

Self-Management of Unreported Musculoskeletal Injuries in a U.S. Army Brigade

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ABSTRACT Background: There is a paucity of literature describing the accuracy of musculoskeletal injury reporting in the U.S. Army. Purpose: To investigate symptom-management behaviors as well as factors associated with seeking medical treatment among active duty Soldiers who reported that they had concealed at least one musculoskeletal injury. Methods: Anonymous surveys were completed by Soldiers ($N = 1,388$; 1,269 males, 74 females, and 45 no response) assigned to an Infantry Brigade Combat Team. Soldiers were asked to self-report injuries sustained in the last 12 months and whether or not they reported those injuries to a medical provider. Descriptive statistics were used to analyze treatment alternatives. Chi-square test was used to assess any significant relationships between injury and various demographics. Results: There were 808 (58%) Soldiers who stated they had an injury that they did not report. Over-the-counter pain relief medication (81%) was the most commonly selected alternative treatment. Conclusion: Over-the-counter pain medication was frequently used for symptom management among Soldiers who did not report their injury to a medical provider.

INTRODUCTION

Military service is associated with unique occupational demands, including significant load carriage associated with rucksacks and body armor, physical training, airborne/air assault training, and engaging in combat in austere environments. These tasks place significant strain on the musculoskeletal system and thus it is no surprise that musculoskeletal injuries (MSI) are the leading cause of injury among military personnel^{1,2} accounting for an estimated 2.2 million injury-related medical encounters per year.³ MSI may result from acute trauma such as a fall that leads to a bone fracture or the cumulative effects of microtrauma over time caused by repetitive movements associated with frequent physical training or repetitive job-related tasks. These injuries result in overuse injuries such as tendinitis.^{1,4,5} Unlike acute injuries, the functional impact of overuse injuries may not be immediately obvious and can be easily concealed and overlooked. However, these injuries can significantly degrade function over time and are the leading cause of disability among all military services.⁶⁻⁸ Over the last several years, musculoskeletal-related disability has increased and is now the fastest growing category of disability.⁹ Undoubtedly, MSIs pose a significant threat to Warfighter health and medical readiness. In order to preserve the combat capability and protect our greatest resource—the Soldier—it is essential to better understand the problem of MSI and contributing factors to attenuate the impact of injuries on operations.

The accuracy of MSI-related medical encounters has been called into question over the past decade with more epidemiological/surveillance data being examined.⁵ Some civilian and military injury experts believe the data may underestimate the actual magnitude of the MSI problem⁵ as it is suspected that a significant number of MSI are not reported to health care providers and thus are not being tracked by conventional surveillance methods. One study investigating injury reporting among Soldiers from a Brigade Combat Team (BCT) found that 49% of MSIs went unreported to medical providers.¹⁰ Furthermore, it is not well understood how military personnel who do not report their injuries manage the symptoms of their MSI when medical attention is not sought. If service members (SMs) are sustaining injuries, but not reporting them to medical providers, they may seek other alternatives to manage pain and symptoms. Alternative treatments for pain relief and symptom management related to MSIs come in many forms to include over-the-counter (OTC) pain medication, ice, heat, topical analgesics, rest, etc. The use of pain-relieving medication is common with 30 billion purchases made for OTC nonsteroidal anti-inflammatory drugs (NSAIDs) per year.^{11,12} The use of pain relieving medication is widespread throughout the military as well.¹³ For example, Walter Reed Army Medical Center Pain Management Center and Landstuhl Army Medical Center Pain Clinic prescribed NSAIDs to 56% and opioids to 49% to Soldiers injured in Operation Iraqi Freedom from 2003 to 2004.¹⁴ Although these medications are used to treat pain, chronic use of pain relievers could have lasting negative effects, particularly on muscle and kidney functions.^{11,15}

Currently, symptom management practices by Soldiers who choose not to seek medical evaluation for MSIs are unknown. However, the consequences for injury mismanagement are potentially serious and may result in a cascade of subsequent related injuries, prolonged healing time, chronic pain, an

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increase in lost duty days, diminished performance, and physical disability.^{7,16,17} A better understanding of symptom management among Soldiers who do not report injuries would help to determine the risks associated with injury concealment and the potential threats to health and medical readiness necessitating further investigation.

