162 - EVALUATION OF THE EFFECTS OF A PHYSICAL EXERCISE PROGRAM IN THE SATISFACTION WITH WORK AND IN THE PERCEIVED PRODUCTIVITY OF PUBLIC EMPLOYEES

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Introduction

With the industrial revolution a restriction of the physical movement was verified driving, per times, to an almost complete absence of physical activities. This reduction in the physical activity carts a decrease of the life quality and of the physical fitness. The physical activity constitutes an important prophylactic measurement against pathologies of the modern civilization, such as stress (Shephard, 1983; Oliveira et al., 2001). This current human need for exercise is not a fashion, but an imminence demanded by the undesirable adaptation from the human organism to the current *modus vivendi*.

The use of physical exercise as a way to improve the work engagement and to reduce the absenteeism is well described in the literature (Shephard, 1983; Gibbons, 1989; Shephard, 1992; Lechner et al., 1997; Shephard, 1999; Anneli et al., 2000; Stein et al., 2000; Aldana & Pronk, 2001; Stein, 2001; Wattles & Harris, 2003). However, contrarily to the scenario that is currently present in some strongly industrialized countries and with a high productivity (for instance Japan and United States of America), in Portugal little attention is paid to this phenomenon by corporate enterprises. Lee et al. (2003) refer that the implementation of physical exercise programs is present with more frequency in the case of the manufacture industries.

Although the search of physical activity by the population in general (namely by active population) has grown in the last two decades (contemplated, for instance, in the proliferation of Gyms and Academies as well as in the development of Courses aimed for physical activity, recreation and leisure), very few enterprises promote those activities in a guided way. Some studies identify the existence of a favorable attitude of the workers for exercise practice during free time (Deutsch. 1999; Shephard, 1999). Several authors have been describing potentials benefits for the enterprises that implement programs of physical exercise for their workers (Blake & DeHart, 1994; Shephard, 1996; Wilson et al., 1996; DiNubile & Cherman, 1999; Aldana, 2001; Pelletier, 2001; Proper et al., 2003). Two indicators are usually observed when one intends to verify the effects of physical exercise programs in workers: the degree of satisfaction with the work (Rudman, 1987; Rudman & Steinhardt, 1988; Paterson & Dunnagan, 1998; Stein, 2001; Wattles & Harris, 2003) and the perceived productivity (Durbeck et al., 1972; Rudman, 1987; Rudman & Steinhardt, 1988; Leutzinger & Blank, 1991; Nurminen et al., 2002; Wattles & Harris, 2003).

Methods

Sample

Twenty employees of a public University (ten male and ten female), with a mean age (± DP) of 45.8 ± 9.5 years participated voluntarily in the present study. The subjects were, on average, public employees for 20.5 ± 14.3 years, being the last 14.5 ± 9.8 years working in the current Institution.

Procedures

The employees' group was submitted to a physical exercise program (PEP) under orientation of a monitor during one year. The program was constituted by three weekly sessions of one hour of varied physical exercise. Half of the subjects indicated that before they participate in this program, they already had habits of regular practice of physical exercise.

After this period of time, two questionnaires were applied in the chronological order stated below (see tables 1 and 2). To quantify the perceived productivity, a translation for Portuguese Language of the questionnaire validated by Rudman (1987) was applied. For quantification of the satisfaction degree with the work, a translation for Portuguese Language of the questionnaire described by Wattles and Harris (2003) and validated by Brayfield and Rothe (1951) was applied. Regarding this second questionnaire, the subjects were requested to answer the questions under two perspectives: i) according to the way they perceived their professional activity before they begin the PEP; ii) according to the way they perceived their professional activity after that program. Both questionnaires were built with a parametric scale from 1 to 5, in order to allow a total quantitative index for each indicator (perceived productivity and satisfaction at work).

