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Dear Author(s),
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This is our pleasure to inform you that your manuscript entitled ' **Effects of work fitness program upon perception of stress level: a case study in the administrative office of a Portuguese company** ' has been accepted for publication in ***Pensee Journal (ISSN: 0031-4773)** based upon the reports of the reviewers. Your article will be published in **Vol. 76, Issue. 5 .**

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Effects of work fitness upon perception of stress level: a case study in the administrative office of a Portuguese company

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Abstract

Test the potential benefits of a Work Fitness Program (WFP) in the administrative department of a Portuguese service enterprise; the usefulness comes from (i) its role as demonstration case study since this type of primary prevention strategy is still hardly implemented in Portugal, as well as (ii) its contribution to advance practical knowledge by studying the effectiveness of WFP on stress level as perceived by worker – since inconclusive results have been emphasized by several reviews on the subject. The participants were 29 office workers in the experimental, and 21 in the control groups. The WFP consisted of an 8-month period, with 3 sessions per week and 15 minutes per session. The WFP successfully decreased the workers' stress level perception, on a statistically significant basis: workers became more relaxed and less nervous, and felt more energetic and healthy. The results of this study are consistent with previous ones developed in a work environment, and emphasized the need for a proactive implementation of workplace fitness by enterprise managers in Portugal.

Keywords: Physical activity, Health promotion, Psychosocial risk, Administrative services

1. Introduction

Although the concept of stress was initially introduced by Selye (1956), it is currently considered as classical and is hardly popular in the field of social sciences. Despite several approaches, the theory that stood out was that by Lazarus (1966); this social-personality psychologist developed and tested the transactional theory of

stress and coping, according to which stress does not exist in the event but is rather a result of a transaction between a person and his/her environment. Later, Lazarus & Folkman (1984) claimed stress as a concept with a heuristic value, but which by itself was not measurable as a single factor. The term stress is indeed a "rubric" for a complex series of subjective phenomena, including cognitive appraisals (threat, harm, and challenge), stress emotions, coping responses, and reappraisals (Lazarus & Folkman, 1984).

Occupational stress may in general be defined as stress felt in areas of work that exceed the capacity of fullness of an individual (organizational stressors), or else the psychological and behavioural characteristics of an individual's response stressors (Jones & Bright, 2001). A major focus of researchers in the field of organizational stress has accordingly been on identifying such stressors – or, in other words, on events that elicit responses underlying stress, and which interfere with one's well-being, health and performance (Marshall, 2004). On the organization level, absenteeism, high staff turnover, poor time-keeping, disciplinary problems, harassment, reduced productivity, accidents, errors, and increased costs of compensations and health care are the most usual outcomes (Godin & Kittel, 2004).

Nowadays, some companies are concerned with the productivity and well-being of their workers, so they have radically changed their concepts of designing and delivering a life of quality to their workers; one illustrative example is the workplace health promotion program (Kerr & Vos, 1993; Marshall, 2004; Aldana te al., 2005). Both a challenge and an opportunity, promotion of this type of program may take place via the Workplace Fitness Program (WFP), which can be defined as a set of physical practices drawn from the work carried out during working hours that aim at preventing occupational diseases, lowering rate of absenteeism, and reducing stress level (Gangster & Schaubroeck, 1991; Kerr & Vos, 1993; Marshall, 2004).

On the one side, several studies showed that the benefits of WFP (also called Employees' Fitness Program, EFP) may include increase of employee's fitness, productivity, energy, and morale, and decrease of stress, job-related tension, health insurance cost, turnover rate, and absenteeism (Oden, Crouse & Reynolds, 1989; Shore, Prasad & Zroback, 1989; Norris, CarrolL & Cochrane, 1990; Mathes; Mcgivern & Schneider, 1992; Parker, 1995; Lechner, Vries, & Adriannsen, 1997; Tveiko & Eriksen, 2008). In the work by Shore et al. (1989) participants reported 35% fewer stress symptoms which interfere with their quality of life as a result of taking part in an EFP. Tveiko and Eriksen (2008) found that there were statistically significant differences between the intervention and control groups in subjective effects – they performed better in stress management. Norris, Carrol and Cochrane (1990) proved that workers undergoing aerobic training improved measures of well-being and stress than anaerobic trainers, and both groups showed significant improvement when compared to controls. Mathes, McGivern and Schneider (1992) reported that participants scored items associated with enhancing fitness, thus reducing stress and learning to relax as more important than nonparticipants did. The main findings, described by Edwards (2006), were that regular exercise was associated with significant improvements in total well-being score, and especially in the well-being components of mood, sense of coherence, fortitude, stress and coping.

