Management of chronic musculoskeletal pain in veterans: a systematic review

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Abstract. Background and aim of the work. Veterans are military with health problems due to military conditions. The improved body armor and operational conditions has reduced the number of deaths, but increased the number of veterans with severe injuries, affected by musculoskeletal pain and associated syndromes, such as post-traumatic stress disorder. Multimodal approaches are considered in USA the gold standard for the treatment of these problems, while in Europe and Italy the data are unknown. The aim of this review was to describe and summarize multimodal therapeutic approaches that apply to the veteran population for chronic musculoskeletal pain and relate syndromes management.

Methods. A comprehensive systematic review of the literature on Cochrane Library, PubMed, CINAHL e PsycINFO databases was conducted, from 2001 to 2020. Results. 228 papers have been found, 134 were selected after the first screening. 24 quantitative studies were included in the review, all from USA. Different multimodal interventions with different kind of treatment types emerged. The analyzed studies’ sample size was 11 million (mean age = 57.67 years; SD=±11.94). The multimodal approaches showed a significant improvement in all outcomes (pain reduction and control, opioid therapy reduction, psychosocial outcomes) compared to traditional therapy. Conclusions. Multimodal therapeutic approaches seem to guarantee a good management chronic musculoskeletal pain and related mental disorders, and the reduction and control to opioid use. Military nurses emerged as professionals who have a central role in this approach. European and Italian authorities should consider veterans, in order to assess their expected increase in the future. (www.actabiomedica.it)

Keywords: veterans; military; nurses; pain; pain management; musculoskeletal pain; opioid therapy; post-traumatic stress disorder.

Background

The word veteran has different meanings in different countries (1, 2), but it generally means men and women in uniform who have reported disabilities and/or health problems, following accidents and or injuries in military operations and and/or due to extreme living and working conditions, specific services, and military operational contexts in crisis areas (3).

The exact number of veterans in the world is not clear, but in the USA, the country most involved in international military operations, the United States Department of Veteran Affairs (VA – USA) estimated approximately 20 million US veterans in 2017 (4). The scientific world has a great interest in studying veterans (5, 6). In other countries, the veteran population is more contained but is likely to grow, given the increased commitments to international operations. In Italy, the Italian Ministry of Defense started an Italian veteran support program at the Defense Veterans Center in Rome and has improved civilian collaborations for post-traumatic rehabilitation (7, 8).
The issue regarding veterans has changed over the years, particularly after September 11, 2001. The number of veterans has grown since 2001, especially after Operation Enduring Freedom (OEF), the International Security Assistance Force (ISAF) in Afghanistan, and Operation Iraqi Freedom (OIF) in Iraq (9, 10). According to the Institute of Medicine (11), the improved body armor provided to service members and the improved emergency medical care in the war zone led to a favorable reduction in deaths, but also created an increase in veterans who return home with severe injuries. For these veterans, the most important health problems are a high level of disability due to chronic musculoskeletal pain (MSP), psychological or physical diseases and syndromes with social implications (12). The overall incidence of MSP was 40.5/1000 (veteran/year), with an incidence range in the general population between 24.2 and 44.7/1000 (person/year) in 2006. Furthermore, in 2018 in the US military cohort for the incidence increased to 54.2/1000 (veteran/year) for military vehicle drivers and 48.3/1000 (veteran/year) for soldiers employed in specific operations (13). MSP is a persistent or recurrent pain that continues for several months and directly affects bones, joints, muscles, and soft tissues (14), with dynamic interactions between the biological, psychological, and social factors unique to each individual with high comorbidity (15, 16) and a negative impact on quality of life (17). The psychological and physical wellbeing of these veterans is also compromised by the frequent coexistence of post-traumatic stress disorder (PTSD) in which traumatized people repeatedly experience the traumatizing event more than one month after the trauma. In many cases, people with PTSD become irritable or, often have chest pains, headaches, gastrointestinal problems, immune-depression, and they want to avoid remembering (18, 19). The MSP and PTSD correlation could be caused by the high intensity of the activities and by the high risks of attack in these operations (20) and by psychophysical stress, particularly musculoskeletal, due to the use of many hours in armored vehicles. Furthermore, comradeship and the concept of “brothers in arms” represent a special kind of friendship and an important and necessary bond in the military (21). So these veterans often have also feelings of guilt because they survived and were not able to save their colleagues.

