48 - PHYSICAL EXERCISE AND STRESS IN BRAZILIAN AVIATION MAINTENANCE TECHNICIANS

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INTRODUCTION

Despite many attempts to increase Brazilian population's level of physical fitness, only few adults are engaged in a physical activity program (IBGE, 1999; PATE et al., 1995), although there are many scientific evidences that show the role of physical practice as an important contributor to individual's health and well being (PAFFENBARGER et al., 1986; BLAIR et al., 1993).

Recent research results about Life Standards (IBGE, 1999) show that 80,8% of the subjects do not exercise during the week and 92,1% do not exercise three or more times a week. Hallal et al. (2003) after reviewing literature found studies that showed a prevalence of sedentary people of 67,7% in a sample of Australians and of 58,0% in a study in the United States. The authors still found in their own studies the value 41,1% of physical inactivity among subjects from Pelotas, Rio Grande do Sul, Brazil. Barros et al´s. (2001) research with industrial workers from Santa Catarina showed that 46,2% of the subjects were inactive and 21,4% were not enough fit.

It is consensus in the literature about aviation, theme of the present study, (GRAEBER, 1988) that many are the factors that may influence human performance and contribute to a decrease in safety and work efficiency being fatigue and stress important matters.

Recent research with Brazilian aviation personnel (DIESAT, 1995 e ITANI, 1998; PALMA, 2000) have showed that fatigue, low level of physical fitness and their working organization contribute to a decrease in health status of these professionals, enhancing the need to develop deeper investigations on this theme.

In the aviation context, fatigue clearly is a great concern in modern operations. According to Caldwell et al (2003), major aircraft manufacturers designed ultra-long-range jets capable of extended long-haul flights. The Airbus 340-500 and Boeing 777-200X both will be able to remain aloft more than 20 hours between refueling stops crossing approximately 8,500 nautical miles, halfway around the world, without a single layover. In fact, extended duty periods, circadian disruptions from rotating work/rest schedules and sleep restrictions may turn aviation employees susceptible to fatigue.

These factors are always exacerbated by economic and political factors as well as poor working conditions such as excessive noisy, inadequate temperature and luminosity, exposition to toxicological material, among others. Fatigue contributes to 4-7% of civil aviation mishaps, affecting cognition, mood, attention and team coordination (CALDWELL ET AL, 2003). Particularly, in the maintenance group, some examples of failures caused by fatigue were listed: judgment errors, inadequate vigilance, slow task performance or not completing a task or missing steps in a multiple step task.

It is important to point out that, according to Airbus (2002), maintenance and inspection are responsible for 12% of accidents worldwide; however the percentage attributable to fatigue remains uncertain.

The aim of the present study is to investigate physical activities habits and its relationship with stress in aircraft maintenance personnel.

This investigation is relevant for not having in the literature studies concerning physical activity adherence in the aviation context. Furthermore, it important to consider that physical activity practice may contribute to the prevention of some diseases such as obesity, diabetics, cardiac problems, osteoporosis among others. (ACSM, 1998).

MATERIAL AND METHODS

The study covered the period from march 2003 to december 2004. A cross-sectional survey (BABBIE, 2001) was used to elicit responses from these shifworkers. The study surveyed a particular professional group of maintenance technicians.

The sample was composed by 436 maintenance technicians from a Brazilian airline with a mean age of 32.60. The investigation was carried out using self-administered two questionnaires during one morning of their one-week biannual job training course. All participants were informed about the objectives and methods of the study. A complete confidentiality was guaranteed during data collection and processing. The respondents were asked to hand out the questionnaires to the researchers after finishing it.

The description and analysis of technicians' occupational hazards were based on data from two sources.

- An Adults Stress Symptoms Inventory (Lipp, 1998) to measure the occurrence of stress. This instrument is subdivided into three groups of questions. The first one referred to stress symptoms experienced during the last 24 hours, the second group measured stress symptoms felt during the last week and the third group involved symptoms felt during the whole month. The symptoms were classified into physiological and psychological.

- A questionnaire with open and closed questions designed to identify aspects related to their physical activities habits. This questionnaire was tested and validated with 15 maintenance technicians that are not part of the sample.