Statistics

The data were analyzed with the software SPSS 10.0 (SPSS Science, Chicago, USES) and the graphs were elaborated with the software SigmaPlot 8.0 (SPSS Science, Chicago, USES). To compare the degree of satisfaction before and after PEP the t-test of repeated measures was used. For comparison among genders in the values of the measured variables, the t-test for independent samples was used. It was previously confirmed the presupposition of normality of the distribution of the variables with the test of Shapiro-Wilk. The results are presented as means ± standard deviations (DP). The level of significance was defined as p0.05.

Table 1: Adapted questionnaire of Rudman (1987).

The physical exercise allows me:	TD	D	DK	A	TA
1. To be more productive in the work					
2. To be more relaxed home					
3. To think with more clarity in the professional problems					
4. To ponder in the professional tasks					
5. To appreciate more my work					
6. To link better with the work friends					
7. It doesn't have any effect on my installment in the work					

Table 2: Adapted questionnaire of Wattles and Harris (2003).

	TD	D	DK	A	TA
1. My work is sufficiently interesting for not feeling displeased					
2. I frequently feel displeased with my work					
3. I feel satisfied with my actual work					
4. Most of the time, I have to do an effort to go to work					
5. I feel more satisfied in my work than most of the other people					
6. In most of the days, I am animated with my work					
7. During the time at work, seems that the time never raises					

Results

Physical exercise and Perceived Productivity

The index of perceived productivity presented mean values of 4.05 ± 0.64 for the total sample. This index presented superior mean values in females (4.33 ± 0.63) for comparison with males (3.76 ± 0.54). However, these differences were not statistically significant. In the illustration 1, the relative results are presented to the index of perceived productivity.

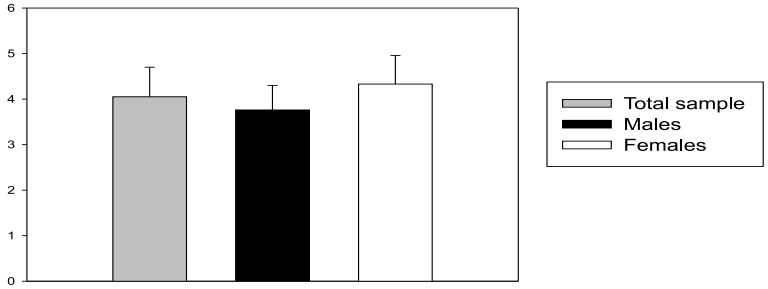

Illustration 1: Averages (±DP) of the index of noticed productivity.

Physical exercise and Satisfaction with the Work

The satisfaction with the work index before exercise program presented mean values of 3.68 ± 0.65 for the total sample. This index presented inferior mean values in females (3.65 ± 0.95) for comparison with males (3.71 ± 0.19). Though, these differences were not statically significant (illustration 2).

The satisfaction with the work index after exercise program presented mean values of 4.08 ± 0.45 for the total sample. This index presented superior mean values in females (4.24 ± 0.54) for comparison with males (3.92 ± 0.31). Also these differences did not present statistical meaning (illustration 2).

Significant increments in the satisfaction with the work index were verified after PEP when considered the relative results to the total sample (P0.01) and to the females (P0.05). However, in the males' case, that increment did not present statistical meaning.

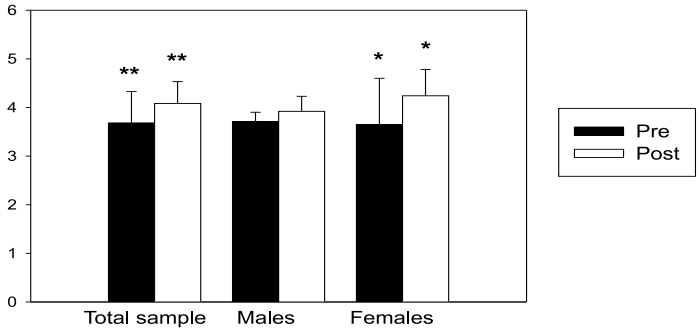

Illustration 2: Averages (±DP) of the satisfaction indexes with the work before (Pre) and after (Post) the program of physical exercise. * P=0.05; ** P=0.01.

