

Effects of combined exercise training on work-related burnout symptoms and psychological stress in the helping professionals

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ABSTRACT

This study aimed to evaluate the effects of eight-week Combined Exercise Training on burnout symptoms and perceived stress among workers in the helping professions. Forty-two men (46.3 ± 8.1 years) suffering from burnout were randomly allocated into an intervention ($n = 21$) or waitlist control ($n = 21$) group. The intervention group performed a combined circuit resistance training and agility training (60 min, $3d \cdot wk^{-1}$) at a local fitness centre. At baseline and after the intervention, the Maslach Burnout Inventory and Perceived Stress Scale were administered. Results showed that the intervention group significantly reduced emotional exhaustion, depersonalization and perceived stress, and increased personal accomplishment ($p < .001$). The magnitude of the effects was large, revealing changes of crucial practical relevance. Adherence and satisfaction with the intervention were high. No significant changes were found in the control group. The findings support the evidence that Combined Exercise Training may reduce occupational burnout and psychological stress in the helping professions.

Keywords: Occupational burnout; Workplace; Worker; Job stress.

Cite this article as:

Greco, G. (2021). Effects of combined exercise training on work-related burnout symptoms and psychological stress in the helping professionals. *Journal of Human Sport and Exercise*, 16(2), 424-434. <https://doi.org/10.14198/jhse.2021.162.16>

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Submitted for publication January 25, 2020.

Accepted for publication March 10, 2020.

Published April 01, 2021 (*in press* April 23, 2020).

JOURNAL OF HUMAN SPORT & EXERCISE ISSN 1988-5202

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doi:10.14198/jhse.2021.162.16

INTRODUCTION

Burnout is considered an occupation-related psychological syndrome consisting of emotional, physical, and cognitive exhaustion (Shirom, 2003). Specifically, burnout is understood to be a chronic state of job stress, where employer expectations and employee workload exceed the individual's perceived psychological capacity and ability to cope with the work demands expected of them (Maslach, Schaufeli & Leiter, 2001; Mutkins, Brown & Thorsteinsson, 2011). Currently, there are no conclusive diagnostic criteria (Bianchi, Schonfeld, & Laurent, 2015b; Chirico, 2017), however in the 11th version of the International Classification of Diseases (ICD-11, 2019), "burnout" has been classified under QD85 and defined as "a syndrome conceptualized as resulting from chronic workplace stress that has not been successfully managed". The ICD-11 definition shows that burnout is a work-related phenomenon and therefore not suitable for describing experiences in other areas of life.

The Maslach Burnout Inventory is the most widely used instrument to assess dimensions of burnout (Maslach, Jackson, & Leiter, 1996). Maslach et al. (2001) defined burnout as a multidimensional psychological syndrome consisting of emotional exhaustion, depersonalization/cynicism, and reduced personal accomplishment. Emotional exhaustion describes feelings of depleted emotional resources, overstrain, tiredness, or fatigue and constitutes the individual energy component of the syndrome. Depersonalization/cynicism represents the interpersonal dimension of burnout which is characterized by negative, cynical, or excessively indifferent, distant and detached responses to other people at work and is associated with lack of work-related enthusiasm. Finally, reduced personal accomplishment contains a strong self-evaluative component and describes a drop in perceived competence, professional self-efficacy, and productivity. Consequently, burnout is often considered synonymous with the definition provided by Maslach et al. (1981, 2001). This also applies to the new ICD-11 definition, in which burnout is characterized by three dimensions, namely: "the feelings of energy depletion or exhaustion, increased mental distance from one's job, or feelings of negativism or cynicism related to one's job, and reduced professional efficacy".

Burnout is an important public health problem due to the negative effects on workers and workplace with consequent social and economic repercussions. The individual outcomes of this phenomenon regard job performance and health. Concerning job performance, burnout decreases productivity and retention, and it is associated with absenteeism and recurrent replacement of work staff (Kim, Ra, Park, & Kwon, 2017; Maslach et al., 2001; Salvagioni et al., 2017). Concerning health outcomes, this syndrome has been linked to mental health disorders such as depression (Bianchi, Schonfeld, & Laurent, 2015a), poor sleep and chronic fatigue syndrome (Brand et al., 2010; Ekstedt et al., 2006; Gerber et al., 2018). In addition, previous studies showed that burnout is linked to poorer self-rated health (Soderfeldt, Soderfeldt, Ohlson, Theorell, & Jones, 2000), gastrointestinal disorders (Kakiashvili, Leszek, & Rutkowski, 2013; Mohren et al., 2003), and increased risk of cardiovascular disease (Kakiashvili et al., 2013; Toker, Melamed, Berliner, Zeltser, & Shapira, 2012).

