

ORIGINAL RESEARCH

Musculoskeletal Injury Reporting by U.S. Army Medical Command (MEDCOM) Personnel

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ABSTRACT

Introduction: Musculoskeletal injuries (MSIs) in the military affect force readiness. If left untreated, MSIs may lead to re-injury, chronic pain, and disability. Providing timely and appropriate care for MSIs requires accurate injury surveillance, which has been identified as an issue within both civilian and military work forces. This study evaluated reporting of MSIs among U.S. Army Medical Command (MEDCOM) personnel and compared reporting patterns with those from a previous study of U.S. Army Forces Command (FORSCOM) personnel. It was a replication study completed in collaboration with the U.S. Army Research Institute of Environmental Medicine (USARIEM).

Methods: Anonymous surveys were completed by 398 active-duty soldiers (310 males, 88 females) assigned to a MEDCOM unit. Surveys gathered information about MSIs sustained in the last 12 months and whether the injuries were reported. Additionally, the survey explored factors influencing a soldier's tendency to report or not report injuries.

Results: A total of 1,230 MSIs were identified, with 826 (67%) reported and 404 (33%) unreported injuries. The top three reasons for reporting were concern about symptoms, injury affecting job performance, and seeking documentation. The top three factors for not reporting were fear of impact on career, avoiding negative perceptions, and avoiding a profile (mandated physical restrictions).

Discussion: MEDCOM soldiers reported a higher percentage of injuries than FORSCOM soldiers to providers (67% vs 51%); however, many injuries continue to go unreported. This trend in underreporting makes accurate surveillance and treatment of MSIs difficult, and there is a need for efforts to boost reporting accuracy to mitigate the negative consequences of untreated injuries.

Keywords: Injury epidemiology; Military injuries; Injury reporting.

INTRODUCTION

Musculoskeletal injuries (MSIs) involve bone,

muscle, tendon, ligament, or nerve tissue. Potential causes of MSIs include both trauma and overuse [1]. A leading risk factor for MSI is a previous injury. Multiple, compounded injuries have the potential to result in chronic conditions, impaired job performance, and reduced overall quality of life [2].

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In the military, MSIs are the leading cause of disability among service members [3]. The military's high physical and occupational requirements place service members at an elevated risk for developing MSIs [4-7]. In 2009, more than 740,000 MSIs were reported in the active-duty military population [8]. Risk for disability discharge was seven times higher in 2005 than in 1981, the increase appearing to be primarily attributable to disorders of the musculoskeletal system [9]. Sequelae of MSIs include lost duty days, failure to complete training or educational courses, ineligibility for deployment, increased healthcare expenditures, and decreased overall force readiness [10]. In 2005, more than 29 billion dollars was spent on payments for service members being medically discharged [11].

Accurate surveillance of MSIs is difficult, as research studies in both civilian and military populations have identified trends toward underreporting of work-related injuries [12-14]. The civilian literature reports concealment rates as high as 65% [15]. Common reasons cited for underreporting include fear of job loss, separation from coworkers, injury minimization, and avoidance of filing a workers compensation claim [16-18]. Similar trends were found by a 2012 U.S. Army Research Institute of Environmental Medicine (USARIEM) study completed with U.S. Army Forces Command (FORSCOM) soldiers [19]. The study surveyed 1,343 soldiers and demonstrated that of 3,202 total injuries sustained during a 12-month period, 49% (1,566 injuries) went unreported [19]. Soldiers disclosed that various factors influenced their tendency not to report injuries. The top three factors from the choices listed in the survey were negative perception associated with injury, fear of negative impact on career advancement,

and avoidance of a restrictive medical profile (mandated physical restrictions). The study highlights a concern for military medical personnel who are responsible for preserving the fighting force by providing timely and appropriate treatment for MSI. The question emerged as to whether this trend in underreporting would be seen in units other than FORSCOM. For example, would survey results in a U.S. Army Medical Command (MEDCOM) unit be similar owing to concern with the same factors, or would the opposite be found as a result of increased awareness of the long-term impact of untreated MSIs?