On the other side, some authors found that there is limited evidence for the effectiveness of physical activity programs at worksites with respect to absenteeism from work, and inconclusive evidence for effectiveness regarding job satisfaction and stress, and there is no evidence at all for effectiveness with regard to productivity (Proper ET AL., 2002; Tveiko & Eriksen, 2008). Oden, Grouse & Reynolds (1989) studied the influence of an EFP on job satisfaction and work-related stress with blue collar employees – who participated in 6-mo fitness programme, and the results unfolded positive trends but were not significant. Although aerobic exercise resulted in significantly increased aerobic capacity, improved feelings of well-being and significantly decreased complaints of muscle pain, there were no changes in anxiety and stress, and job satisfaction was significantly reduced (Grønningæter et al., 1992).

The conflicting findings about the effectiveness of workplace physical activity interventions on well-being of workers suggest that more thorough data and studies evaluating worksite physical activity promotion programs are needed (Sjögren et al., 2006; Tveiko & Eriksen, 2008; Conn et al., 2009).

Therefore, the present study attempts to shed further light on the role of WFP upon stress level perceived by workers from an enterprise – which was not socially aware of benefits of WFP on the well-being of their

workers, and that is located in Portugal as a country where research has lagged far behind that in other European countries in this area.

2. Methods

2.1 Participants

This case study was conducted in the Department of Exhibitions and Events of AEP Foundation (EXPONOR, Portugal), and encompassed a total of 60 workers. All workers perform their functions in a sitting position most of the time, and work chiefly with office tools (i.e. computer, calculator, paper and telephone). At the beginning of the study, information was posted on the walls of all offices and corridors, and short classes were delivered aimed at increasing the awareness of workers on the potential benefits associated with the activities included in WFP. Since enrolment in the program was not enforced by the managers, a convenience sample was used – based on workers who volunteered to join our study. The experimental group was obtained from the workers that properly filled in the surveys and attended most WFP classes (n=29). The control group included the workers that properly filled in the surveys but did not follow-up the WFP (n=21). The other workers (n=10) were excluded because they decided, from the very beginning, that they did not want to join such an effort.

Consent for participation was previously obtained in writing form from each individual. Precautions were obviously taken to preserve their privacy, and information was kept in confidence. The good health and well-being of each volunteer were always above any other issue during the program normal regular development.

2.2 Materials and Procedures

Two surveys were applied to the groups: one was aimed at characterizing the participants and the organizational work, and the other at quantifying the stress level perceived by each worker (Oiveira, 2006). The stress level survey used was validated and published in Portuguese language by Oliveira (2006). The worker had to answer 14 questions (see Table 3) via a Likert 6-point scale (e.g., for question 1: With excellent mood, With good mood, Mostly good mood, Sometimes good mood, Often down, Always down), and 4 final questions with a Likert 10-point scale (e.g., for question 18: 0-very depressed to 10-very cheerful). Thereafter, the sum of all points (see Table 1) was calculated – which should lie between zero (severe suffering) to 110 (full well-being). Data collection took place at two different times: before application of the WFP, and after the 8-month period duration of WFP.

The WFP consisted of three weekly sessions of the compensatory type – i.e. the activities were developed during the workday (more specifically, during the morning break) and lasted 15 min each. The various activities were fully adapted to the workers' clothes and working environment. Emphasis was put on stretching (see Figure 1) and relaxation exercises; recreational activities were performed and massage with physiotherapy ball and exercises with Pilate's balls were performed as well (see Figure 2). Physical activities were performed individually, in pairs or in groups. Classes were performed together with background music that helped workers relax and made the program more enjoyable overall. The WFP were instructed by two teachers and one student of a 5-year degree program in Physical Education and Sport.