Therefore, based on the consequences mentioned above, knowledge about effective treatments to reduce levels of burnout syndrome becomes very important. Evidence suggests that physical activity could be a useful treatment for reducing occupational burnout, however high-quality rigorous studies concerning treatment effectiveness are lacking, thus revealing a huge research gap. Only a few randomized controlled trials have reported a significant reduction in perceived stress (Bretland & Thorsteinsson, 2015; Fischetti, Cataldi, Latino, & Greco, 2019; Norvell & Belles, 1993) and burnout symptoms (Bretland & Thorsteinsson, 2015; de Vries, van Hooff, Guerts, & Kompier, 2017; Heiden et al., 2007; Mealer et al., 2014; Stenlund, Birgander, Lindahl, Nilsson, & Ahlgren, 2009) in workers. In these studies, participants were treated with

cardiovascular training, strength training, cognitive-behavioural training and/or a combination of some of the above, although the aerobic exercise was favoured. We used a Combined Exercise Training that has already been shown to improve physical (Fischetti & Greco, 2017) and psychological fitness (Fischetti et al., 2019) in other workers. Thus, the purpose of this study was to investigate the effects of a Combined Exercise intervention on occupational burnout and psychological stress. It was hypothesized that burnout symptoms and perceived stress would reduce after eight weeks of intervention.

MATERIALS AND METHODS

Study design

This randomized controlled study was designed to assess burnout symptoms and perceived stress via standardized psychological instruments (i.e., Maslach Burnout Inventory and Perceived Stress Scale) and to compare the intervention and control groups at different times for the measured dependent variables. Data were collected and recorded at week 1 (Baseline) and after week 8 (Post-test) under the supervision of an experienced researcher and identical conditions. The researcher was blinded to the randomization of the intervention and control group allocations.

Before study participation, all participants were given detailed information about the purpose of the study and the intervention program and informed written consent was provided by each participant. The study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by the local Ethics Committee. After the baseline assessment, participants of the intervention group performed an eight-week Combined Exercise Training at a local fitness centre under the supervision of exercise professionals. At the end of the study, participants in the intervention group were asked to evaluate the general satisfaction of training using a 4-point Likert scale, i.e. from 1 (poor) to 4 (excellent).

Participants and procedures

A total of forty-two males (mean age, 46.3 ± 8.1 ; range, 33-59 years) suffering from occupational burnout (Maslach et al., 2001) was recruited from nearby locations to participate in our study. Participants were contacted via email or social media (Facebook, LinkedIn), because they completed a burnout questionnaire (i.e., Maslach Burnout Inventory; Maslach et al., 1996) and a pre-exercise health screening online (i.e., PAR-Q; ACSM, 2018). All participants were involved in some helping professions (i.e., police officers, physicians, psychologists, nurses, social assistants and educators) and have continued working during study participation. The following inclusion criteria were applied: a) medium to high scores on the Maslach Burnout Inventory subscales of “*emotional exhaustion*” (≥ 17) or “*depersonalization*” (≥ 7), b) male gender, c) aged between 30 to 60 years, d) non-smoking, e) good physical health, f) not involved in regular exercise during the last two years, and g) employed for a minimum of 20 hours per week. Participants were excluded from the study if they did not have a medical certificate attesting to their state of good physical health.

Based on previous researches (Bretland & Thorsteinsson, 2015; Gerber et al., 2013) that revealed a large effect size ($\eta^2_p \geq .14$), we estimated the sample size (Faul, Erdfelder, Lang & Buchner, 2007). With an assumed type I error of .05 and a type II error rate of .10 (90% statistical power), it was calculated that 10 participants per group would be sufficient to observe medium “*Time x Group*” interaction effects. However, among the volunteers contacted ($n = 49$), 42 participants met all the above-mentioned eligibility criteria. Thus, participants were matched into pairs based on age, burnout severity and profession, and randomly assigned to the intervention group ($n = 21$; age, 45.9 ± 8.3 years) or waitlist control group ($n = 21$; age, 46.7 ± 8.1 years). The participants of the control group were informed that they were on a waiting list for participation in the Combined Exercise program and were asked to complete the data collection initially and at eight weeks,

before being allocated to the intervention condition. The study was carried out between September and November 2019. All participants completed the study.

