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ORIGINAL PAPER

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# Comparison the Effects of Physical Therapy on Chronic Pain in Active or Sedentary Military Personnel

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## ABSTRACT

**Background:** Chronic pain (CP) is a debilitating condition in which pain persists for months or years beyond the expected duration seen in normal healing processes. Because of the social and economic burden of CP in military personnel, it is important to ascertain pain-related physical, mental and psychological conditions to improve pain management. **Objective:** The aim of the study was to evaluate the effectiveness of the physical therapy in active military personnel (AMP) with CP through self-reported questionnaires. **Methods:** Sixty male AMP outpatients suffering from CP were included and divided into two groups according to their exercise levels in daily life (30 patients exercised regularly, while the remaining 30 had a sedentary lifestyle). All participants completed the following forms and questionnaires: Oswestry Disability Index (ODI), Visual Analogue Scale (VAS) for pain, Neck Disability Index (NDI), Neck Bournemouth Questionnaire (NBQ), International Physical Activity Questionnaire (IPAQ), Hospital Anxiety-Depression Index (HADS), 36-item Short Form Survey (SF-36), Automatic Thoughts Questionnaire (ATQ), and Pain Belief Questionnaire (PBQ). Patients were given 10 sessions of a standardized physical therapy program, including hot pack applications, TENS, ultrasound therapy and also home-based physical exercise. **Results:** The median age of patients was 22 (min-max: 20-42) years. The HADS and PBQ-psychological scores were high and ATQ scores were low in both groups. After the treatment, ODI and VAS scores decreased in both groups; however, the group comprised of patients that exercised regularly at baseline also demonstrated a significant decrease in NBQ and NDI values. **Conclusion:** We showed that three components of pain (physical, cognitive and emotional) are indeed effective on pain intensity and levels of disability. Our study

showed that scales related with pain could improve by physical therapy in AMP, and that patients who normally exercised benefitted from physical therapy at a relatively higher degree. Chronic pain needs to be managed in the context of the patient's biological, psychological, social and also occupational characteristics; thus, individualized, patient-specific and multi-factorial treatments should be considered whenever possible.

**Keywords:** Chronic pain, physical therapy, questionnaires, military, soldiers.

## 1. BACKGROUND

Chronic pain is a debilitating and ongoing sense of pain that continues for weeks or even years after the actual healing process is completed. It may cause physical effects including tense muscles, limited mobility, a lack of energy and changes in appetite; emotional effects such as anger, depression, anxiety and fear; and also mental effects including decreased memory and concentration (1). The age-standardized 12-month prevalence of chronic pain was shown to be approximately 37% in developed countries and 41% in developing countries in a study evaluating 18 national questionnaires studies involving 42,249 adults (2). It is well known to cause impaired quality of life, reduced work-related function and has been reported to affect the families of patients. Many risk factors have been identified for chronic pain, including life-style factors such as smoking, excessive alcohol consumption, decreased physical activity and obesity, and also occupational risk factors such as lack of job autonomy and inability to change work, higher perceived difficulty level of work-related satisfaction, and excessive physical demand in the workplace (1). Identifying

modifiable risk factors will allow the reduction of incidence and could aid in the management of the effects, intensity, duration and severity of chronic pain.

Many different management approaches such as, surgery, drug therapy and non-pharmacological interventions including physical therapy and exercise have been used for the treatment of chronic pain (3). The primary purpose in the management of chronic pain is to improve the individual's function and assist in the recovery of desired level of daily activity and social relationships (4). Although there are various different intervention options for the chronic pain, single modality treatments are often ineffective for patients because of the complexity of the condition and associated challenges in its assessment. To develop better prevention and treatment approaches, chronic pain needs to be identified in the context of each patient's biological, psychological, physical and occupational features.