Discussion

Physical exercise and Noticed Productivity

The mean value that we found for the index of perceived productivity (4.05) is lower than the report by Wattles and Harris (2003) for a larger sample (4.20). These authors verified that this index presented values slightly higher in males than in females (4.20 vs 4.16, respectively). However, in the present study, the opposite tendency was verified, because the relative mean value of females was superior to the one of males (4.33 vs 3.76, respectively). Although in our study the differences were not statistically significant, they seem to have an important dimension. Possibly, the reduced dimension of our sample can justify the absence of statistical significance.

The adherence of females to the practice of physical exercise is more recent than the one of males. This phenomenon is still more marked in the inner land areas of the Country (origin of the sample used in the present study). Indeed, several factors, mainly of cultural stamp, hindered females' access at this practice for decades. It is possible that this fact may partially explain our results. The recent access of females to the physical activity can determine that these enjoy more than the males of the psycho-somatic effects that are described for this type of activity, in this case the productivity perceived at work (Durbeck et al., 1972; Rudman, 1987; Rudman & Steinhardt, 1988; Leutzinger & Blank, 1991; Nurminen et al., 2002; Wattles & Harris, 2003).

The distribution of the subjects' answers to the questionnaire of Rudman (1987) in the present study was very similar to those described for Wattles and Harris (2003) when they applied this same questionnaire. The largest relative frequencies located in both studies in the same answer categories for 6 of the 7 subjects that compose the questionnaire.

Physical Exercise and Satisfaction with the Work

Our previous suggestion that females presented more benefits as answer to PEP is reinforced by the results that we found for the satisfaction index with the work (illustration 2). We have found increments that were statistically significant for the total sample when we compared the satisfaction degree with the work before and after PPE (P 0.01). However, when we analyzed the two genders separately, we verified that just in the female case the differences presented statistical significance (P 0.05), contrarily to that happened to males' case. It is important to mark that satisfaction degree with the work was lower in females before the beginning of the program, but it was superior after the same. Therefore, we have confirmed that, indeed, females had additional benefits in the effects of PEP.

Wattles and Harris (2003) also evaluated the satisfaction with the work in subjects submitted to physical exercise programs. The mean values they have found are close of the ones that we observed (4.10 vs 4.08, respectively). The mean values that those authors have presented for males are higher than the values we have observed (4.20 vs 3.92, respectively). Though, their values for females are lower to the ones we analyzed (3.89 vs 4.24). Therefore, the mean values that observed women presented in our study after PEP seem to be high, compared with the literature.

The distribution of the answers of the subjects to the questionnaire of Wattles and Harris (2003) in the present study (after PEP) were not similar to that described for the authors that proposed this same questionnaire, because just in 3 of the 7 questions were verified that the largest relative frequencies located in the same answer categories. When considered the answers of our subjects relatively to the form as they felt before the beginning of PEP, only in 2 questions similar answers were verified.

Wattles and Harris (2003) found significant associations among an indicator of the aerobic aptitude (maximum consumption of oxygen) and the satisfaction degree with the work. Some studies verified an improvement in the satisfaction degree with the work after programs of aerobic exercise from 10 to 14 weeks of duration (Jasnoski et al., 1981; Pauly et al., 1982). These studies demonstrate the influence of the aerobic exercise in the workers' sensation of well-being and, above all, with their performance at work. It is possible that workers with a better aerobic aptitude would feel less tired, more concentrated on their work tasks and thus feel more satisfied with their quality of work (Wattles and Harris, 2003). The program of physical exercise in which the subjects of the present study were involved, although being of varied character, had a predominant component of aerobic exercises. Therefore, it is possible that the abovementioned physiological and psychological mechanisms have induced improvements in the satisfaction degree with the work and in the perceived productivity and can also explain the results that we have found. Other effects of the physical exercise that also can contribute to explain these results are a decrease of the daily stress (Shepard, 1983; Oliveira et al., 2001) and a decrease in the absenteeism at work (Shephard, 1992; Lechner et al., 1997; Wattles & Harris, 2003).