Measures

The Maslach Burnout Inventory (MBI) is a valid and reliable instrument to measure work-related burnout (Maslach et al., 1996; Sirigatti & Stefanile, 1993). It has 22 items presented on a 7-point Likert scale ranging from 0 (Never) to 6 (Every day). It has three subscales: Emotional Exhaustion (baseline, $\alpha = .86$; post-test, $\alpha = .90$) with nine items such as *"I feel used up at the end of the workday"*, Depersonalization (baseline, $\alpha = .92$; post-test, $\alpha = .88$) with five items like *"I treat some recipients as if they were impersonal objects"*, and Personal Accomplishment (baseline, $\alpha = .87$; post-test, $\alpha = .89$) with eight items including *"I have accomplished many worthwhile things in my job"*. Burnout was represented by high scores on emotional exhaustion and depersonalization and low scores on personal accomplishment. The three-factor structure of all versions of the MBI has been confirmed in several empirical studies across samples from different countries (Schaufeli & Buunk, 2003). These investigations revealed that the three dimensions are conceptually distinct but empirically related. Researchers have made recommendations against using an aggregate of the three MBI components (Maslach et al., 2001).

The Perceived Stress Scale (PSS) is among the most widely used instruments for measuring the perceived stress by the individual over the last month (Cohen, Kamarck, & Mermelstein, 1983; Lee, 2012; Mondo, Sechi, & Cabras, 2019). The PSS consists of 10 items and draws on cognitive-transactional stress theory. Thus, the PSS measures the degree to which respondents find their lives unpredictable, uncontrollable, and overloading (e.g., *"How often have you felt that you could not control the important things in your life?"*). Answers were given on a 5-point Likert-scale anchored at 0 (never) to 4 (very often). Items 4, 5, 7, and 8 are positively stated (e.g., *"In the last month, how often have you felt that things were going your way?"*) thus reverse coded for analysis. The mean scores were calculated. A high score indicates greater perceived stress. Adequate validity and reliability of the PSS have been previously established (Lee, 2012; Mondo et al., 2019). The Cronbach's alpha in the present study was $\alpha = .79$ (baseline) and $\alpha = .88$ (post-test). The PSS is a more suitable measure of perceived psychological stress as it measures stress without reference to specific life events, making it an appropriate choice given the current burnout focus (Maslach et al., 2001). Also, the situations in which perceived demands are in excesses of physical or personal resources are commonly encountered in the workplace, therefore the two constructs of perceived stress and occupational burnout are interwoven.

Intervention

Participants allocated to the intervention group received a Combined Exercise program for about 60 minutes, three sessions per week, with a total of 24 training sessions. Each intervention session was supervised by the primary investigator and conducted by graduate exercise professionals, with a minimum of a bachelor's degree in sports sciences, to help ensure consistent and safe exercise performance. Loads of each exercise were adjusted according to the participant's abilities and improvements in exercise capacity throughout the study to ensure that the participants were exercising with as much resistance as possible while maintaining proper exercise technique. Additionally, the mode, frequency, intensity, duration, and progression in an individual exercise log were recorded to ensure adequate training. In the present study, the guidelines of the American College of Sports Medicine (ACSM, 2018) were followed.

Each training session started with a brief dynamic warm-up program, mainly consisting of calisthenics-type exercises and ended with a cool-down program, consisting of static stretching exercises. The conditioning phase included resistance training (i.e., weight training and bodyweight training) and agility training. The three

training sessions per week were divided as follows: Mondays, weight training; Wednesdays, bodyweight training; Fridays, agility training. During the first two weeks, the training primarily consisted of preconditioning. From the third week onwards, we gradually increased the intensity and volume of the training. For an effective workout, the principles of overload and specificity were addressed (Haff & Triplett, 2016). Also, participants were asked to monitor their heart rate (HR) and train within 60-90% of HRmax during the exercises. The maximum HR was estimated using the formula: maximum HR = $208 - (.7 \times \text{age})$ (Tanaka, Monahan, & Seals, 2001). HR was monitored during all training sessions with an HR rate monitor (Polar®) to ensure proper, effective and safe training. The Combined Exercise contents are shown below.

The dynamic warm-up program (10 min) included arm swings, trunk twisting, high marching, jumping jacks, stride jumping, high knees, side bending, side stretching, skipping leg swings, backward sprinting, carioca, and lateral shuffles. The participant performed each exercise for 1 set of 60 s.

During weight training (40 min), the participants performed 2-4 sets of 8-12 reps (60/80% of 1 RM) for each exercise. The training was designed to circuit with minimal rest periods between sets and the rest-pause between circuits was 2 minutes. Exercises performed included leg presses, leg extensions, leg curls, lat pulldowns, seated rows, bench presses, shoulder presses, triceps presses, arm curls, and calf raises.