Although there are very few studies assessing chronic pain prevalence among military personnel in active duty, research has shown that many military members receive prescriptions for chronic pain medications (5). Because of the social and economic burden of pain in the military service, it is important to ascertain pain-related physical, mental and psychological conditions to improve pain management. Standardized self-reported questionnaires related with pain can provide large amounts of information regarding pain intensity and severity, pain-associated disabilities and functioning, and also emotional distress in military member personnel. To date, few studies have assessed pain beliefs and perceptions and the changes after treatment among active military personnel (AMP) suffering from chronic pain (5, 6); and available results are largely inconclusive.

## 2. OBJECTIVE

The aim of this study was to evaluate the effectiveness of physical therapy on pain characteristics through self-reported questionnaires in AMP suffering from chronic pain and to determine risk factors effective on the persistence of chronic pain after treatment(s).

## 3. MATERIAL AND METHODS

### *Study design*

This prospective cohort study was performed between November 2018 and November 2019 in the Department of Physical Medicine and Rehabilitation of Famagusta State Hospital, Famagusta, Cyprus. The diagnosis of chronic pain was based on anamnesis and physical examinations with radiological evaluation in patients with pain complaints for more than 3 months. 80 outpatients suffering from chronic pain who were admitted to the hospital for diagnosis and treatment were chosen randomly for participation to the study. 18 patients were excluded according to exclusion criteria. Additionally, 2 patients were excluded because they did not complete the required questionnaires or could not free up any time to perform the physical therapy programme due to work-load. Finally, 60 participants who did not respond correctly and reliably to the questionnaires were excluded after the study was completed. As a result, 60 male patients with chronic pain were involved in the current

study. The patients were divided into two groups according to the presence or absence of daily exercise in their life routine at baseline (exercising group and sedentary group). Before the physical therapy, self-reported questionnaires and forms which are detailed below were performed on all patients. Clinical data including age, gender, educational and marital status, residence, job status in military service, and the frequency and duration of pain were acquired from medical files. All participants were military service members on duty, referred to as 'active military personnel' (AMP). The patients were not provided any sort of incentive to participate in this study.

Exclusion criteria was set as follows: patients with a history of neurological diseases including migraine, epilepsy and muscular disorders, psychiatric diseases including psychosis and obsessive disorders, spinal cord compression, cardio-vascular or cerebro-vascular disease, metabolic diseases, cancer, serious instability and those with a family history of psychiatric diseases were excluded from the study.

### *Ethical issues*

The study was performed in agreement with the ethical standards specified in the Declaration of Helsinki and the protocol was accepted by the Research Ethics Committee of Famagusta State Hospital. Informed consent was signed by the patients before their participation.

### *Physical therapy*

All patients were given a total of 10 sessions of a standardized physical therapy program, including hot pack applications, transcutaneous electrical nerve stimulation (TENS), ultrasound therapy and physical exercise. Physical therapy was applied five days a week with one session per day. Hot pack therapy was performed for 20 minutes. Ultrasound therapy was given for five minutes in continuous form with an intensity of 1W/cm<sup>2</sup> and a frequency of 1 Mhz. Transcutaneous electrical nerve stimulation (TENS) therapy was applied in continuous form (100 Hz, 40  $\mu$ SN for 30 minutes). Home-based physical exercise program including neck mobility exercises, muscular stretching and strengthening exercises were also prescribed by a physiotherapist to each patient. Patients were instructed on how to perform these exercises personally and the exercise program was also given in written form. After the 6-week therapeutic physical therapy, patients completed the questionnaires including Visual Analog Scale (VAS), Oswestry Low Back Pain Disability Index (ODI), Neck Bournemouth Questionnaire (NBQ), Neck Disability Index (NDI), and 36-Item Short Form Survey (SF-36).

### *Measures*

The patients' pain severity was self-evaluated using VAS on a 10 point scale; 0 points meaning no pain and 10 meaning the most severe pain suffered by the patient (7).