2.3 Data Analysis

Statistical analysis of the data produced was performed by SPSS Statistics software, v. 20.0. Shapiro-Wilk test, normality plot, skewness and kurtosis ratios were used to check the normal distribution condition required by application of parametric tests. None of the variables possessed a normal distribution, so nonparametric tests had to be used – Mann-Whitney test for independent samples, and Wilcoxon test for dependent samples.

3. Results

The ages were 42.7 ± 1.80 years old and 38.8 ± 1.27 years old, for control and experimental groups, respectively. No significant difference between the ages of the two groups was found ($U=212$; $z=-1.82$; $p=0.07$). Some relevant individual and organizational characteristics of both groups are depicted in Table 2. A higher level of education/formation of the experimental group than the control one was apparent. No major

differences between seniority of workers existed between groups. Most participants of both groups worked 8 h, and took 2 breaks of 5 min each per day. The experimental group included in general people feeling on average more tired. The control and experimental groups were statistically identical in terms of total stress level perceived by workers before implementation of the WFP (see Table 3). Workers of both groups had experienced stress during previous regular performance of their work; the levels of stress perceived by workers of the experimental group, before and after the WFP, are shown in Figure 3.

One confirmed that there were no statistical differences on individual item and total stress level between groups (control vs. experimental) at the beginning of WFP (see Table 3). One also verified that individual items and total stress level in control group did not change significantly during the 8-mo period (see Table 3).

The total scores for stress level perception of the experimental group increased during the 8-mo period (see Table 3). This realization was confirmed by the increase in number of workers that felt well after WFP in the experimental group (see Figure 3). This variation can be attributed specifically to the following items: (i) feel better mood, (ii) feel less nervous; (iii) wake up more relaxed; (iv) feel more interested about health; (v) feel less tense and more relaxed; and (vi) feel more energetic and lively (see Table 3).

Finally, the total scores obtained for the stress level perception between control and experimental groups after the 8-mo WFP period were significantly different (see Table 3), chiefly for the same reasons mentioned above.

4. Discussion

Participation by workers in specific types of programs can vary widely, although they are typically low. Attempts to increase participation should look beyond individual, health, and organizational variables, to specific features of the work environment that encourage involvement in health-promotion activities (Shephard, 1996; Grosch et al., 1998; Chen, Cromatie, & esposito, 2002; Soares, Assunção, & Lima, 2006; Robroek et al., 2009).

Employees may not be motivated to participate if they think their organizations are not fully supportive of their efforts to engage in some sort of daily physical activity.

Many reasons have been put forward for this realisation: (i) some workers prefer not to use their breaks during work – and, as happened in the present study, ca. 20% of workers do not take any break at all; (ii) there is an intrinsic resistance to change; (iii) there is some degree of job insecurity; (iv) workers sometimes feel timid and unmotivated to participate in a physical testing because they assume that their organizations may view them in a negative manner due to a substandard physical performance or health condition; and (v) workers feel too exposed when performing exercises and receiving massages in front of their co-workers. Based on these results – and knowing that the management board did not take any positive action to encourage workers to participate in the study, one decided to create the experimental sample on a volunteer basis that included 48% of the department office workers, and the control group – based on those that did not mind to fill in the surveys, but did not want to engage in the WFP itself. Even following this alternative strategy, 17% of the workers decided not to participate at all – knowing that explanation of the program was done prior to its implementation (as mentioned before). Hence, one concluded that an active promotion of participation by the company management is nuclear to assure consistency and representativeness of this type of program – because it fully eliminates the job insecurity associated therewith, while increasing motivation (and thus regular attendance).

One risk inherent to this sampling strategy is that the (individual and organizational) characteristics and the stress levels perceived by the two groups may be different – in such a way that the experimental design would not be valid. However, there was no a priori reason to consider that the individual and/or organizational characteristics of the participants in the control and experimental groups should be different; additionally, the stress levels perceived by the two groups were statistically identical at the beginning of the study. Therefore, one accepted as reasonable hypothesis that the control and experimental groups were appropriate for the purpose of the study.