Conclusions

In conclusion, the present study verified the existence of beneficial effects of physical exercise in the perceived productivity and of satisfaction with the work in a group of male and female public employees. Our results confirm the tendency referred in the literature for the two indicators that were assessed. Our results still suggest that those effects may be more intensive in the females due to the recent adherence of females to physical exercise.

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EVALUATION OF THE EFFECTS OF A PHYSICAL EXERCISE PROGRAM IN THE SATISFACTION WITH WORK AND IN THE PERCEIVED PRODUCTIVITY OF PUBLIC EMPLOYEES

Abstract

Few studies have used indirect calorimetry during swimming to estimate the energy cost of competitive swimmers and their association with cinematic parameters. Therefore, the aims of the present study were: i) to describe the aerobic and anaerobic energy production during the 200m breaststroke event; ii) to investigate the association between those variables and cinematic parameters during the event; iii) to investigate the association between physiological and mechanical parameters with the performance over the same distance. The sample included 12 breaststroke swimmers of national competitive level, with a mean (±SD) age of 17,42 ± 2,37 years, a mean weight (±SD)of 67,07 ± 6,26 kg, a mean height (±SD) of 1,74 ± 3,28 metros, a mean (±SD) arm span of 182,64±4,49 metros, a mean (±SD) body fat of 8,12±2,81 % and with a mean (±SD) of 10,71±2,21 years of training. The swimmers were submitted to a progressive intensity exhaustive test and a maximal 200m breaststroke test, both on a 25m swimming pool and with a 24h time lag. During tests, oxygen uptake and post exercise blood lactate were assessed. The tests were video recorded and the images were digitalized to calculate the vertical oscillation of the centre of mass (OV) and the intra cycle horizontal velocity variation (VIV). The anaerobic and aerobic fractions of total energy released during the 200m event were 18% and 82%, respectively. No association was found between these variables and the performance. The energy cost of swimming correlated negatively with OV and positively with VIV. None of the cinematic variables have correlated with the performance over the 200m distance.

Key-words: energy cost, breaststroke, performance, cinematic parameters

EVALUATION DES EFFETS D´UN PROGRAMME DE EXERCICE PHYSIQUE DANS LA SATISFACTION AVEC LE TRAVAIL ET DANS LA PRODUCTIVITÉ PERCEVANT

Résumé

Cette étude à investigué l´existence des effets positifs d´un programme de exercice physique dans la satisfaction avec le travail et dans la productivité percevant par un groupe des fonctionnaires de une Université publique. Vingt fonctionnaires (dix masculin et dix féminin) avec une age moyen (± DP) 45.8 ± 9.5 ans ont participé dans cette étude. Ils ont comprit un programme des exercices physiques trois fois par semaine pédant une année. Deux questionnaires ont été appliqués aux sujets après la fin du programme. Un questionnaire pour mensurer la satisfaction avec le travail (Wattles et Harris, 2003 ; Brayfield et Rothe, 1951) et une autre pour mensurer le index de productivité percevant (Rudman, 1987). Le index de productivité percevant á présenté une moyenne de 4.05 ± 0.64, avec un index 4.33 ± 0.63 pour les femmes et un index de 3.76 ± 0.54 pour les hommes. Le index de satisfaction avec le travail avant le programme de exercices physiques a présenté une moyenne de 3.68 ± 0.65, avec un index 3.65 ± 0.95 pour les femmes et un index de 3.71 ± 0.19 pour les hommes. Le index de satisfaction avec le travail après le programme de exercices physiques a présenté une moyenne de 4.08 ± 0.45, avec un index 4.24 ± 0.545 pour les femmes et un index de 3.92 ± 0.31 pour les hommes. On a observé un incrément signifiant dans la satisfaction avec le travail après le programme pour le ensemble des sujets (P0.01) et aussi pour le gendre féminin (P0.05).