Functional status was assessed with the ODI comprised of 10 questions which evaluate the degree of pain, pain alteration, social life, personal care, travel, sleeping, sitting, walking, lifting and standing (8). Each question is scored between 0 and 5, with a total possible score of 50. Each patient's ODI score was presented as a percentage (Patient score / total score (50) x 100). Higher ODI scores indicate higher functional limitations and severe pain.

	Doing Exercise (n=30)	Sedentary (n=30)	Total	p value
Age	22 (20–30)	22 (20–42)	22 (20–42)	0.505
Gender (Male)	30 (100.00%)	30 (100.00%)	60 (100.00%)	N.A
Education Status				
Primary School	6 (20.00%)	11 (36.67%)	17 (28.33%)	0.271
Secondary School	11 (36.67%)	12 (40.00%)	23 (38.33%)	
High School	4 (13.33%)	1 (3.33%)	5 (8.33%)	
University	9 (30.00%)	6 (20.00%)	15 (25.00%)	
Job Status in Military				
Heavy Worker	11 (36.67%)	17 (56.67%)	28 (46.67%)	0.282
Moderate	12 (40.00%)	9 (30.00%)	21 (35.00%)	
Deskjob	7 (23.33%)	4 (13.33%)	11 (18.33%)	
Living Place				
Military Post	29 (96.67%)	30 (100%)	59 (98.33%)	1.000
Home	1 (3.33%)	0 (0.00%)	1 (1.67%)	
Marital Status				
Married	5 (16.67%)	16 (53.33%)	21 (35.00%)	0.007
Single	25 (83.33%)	14 (46.67%)	39 (65.00%)	

Table 1. Demographic data of the patients. Data is presented as median (minimum–maximum) or frequency (percentage).

Disability was assessed using the NDI which consists of 10 sections, 7 of which concern daily activities, 2 are related with pain, and the final section evaluates problems associated with concentration (9). With a maximum score of 50, the NDI is graded between 0–5 and high values indicate higher degree of perceived disability due to neck pain.

Physical activity levels were assessed using the International Physical Activity Questionnaire (IPAQ) which examines the activity levels (in minutes) during the prior week based on 4 intensity levels: 1) vigorous-intensity activities such as aerobics, 2) moderate-intensity activities such as leisure cycling, 3) walking, and 4) sedentary activity (10). The IPAQ yields a 'MET' score; patients with a score less than 600 are defined as physically inactive, those with a score between 600–1500 MET are defined to have low physical activity, and those scoring higher than 3000 MET are defined to have sufficient physical activity.

Health related quality of life was evaluated with the well-known and widely used SF-36, involving eight domains: physical functionality (PF), social functionality (SF), role limitation due to physical problems (RP), role limitation due to emotional problems (RE), mental health (MH), energy and vitality (VT), physical pain (PP) and general health perception (GH) (11). Each of the SF-36 subscales is graded from 0 to 100 and higher values indicate better health related quality of life, except for the pain section which is inverse.

The patients' risk for (and level of) anxiety and depression were assessed with the Hospital Anxiety and Depression Index (HADS) consisting of 14 items that are divided into two subscales: anxiety and depression (12). Each item was answered by the patients on a four point (0–3) scale, with a maximum subscale score of 21. A score between 0 and 7 is considered normal, 8 to 10 demonstrates borderline / mild distress for anxiety or depression, and 11 to 21 points

reflect severe distress in both subscales.

The patients' neck conditions were assessed using the Neck Bournemouth Questionnaire (NBQ), consisting of seven items assessing neck-related pain intensity, disability in activities of daily living, disability in social activities, work-related fear and avoidance beliefs, anxiety, depression, and pain control (13). Each item is scored from 0 to 10, taking the maximum possible NBQ score to 70 points. High NBQ score indicate higher severity of neck-related problems and greater impact on a patient's life.