From the results obtained, one verified that the WFP contributed significantly to increase the total scores of stress level perceived, and increased significantly the number of people feeling less stressed. Throughout the WFP, the workers from the experimental groups became more relaxed and less nervous – and this brought them to feel more energetic and lively, and thus less concerned with health. Similar conclusions were reached before

by Norris, Carroll and Cochrane (1990) – who showed significant improvements in self-reported measures of stress among the subjects participating in a training program when compared with the reference group; by Tveito and Eriksen (2008) – who unfolded statistically significant differences between the experimental and control groups, with the former actually reporting that their health and stress management became better; and by Resende et al. (2007) – who concluded that work gymnastics improved interaction with co-workers, while reducing stress and fatigue.

5. Conclusions

One concluded that WFP used in this study induces positive changes in the well-being of workers, by reducing the feeling of being nervous, tense and stress, and by increasing the feeling of good mood, relaxation, and vitality. The general work atmosphere prevailing in the department studied was indeed improved.

Therefore, this study was important as long as an actual contribution to show to the enterprise managers– which were not socially aware of the well-being of their workers – that work fitness programs have a clear benefit toward worker health, and therefore toward health of the whole organization.

By giving a final and positive conclusion on the benefits of WFP on health of workers, this study represented a further confirmation of research trends, and helped fill in the gap unfolded by critical reviews on this subject (Conn et al., 2009; Proper et al., 2003) – who claimed that scientific evidence of effectiveness of WFP is scarce and sometimes inconclusive.

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Table 1. Relationship between stress level perceived by workers and survey total score

Stress level		Scores
Suffering	Severe	0 – 25
	Serious	26 – 40
Suffering		41 – 55
Stress Problems		56 – 70
Marginal		71 – 75
Low Positivity		76 – 81
Well-being		81 – 110

Table 2. General characteristics of worker groups

Characteristics	Control	Experimental
Graduation degree (%)		
Basic school	19	5
High school	38	24
University	43	71
Department seniority years (%)		
[0, 5[	19	38
[6, 10[	43	35
[11, 15[	24	10
[16, 20[	10	14
>20	4	3
Working hours per day (%)		
8	86	90
9	10	7
10	4	3
Number of breaks of 5 min per day (%)		
0	19	21
1	13	11
2	58	61
>3	10	7
Health problems (%)		
None	47	32
Tiredness	0	7
Cold/Flu	24	24
Surgery	24	21
Others	5	16
Tiredness (%)		
Exhausted	14	11
Tired	37	56
Reasonable	20	11
Well	29	22

Table 3. Comparing changes in stress level perceived by worker within and between groups

Questions	*p*-value			
	Control (0 vs. 8-mo)	Experimental (0 vs. 8mo)	0-mo (Experimental vs. Control)	8-mo (Experimental vs. Control)
1. In general, how do you feel?	0.109	**0.070**	0.935	**0.027**
2. Has been nervous?	0.754	**0.042**	0.159	0.463
3. Do you have control over your behaviour, thoughts, emotions and feelings?	1.000	0.284	0.943	0.305
4. Have you felt discourage, desperate, or have you many problems?	1.000	0.538	0.872	0.856
5. Have you felt stress, pressure or tension?	0.754	0.086	0.174	0.554
6. Haw happy, satisfied or happy have you felt in relation to your life?	0.594	0.222	0.207	**0.002**
7. Have you had reason to fear loss of control of your mind, deeds? Words, thoughts, feelings, or memories?	1.000	0.285	0.859	0.429
8. Have you been anxious, worried or down?	0.549	0.329	0.765	0.829
9. Do you get up in morning refreshed and relaxed?	0.289	**0.018**	0.302	**0.042**
10. Have you been troubled by illness, organic disorder, pains or fears about your health?	0.453	0.334	0.439	0.464
11. Has your life been felt of interesting things?	0.453	0.248	0.974	0.098
12. Do you feel discourage and sad?	0.109	0.903	0.555	0.193
13. Do you feel emotionally stable ad sure of yourself?	1.000	0.157	0.506	0.707
14. Do you feel tired, exhausted or weakened?	0.125	0.161	0.740	0.101
15. How worried or concerned are you about your health?	0.146	**0.018**	0.244	**0.004**
16. How relaxed or tense do you feel?	0.344	**0.003**	0.646	**0.005**
17. How much energy and vitality have you felt?	0.180	**0.008**	0.947	**0.001**
18. How depressed or cheerful have you been?	0.344	0.108	0.967	**0.013**
Total stress perceived by worker	0.118	**0.000**	0.420	**0.003**