PRESENTATION AND DISCUSSION OF RESULTS

The results showed that in spite of their working organization, 38 (8,7%) of the subjects are engaged in some physical practice, five to seven times during the week, whereas 92 (21,1%) practice three or four times a week, 105 (24,1%) once or twice a week and 92 (46,1%) do not exercise at all.

Similar results were found in a research developed with industrial workers from Santa Catarina and the findings

showed that 32,3% of the subjects were fit ; 21,4% not enough fit and 46,2% unfit (BARROS et al., 2001).

The activities chosen by the subjects include: walking (n=69; 30,1%), a weight lifting/gym (n=59; 25,7%). and sports (n=27; 17,76%). Table 1 shows the distribution of the activities.

Table 1. Distribution of activities chosen by the subjects

Type	n	%
Walking	69	30,1
Weight lifting/Gym	59	25,7
Sports	45	19,6
Jogging	28	12,2
Swimming	13	5,6
Cycling	8	3,4
Tennis	6	2,6
Windsurf	1	0,4

According to literature, one of the benefits of physical activity practice is related to the development of mechanisms to better cope with stress (LONG, 1993). Findings concerning stress indicated that 225 (51,6%) of the subjects presented symptoms of stress.

Table 2 shows the results of the distribution of subjects with stress and its relation with physical activity practice. Fit subjects were considered those who practiced physical activity three times a week or more (n=130; 29,8%) and unfit those who practiced twice or less times a week (n= 306; 70,2%).

Table 2. Distribution of subjects with stress and its relation with physical activity practice

	Stressed		Not stressed			
Level of fitness	n	%	n	%	OR	P
Classification						
Fit	56	43,1	74	56,9	1,00	
Unfit	169	55,2	137	44,8	1,63	<0,05
Week frequency						
5 a 7 times	16	42,1	22	57,9	1,00	
3 a 4 times	40	43,5	52	56,5	1,06	
1 a 2 times	54	51,4	51	48,6	1,46	
Do not practice	115	57,2	86	42,8	1,84	

* the perceptual values were calculated based on the variable total values.

Data showed that the prevalence of stress is 1,63 times higher in inactive individuals (p<0,05). Nevertheless, when stress is confronted with week frequency aiming at verifying the response of stress based on the increase of the amount of exercise during the week (dose reply) no statistical differences were found.

Paulich et al (2005), in research with the same professional group found that stress occurred in 52% of the workers. This study also showed that unfit subjects had twice more chances to have stress than fit subjects (p<0,05).

Pacheco et al. (2003) found that 68 crewmembers (23,61%) had symptoms of stress. Among them, 41 (60,29%) were unfit. However, Sotile (2003) points out that it is too early to state that physical exercise practice may bring long term benefits to workers' health.

The results of the present study, however, have to be observed with caution. It seems to be hasty to consider that the practical of physical exercises is a factor of protection against stress for two reasons. First because the effect does not increase when it raises the dose (principle of the dose-reply in the causal inference) (LUIZ et al., 2002). Second because some variables related to stress were not controlled

According to Lipp (2000), while the body is still able to adapt to the situations, the stress can not be considered pathological for it can be managed; however, when too much effort is necessary to keep the situation under control, the body runs out of energy to cope with the demands of the job.

Specifically with the maintenance group, if something more challenging happens during their work shift, such as a change to an aircraft with higher technological complexity or lack of resources or training to do their job or bad working conditions, their health and aviation safety must be put at jeopardy. Therefore, it is extremely important to study deeply their work characteristics and process (PACHECO et al., 2003).

FINAL CONSIDERATIONS

Any suggestion about physical exercise practice given to the workers must have its benefits announced with caution since their work it self may jeopardize their health. Considering these circumstances, physical activity practice should not be obligatory because it could represent an extra workload and one more obligation to the worker. However, it could be stimulated. On this direction any process of intervention should be based on an educational program considering the possible benefits of the physical exercises for the health and reduction of stress, as well as a personal program built together with the workers where they would decide the best activity, place and time to exercise.