Lew et al. (22) described a high prevalence of MSP (81.5%) in veterans, followed by PTSD (68.2%) and persistent post-concussive symptoms (PPCS) (66.8%). Only 3.5% of veterans are free of these clinical conditions. In 42.0%, these conditions were combined, and in a few cases, they were isolated (10.3% vs. 2.9% vs. 5.3%). The presence of these three conditions is called the post-deployment triad (23). All of these conditions, which can also be associated with major depression and the abuse of drugs and alcohol, can negatively impact the pain management outcomes, such as pain interference, pain severity, pain acceptance, quality of life, and disability (24, 25, 26). Therefore, VA-USA considers chronic MSP in veterans as a national priority (27), investing in both research and the implementation of effective management approaches (28) also able to limit the abuse of opioid therapy (OT) (28), with interdisciplinary, multidisciplinary and transdisciplinary problem solving approaches (29). These approaches are considered the gold standard because could guarantee greater efficacy, reduction of side effects, long-term satisfaction (30), limiting the illicit substances used to manage pain (31), and reestablishing the residual autonomy (32).

In Europe and, in particular, in Italy, the issue of veterans is currently much more limited, even if Italy is among the main contributors to the military international operations (33). To our knowledge, data regarding MSP of Italian veterans is unknown. More, an increase in the number of missions is foreseeable in the future, so the Ministry of Defense has started a support program for Italian veterans, by establishing a special Defense Veterans Center in Rome (7), and by collaborating with civil health institutions in the post-traumatic rehabilitation sector (8). For these reasons, it would be desirable a better knowledge in order to plan correct management of chronic MSP of Italian veterans. Thus, it could be desirable acting in a preventive perspective rather than delaying interventions.

The literature describes the approaches used to treat chronic MSP in the general population (34, 35), but it is not clear which approaches are used in chronic MSP management in the veteran population.
Aims

The objective of this review was to describe and summarize multimodal therapeutic approaches that apply to the veteran population for chronic MSP management and related syndromes management.

Methods

Search strategy

A comprehensive systematic review was conducted from 2001 (OIF/ISAF/OEF start date) to 2020.

We excluded studies before 2001 because this year is considered the cornerstone in changed condition regarding veterans, as reported above.

This review used the following databases: Cochrane Library, PubMed, CINAHL, and PsycINFO. The keywords were “veterans,” “chronic musculoskeletal pain/MSP,” “post-traumatic stress disorder/PTSD,” “treatment,” “Afghanistan,” “Iraq/Irak,” “military operations,” and “noncancer.” Both thesaurus and free-text terms were used when relevant and combined with Boolean operators (AND, OR, NOT). The search strategies were adapted for each database, using Population, Intervention, Control, Outcome (PICO): P: Afghanistan and Iraq recent veterans; I: multimodal therapeutic approaches for chronic MSP and related mental disorders; C: compared to traditional pharmacological approaches; O: pain severity, improving quality of life, and cost reduction. The reference list of identified papers was also hand-searched for additional studies. This systematic review was conducted according to the PRISMA guidelines (36).

Inclusion and exclusion criteria

This review included all quantitative studies on: a) veterans of the recent crisis in Afghanistan (OEF/ISAF) and OIF in Iraq from 2001; b) inpatient and or/and outpatient veterans in treatment for chronic MPS; c) RCTs and observational studies; d) articles on different approaches to chronic MSP management with with/or mental disorders related, and e) papers in English and Italian only. We have not included: a) case reports, editorial letters, consensus conference, doctoral thesis; b) studies on the general population; c) studies on veterans of operations before 2001; d) studies on the pediatric or geriatric population; e) studies on chronic cancer pain; qualitative studies.

Data extraction and synthesis of quantitative studies

The included studies were read to identify and understand the content and were selected by year, title, abstract, and duplicates. Subsequently, we obtained a sample of articles with full text. The data considered useful for the review have been extracted, analyzed and summarized according to the following items: authors, year, type of study, setting and characteristics of the population (sample, number, age, mean and standard deviation, sex, race, education), outcomes, outcomes instruments, aims, results, randomization, conclusions, nationality, and funding.

Quality appraisal

The quality of assessment of the study, for quantitative studies, was carried out through the Consolidated Standards of Reporting Trial (CONSORT) (37) method and its extension (38); for observational studies, we used the Reinforcement of the Reporting of Observational Studies in Epidemiology (STROBE) (39).