The frequency of dysfunctional and irrational automatic negative thoughts associated with depression was evaluated with The Automatic Thoughts Questionnaire (ATQ) comprised of 15 items (14). The questions are answered on a 5-point Likert scale (1: not at all, 5: all the time) with regard to the respondent's reported frequency of each item during the last week. Higher ATQ scores show more frequent negative automatic thoughts.

Pain belief was evaluated with the Pain Belief Questionnaire (PBQ) consisting of two subscales that are defined as 'organic' (8 items) and 'psychological' (4 items) (15). The organic beliefs subscale (PBQ-O) addresses physical injury or physiological pain that threatens the patient's wellness and assesses perceived cause of pain (pain-damage). The psychological pain beliefs subscale (PBQ-P) addresses the influence of emotions and intrinsic factors such as anxiety, depression and relaxation, on pain experience. Each item is graded from 1 to 6. High PBQ scores show worse pain perception and negative beliefs for both subscales.

#### Statistical Analyses

All analyses were performed on SPSS v21 (SPSS Inc., Chicago, IL, USA). For the normality check, the Shapiro-Wilk test was used. Data are given as mean  $\pm$  standard deviation or median (minimum–maximum) for continuous variables regarding normality of distribution, and as frequency

	Exercise (n=30)	Sedentary (n=30)	Total	p value
Pain Duration (months)	8 (6–36)	12 (6–24)	12 (6–36)	0.223
Pain Frequency (day in a month)	13.5 (5–30)	14.5 (5–30)	14.5 (5–30)	0.041
IPAQ	360 (30–500)	30 (0–60)	60 (0–500)	<0.001
HADS-Anxiety	15 (2–20)	12 (4–20)	15 (2–20)	0.119
HADS-Depression	13.5 (0–18)	12.5 (5–19)	13 (0–19)	0.840
Pain Beliefs Questionnaire				
Organic	26 (8–61)	25 (5–41)	25.5 (5–61)	0.778
Psychological	15 (4–25)	16 (5–40)	15 (4–40)	0.306
Automatic Thoughts Questionnaire				
Negative Self-concept	13 (10–35)	15 (8–30)	15 (8–35)	0.042
Confusion and Escape Fantasies	8 (6–27)	12 (6–22)	10 (6–27)	0.027
Personal Maladjustment	5 (3–20)	7 (3–21)	6 (3–21)	0.001
Loneliness/Isolation	5 (4–15)	8 (4–15)	6.5 (4–15)	0.002
Giving up/Helplessness	5 (4–20)	8 (4–18)	6 (4–20)	0.005

Table 2. Clinical data of the patients. IPAQ: International Physical Activity Questionnaire; HADS: Hospital Anxiety and Depression Scale, Data presented as median (minimum–maximum)

(percentage) for categorical variables. Normally distributed variables (SF-36 General Health) was analyzed with two-way repeated measures analysis of variances (ANOVA). Non-normally distributed variables were analyzed with the Wilcoxon Signed Ranks test for repeated measurements. Comparison of the groups concerning the changes in these variables was performed by analyzing differences between the measurements with the Mann Whitney U test. p-values < 0.05 were accepted as statistically significant results.

#### 4. RESULTS

The study included sixty male outpatients who suffered from chronic pain. Thirty of these patients exercised in their daily routine, while 30 of them had a sedentary life-style. The median age of patients was 22 (min-max: 20–42) years. No differences were found between the sedentary group and the exercise group with regard to age ( $p=0.505$ ). Demographic data including marital and educational status, jobs status in the military and residence are shown in Table 1.