The purpose of this study was to describe how Soldiers who choose not to report an MSI are managing the pain and symptoms associated with these injuries. A secondary purpose was to evaluate attitudes regarding injuries, injury reporting, and pain among military personnel.

METHODS

Design and Participants

Data were collected using a cross-sectional survey design. Surveys were distributed to Soldiers of an Infantry BCT. A total of 1,388 Soldiers agreed to complete the survey. While response rate data were not collected, a typical Infantry Brigade is made up of approximately 3,000 to 3,500 Soldiers. If the maximum number of Soldiers were briefed this would have yielded a 40% response rate. Additionally, at the time the survey was administered the unit had recently returned from a deployment to Afghanistan. When responding to survey questions, participants were asked to reflect on the previous 12 months which therefore included deployed and nondeployed time. The sample also potentially included personnel who did not deploy with the rest of the unit. Data for this study were extrapolated from a larger study, in which the incidence of injury reporting behavior was investigated.¹⁰ The study was approved by the U.S. Army Research Institute of Environmental Medicine Institutional Review Board.

Procedure

Surveys were distributed to Soldiers seated in a large auditorium with a minimum of one seat separating each participant. Junior enlisted Soldiers (E4 and below) were separated from Noncommissioned Officers (E5 and above) and Officers to encourage honest responses without fear of reprisal for answers on sensitive topics. Soldiers were briefed about the study purpose and procedures and that their participation was completely voluntary. The anonymity of the survey was emphasized and Soldiers were encouraged to answer survey questions honestly, but had the option to skip questions they did not feel comfortable answering.

Survey Description

At this time there is no valid survey/instrument that measures injury reporting and self-management of MSI symptoms among military personnel. To measure injury reporting behaviors and treatment alternatives for unreported MSIs, the investigators developed a survey specifically for use during this study. Although the survey was not tested for reliability and validity, it was piloted on a panel of military

personnel of varying ranks and military occupational specialties. The intent of the survey was to describe injury reporting behaviors and factors that influenced injury reporting. Soldiers were asked if they sustained an injury to any of 10 body regions (neck, back, shoulder, elbow, wrist, hand, hip, knee, ankle, and foot) in the last 12 months and if they reported the injury to a medical provider.

For the purposes of this study, MSI was defined by the investigators as any ache, pain, or discomfort thought to be related to the musculoskeletal system that persisted for more than 7 days. Medical providers were defined as physicians, physician assistants, nurse practitioners, or physical therapists. Underreporting was defined as an MSI that the Soldier believed they had sustained but did not report to a medical provider. The survey also included demographic information such as age, height, weight, gender, time in service, current battalion type, rank, and Military Occupational Specialty.

In addition to injury reporting, Soldiers were asked to select alternative treatments they used to manage their symptoms. They were provided a list of 14 different alternative medical treatments (OTC pain relief medication, topical muscle rubs, splint/brace, ice packs, yoga, massage, meditation, heat packs, illicit drugs, pain avoidance, hot tub, alcohol, more sleep, and narcotics) and asked to select any they had used to relieve symptoms of a MSI within the previous 12 months. Finally, Soldiers were presented with several statements related to injuries and seeking medication evaluation. They were asked to respond to the statements using a Likert scale in which the answers ranged from strongly agree to strongly disagree. With very few exceptions, survey questions were close ended (multiple choice, rank order, etc.) in which the participants were provided a list of responses and were asked to select one answer. In some instances they were instructed to select all answers that applied.

Data Analysis

Statistical analysis was performed using the statistical package IBM SPSS (version 21.0; IBM Corporation, Armonk, NY). Because it was possible for participants to report an injury in one body region and not another, each injury was treated individually and unreported injuries were filtered for analysis. Frequency distributions were used to calculate ordinal data. Pearson's chi square was used to assess any significant relationships between injury reporting and gender, age, rank, time in service, and battalion type. Significance was set a priori at $\alpha < 0.05$.

RESULTS

Sample Characteristics

The sample included 1,388 Soldiers comprised of 1,269 males and 74 females (45 participants did not respond to the gender question), with an average age of 27.5 years (range 18–60; standard deviation 6.3). Most were enlisted Soldiers

(86%) with 5 years or less of service in the military (58.9%) (Table I).