Results

Included articles, countries and funding

We found 228 papers in the selected databases. After the first screening of the title and abstract, and after removing duplicates, we identified 134 papers. After the screening of the full text, we included 24 articles, as shown in the flow chart diagram (Figure 1).

The selected articles are all on US veteran populations and none on Italian veterans, all with public or academic funding and, in particular, by VA-USA. The first included study was published in 2009, eight years from the OEF/ISAF OIF operations start date.

The last studies were published in 2020 (Table 1).
Records identified through database searching \((N = 204)\)

Records after duplicates removed \((N = 134)\)

Records screening for relevance on basis of title and abstract \((N = 134)\)

Full-text articles assessed for eligibility \((N = 111)\)

Studies included in the papers \((N = 24)\)
24 Quantitative studies in the systematic review

Records excluded \((N = 23)\)
4 websites
6 editorials
6 qualitatives
2 doctoral theses
1 poster
1 case report
2 consensus conference
1 letter to the editor

Full-text articles excluded \((N = 87)\)
28 other populations
30 other intervention and/or outcomes
20 bibliographic studies
9 unfinished studies

**Figure 1.** Flow chart diagram

**Table 1. Studies**

| Articles            | Study                      | Country | Funding   |
|---------------------|---------------------------|---------|-----------|
| Dobscha et al., 2009| Cluster RCT               | USA     | VA-USA    |
| Murphy et al., 2013 | Observational study       | USA     | VA-USA    |
| Kroenke et al., 2014| RCT                       | USA     | VA-USA    |
| King et al., 2015   | Pilot study               | USA     | VA-USA    |
| Bair et al., 2015   | RCT                       | USA     | VA-USA    |
| Stratton et al., 2015| CT non randomized         | USA     | VA-USA    |
| Thielcke et al., 2015| RCT - secondary analysis | USA     | VA-USA    |
| Frank et al., 2015  | Observational study       | USA     | VA-USA    |
| Herbert et al., 2016| Observational study       | USA     | VA-USA    |
| Koffel et al., 2016 | RCT - secondary analysis  | USA     | VA-USA    |
| Groessl et al., 2017| RCT                       | USA     | VA-USA    |
Articles Study Country Funding
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Highland et al., 2017 RCT pilot USA USA, Department of the Army
Burgess et al., 2018 RCT pilot USA USA, National Center for CIH
Cosio et Lin, 2018 Quasi-experimental study USA Non funding
Goode et al., 2018 RCT pilot USA VA-USA / National Center for CIH
Martinson et al., 2018 Quasi-experimental study USA VA-USA
Cummins & Tobian, 2018 CT non-randomized USA VA-USA
Anamkath et al., 2018 Observational study USA VA-USA / University of California
Carey et al., 2018 Observational study USA VA-USA
Edmond et al., 2018 Observational study USA Weldon Donaghue Medical Research Foundation and VA-USA
Kay et al., 2018 Observational study USA USA, Advancing a Healthier Wisconsin
Rosen et al., 2019 RCT USA USA, National Institutes of Health
Han et al., 2019 Observational study USA VA-USA / National Center for CIH
Herbert et al., 2019 Observational study USA VA-USA

RCT = Randomized Controlled trial; CT = Controlled Trial; VA-USA = Veterans Affairs department – United States of America; CIH = Complementary and Integrative Health.

**Intervention types**

From our analysis, different interventions with different kind of treatment types emerged: 9 were considered interdisciplinary, 1 transdisciplinary, 4 multidisciplinary, 1 not clear (Table 2).

Interdisciplinary studies considered a combination of different treatments (i.e., yoga, acupuncture, psychoeducational interventions, muscular stretching exercises etc.). In the transdisciplinary studies a two steps algorithm was applied (12 weeks of analgesic treatment coupled with pain self-management strategies, and in the step 2, 12 weeks of cognitive behavioral therapy). In the multidisciplinary studies were used 4 different interventions: a home-based bright light treatment, a health technology intervention to help primary-care providers, a motivational intervention and a yoga-classes program. The last intervention used a comprehensive approach in order to predict and manage OT and alternative therapies.