Healthcare providers are a population at risk for MSI owing to repetitive and often strenuous job tasks [20-22]. A study examining injury reporting of healthcare workers within the Veterans Administration showed that many employees were unlikely to report MSI sustained on the job, even if the injuries resulted in lost work time [21]. Given the trends of underreporting among both military personnel and civilian healthcare workers, the present study aimed to examine the reporting patterns and behaviors of medical personnel on active duty in the U.S. Army.

MATERIALS & METHODS

Design and Participants

This research among MEDCOM personnel was a replication study of the FORSCOM injury reporting study conducted in 2012 by Smith et al. [19]. Our study was done in collaboration with USARIEM researchers. Minor changes were made to the survey, based on suggestions provided by researchers at USARIEM and participants in the pilot testing phase of the present study. A total of 398 soldiers completed the

survey. Participants in this study were active-duty U.S. Army MEDCOM soldiers at Joint Base San Antonio (JBSA), with at least 1 year of active-duty service. Soldiers of varying ranks, Military Occupational Specialties/Areas of Concentration, and times in service were recruited through talking with leaders in hospital clinics and soldiers in the Schoolhouse (soldiers currently in full-time advanced military education programs). Successive independent sampling and “snowball” sampling were used to obtain participants. Power analysis determined a required participant sample of 398 soldiers.

Procedures

Soldiers were briefed by the first author on the purpose of the study in both group settings and on an individual basis before or after department meetings or during downtime in the duty day. The survey administrator explained the voluntary and anonymous nature of the survey, and soldiers were encouraged to be honest in their responses. Soldiers were instructed to read the first page of the survey, which explained the purpose of the survey and directions for completion. To ensure confidentiality, soldiers were instructed not to write identifying information on any part of the survey. The first author remained at the front of the room, and collected completed surveys in an envelope. Completed surveys were stored in a locked cabinet in a locked office.

Survey Description

The survey gathered demographic information, including age, sex, height, weight, time in service, Military Occupational Specialty/Area of Concentration, rank, and most recent Army physical fitness test (APFT) score. Soldiers provided information about injuries

sustained within the last 12 months, including anatomic location, injury onset (sudden vs gradual), and whether the injury was reported to a medical provider. Soldiers were also asked about any measures taken to self-treat injuries (eg, medication, ice, rest). Injury was defined by the survey as any ache, pain, or discomfort related to the musculoskeletal system (bone, muscle, tendon, ligament, or nerve tissue) that persisted for more than 7 days. A medical provider was defined as a physician, physician assistant, nurse practitioner, physical therapist, or occupational therapist.

The survey aimed to measure factors that influenced the tendency of soldiers to accurately report, underreport, or overreport an injury. Accurate reporting was defined as an injury being reported to a medical provider. Underreporting was defined as an injury not being reported to a medical provider. Overreporting was defined as the symptoms of an injury being exaggerate to a medical provider.

Soldiers were asked to rank potential factors in order of most to least influential in their reporting. Table 1 lists the predefined factors included in the survey according to accurate reporting, underreporting, or overreporting.

Several free-response questions were added to the survey to gather qualitative data and provide soldiers with the opportunity to expand on factors that influenced injury reporting.

Data Analyses

Data analyses were performed using the statistical package IBM SPSS (Version 20.0; IBM Corporation, Armonk, NY). Means and standard deviations were obtained for continuous variables. Ordinal data were ana-

Table 1. Factors influencing reporting.

Accurate Reporting	Underreporting	Overreporting
Documentation in record	Fear of impact on career	Documentation of injury
Seeking referral	Avoiding negative perceptions	Seeking prescription
Seeking medication	Avoiding a profile*	Concern about work performance
Concern about symptoms	Negative past experience	Seeking medical discharge
Injury affected job performance	Inconvenience in seeing provider	Seeking a profile
Concern about upcoming training/APFT/deployment		Concern about upcoming training/APFT/deployment

APFT=Army physical fitness test; *A profile is mandated physical restrictions for personnel who have experienced an injury.

lyzed using frequency distributions. Qualitative data were analyzed using coding and theming, the results confirmed by utilizing NVivo software (QSR International; Burlington, MA).

RESULTS

Demographics

A total of 398 surveys were completed by the MEDCOM soldiers (310 males and 88 females). The survey response rate was 71%. Eighty-two percent of the participants were enlisted: 26% were junior enlisted soldiers (E1-E4) and 56% were noncommissioned officers (E5-E9). The remaining 18% of participants were commissioned officers. Figure 1 displays the participants' cumulative times in service.