The majority of studies that suggest the importance of the physical activity for maintenance of health or prevention of the appearance of cardiac illnesses, osteoporosis or obesity is based on scientific research that demonstrates pertinent physiological alterations on these aspects. However, how to apply a regular, systematic program of physical activity in a group whose working organization is so complex?

Physical education, as a social practical cannot help to hide the problems brought by their work. However, it must contribute to transform the real situation of health of the workers taking into account the adversities of their job.

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PHYSICAL EXERCISE AND STRESS IN BRAZILIAN AVIATION MAINTENANCE TECHNICIANS

Abstract
The aim of the study was to investigate physical exercise practice among maintenance technicians and some influences on their overall state of health. 436 technicians from a Brazilian airline were investigated. For data collection, a Stress Symptom Inventory and a questionnaire were applied to classify the levels of stress, physical exercise practice and sleep habits. The results showed that there is an important relationship between physical exercise practice and stress ($p<0,05$). Besides, findings showed that unfit workers have 1,63 more chance to develop symptoms of stress when compared to the fit ones. To conclude, it is important to point out that inactivity may be related to the worker's stress.
Keywords: Physical exercise, stress, worker's health.

EXERCICE ET EFFORT PHYSIQUES DANS LES TECHNICIENS BRÉSILIENS D'ENTRETIEN D'AVIATION

Abstrait
Le but de l'étude était d'étudier la pratique en matière physique d'exercice parmi des techniciens d'entretien et quelques influences sur leur état de santé global. 436 techniciens d'une ligne aérienne brésilienne ont été étudiés. Pour la collecte de données, un inventaire de symptôme d'effort et un questionnaire ont été appliqués pour classifier les niveaux de l'effort, de la pratique en matière physique d'exercice et des habitudes de sommeil. Les résultats ont prouvé qu'il y a un rapport important entre la pratique en matière d'exercice et l'effort physiques ($p<0,05$). En outre, les résultats ont prouvé que les ouvriers incapables ont 1.63 plus de chance de développer des symptômes d'effort une fois comparés à le convenable. Pour conclure, il est important de préciser que l'inactivité peut être liée à l'effort de l'ouvrier.
Mots-clés : Exercice physique, effort, la santé de l'ouvrier.

EJERCICIO FÍSICOS Y ESTRÉS EN TÉCNICOS DEL MANTENIMIENTO DE LA AVIACIÓN BRASILEÑA

Resumen
El propósito del estudio fue investigar los hábitos de ejercicios físicos de técnicos de mantenimiento y algunas

consecuencias a la salud de ellos. Fueran investigados 436 técnicos de una empresa aérea brasileña. Para la obtención de los datos, se ha utilizado un "Inventario de Síntomas de Estrés en Adultos", el *"Standard Shiftwork Index"* y un cuestionario que ha involucrado questiones relativas a la práctica de ejercicios. Los resultados han puesto de manifiesto una relación entre la práctica de ejercicios físicos y la condición de estrés ($p<0,05$). Además, los resultados demostraron que los trabajadores inactivos tienen 1.63 más ocasión de desarrollar síntomas de el estrés cuando están comparados las aptas. Se conclui que lo sedentarismo puede, de esta forma, relacionarse al estrés de los trabajadores.

Palabras-clave: Ejercicio físico, estrés, salud del trabajador.

EXERCÍCIO FÍSICO E ESTRESSE EM TÉCNICOS DE MANUTENÇÃO DE AERONAVES DA AVIAÇÃO COMERCIAL BRASILEIRA

Resumo

O propósito do estudo foi investigar os hábitos de exercícios físicos de técnicos de manutenção e algumas conseqüências à sua saúde. Foram pesquisados 436 técnicos de uma empresa aérea brasileira. Para coleta de dados, utilizou-se um "Inventário de Sintomas de Estresse em Adultos e um questionário que envolveu questões relativas à prática de exercícios. Os resultados mostraram uma relação entre a prática de exercícios físicos e a condição de estresse ($p<0,05$), e que os trabalhadores inativos possuem 1,63 de desenvolverem um quadro de estresse quando comparados com trabalhadores ativos. Conclui-se que o sedentarismo pode, então, relacionar-se ao estresse dos trabalhadores.

Palavras-chave: Exercício físico, estresse, saúde do trabalhador.