**Quantitative studies quality appraisal**

The included quantitative studies have many of the quality appraisal checklists (CONSORT and STROBE). The only limits were: a) single center and b) blinding for 4 randomized controlled trials (41, 42, 43, 44); b) single center for Cluster RCT (30); c) do not defined the non-inferiority limits, population age media and ethnic percentage for noninferiority’s RCT (45); d) single center and small sample for the pilot RCTs (46, 47, 48, 49); e) poor control bias in some observational studies (34, 50, 51, 52, 53, 54, 55). We did not analyze quasi-experimental studies, non-randomized trials, or RC secondary analyses.
### Table 2. Interventions

| Intervention                                                                 | Type of approach | Description                                                                                                                                   |
|----------------------------------------------------------------------------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Complementary and Integrative Health therapies (CIH)                       | Interdisciplinary | Additional treatment by chiropractic, acupuncture, yoga, and psycho-educational therapy                                                     |
| Acceptance and Commitment Therapy (ACT)                                    | Interdisciplinary | Cognitive behavioral therapy comprises three components: 1) awareness and nonjudgmental acceptance of all experiences (negative as well as positive), 2) identification of valued life directions, and 3) committed action toward goals that support values. |
| Interdisciplinary Pain Rehabilitation Program (IPRP)                        | Interdisciplinary | Several treatment components, including the following: Acceptance and Commitment therapy, cognitive behavioral therapy, physical therapy, pain education, and pharmacy counseling. |
| Home-based morning bright light treatment                                  | Multidisciplinary | 13 days of a one-hour morning bright light treatment self-administered at home. Consist of having participants receive high-intensity ultraviolet free light, most typically from a light box during morning hours |
| Restorative Exercise and Strength Training for Operational Resilience and Excellence (RESTORE) | Interdisciplinary | 8-week based on therapeutic yoga, targeting major muscles affected by chronic lower back pain, including back and core strengthening/stretching for postural alignment. |
| Screening Brief Intervention and Referral to Treatment–Pain Module (SBIRT-PM) | Interdisciplinary | Brief phone counseling about the veteran’s pain and an explanation of multimodal pain treatment, to explain on substance use, to inform them of available services at the VA Healthcare |
| Stepped Care to Optimize Pain care Effectiveness (SCOPE)                    | Transdisciplinary | Two steps; Step 1 included 12 weeks of analgesic treatment and optimization according to an algorithm coupled with pain self-management strategies; Step 2, 12 weeks of cognitive behavioral therapy. Nurse care managers delivered all intervention aspects |
| Effectiveness of a Collaborative Approach to Pain (SEACAP)                 | Interdisciplinary | Included a 2-session clinician education program, patient assessment, education and activation, symptom monitoring, feedback and recommendations to clinicians, and facilitation of specialty care |
| Cognitive Behavioral Therapy (CBT)                                        | Interdisciplinary | Intervention included stretching, strengthening, and aerobic activities; CBT-P covered activity pacing, relaxation techniques, and cognitive restructuring |
| Comprehensive TBI Evaluation (CTBIE)                                       | Not clear         | Patients are evaluated by CTBIE (Emotional, Vestibular, Cognitive and Somatic/Sensory symptoms) to predict the start of drug therapies in order to manage the short term and long-term OT and alternative non-pharmacological therapy |
| Education, Exercise and Chiropractic treatment (EEC)                       | Interdisciplinary | Integrated conventional and complementary alternative medicine with educational programs, exercise training, and chiropractic therapy |
| Specialty Care Access Network-ECHO (SCAN-ECHO)                            | Multidisciplinary | Uses tele-health technology to provide primary care providers with case-based specialist consultation and pain management education. To assess the association between provider SCAN-ECHO-PM consultation and 1) delivery of outpatient care (physical medicine, mental health, substance use disorder, and pain medicine) and 2) medication initiation (antidepressants, anticonvulsants, and opioid analgesics) |
| Chronic Opioid Therapy (COT) + ambulatory resources                       | Interdisciplinary | Uses telephone calls, secure messages, nurse visits, and telephone triage to the management of patients on chronic opioid therapy |
| Intervention                        | Type of approach | Description                                                                                                                                                                                                 |
|------------------------------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Motivational Enhancement Therapy (MET) | Multidisciplinary | MET is a brief, targeted, structured version of motivational interviewing; It is an evidence-based form of treatment that is used to elicit and strengthen motivation for change. Patients are helped to process their own change talk, therefore helping them to build on their motivations as well as helping them understand their own sustaining narratives that may be holding them back from change. The process is respectful, nondirective, and emphasizes participants’ personal choice and control |
| Yoga                              | Multidisciplinary | Yoga classes (with home practice) were led by a certified instructor twice weekly for 12 weeks and consisted primarily of physical postures, movement, and breathing techniques |

**Population characteristics**

The included studies’ settings were mainly from the OEF/ISAF and OIF veterans. The analyzed studies’ sample size is 11 million; the mean age was 57.67 years (SD=±11.94), with a range from 36 to 70 years. 85.26% were male, 70% were White/Caucasian, 22.88% were African-American/Black, and 7.12% were Other. The 11.98% of population included attended high school while the 88.02% upper educational level. Educational level results in 11.98% high school and in 88.02% upper.