Injury Reporting

The MEDCOM soldiers reported experiencing, cumulatively, 1,230 injuries during

a 12-month period. Of these injuries, 826 (67%) were reported to a medical provider, and 404 (33%) were not reported. Injury exaggeration was reported by 1.6% of soldiers. As a group, men reported 65% of their injuries, whereas women reported 77%. Table 2 represents the total number of unreported injuries by body region and onset type. The top three reasons for reporting injuries were concern about symptoms, injury affected job performance, and seeking documentation. Figure 2 displays a comparison of reporting reasons for MEDCOM vs FORSCOM soldiers. The top three reasons for MEDCOM soldiers not to report injuries according to the percentage of participants who ranked the reason number one were fear of impact on career, avoiding negative perceptions, and avoiding a profile. Figure 3 shows a comparison of MEDCOM and FORSCOM underreporting factors according to the percentage of participants who ranked the reason number one. FORSCOM soldiers were more likely

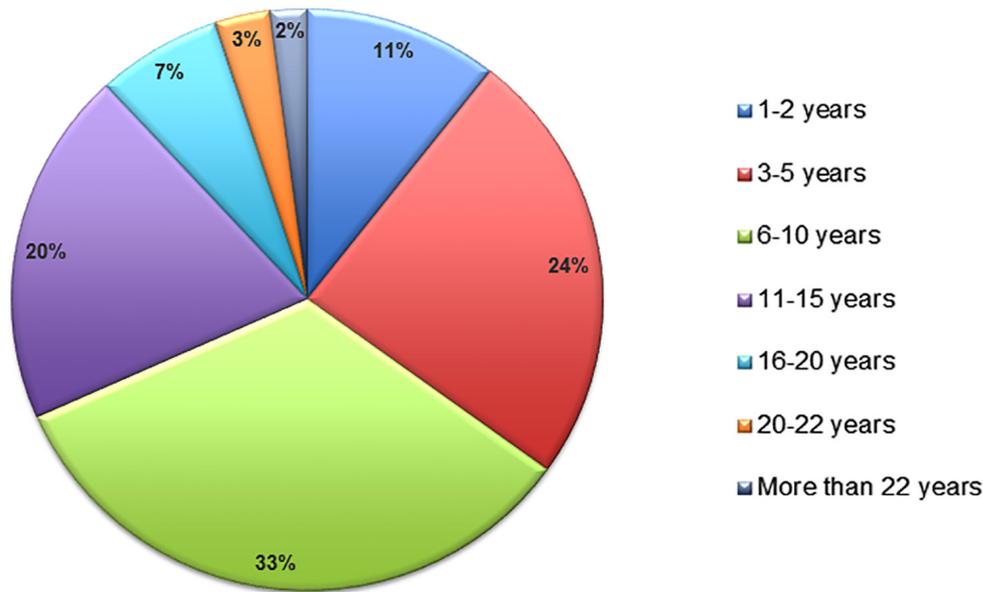


Figure 1. Time in service.

Table 2. Unreported injuries by anatomic location.

Injury Location	Total Injuries	Described as Acute Onset	Described as Gradual Onset
Back	129	30 (23%)	99 (77%)
Knee	90	25 (28%)	65 (72%)
Neck	34	11 (32%)	23 (68%)
Shoulder	32	10 (34%)	22 (66%)
Ankle	31	15 (48%)	16 (52%)
Hip	21	6 (28%)	15 (72%)
Hand	19	12 (62%)	7 (38%)
Foot	19	7 (37%)	12 (63%)
Wrist	17	7 (43%)	0 (57%)
Elbow	12	7 (55%)	5 (45%)
Total	404	130 (32%)	274 (68%)

than MEDCOM soldiers to exaggerate MSI symptoms (6% vs the above-noted 1.6%). Waiting 3 or more months to seek care for an MSI was reported by 48% of MEDCOM soldiers. Additionally, the mean for pain ex-

perienced on a 0-10 visual analog scale before reporting an injury was 7.2 (SD=1.3).