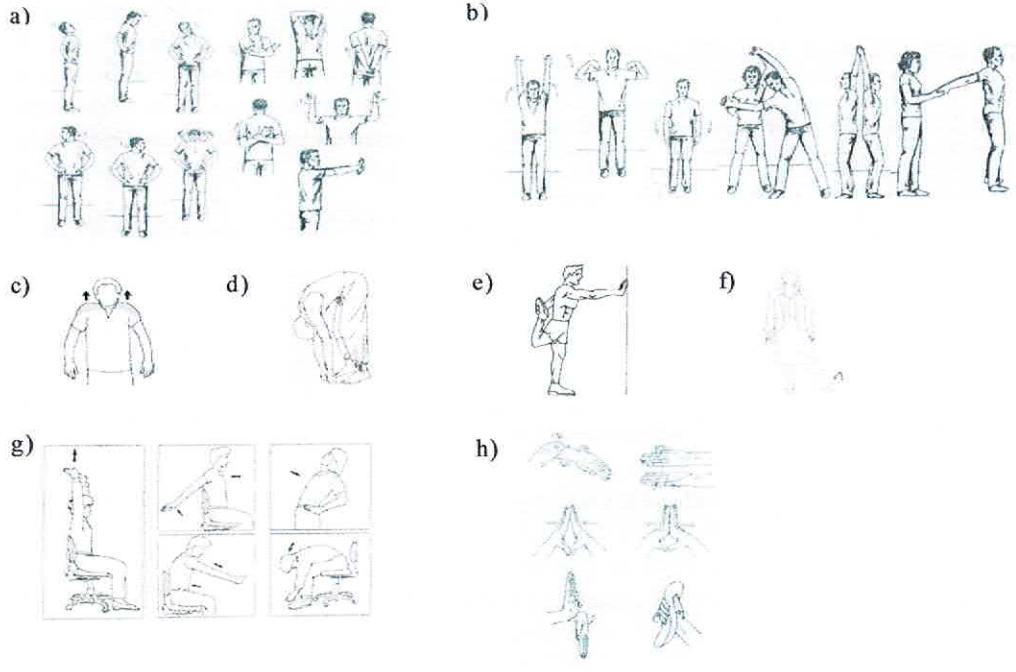

Figure 1. Diagrams of some stretching exercises used in the Workplace Fitness Program (a and b – neck, shoulders and arms, c – shoulders, d – back, e – leg, d – foot, g – arms, shoulders and back in sitting position, and g – wrists and hands)

Figure 2. Examples of WFP exercises without and with Pilate's balls performed individually, in pairs or in groups