During bodyweight training (40 min), the participants performed jump squats, burpees, lunges, push-ups, pull-ups, sit-ups/crunches, back extensions, single or double leg hops, half squats, long jumps, planks, and medicine ball tosses. In total, 1-4 sets of 15 reps, organized in circuits with minimal rest periods between sets, were performed. The rest-pause between the circuits was 2 minutes.

The aims of the agility training protocol (40 min) were to challenge hand-eye coordination, foot-eye coordination, dynamic balance, standing and leaning balance, and psychomotor performance (reaction time). Ball games, relay races, box drills, shuttle run, lateral coach drills, and obstacle courses were used to achieve these goals.

The cool-down program (10 min) was performed with static stretches, which included movements, such as Achilles' tendon/calf stretches, skier's stretches, quadriceps stretches, hurdler's stretches, straddle stretches, groin stretches, back stretches, and archers. Exercises were performed stretching beyond resting length but not beyond the pain-free range of motion. Duration of 10-30 sec/stretch; 2-4 reps up to accumulate 60 sec per exercise. A gradual increase in stretch duration or repetitions.

Statistical analysis

Statistical analyses were carried out using SAS JMP® Statistics (Version < 14.3 >, SAS Institute Inc., Cary, NC, USA, 2018). Data were presented as group mean values and standard deviations and checked for assumptions of normality that were confirmed with visual observation of univariate histograms, Q-Q plots and skewness, and kurtosis values. An independent sample *t*-test was used to evaluate group differences at baseline. A two-way ANOVA (group (intervention/control) × time (pre/post-intervention)), with repeated measures on the time dimension, was conducted to examine the effect of the intervention on all dependent variables. When 'Group x Time' interactions reached the level of significance, group-specific post hoc tests (i.e., paired *t*-tests) were conducted to identify the significant comparisons.

Partial eta squared (η^2_p) was used to estimate the magnitude of the difference within each group and interpreted using the following criteria: small ($\eta^2_p < .06$), medium ($.06 \leq \eta^2_p < .14$), large ($\eta^2_p \geq .14$). Effect sizes for the pairwise comparisons were determined by Cohen's *d* and interpreted as small ($0.20 \leq d < 0.50$),

moderate ($0.50 \leq d < 0.79$) and large ($d \geq 0.80$) (Cohen, 1992). To assess the internal consistency of the psychological measures, Cronbach’s alpha was used; scores from .70 to .79 were considered reliable, from .80 to .90 as highly reliable, and $> .90$ as very highly reliable (Cohen, Manion, & Morrison, 2011). An alpha level of $p < .05$ was considered statistically significant.

RESULTS

All participants received the treatment conditions as allocated and the adherence to the intervention was 90.4 % (21.7 actual sessions / 24 intended sessions). No injuries or other health problems were noted in the participants over the eight weeks. Participants reported a high level of overall satisfaction (3.71 ± 0.56 ; rating from 1 (poor) to 4 (excellent)) and stated that they wanted to continue the training program on their own. We found no significant differences between groups at baseline in age ($t(40) = -0.30, p = .764$) and burnout symptom severity, i.e. Emotional exhaustion ($t(40) = 0.35, p = .726$) and Depersonalization ($t(40) = 0.58, p = .568$), after randomized group assignment. Pre- and post-intervention results for all outcome variables are presented in Table 1.

Table 1. Changes in work-related burnout symptoms and psychological stress after 8 weeks among helping professionals.

	Intervention group (n = 21)			Waitlist Control group (n = 21)		
	Baseline	Post-test	Δ	Baseline	Post-test	Δ
MBI						
Emotional exhaustion	32.0 (7.5)	22.8 (7.7)†*	-9.2 (2.7)	31.2 (7.3)	32.0 (7.0)	0.8 (1.7)
Depersonalization	16.6 (4.5)	12.0 (4.7)†*	-4.7 (2.8)	15.9 (4.1)	14.9 (4.3)	-1.0 (2.3)
Personal accomplishment	24.9 (5.7)	29.2 (4.8)†*	4.3 (1.9)	24.3 (6.6)	23.5 (6.4)	-0.8 (2.6)
PSS						
Perceived stress	21.6 (5.7)	15.5 (4.7)†*	-6.0 (2.5)	22.7 (7.1)	23.1 (7.6)	0.4 (2.5)

Notes: Scores are presented as mean (± SD). Abbreviations: MBI, Maslach Burnout Inventory; PSS, Perceived Stress Scale; Δ, pre- to post-training changes. †Significant ‘Group x Time’ interaction: significant effect of the intervention ($p < .001$). *Baseline versus post-test ($p < .001$).

