC Int Health Hum Rights. 2018;18:28.
14. Gowinnage SS, Arambepola C. Quality of life and its determinants among community re-integrated soldiers with permanent disabilities following traumatic limb injuries. Qual Life Res. 2020;29:2119-27.
15. Lins L, Carvalho FM. SF-36 total score as a single measure of health-related quality of life: scoping review. SAGE Open Med. 2016;4:2050312 116671725.
16. Saris-Baglama RN, Dewey CJ, Chisholm GB, et al. QualityMetric Health Outcomes™ scoring software 4.0. Lincoln, RI: QualityMetric Incorporated; 2010. p. 138.
17. Lindheimer JB, Stegner AJ, Wylie GR, Klein-Adams JC, Almassi NE, Ninneman JV, et al. Post-exertional malaise in veterans with gulf war illness. Int J Psychophysiol. 2020;147:202-12.
18. Chao LL, Kanady JC, Crocker N, Straus LD, Hlavin J, Metzler TJ, et al. Cognitive behavioral therapy for insomnia in veterans with gulf war illness: results from a randomized controlled trial. Life Sci. 2021;279:119147.
19. Overgaard M, Høyer CB, Christensen EF. Long-term survival and health-related quality of life 6 to 9 years after trauma. J Trauma. 2011;71:435-41.
20. Kiely JM, Brasel KJ, Weidner KL, Guse CE, Weigelt JA. Predicting quality of life six months after traumatic injury. J Trauma. 2006;61:791-8.
21. Wad MS, Laursen T, Fruergaard S, Morgen SS, Dahl B. Survival and health related quality of life after severe trauma — a 15 years follow up study. Injury. 2018;49:191-4.
22. Nizamli FM. Quality of life among Syrian patients with war-related lower limb amputation at the Military Hospital in Lattakia. Int J Nurs Sci. 2020;7:297-302.
23. Laupland KB, Svenson LW, Grant V, Ball CG, Mercado M, Kirkpatrick AW. Long-term mortality outcome of victims of major trauma. Injury. 2010;41:69-72.
24. Probst C, Zelle B, Panzica M, Lohse R, Sitarro NA, Krettek C, et al. Clinical re-examination 10 or more years after polytrauma: is there a gender related difference? J Trauma. 2010;68:706-11.
25. Oznur T, Akarsu S, Erdem M, Durusu M, Toygar M, Poyrazoglu Y, et al. Psychiatric symptoms and quality of life in military personnel deployed abroad. Isr J Psychiatry Relat Sci. 2015;52:60-4.
26. Niedhammer I, Chastang JF, David S, Barouhiel L, Barrandon G. Psychosocial work environment and mental health: job-strain and effort-reward imbalance models in a context of major organizational changes. Int J Occup Environ Health. 2006;12:111-9.
27. Reyes J, Sweet J, MacLean M, Poirier A, VanTil L. Characterization of occupational, demographic and health determinants in Canadian reservists veterans and the relationship with poor self-rated health. Health Qual Life Outcomes. 2020;18:274.
28. Edens JW, Beekley AC, Chung KK, Cox ED, Eastridge BJ, Holcomb JB, et al. Longterm outcomes after combat casualty emergency department thoracotomy. J Am Coll Surg. 2009;209:188-97.
29. Han S, Baldemir M, Kose SK, Erdem D, Sakinci U. The time course of recovery following mild thoracic trauma. Heart Lung Circ. 2005;14:252-4.
30. Talbot LA, Brede E, Metter EJ. Psychological and physical health in military amputees during rehabilitation: secondary analysis of a randomized controlled trial. Mil Med. 2017;182:e1619-24.
31. Kerr NC, Ashby S, Gerardi SM, Lane SJ. Occupational therapy for military personnel and military veterans experiencing post-traumatic stress disorder: a scoping review. Aust Occup Ther J. 2020;67:479-97.
32. Llaquet Bayo H, Montmany S, Rebasa P, Secanella M, Alberich M, Navarro S. Analysis of quality of life after major trauma: a Spanish follow-up cohort study. Eur J Trauma Emerg Surg. 2019;45:289-97.