There were 808 (58%) Soldiers (732 males and 46 females) who stated they had sustained an injury that went unreported to a medical provider. Of these Soldiers, 69% were in a Combat Arms Battalion and 24% were in a Support Battalion (Fig. 1). There were 580 (42%) Soldiers (537 males and 28 females) who stated they had sustained an injury and reported it to a medical provider. Soldiers reported 1,636 injuries, but 1,566 injuries were not reported to a medical provider (Table II). There were 3,132 alternative treatments used by Soldiers to manage symptoms of MSIs. On average, four different treatments were attempted per Soldier. Frequency of alternative treatments used for symptom management of an unreported MSI was as follows: OTC pain medication (81%), use of ice packs (55%), and use of heat packs (52%) (Fig. 2). When assessing relationships between unreported injuries across various demographics, the results of chi-square tests revealed significant relationships for unreported injuries and age ($\chi^2 = 41.351$, $p < 0.001$) and time in service ($\chi^2 = 41.817$, $p < 0.001$). When responding to questions asking their opinions about seeking medical care, more than half of participants agreed that aches and pains are a natural consequence of hard work (68.3%), that it is better to just work through pain (57.6%), that their unit believes in the “suck it up” mentality when it comes to injuries (54.7%) and seeking medical attention is an inconvenience (50.7%). It was also observed that 53.9%

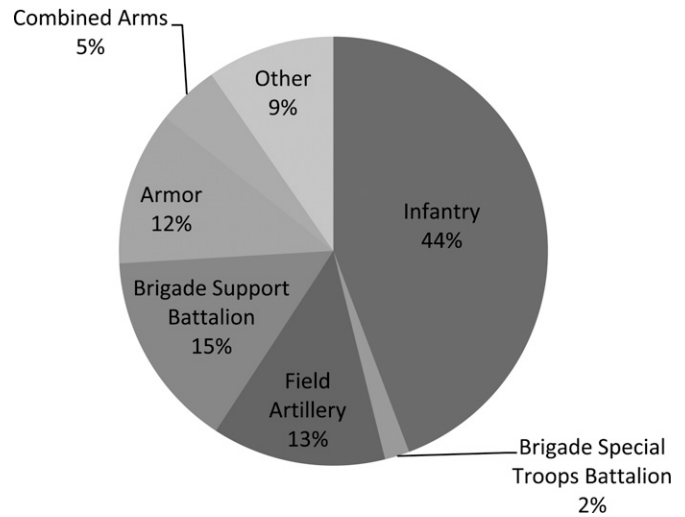


FIGURE 1. Battalion type for unreported injuries.

of Soldiers stated that they would not immediately seek medical care if they were injured.

DISCUSSION

The purpose of this study was to evaluate MSI symptom management among Soldiers who do not report their injuries as well as to investigate current perceptions about pain and injuries in the military. The main finding of this study is the

TABLE I. Demographic Characteristics for the U.S. Army BCT

	Total Participants (<i>n</i> = 1,388)	Participants Reported Injury (<i>n</i> = 580)	Participants Unreported Injury (<i>n</i> = 808)
Gender			
Male	1,269	537	732
Female	74	28	46
Unknown	45	15	30
Age			
18–20	53	30	23
21–30	960	443	517
31–40	260	82	178
>41	56	6	50
Unknown	52	16	36
Rank			
E1–E9	1,194	490	704
WO1–WO5	8	4	4
O1–O6	109	59	50
Unknown	77	27	50
Time in Service (Years)			
1–5	818	393	425
6–10	285	107	178
11–15	121	39	82
16–20	58	10	48
>21	29	5	24
Unknown ^a	77	26	51
Battalion			
Combat Arms	976	421	555
Support	319	122	197
Unknown	93	37	56

^aUnknown, response was not given to questions.