Maslach Burnout Inventory

A two-factor repeated measures ANOVA found significant ‘Time x Group’ interaction effects for Emotional exhaustion ($F_{1,40} = 199.00, p < .001, \eta^2_p = .83$, large effect size), Depersonalization ($F_{1,40} = 21.33, p < .001, \eta^2_p = .35$, large effect size) and Personal accomplishment ($F_{1,40} = 52.92, p < .001, \eta^2_p = .57$, large effect size). As for the intervention group, the post-hoc analyses revealed a significant decrease in the score from pre- to post-intervention for Emotional exhaustion ($t(20) = -15.32, p < .001, d = 1.21$, large effect size) and Depersonalization ($t(20) = -7.55, p < .001, d = 1.00$, large effect size), and a significant increase in the score for Personal accomplishment ($t(20) = 10.28, p < .001, d = 0.81$, large effect size). The significant changes from pre- to post-intervention have been of crucial practical importance, as effect size was large ($d \geq 0.80$). No significant changes were found in the control group ($p > .05$).

Perceived Stress Scale

Statistical analysis revealed significant interactions in group-by-time differences for Perceived stress ($F_{1,40} = 69.88, p < .001, \eta^2_p = .64$, large effect size). The post-hoc analysis revealed a significant decrease in the

score for Perceived stress ($t(20) = -11.09, p < .001, d = 1.16$, large effect size) in the intervention group after 8 weeks, whereas no significant changes were found in the control group ($p > .05$). The difference from pre- to post-intervention can be considered of crucial practical relevance, as the effect size was large ($d \geq 0.80$).

DISCUSSION

Implementing physical activity interventions seems to be an effective way to reduce burnout and psychological stress among the workers, however there are few rigorous studies on treatment efficacy (Bretland & Thorsteinsson, 2015; de Vries et al., 2017; Fischetti et al., 2019; Heiden et al., 2007; Mealer et al., 2014; Norvell & Belles, 1993; Stenlund et al., 2009). Previous studies demonstrated that the Combined Exercise Training method, which targets multiple components of fitness, improves physical (Fischetti & Greco, 2017) and psychological fitness (Fischetti et al., 2019) in workers. Therefore, this research work presented a randomized controlled study design whose main objective was to evaluate the effects of a Combined Exercise intervention on burnout symptoms and perceived stress among workers in the helping professions. After eight weeks, the intervention improved burnout symptoms and perceived stress in a sample of male participants scoring medium-high on the MBI emotional exhaustion and depersonalization scales. All changes can be considered of crucial practical relevance, as the effect sizes were large. Besides, the adherence to the intervention was high as well as satisfaction with the results obtained, thus providing the conditions for a positive change in the lifestyle of the workers.

The results were consistent with the previously mentioned studies, but also with less rigorous studies (Gerber et al., 2013; Stenlund, Nordin, & Jarvholm, 2012). However, in a 12-week high-quality study, Eskilsson et al. (2017) did not find a significant reduction in burnout symptoms, and the intervention consisted only of aerobic training. The randomized controlled trials that reduced burnout symptoms lasted 4 to 12 weeks and the participants were treated with aerobic exercise (de Vries et al., 2017; Mealer et al., 2014), Qigong (Stenlund et al., 2009) and a combination of aerobic and resistance exercises (Bretland & Thorsteinsson, 2015; Heiden et al., 2007). Bretland and Thorsteinsson (2015) observed significant improvements for emotional exhaustion and personal accomplishment but not for depersonalization, whereas Gerber et al. (2013) assessed the effectiveness of aerobic exercise on burnout symptoms among workers with high burnout scores and found a significant improvement of emotional exhaustion and depersonalization but not of the personal accomplishment.

Our study found improvements in all MBI subscales with a large effect size. This result could be because the Combined Exercise Training method simultaneously trains more components of physical fitness; in fact, our method consists of a combination of circuit resistance training and agility training. The explanation in support of our results can be found in previous studies that have shown that resistance training is more effective in increasing personal accomplishment and the combination of aerobic and resistance exercise is effective to improve emotional exhaustion (Bretland & Thorsteinsson, 2015). Furthermore, we speculate that participation in the intervention program in leisure time in close contact with the professionals of the exercise and the sociable environment of the fitness centre may have contributed to the reduction of depersonalization due to increased social support. It must also be said that the effects of agility training on burnout have not been studied by anyone previously; nevertheless, only one study combined agility training with resistance training and found improvements in the stress coping and stress perception (Fischetti et al., 2019). Also, it is known that agility training improves physiological, cognitive and psychomotor performance (Lennmann et al., 2013). Therefore, further research is needed to assess the effects of agility training on burnout symptoms.