The median pain duration was 8 months in the exercising group and 12 months in the sedentary group; no significant difference between groups was found ( $p=0.223$ ). The median pain frequency of patients exercising and baseline was 13.5 days in a month and 14.5 in sedentary patients. There were significant differences between groups with respect to pain frequency ( $p=0.041$ ). The median IPAQ score was 360 in the exercise group and 30 in the sedentary group, which was statistically significant between the two groups ( $p<0.001$ ). While the HADS scores were 15 for anxiety and 13.5 for depression in exercise group, HADS scores were 12 for anxiety and 12.5 for depression in the sedentary group. The median PBQ scores were found to be 26 for the organic scale (PBQ-O) and 15 for the psychological scale (PBQ-P) in the exercise group; whereas these values were 25 and 16, respectively, in the sedentary group. No significant differences were shown between the groups with regard to

HADS and PBQ scores ( $p>0.05$ ). There was a statistically significance between groups with respect to ATQ scores, including negative self-concept, confusion and escape fantasies, personal maladjustment, loneliness/isolation and giving up/helplessness ( $p<0,05$ ). The summary of the study group's scores are shown in Table 2.

The summaries of scale / questionnaire scores of the patients before and after treatment are depicted in Table 3. In the exercise group, VAS scores were 5 before treatment and 3 after treatment, which was statistically significant ( $p<0,001$ ). The VAS scores of the sedentary group were 6 before treatment and 1 after treatment ( $p<0,001$ ). There were also significant differences between the exercise group and the sedentary group with respect to VAS scores ( $p=0,001$ ). Significant differences were found between and within the groups with respect to ODI scores (Table 3, all  $p<0,005$ ). NDI scores were decreased in the exercise group after treatment ( $p<0,001$ ). Physical functioning, which is one of the subscales of the SF-36, was found to have increased with treatment in the exercise group ( $p=0.049$ ). We also found increased general health status, as measured by the SF-36, with therapy in the sedentary group ( $p=0.036$ ).

#### 5. DISCUSSION

The current study aimed to evaluate the effectiveness of therapeutic exercise on the clinical features of chronic pain through self-reported forms in AMP, and also to determine risk factors for chronic pain in the study group. Questionnaire scores associated with the physical and psychological factors of patients showed a decrease with exercise therapy; however, it was apparent that the sedentary group benefited to a greater degree in terms of various aspects.

Chronic pain is technically defined as pain that persists for at least 12 weeks despite the adequate application of different treatment modalities. It is a serious and challenging health concern causing short and long term disability, loss in productivity and economic burden. Health care costs

	Doing Exercise (n=30)	Sedentary (n=30)	p value (between groups)
<b>Visual Analog Scale</b>			
Before	5 (3–10)	6 (3–8)	0.001
After	3 (0–5)	1 (0–4)	
p (within groups)	<0.001	<0.001	
<b>Oswestry Low Back Pain Disability</b>			
Before	24 (10–76)	30 (20–68)	0.016
After	13.5 (2–28)	11 (0–24)	
p (within groups)	<0.001	<0.001	
<b>Neck Bournemouth Questionnaire</b>			
Before	22 (5–62)	20 (5–42)	<0.001
After	19 (4–25)	20 (5–42)	
p (within groups)	<0.001	0.180	
<b>Neck Disability Index</b>			
Before	19 (4–44)	19 (5–60)	<0.001
After	15 (4–28)	19 (5–60)	
p (within groups)	<0.001	0.180	
<b>36-Item Short Form Survey (SF-36)</b>			
<b>Physical functioning</b>			
Before	62.5 (0–100)	60 (0–100)	0.684
After	80 (25–100)	72.5 (20–100)	
p (within groups)	0.049	0.085	
<b>Role functioning/physical</b>			
Before	50 (0–100)	50 (0–100)	0.456
After	100 (0–100)	50 (0–100)	
p (within groups)	0.078	0.383	
<b>Role functioning/emotional</b>			
Before	67.5 (0–100)	55 (0–100)	0.848
After	68 (10–100)	52 (10–100)	
p (within groups)	0.564	0.165	
<b>Energy/fatigue</b>			
Before	60 (25–100)	50 (0–70)	0.424
After	59.5 (25–100)	55 (15–87)	
p (within groups)	0.853	0.183	
<b>Emotional well-being</b>			
Before	60 (24–100)	45 (15–87.5)	0.060
After	55 (15–95)	55 (5–90)	
p (within groups)	0.100	0.359	
<b>Social functioning</b>			
Before	62.5 (25–100)	50 (20–100)	0.923
After	75 (37.5–100)	62.5 (25–100)	
p (within groups)	0.066	0.096	
<b>Pain</b>			
Before	57.5 (20–100)	57.75 (0–100)	0.231
After	66.67 (0–100)	33.33 (0–100)	
p (within groups)	0.703	0.055	
<b>General health</b>			
Before	64.33 ± 16.49	49.55 ± 13.47	0.036
After	60.67 ± 18.94	58.40 ± 18.33	
p (within groups)	0.378	0.036	