TABLE II. Reported and Unreported Injuries by Body Region

Body Region	Reported	Unreported
Neck	95	120
Back	338	268
Shoulder	194	226
Elbow	46	65
Wrist	78	108
Hand	76	73
Hip	83	109
Knee	341	289
Ankle	240	176
Foot	145	132
Total	1,636	1,566

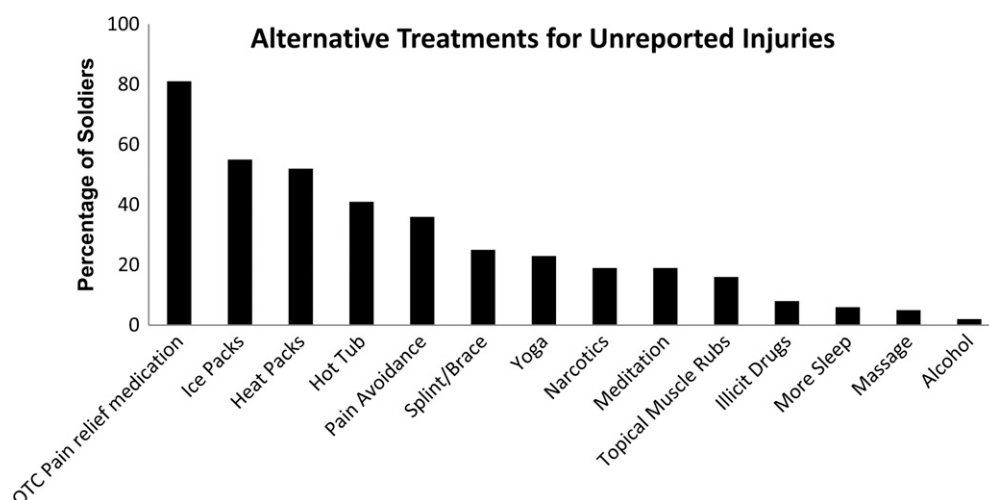
prevalence of OTC pain relief medication for the purposes of symptom management of MSIs among Soldiers who do not report their injuries to medical providers.

Pain and injury are costly to both the workforce and the individual both in the short term as well as throughout the Warfighter lifecycle. These cost burdens are marked by decreased job performance as a result of physical limitations and pain as well as decreased productivity because of lost work days.¹⁸ NSAIDs are a common treatment for pain associated with MSI caused by inflammation because of their ability to selectively inhibit the cyclooxygenase enzyme thus reducing inflammation (if present) and pain.^{11,19} NSAID use among the military population is high.¹³ As of 2011, 79% of the active duty Army had received at least one prescription for an NSAID.¹³ Previous literature has reported that 62.8% of Soldiers deployed during Operation Iraqi Freedom and Operation Enduring Freedom received ibuprofen and 17% received a narcotic for a nonbattle injury.²⁰

While NSAIDs serve a purpose, there are situations and conditions for which NSAIDs may not be the most appropriate intervention. A review by Urso¹¹ found that current use

of anti-inflammatory drugs are not necessarily effective at reducing pain levels. Further, the use of NSAIDs may pose a risk to the user by preventing inflammation at the injury site and thus hindering the recovery process.^{21–23} Another study reported that ibuprofen consumption had no effect on decreasing perceived pain and soreness during a 6-week resistance training program,²⁴ and there has been no supporting evidence that NSAIDs have any significant impact at reducing delayed onset muscle soreness.²⁵

Use of pain relief medications alone is not a concerning issue. However, pain medication that is used chronically without provider oversight can give a false impression of recovery and thereby increase one's risk for further injury or lead to complications in other structures and body systems. Recent research suggests that NSAIDs could cause further organ damage in Soldiers with a heat injury.²⁶ Heat injuries include heat cramps, heat exhaustion, and heat stroke. Soldiers often perform physically demanding tasks in hot environments. There were over 1,600 heat casualties in 2012 for active duty Army.²⁷ Heat stroke has been shown to cause myocardial infarction, renal tubular necrosis, and acute liver necrosis.²⁸ Caution must be exercised when using these types of medication and performing vigorous activities in the heat. If Soldiers are using NSAIDs without medical oversight they may lack awareness about the proper precautions associated with these medications. When NSAIDs are used inappropriately, Soldiers unnecessarily and unknowingly increase their risk of experiencing potentially negative consequences and causing further harm. The results of the current study suggest that OTC pain relief medications including NSAIDs are frequently used among Soldiers who do not report their injuries as an alternative to seeking medical treatment. Although the present study did not quantify the amount being used, the findings suggest that further investigation may be an important step in determining the possibility of a potential knowledge gap among Soldiers

**FIGURE 2.** Alternative treatments for unreported injuries ($N = 3,132$).

using these medications that may increase risk for further injury or medical complication.