This research work highlighted that optimum use of leisure time (i.e., sports activities) is suggested for the ability to improve mood, facilitating a momentary coping of tension situations where engagement in positive support groups outside the workplace can help to improve stress levels (Bretland & Thorsteinsson, 2015; Fischetti et al., 2019; Greco & Fischetti, 2018; Iwasaki, Mannell, Smale, & Butcher, 2005; Norvell & Belles, 1993). Furthermore, our findings agree with a previous study that showed that both aerobic and resistance training were effective in decreasing perceived stress, but cardiovascular exercise tended to be better than resistance exercise when it came to reduce psychological distress (Bretland & Thorsteinsson, 2015). Since our results detected an improvement of all MBI subscales (i.e. emotional exhaustion, personal accomplishment, and depersonalization) and perceived stress, we may assume that the Combined Exercise Training is a comprehensive method of preventing and reducing all symptoms of work-related burnout.

Despite the strengths and precautions taken in carrying out this research work, several limitations require caution. First, the subjective self-report questionnaires entail the risk that the results are susceptible to expectancy effects. Second, MBI is a multidimensional tool, but the trifactorial structure, suggested by Maslach et al. (1996), still presents some limit due to the number of items not evenly distributed among the three scales (Sirigatti & Stefanile, 1993). However, this instrument is the most worldwide used to assess the dimensions of occupational burnout. Third, subjects from different helping professions were assigned to each group; each profession could have its own peculiarity and should be analysed individually. However, the study provides important preliminary results for further research. Finally, the findings have limited generalizability since the sample included only non-smoking males with good physical health and belonging to the helping professions. Future studies should include both genders, as well as various populations (e.g. students, other professions).

CONCLUSIONS

The present study found that Combined Exercise Training, a method that targets multiple components of fitness combining the circuit resistance training with agility training, may reduce burnout symptoms and perceived stress among workers in the helping professions. Thus, Combined Exercise intervention could constitute a relatively simple and inexpensive alternative compared to pharmacotherapy or psychotherapy in the treatment of occupational burnout. Our findings are very important in light of the recent classification of burnout under QD85 and defined as “*a conceptualized syndrome as a consequence of chronic stress in the workplace that has not been successfully managed*” (ICD-11, 2019). For this reason, we recommend participation in exercise in leisure time or workplace under the supervision of an exercise professional because exercise may likely improve work performance, increase productivity and retention, and enhance wellbeing and life quality in workers.

SUPPORTING AGENCIES

No sources of funding were used to assist in the preparation of this manuscript.

DISCLOSURE STATEMENT

The author declared no potential conflicts of interest concerning the research, authorship, and/or publication of this article.