IPAQ: International Physical Activity Questionnaire; HADS: Hospital Anxiety and Depression Scale. Data presented as mean ± standard deviation or median (minimum–maximum) for continuous variables with regard to normality of the variables.

Table 3. Summary of scale / questionnaire scores before and after treatment and analysis results

have been shown to be higher in the population with pain complaints (16). Further, chronic pain is a multidimensional condition involving biological, cognitive, psychological and occupational determinants that influence the individual's pain status and life quality (17). Chronic pain may seriously impact cognitive status leading to unrealized expectations, reduction in personal and environmental compliance and may cause an overwhelming feeling of helplessness. Negative thoughts about pain have been found to predict actual pain and also disability among patients with chronic pain (18). In our study, we found decreased ATQ scores in both groups, which were significantly lower in the exercise group. Our results show cognitive functioning distortions and preponderance to negative cognitions in the form of negative automatic thoughts. Our results confirm that symptoms such as feeling lonely and helpless, isolation and negative awareness may develop in patients. It is therefore feasible to speculate that negative attitudes and thoughts about pain may be an initial step in the transition to chronic pain, subsequently leading to resistance to treatments. Our findings suggest that patients should receive therapies that support cognitive status, and it is also noteworthy that training patients in coping strategies may prevent pain development and negative attitudes.

Psychological factors could exacerbate pain by affecting pain severity, emotional distress and treatment seeking. Chronic pain also impairs patients' psychological status leading to fear, anxiety and depressed mood. A close relationship between chronic pain and psychiatric diseases involving depression, anxiety disorders and posttraumatic stress disorder have been shown in literature (7). Furthermore, the comorbidity of physical and mental disorders in chronic pain is reportedly related with activity limitation, pain severity and greater disability (19). Consistent with contemporary studies, we demonstrated high values of PBQ-P, HADS-anxiety and HADS-depression in both groups. This indicates that psychological factors play a prominent role in the development and persistence of pain, causing impaired pain perception and response. Patients may need supportive measures involving the psychological factors aspects of chronic pain. Our results also show that anxiety and depression are common in AMP, as shown by the clinically relevant scores obtained in anxiety and depression scales.

Chronic pain also affects individuals' occupational status. It may affect work life, often causing decreased job satisfaction, avoidance of occupational activity, work absence and loss in productivity. Military personnel on duty and veterans were reported to be at high risk for chronic pain due to their potential exposure to various physical and psychological stressors (20). For instance, military personnel on active duty registered with the US military health insurance program were evaluated in 2012, and 63% were diagnosed with a pain condition (21). It was found in another study that the rate of drug use for pain increased in proportion to years of active military duty in American soldiers (6). Because of the high prevalence of pain in AMP, an interdisciplinary medical center was established in U.S. Army for the sole purpose of identifying and treating acute or chronic pain (22). Conditions that affect physical and mental health,

including sleep disorders, anxiety, depression, substance use disorders, malnutrition, loneliness, fatigue and PTSD, which are common in military personnel, are among the factors that are known to exacerbate pain symptoms and may lead to progression to chronic pain (6, 20). Consistent with the literature, we found altered VAS, NDI, NBQ and ODI values in both groups before the treatment. This indicates that AMP suffering from chronic pain indeed had severe pain intensity, functional limitations and disability. Measures of chronic pain using self-reported scales may be useful in clinical assessment and appropriate treatment. We also found low SF-36 scores in both groups. This decline in health quality scores in patients with chronic pain may be associated with occupational conditions. Therefore, the assessment of work-related factors should be considered in the identification and management of chronic pain in AMP.