Analysis of qualitative data yielded three main themes for factors prompting accurate reporting. The first theme to emerge,

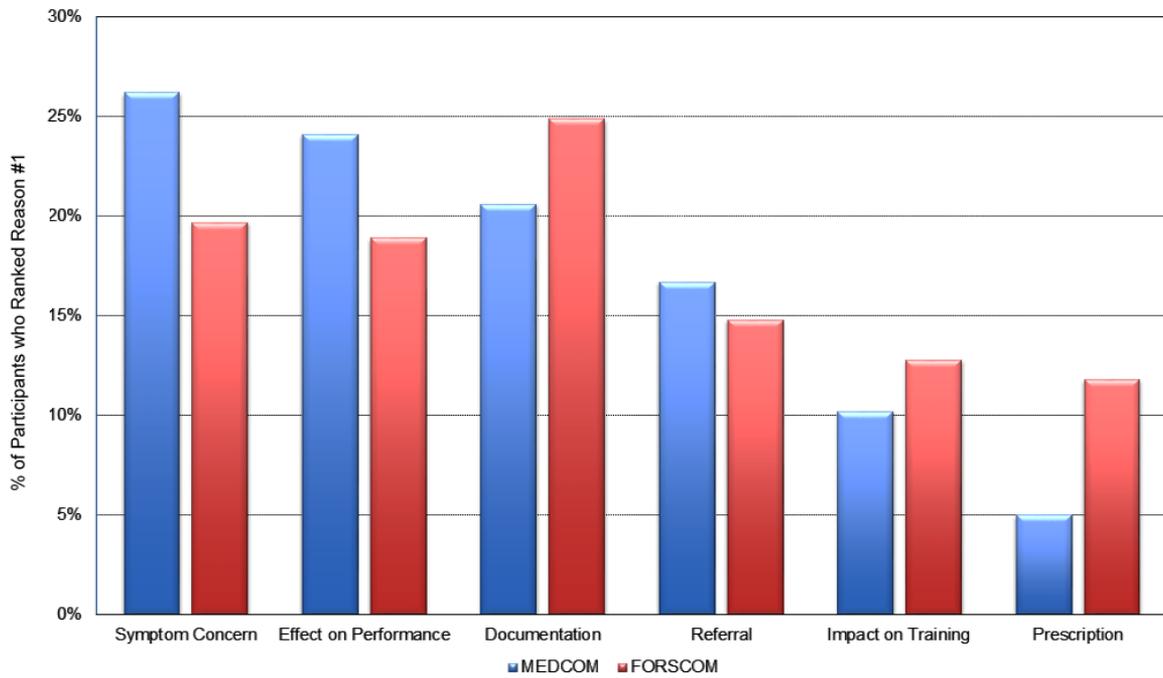


Figure 2. Reasons for reporting injuries for MEDCOM vs FORSCOM.