REFERENCES

- American College of Sports Medicine (2018). ACSM's Guidelines for Exercise Testing and Prescription (10th ed.). Philadelphia, PA, USA: Wolters Kluwer.
- Bianchi, R., Schonfeld, I.S., & Laurent, E. (2015a) Burnout-depression overlap: a review. *Clinical Psychology Review* 36, 28–41. <https://doi.org/10.1016/j.cpr.2015.01.004>
- Bianchi, R., Schonfeld, I.S., & Laurent, E. (2015b). Is it time to consider the “burnout syndrome” a distinct illness? *Frontiers in public health*, 3, 158.
- Brand, S., Beck, J., Hatzinger, M., Harbaugh, A., Ruch, W., & Holsboer-Trachsler, E. (2010). Associations between satisfaction with life, burnout-related emotional and physical exhaustion, and sleep complaints. *The World Journal of Biological Psychiatry*, 11(5), 744-754. <https://doi.org/10.3109/15622971003624205>
- Bretland, R. J., & Thorsteinsson, E. B. (2015). Reducing workplace burnout: The relative benefits of cardiovascular and resistance exercise. *PeerJ*, 3, e891. <https://doi.org/10.7717/peerj.891>
- Chirico, F. (2017). Is it time to consider Burnout Syndrome an occupational disease? *British Journal of Psychiatry*, eLetter July, 17.
- Cohen, J. (1992). A Power Primer. *Psychological Bulletin*, 112(1), 155-159.
- Cohen, L., Manion, L., & Morrison, K. (2011). *Research Methods in Education* (7th edition). Oxford, UK: Routledge.
- Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, 24, 386-396. <https://doi.org/10.2307/2136404>
- de Vries, J.D., van Hooff, M.L., Guerts, S.A.E., & Kompier, M.A.J. (2017) Exercise to reduce work-related fatigue among employees. A randomized controlled trial. *Scandinavian Journal of Work, Environment & Health* 43(4), 337-349. <https://doi.org/10.5271/sjweh.3634>
- Ekstedt, M., Söderström, M., Åkerstedt, T., Nilsson, J., Søndergaard, H.P., & Aleksander, P. (2006) Disturbed sleep and fatigue in occupational burnout. *Scandinavian Journal of Work, Environment & Health*, 32(2), 121-131. <https://doi.org/10.5271/sjweh.987>
- Esilsson, T., Slunga Järholm, L., Malmberg Gavelin, H., Stigsdotter Neely, A. and Boraxbekk, C.J. (2017). Aerobic training for improved memory in patients with stress-related exhaustion. A randomized controlled trial. *BMC Psychiatry* 17(1), 322. <https://doi.org/10.1186/s12888-017-1457-1>
- Faul, F., Erdfelder, E., Lang, A.G., & Buchner, A. (2007). G*Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39, 175–191. <https://doi.org/10.3758/bf03193146>
- Fischetti, F., & Greco, G. (2017). Multilateral training as an innovative didactic method to support continuous education in police. *Form@re*, 17(3), 303-315. <https://doi.org/10.13128/formare-20801>
- Fischetti, F., Cataldi, S., Latino, F., & Greco, G. (2019). Effectiveness of multilateral training didactic method on physical and mental wellbeing in law enforcement. *Journal of Human Sport and Exercise*, 14(4proc), S900-S909. <https://doi.org/10.14198/jhse.2019.14.proc4.53>
- Gerber, M., Best, S., Meerstetter, F., Isoard-Gautheur, S., Gustafsson, H., Bianchi, R., ... & Brand, S. (2018). Cross-Sectional and Longitudinal Associations Between Athlete Burnout, Insomnia, and Polysomnographic Indices in Young Elite Athletes. *Journal of Sport and Exercise Psychology*, 40(6), 312-324. <https://doi.org/10.1123/jsep.2018-0083>
- Gerber, M., Brand, S., Elliot, C., Holsboer-Trachsler, E., Puhse, U., & Beck, J. (2013). Aerobic exercise training and burnout: a pilot study with male participants suffering from burnout. *BMC Research Notes* 6, 78. <https://doi.org/10.1186/1756-0500-6-78>
- Greco, G., & Fischetti, F. (2018). Physical, technical and tactical training and stress management in law enforcement. *Journal of Physical Education and Sport*, 18(2), 555-560.

- Haff, G. G., & Triplett, N. T. (Eds.). (2016). *Essentials of strength training and conditioning* 4th edition. Champaign, IL: Human kinetics.
- Heiden, M., Lyskov, E., Nakata, M., Sahlin, K., Sahlin, T., & Barnekow-Bergkvist, M. (2007) Evaluation of cognitive behavioural training and physical activity for patients with stress-related illnesses: a randomized controlled study. *Journal of Rehabilitation Medicine* 39(5), 366-373. <https://doi.org/10.2340/16501977-0053>
- ICD-11. (2019). *International Classification of Diseases 11th Revision*. Retrieved from: <https://icd.who.int/browse11/l-m/en#/http://id.who.int/icd/entity/129180281> [Accessed 8 September 2019].
- Iwasaki, Y., Mannell, R. C., Smale, B. J., & Butcher, J. (2005). Contributions of leisure participation in predicting stress coping and health among police and emergency response services workers. *Journal of Health Psychology*, 10(1), 79-99. <https://doi.org/10.1177/1359105305048557>
- Kakiashvili, T., Leszek, J., & Rutkowski, K. (2013) The medical perspective on burnout. *International Journal of Occupational Medicine and Environmental Health* 26(3), 401-412. <https://doi.org/10.2478/s13382-013-0093-3>
- Kim, W.H., Ra, Y.A., Park, J.G., & Kwon, B. (2017). Role of burnout on job level, job satisfaction, and task performance. *Leadership & Organization Development Journal*, 38(5), 630-645. <https://doi.org/10.1108/lodj-11-2015-0249>
- Lee, E. H. (2012). Review of the psychometric evidence of the perceived stress scale. *Asian nursing research*, 6(4), 121-127. <https://doi.org/10.1016/j.anr.2012.08.004>
- Lennemann, L.M., Sidrow, K.M., Johnson, E.M., Harrison, C.R., Vojta, C.N., & Walker, T.B. (2013). The influence of agility training on physiological and cognitive performance. *The Journal of Strength & Conditioning Research*, 27, 3300–3309. <https://doi.org/10.1519/jsc.0b013e31828ddf06>
- Maslach, C., & Jackson, S.E. (1981). The measurement of experienced burnout. *Journal of Occupational Behaviors*, 2, 99-113. <https://doi.org/10.1002/job.4030020205>
- Maslach, C., Jackson, S.E., & Leiter, M.P. (1996). *Maslach Burnout Inventory Manual* (3rd ed.). Palo Alto, CA: Consulting Psychologist Press.
- Maslach, C., Schaufeli, W. B., & Leiter, M. P. (2001). Job burnout. *Annual review of psychology*, 52(1), 397-422. <https://doi.org/10.1146/annurev.psych.52.1.397>
- Mealer, M., Conrad, D., Evans, J., Jooste, K., Solyntjes, J., Rothbaum, B., & Moss, M. (2014) Feasibility and acceptability of a resilience training program for intensive care unit nurses. *American Journal of Critical Care* 23(6), e97-105. <https://doi.org/10.4037/ajcc2014747>
- Mohren, D.C.L., Swaen, G.M.H., Kant, I., van Amelsvoort, L.G.P.M., Borm, P.J.A., & Galama, J.M.D. (2003). Common infections and the role of burnout in a Dutch working population. *Journal of Psychosomatic Research* 55(3), 201-208. [https://doi.org/10.1016/s0022-3999\(02\)00517-2](https://doi.org/10.1016/s0022-3999(02)00517-2)
- Mondo, M., Sechi, C., & Cabras, C. (2019). Psychometric evaluation of three versions of the Italian Perceived Stress Scale. *Current Psychology*, 1, 9. <https://doi.org/10.1007/s12144-019-0132-8>
- Mutkins, E., Brown, R. F., & Thorsteinsson, E. B. (2011). Stress, depression, workplace and social supports and burnout in intellectual disability support staff. *Journal of Intellectual Disability Research*, 55(5), 500-510. <https://doi.org/10.1111/j.1365-2788.2011.01406.x>
- Norvell, N., & Belles, D. (1993). Psychological and physical benefits of circuit weight training in law enforcement personnel. *Journal of consulting and clinical psychology*, 61(3), 520-527. <https://doi.org/10.1037/0022-006x.61.3.520>
- Salvagioni, D. A. J., Melanda, F. N., Mesas, A. E., González, A. D., Gabani, F. L., & de Andrade, S. M. (2017). Physical, psychological and occupational consequences of job burnout: A systematic review of prospective studies. *PloS one*, 12(10), e0185781. <https://doi.org/10.1371/journal.pone.0185781>