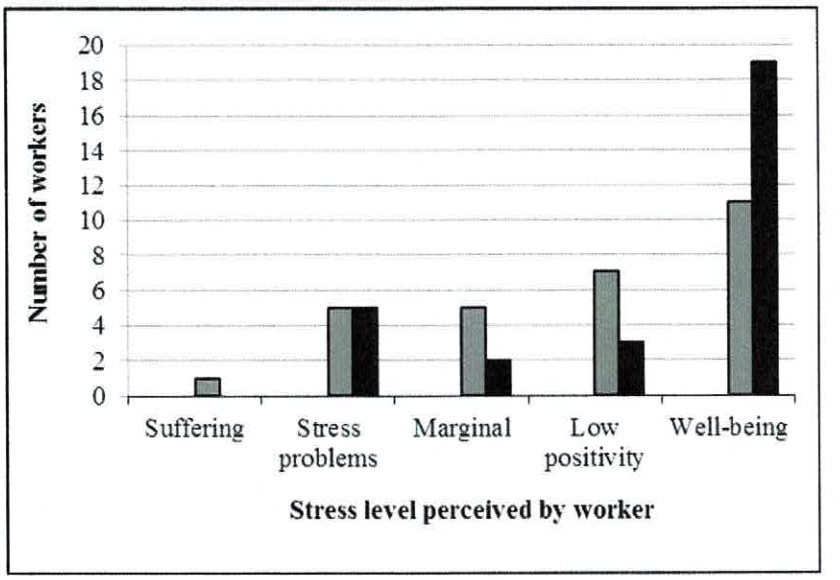

Figure 3. Histogram for stress level perceived by workers of experimental group (□ – before and ■ – after)

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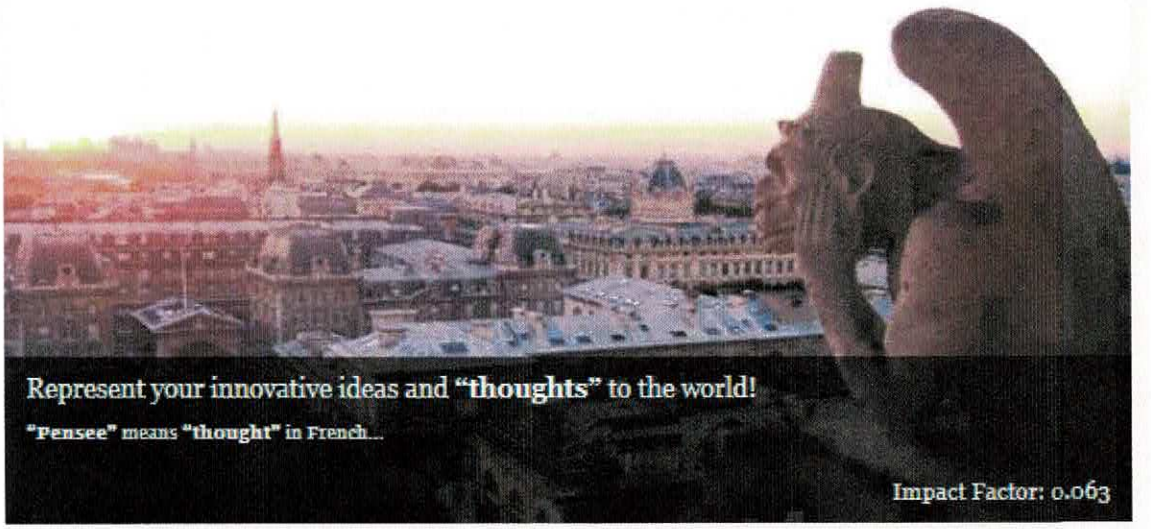

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animosities in intra-national/domestic contexts. So, this critical review paper intends to study the effects of intra-national ethnic food acculturation in majority ethnic groups in relation to possible animosities. The first section suggests a theoretical framework based on review of literature while the second section suggests a systematic approach to study this phenomenon in a particular context.

Effects of work fitness program upon perception of stress level: a case study in the administrative office of a Portuguese company

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Abstract:

Test the potential benefits of a Work Fitness Program (WFP) in the administrative department of a Portuguese service enterprise; the usefulness comes from (i) its role as demonstration case study since this type of primary prevention strategy is still hardly implemented in Portugal, as well as (ii) its contribution to advance practical knowledge by studying the effectiveness of WFP on stress level as perceived by worker – since inconclusive results have been emphasized by several reviews on the subject. The participants were 29 office workers in the experimental, and 21 in the control groups. The WFP consisted of an 8-month period, with 3 sessions per week and 15 minutes per session. The WFP successfully decreased the workers' stress level perception, on a statistically significant basis: workers became more relaxed and less nervous, and felt more energetic and healthy. The results of this study are consistent with previous ones developed in a work environment, and emphasized the need for a proactive implementation of workplace fitness by enterprise managers in Portugal.

A Look to Policy Implementation and Identifying Successful Implementation Factors (In Health Care Field)