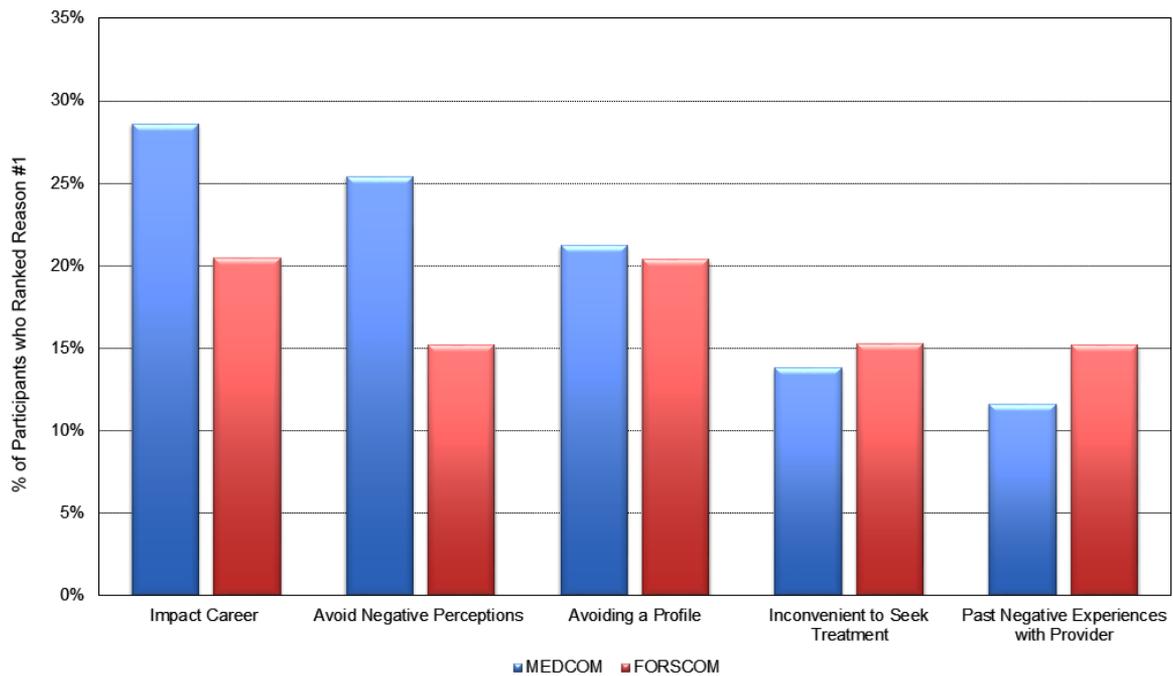


Figure 3. Reasons for underreporting injuries for MEDCOM vs FORSCOM.

based on 61 responses, was the idea of a pain or impact threshold. Soldiers expressed attempting to manage symptoms on their own and reporting an injury only

when symptoms became unmanageable. The second theme to emerge was soldiers' acknowledging the potential long-term consequences of injuries. Soldiers shared

thoughts about unreported injuries ending careers and decreasing quality of life. Many soldiers reported witnessing the negative impact of untreated injuries on peers and/or patients. The third theme soldiers discussed related to accurate reporting was motivation for recovery. Soldiers reported a desire to return to optimal functioning at work and in leisure activities.

An additional three themes, based on 65 soldiers' comments, emerged regarding factors prompting underreporting of injuries. The first theme was minimization of injuries. Soldiers expressed trying to ig-

nore symptoms, assuming that they would improve with time. The second theme was concern about the social implications of injury. Many soldiers reported feeling isolated from peers, and assumed that leaders and fellow soldiers would view reporting an injury as a demonstration of weakness. The final theme was fear of injuries affecting a soldier's career negatively. Soldiers viewed injuries as deterrents to career advancement, and expressed concern about not being able to reach typical military milestones. Table 3 displays qualitative themes and examples of supporting quotes.

Table 3. Qualitative themes and quotes.

Theme	Supporting Quote
Pain/Impact threshold	I always try to treat and cope with injuries on my own first, and when it gets to the point where I can't deal with it anymore I go see the doc.
Long-term consequences	I've seen guys who "soldier through" an injury and end up not being able to do things in the future because of it.
Motivation for recovery	I didn't want my knee injury to get in the way of being able to do my job the best that I could. I figured going to physical therapy would help me feel and do better.
Minimization	You think it will just get better after a while and that you can just ignore the pain until it gets better. Sometimes it is easier to ignore it and push on.
Social concern	It's a big deal when you can't do your job. Other soldiers tend to have a poor perception of you when you can't carry your workload, even if it isn't your fault and is because of an injury.
Career advancement	You can't do certain things when you are injured. You can't pass a PT test to commission or go to WLC, and sometimes you can't deploy. It is safer to just not get care in order to keep moving up.

PT=physical training; WLC=Warrior Leadership Course.

DISCUSSION

The findings of this study provide additional evidence that underreporting of MSI within the U.S. Army is present, specifically in healthcare personnel. This trend in underreporting is consistent with prior military and civilian research findings. Additionally, in these studies similar factors were found to prompt underreporting, including fear of negative impact on career, minimization, and social factors/perceptions of peers.

This study also compared reporting patterns of MEDCOM and FORSCOM personnel by using the Smith et al FORSCOM study [19]. A major finding of this study was a trend in underreporting that is consistent with previous studies [12-15,21]. MEDCOM and FORSCOM soldiers reported similar factors that influenced their decision to accurately report or not report MSI, although there were some key differences.