As previously stated, Soldiers are routinely required to perform physically demanding tasks, often times in austere and suboptimal conditions. Thus, pain and injuries are inevitable. Recovering from injuries requires perseverance and resiliency. However, the “drive-on” mentality that permeates military culture can sometimes influence the thoughts and behaviors of Soldiers in regard to seeking medical care for injuries. This is further supported by the number of Soldiers in this study who agreed that it is better to just work through pain (57.6%) and seeking medical attention is an inconvenience (50.7%). These opinions support that injury minimization is still a predominant theme among military culture. While not all pain necessitates immediate medical evaluation, ignoring injuries or delaying medical care in some instances can have negative implications such as compounding the injury, reinjury, or developing chronic pain. Injuries that go untreated may also negatively impact operational readiness at the individual and unit level. A survey completed by SMs deployed to Iraq or Afghanistan during 2003–2004 found that 25% believe common injuries reduced unit effectiveness.²⁰ Additionally, the number one predictor of reinjury was previous injury.² One study revealed Soldiers with a prior knee injury (within 2 years) had more than a 9-fold increased relative risk of reinjury.¹⁷ The fact that some Soldiers in this study reported delaying medical evaluation is problematic as they potentially increasing their risk for future injury without any awareness by their unit leadership or medical provider. Delayed treatment of an injury could also mean multiple visits to a health care provider. One study found that of the 34% of SMs that reported a noncombat MSI, 77% sought care multiple times.²⁰ Another study that looked at the implications of early physical therapy exclusively for low back pain found that delayed physical therapy resulted in increased spinal injections, rates of surgery, and medication use as well as increased costs overall.²⁹ Although generalizability of these results outside patients with low back pain should be cautioned, the data suggest that delayed medical care was associated with less favorable results. While injury minimization is prevalent among military culture, it is potentially concerning that Soldiers believe that seeking medical care is an inconvenience. It may be worth investigating the perceived barriers or inconveniences that prevent Soldiers from seeking early medical care and the impact this has on injury reporting and self-management of symptoms.

MSIs and pain both pose a threat to Warfighter performance and operational readiness.³⁰ As we transition into an era of fiscal and personnel reduction there is a greater emphasis on the human dimension. Senior leaders have identified performance optimization and injury prevention as top strategic and operational priorities.^{3,30} Nindl et al³ have highlighted several models to address injury prevention and mitigate the burden of MSIs on individual and unit readiness. Education about injury management and appropriate

use of NSAIDs would align with these initiatives. These would be useful interventions to help Soldiers understand when pain should and should not be ignored, how effective use of medications and modalities can reduce symptoms and expedite recovery thereby reducing the burden of injuries on combat readiness. Additionally, Nindl et al³⁰ summarized several metrics that could be used to more comprehensively and holistically to assess human performance optimization for Warfighters. Included in these recommendations was additional metrics to assess pain in an accurate and meaningful way. Based on data from this study, it may be worth including self-report of pain medication usage as an indicator and objective measure of the presence of and changes in pain.

Although this was the first attempt to assess reporting behaviors and management of unreported MSIs, generalizing these results to the rest of the military population should be cautioned. One limitation to this study is the survey was not tested for reliability or validity, which could result in measurement error. Additionally, females were underrepresented in this study, making it difficult to generalize results to female Soldiers. Finally, the survey did not quantify the dosage of NSAIDs, duration of use, nor did it specify for what symptoms the medication was being used for, and therefore it is difficult to determine if OTC medications were being used appropriately or not.

CONCLUSION

Symptom management by Soldiers who do not report their injuries could have potentially negative effects at both the individual and unit level. Given an impending reduction in force it is critical to maximize Warfighter health and reduce the burden of MSIs on operational readiness. Increased education regarding safe and effective MSI management strategies are needed to optimize injury recovery. Along with education there is also a need to emphasize injury prevention and encouragement among leadership to seek early treatment of injuries to prevent performance decrements. Future investigation is needed to develop an understanding of how unreported injuries are managed and where educational intervention would be best served.

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