Many different intervention strategies could be used for the management of chronic pain, including medical treatments such as analgesics and opioids, rehabilitative approach including physical activity and exercise, subcutaneous electrical nerve stimulation, spinal cord stimulation, nerve blocks, denervation surgery, implantable drug delivery systems, the use of complementary and alternative therapies, and also psychological management including cognitive behavioral therapy, acceptance and commitment therapy, and awareness-based approaches (23). Because the etiology and pathogenesis of chronic pain is not fully understood, chronic pain management is not simple and there is no agreed treatment strategy. The focus of chronic pain management is to address the effects of pain and improve functional capacity and quality of life (1). Non-pharmacological interventions including physical therapy and exercise are often recommended as first line treatment for the chronic pain (24). In our study, we performed standardized physical therapy program including hot pack application, TENS, ultrasound therapy and also home-based exercise program in all patients. After physical therapy, pain-related scale scores were found to have improved, indicating benefits from physical therapy. Additionally, pain severity and intensity, functional limitations, and disabilities were found to be reduced after 10 sessions of physical therapy. These benefits were consistent with literature (25-28). Thermotherapy has been demonstrated to improve healing by stimulating blood flow to the treated area and reducing pain (25). TENS is a simple-to-use, portable, self-administered application of electrical nerve stimulation through the skin. TENS-induced analgesia is considered to be multi-factorial as various peripheral, spinal and supra-spinal mechanisms have been proposed (26). Therapeutic ultrasound therapy is often used as a part of physical therapy program (4). Ultrasound therapy has been shown to reduce pain when combined with physiotherapy or exercise. Therefore, we included ultrasound therapy in our physical therapy protocol. Gordon and Bloxham assessed the effects of exercise on chronic pain in a systemic review and found that increasing the strength and flexibility of muscle-tendons and ligaments could assist with patients' healing process and could reduce pain levels (27). We also observed that the changes in ODI and VAS values were significant in the sedentary group after physical therapy. In

accordance with our study, Ambrose et al. showed that small amounts of activity can lead to great benefits, especially in patients transitioning from a sedentary lifestyle to an active lifestyle (28). Sedentary behavior or physical inactivity should be considered in the management of chronic pain. Furthermore, we showed significant improvement on the general health status, which is one of the subscales of the SF-36, in the sedentary group after the physical therapy. This indicates that patients have better health profile and functional abilities as a result of reduced pain.

Although we measured an extensive set of scales in our group of AMP, there are some limitations that must be acknowledged. The first limitation is related to the use of self-reported data, as scales are conducted with the assumption that participants will respond correctly. Secondly, this study was performed to investigate chronic pain conditions in military personnel on duty; therefore, it was completed in a relatively small sample size that included only young adult males. Thirdly, some of our patients' superiors in command did not allow their participation in the physical therapy protocol (due to high workload), limiting the number of patients included (especially considering that patients with higher workloads may have had greater benefit). Furthermore, we were unable to perform post-treatment questionnaires for psychological factors.

## 6. CONCLUSION

We have shown that the three components of pain (physical, cognitive and emotional) are indeed effective on pain intensity and disability in our group of patients with chronic pain. Our study showed that scales related with pain could improve by physical therapy in AMP. Chronic pain needs to be managed with regard to the patient's biological, psychological, social and occupational characteristics, and often requires patient-specific treatments. Because of the potential exposure of soldiers to physical, physiological and occupational features of pain, an interdisciplinary pain management medical center may be required in military facilities for the determination and evaluation of AMP with acute and chronic pain.

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