A larger percentage of MEDCOM soldiers (26%) compared with FORSCOM soldiers (19%) identified concern about symptoms as the number one factor influencing their decision to accurately report an injury. This suggests that health-related knowledge and training may affect a soldier's decision to report an injury. MEDCOM soldiers likely have an increased awareness of the long-term negative consequences of unreported and untreated MSI, prompting them to report a higher percentage of injuries sustained.

MEDCOM soldiers also more frequently than FORSCOM soldiers reported avoiding negative perceptions as a key factor in not reporting injuries. This highlights the role that social factors play in the reporting of MSI. The qualitative data collected from MEDCOM soldiers confirmed this relationship, as many soldiers discussed

negative perceptions that peers and leaders may have about MSI.

MEDCOM soldiers were less likely than FORSCOM soldiers to select inconvenience of seeking care as an influence on their decision not to report. This is likely due to the inherent accessibility and higher echelon of care available to soldiers within a medical setting. Soldiers not embedded in a clinic or hospital often have to follow a chain of reporting and do not have easy access to specialty providers.

MEDCOM soldiers were less likely than FORSCOM soldiers to exaggerate MSI symptoms (1.6% vs 6%). Increased direct access to providers likely decreases the perceived need for injury exaggeration in MEDCOM soldiers, whereas FORSCOM soldiers may feel the need to exaggerate symptoms to access the appropriate level of care.

Another notable finding was that 12% of MEDCOM soldiers, compared with 15% of FORSCOM soldiers, reported that a past negative experience with a provider was the most important factor influencing their decision to underreport. This speaks to the importance of empathy in provider interactions and validation of reported injuries.

This study showed high percentages of gradual-onset injuries, notably of the neck and back, which is consistent with common work-related injuries sustained by civilians [1]. About one half of the MEDCOM soldiers reported waiting 3 months or more before seeking treatment. By waiting to seek care, soldiers may elevate their risk for experiencing chronic conditions, suffering re-injury, and/or sustaining additional injuries from compensatory movements.

When left untreated, MSIs can have a negative impact on individual and unit effectiveness, and can lead to chronic conditions and permanent disability. This has long-term

implications for force readiness and the financial burden of providing care and compensation for injured soldiers. The reasons soldiers identified as influencing not reporting were similar to those cited in the civilian literature and ultimately highlight the need for a cultural shift in the way MSIs are viewed and discussed within the U.S. Army [16,17]. The negative perceptions of soldiers with MSI as weak or a burden only perpetuate the difficulty of obtaining accurate surveillance and providing appropriate treatment. There is a need for increased education and prevention efforts to mitigate the long-term consequences of untreated MSI.

Rehabilitation professionals should play a key role in leading efforts to shift perceptions and address MSI from a preventive standpoint. By taking a thorough history during evaluation of MSI, demonstrating empathy in interactions, and educating soldiers about risk factors for MSI, rehabilitation professionals can begin to address the complicated issue of MSI surveillance.

Survey research always carries the limitation of self-report bias. Furthermore, this particular survey asked participants to recall injuries experienced over the previous 12 months, introducing the potential for recall bias. This study surveyed soldiers at only one MEDCOM post, and findings may not be generalizable to other MEDCOM soldiers.

In the future, distributing this survey post-wide would allow a more diverse sample, and potentially increase the generalizability of findings. This study's findings highlight the need for standardized education and training for all soldiers. Moving forward, the development and evaluation of interventions aimed at promoting awareness and enhancing accurate reporting would be beneficial.

CONCLUSIONS

The findings of this study suggest that U.S. Army MEDCOM compared with FORSCOM personnel report a higher percentage of MSIs to providers. This study found a similar trend of underreporting, highlighting a need for increased education and efforts to encourage accurate MSI reporting. By increasing accurate injury surveillance, measures can be taken to prevent further injury and mitigate the long-term consequences of MSIs.