- Schaufeli, W.B., & Buunk, B.P. (2003). Burnout: An overview of 25 years of research and theorizing. In M.J. Schabracq, J.A.M. Winnubst, & C.L. Cooper (Eds.), *Handbook of work and health psychology* (pp. 383-342). Chicester, UK: Wiley. <https://doi.org/10.1002/0470013400.ch19>
- Shirom A. (2003). Job-related burnout. In J.C. Quick, & L.E. Tetrick (Eds), *Handbook of occupational health psychology* (pp. 245-265). Washington, USA: American Psychological Association. <https://doi.org/10.1037/10474-012>
- Sirigatti S., & Stefanile S. (1993). MBI Maslach Burnout Inventory. Firenze, IT: Organizzazioni speciali.
- Soderfeldt, M., Soderfeldt, B., Ohlson, C. G., Theorell, T., & Jones, I. (2000). The impact of sense of coherence and high-demand/low-control job environment on self-reported health, burnout and psychophysiological stress indicators. *Work & stress*, 14(1), 1-15. <https://doi.org/10.1080/026783700417195>
- Stenlund, T., Birgander, L.S., Lindahl, B., Nilsson, L., & Ahlgren, C. (2009). Effects of Qigong in patients with burnout: a randomized controlled trial. *Journal of Rehabilitation Medicine* 41(9), 761-767. <https://doi.org/10.2340/16501977-0417>
- Stenlund, T., Nordin, M. and Jarvholm, L.S. (2012) Effects of rehabilitation programmes for patients on long-term sick leave for burnout: a 3-year follow-up of the REST study. *Journal of rehabilitation medicine* 44(8), 684-690. <https://doi.org/10.2340/16501977-1003>
- Tanaka, H., Monahan, K. D., & Seals, D. R. (2001). Age-predicted maximal heart rate revisited. *Journal of the american college of cardiology*, 37(1), 153-156. [https://doi.org/10.1016/s0735-1097\(00\)01054-8](https://doi.org/10.1016/s0735-1097(00)01054-8)
- Toker, S., Melamed, S., Berliner, S., Zeltser, D., & Shapira, I. (2012). Burnout and risk of coronary heart disease: a prospective study of 8838 employees. *Psychosomatic Medicine* 74(8), 840-847. <https://doi.org/10.1097/psy.0b013e31826c3174>



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