The mental disorders related (PTSD, PPCS, depression) were analyzed in all studies, except for three (42, 44, 56).

**Quantitative studies included**

In the 24 quantitative studies included, we found different outcomes and instruments used. However, all included studies were analyzed to measure outcomes relative to pain severity, pain-related disability, pain interference, quality of life, quality of sleep, depression, and anxiety. Another important outcome is OT reduction. All multimodal approaches (using two or more different methods or medications to manage pain) that were described and analyzed (Table 2) show a significant improvement in all outcomes compared to traditional therapy or non-inferiority, but with fewer side effects (data not shown). In particular, using the Stepped Care model as a transdisciplinary approach, we found the following: a) 2 point decrease in the Roland–Morris disability questionnaire (95% CI, -3.2 to -0.7, p= 0.002); b) 0.8 point decrease in the Pain Interference subscale score of the Brief Pain Inventory (95% CI, -1.3 to -0.3, p=0.003); c) a 6.6 point decrease in the Graded Chronic Pain scale (95% CI, -10.5 – 2.7; p= 0.001); d) an 0.9 point decrease in OT (4.2% to 3.3%) and a 3.1% increase in non-OT at 5 years (36.7% to 39.8%) (41, 52, 57).

**Discussion**

The objective of this review was to describe and summarize the multimodal therapeutic approaches applicable to the veterans’ population, which is necessary for chronic MSP management and related syndromes management. All papers we found were created in the USA, with VA-USA or clinic (VA Center) funding. According to us, the reasons for this are attributable to many factors: a) US is the country most involved in international military operations with 20 million total veterans estimated in 2017 and an excellent form of veterans specific welfare, the United States Department of Veterans Affairs (4, 10); b) the numerical contribution of other nations to international operations is certainly lower than in the US (9, 10); d) these are confidential military data and are not published in scientific papers; e) other countries, for example, the UK has a different military health organization that is fully integrated with civil health (58). In Italy, the number of veterans is lower than in the US, but the Italian Ministry of Defense guarantees health care for veterans support by using the military and civil national health system, which comprises both civil and
military care (7, 8). All studies reported the management of the major issue of veterans: the chronic pain, with implications for the physical, psychological, and spiritual conditions of people, necessitating an holistic approach (35). In the included studies, different intervention types emerged as an alternative and/or complement to traditional OT and, in particular, multidisciplinary, interdisciplinary, and transdisciplinary approaches based. In interdisciplinary and, even more, transdisciplinary, the team shares not only the same goal but also the same treatment plan, thus representing itself as the gold standard of multimodal approaches (32). Among the emerging interventions, the transdisciplinary approach was employed in veterans’ populations in the stepped care model. In fact, in the multidisciplinary approach, a problem is viewed from different disciplinary perspectives; interdisciplinary approaches refer to cooperation between academic disciplines which could appear in contrast; last, transdisciplinary methods could lead to a new discipline which transcend the limits of a disciplinary perspective.

This model was used in two RCT studies (41, 57), and in one observational retrospective study (52). The Stepped Care model includes two steps: Step 1, which uses analgesic therapy optimization for 12 weeks with a specific algorithm, and a self-management program to reduce the mobility deficit and increase participation through the largest possible number of daily activities that include physical activity and stretching; after 12 weeks, Step 1 continues and Step 2 begins with six individual sessions twice a week (45 minutes each time) week, with 45 minutes each of Cognitive Behavioral Therapy to reshape the patient’s perception and feelings about pain, past treatments, and to identify barriers that hinder the return to normal life. In this model, the nurse care manager is central in all phases of treatment, from analgesic optimization to self-management and in coordinating the Cognitive Behavioral Therapy, with excellent results. This approach provides: a) the concept of gradualness between Step 1 and Step 2; b) the follow-up monitoring; c) the OT optimization with a precise algorithm; d) overcoming barriers to services access and the healthcare professionals’ role as pain managers. However, the two RCT studies where Stepped Care Model was conducted presented some limitations, such as conduction in single center and blinding method not used.