Mots-clés: exercice physique, productivité percevant, satisfaction avec le travail.

EVALUACIÓN DE LOS EFECTOS DE UN PROGRAMA DE EJERCICIO FÍSICO EN LA SATISFACCIÓN CON EL TRABAJO Y LA PRODUCTIVIDAD PERCIBIDA DE FUNCIONARIOS PÚBLICOS.

Resumo

Fue investigada la existencia de efectos benéficos del ejercicio físico en los índices de productividad percibida y de satisfacción con el trabajo de un grupo de funcionarios públicos. Veinte sujetos (diez de cada género) con una edad media (± DP) de 45.8 ± 9.5 anos han participado en un programa de tres sesiones por semana de ejercicio físico durante un ano. Después del final del programa, dos cuestionarios fueran aplicados: un para evaluar el Grau de satisfacción con el trabajo (Wattles y Harris, 2003; Brayfield y Rothe, 1951) y otro para evaluar el indexe de productividad percibida (Rudman, 1987). El indexa de productividad percibida presentó un valor medio de 4.05 ± 0.64 en la muestra total, con valores superiores en las señoras (4.33 ± 0.63) comparativamente con los hombres (3.76 ± 0.54). El grado de satisfacción con el trabajo antes del programa de ejercicio presentaba un valor medio de 3.68 ± 0.65, con valores inferiores en las mujeres (3.65 ± 0.95) comparativamente con los hombres (3.71 ± 0.19). El grado de satisfacción con el trabajo después del programa de ejercicio presentaba un valor medio de 4.08 ± 0.45, con valores inferiores en las mujeres (4.24 ± 0.54) comparativamente con los hombres (3.92 ± 0.31). El grado de satisfacción con el trabajo aumentó significativamente en la muestra total (P0.01) y también el las mujeres (P0.05).

Palabras clave: ejercicio físico, productividad percibida, satisfacción con el trabajo.

ASSOCIAÇÕES ENTRE A PRODUÇÃO ENERGÉTICA, INDICADORES CINEMÁTICOS E A PRESTAÇÃO NOS 200M DE NADO PEITO.

Resumo

São raros os estudos que utilizaram a calorimetria indirecta na água como maneira de calcular o custo energético de nadadores e a sua associação com indicadores biomecânicos. Assim, os objectivos deste estudo foram: i) descrever a produção de energia aeróbia e anaeróbia durante a prova de 200m peito; ii) analisar a associação destas variáveis com indicadores mecânicos na mesma prova; iii) analisar a associação de variáveis fisiológicas e mecânicas com o rendimento nesta prova. A amostra foi constituída por 12 nadadores especialistas em prova de 200 metros peito, participantes do campeonato nacional português, com as seguintes características (média ± DP): 17,42 ± 2,37 anos de idade, 67,07 ± 6,26 kg de peso corporal, 1,74 ± 3,28 metros de altura, 10,71 ± 2,21 anos de prática, 182,64 ± 4,49 metros de envergadura e 8,12 ± 2,81 % de percentual de gordura. Os nadadores foram submetidos a um teste progressivo até à exaustão e a um teste máximo de 200 peito. Ambos os testes foram realizados em piscina de 25 metros e separados por 24h. Durante ambas as provas foi medido o VO_2 e a lactatémia pós-esforço. Foram filmadas as provas e digitalizadas as imagens para determinação de oscilação vertical do centro de massa (OV) e da variação intra cíclica da velocidade horizontal (VIV). Verificou-se que a contribuição anaeróbia foi em média 18% e a aeróbia foi em média 82% durante a prova de 200m. Não se verificou qualquer associação com significado estatístico entre a prestação nos 200 m peito e os percentuais aeróbios e anaeróbios de energia produzida. O custo energético correlacionou-se negativamente com OV e positivamente com a VIV. Nenhuma das variáveis cinemáticas acima indicadas, se associou significativamente com o rendimento na prova de 200m peito.

Palavras-chave: custo energético, nado de peito, rendimento, indicadores cinemáticos.