REFERENCES

- [1] National Institute for Occupational Safety & Health. Musculoskeletal Disorders and Workplace Factors. NIOSH publication number 97-141, 1997.
- [2] Alnaser MZ. Occupational musculoskeletal injuries in the health care environment and its impact on occupational therapy practitioners: a systematic review. *Work*. 2006;29:89-100.
- [3] Jones BH, Hansen BC. An Armed Forces Epidemiological Board evaluation of injuries in the military. *Am J Prev Med*. 2000;18:14-25.
- [4] Jennings BM, Yoder LH, Heiner SL, Loan LA, Bingham MO. Soldiers with musculoskeletal injuries. *J Nurs Scholarsh*. 2008;40:268-74.
- [5] Roy TC, Springer BA, McNulty V, Butler NL. Physical fitness. *Mil Med*. 2010;175:14-20.
- [6] Sharma J, Greeves JP, Beyers M, Bennett AN, Spears IR. Musculoskeletal injuries in British Army recruits: a prospective study of diagnosis-specific incidence and rehabilitation times. *BMC Musculoskelet Disord*. 2015;16:106.

- [7] Bedno S, Hauret K, Loring K, Kao TC, Mallon T, Jones B. Effects of personal and occupational stress on injuries in a young, physically active population: a survey of military personnel. *Mil Med.* 2014;179:1311-8.
- [8] Hauret KG, Jones BH, Bullock SH, Canham-Chervak M, Canada S. Musculoskeletal injuries: description of an under-recognized injury problem among military personnel. *Mil Med.* 2010;38(1 Suppl):S61-70.
- [9] Bell NS, Schwartz CE, Harford T, Hollander IE, Moroso PJ. The changing profile of disability in the U.S. Army: 1981-2005. *Disabil Health J.* 2008;1:14-24.
- [10] Roy TC, Piva SR, Christiansen BC, Leshner JD, Doyle PW, Waring RM, Irrgang JJ, Moore CG, Brininger TV, Sharp MA. Description of musculoskeletal injuries occurring in female soldiers deployed to Afghanistan. *Mil Med.* 2015;180:269-75.
- [11] US Government Accountability Office. Veterans' Disability Benefits: VA Should Improve Its Management of Individual Unemployability Benefits by Strengthening Criteria, Guidance, and Procedures. Report to Congressional Requesters GAO-06-309, 2006.
- [12] Evanoff B, Abedin S, Grayson D, Dale A, Wolf L, Bohr P. Is disability underreported following work injury? *J Occup Rehabil.* 2002;12:139-50.
- [13] Menzel NN. Underreporting of musculoskeletal disorders among health care workers: research needs. *AAOHN J.* 2008;56:487-94.
- [14] Shannon HJ, Lowe GS. How many injured workers do not file claims for workers' compensation benefits? *Am J Ind Med.* 2002;42:467-73.
- [15] Roseman KD, Kalush A, Reilly MJ, Gardiner JC, Reeves M, Luo Z. How much work-related injury and illness is missed by the current national surveillance system? *J Occup Environ Med.* 2006;48:357-65.
- [16] Moore JT, Cicularov KP, Sampson JM, Rosecrance JC, Chen PY. Construction workers' reasons for not reporting work-related injuries. *Int J Occup Saf Ergon.* 2013;19:97-105.
- [17] Azaroff LS, Levenstein C, Wegman DH. Occupational injury and illness surveillance: conceptual filters explain underreporting. *Am J Public Health.* 2002;92:1421-9.
- [18] Pransky G, Snyder T, Dembe A, Himmelstein J. Under-reporting of work-related disorders in the workplace: a case study and review of the literature. *Ergonomics.* 1999;42:171-82.
- [19] Smith L, Warr B, Cooper A, Scofield D, Sauers S, Claro P. Musculoskeletal injury reporting in U.S. Army FORSCOM unit. In press.
- [20] David S. Importance of sonographers reporting work-related musculoskeletal injury: a qualitative view. *J Diagn Med Sonogr.* 2005;21:234-7.
- [21] Siddharthan K, Hodgson M, Rosenberg D, Haiduven D, Nelson A. Under-reporting of work-related musculoskeletal disorders in the Veterans Administration. *Int J Health Care Qual Assur Inc Leadersh Health Serv.* 2006;19:463-76.
- [22] Weiner C, Alperovitch-Najenson D, Ribak J, Kalichman L. Prevention of nurses' work-related musculoskeletal disorders resulting from repositioning patients in bed: comprehensive narrative review. *Workplace Health Saf.* 2015;63:226-32.