In the present review, only four RCTs were found which is probably due to the following issues: a) resource poorness in this research sector; b) difficulties investigating methods that compare multidisciplinary/interdisciplinary/transdisciplinary treatments to OT treatments and that, with all the risks already highlighted, are effective and rapid. For this reason, patients are reluctant to abandon OT treatments because the patients often depend on these treatments. However, the alternative and/or complementary treatments we analyzed usually require longer times to prove their effectiveness. This leads to recruitment difficulties and high dispersion in the RCTs (41).

The results showed different outcomes and tools that did not let us proceed with the meta-analysis. In particular, one of the most important outcomes of our review is OT reduction, which results in efficacious therapy for MSP symptoms. However, OT alternatives and/or complementary practices are equally effective and could reduce opioid drug use (34, 50, 56, 60). These multimodal treatments (Table 2) would allow a reduction of the OT’s collateral negative effects, such as drug abuse and the use of illicit substances (31), a very important problem in the US (61, 62). This last issue should be carefully assessed in other populations of veterans.

The correlation between MSP and mental disorders has been analyzed for specific outcomes, such as depression, quality of sleep, and anxiety; in some articles, a positive correlation was highlighted in the improvements obtained in the management of mental disorders and MSP, and vice versa (57, 63, 64). Another important element is a follow-up analysis that resulted in only a few papers for a maximum of 12 months (42, 49, 53, 54). These analyses showed more long-term improvements than short-term outcomes because, in our opinion, multimodal approaches need more time to be effective than OT, which is immediate (30).

In our analysis, the population included about 1.1 million people compared to the total population of OIF and OEF/ISAF veterans (1.9 million in 2010) (18) and that the population could reach about 7.2 million (VA-USA) since these operations are still ongoing. However, although with different modes and
characteristics (9, 10), the population characteristics are comparable to the active American military service population (65, 66). The analysis of population characteristics correlates MSP with some mental disorders (PTSD, PPCS, depression). These correlations were considered in the eligibility criteria and and/or in outcomes of all studies, except for 3 papers (42, 44, 56) and it seems that OEF - OIF/ISAF veterans’ phsico-physical wellbeing is compromised by the frequent coexistence of mental disorders (18).

Limitations

Only English and Italian studies have been sought, since only US studies were used, and this could represent a generalizability limit for results of other nations’ veterans.

Implications for Nursing Education, Practice and Research

Pain is a multidimensional and subjective experience that affects all human components: biological, physical, psychic, spiritual, and social. Kress et al. (69) analyzed the stakeholder’s role in chronic MSP management and, in particular, the nurses’ role. Nurses are being oriented to global care and are the closest to patients (70); for these characteristics, they could have a central role in pain management, but these potentials are not adequately exploited in pain management in Europe yet. In our review, instead, it emerges that in the multimodal approaches analyzed, the nurse’s role is clear, central and well defined in the chronic pain management and, in particular, in the Stepped Care model (Table 2). It is essential to emphasize the importance of military nurses, in particular, for veterans. The military nurses are “brothers in arms”, because they have similar experiences and know the military organizations (71). They, therefore, occupy a privileged position in the multimodal treatment of their colleagues’ chronic MPS, which must be implemented, also in Europe, developing specific training paths and professional roles.

European countries should deal with this issue, given the future increasing in military missions abroad. Our result should push European and, particularly, Italian ministries and institutions to cooperate in order to improve interventions such as those reported in this study. Even though there are some different cultural issues, to our opinion the methods used for American veterans could be as much effective for Italian veterans. For this reason, research should be increased in order to address this issue. Future studied should evaluate if the reported methods could operate in a specific social and cultural environment, and if they should be adapted or modified.

Conclusions

Chronic MSP and its related mental disorders are significant problems for veterans, and their countries have a moral and political obligation to care for veterans and improve their quality of life. This improvement is possible through transdisciplinary approaches to chronic MSP management, where the nurses play a central role. We do not mean that OT is to be abandoned; indeed, its effectiveness, despite the side effects discussed, remains significant, but we do mean that it is important the right management of this therapy, considering all the possibility of its control and reduction in order to manage negative effects such as opioid abuse and the use of illicit substances.

However, it is necessary to conduct more trials, involving more countries, and analyzing the follow-up outcomes to confirm this results.

Conflicts of interest: Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article.

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