56 - OBESITY AND RISK FACTORS AMONG WORKERS OF A PUBLIC TRANSPORT COMPANY CAMPO GRANDE/MS.

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Introduction

The Laboratory for Physical Aptitude Evaluation (LPAE) helped by the Department of Community Projects of the Dom Bosco Catholic University (UCDB) develops actions for diagnosis of the population's health and physical aptitude. Some of the activities developed are evaluation of growth and development of schoolchildren at state schools, anthropometric and functional evaluation of military staff at the West Military Command, evaluations and prescription of physical activities in local parks.

In September, 2005, professors and undergraduates involved in this project were contacted by members of the board of directors of the Viação Campo Grande public transport company. During a meeting the directors of the company reported a significant rise in the number of workers' temporary sick leaves in the last few years, not to mention the recurrence of such problems.

This report encouraged the investigation of the causes of so many sick leave requests. Our doubt led us to investigate the possible causes through characterizing the level of physical activity, obesity and other factors which could compromise the health of this company's employees.

Campo Grande is the capital and most important city in the state of Mato Grosso do Sul, although it's architectural development is not based on planning. We verified that its urban plan is flat with straight avenues whose organization resembles a chess board. According to data from the Brazilian Institute of Geography and Statistics (IBGE, 2006) the city's population is 749, 769 inhabitants in a territory of 8,096 square kilometers.

Information collected in the City Council reveal that in the year 2000 all the authorized public transport companies transported approximately 83,000,000 students, paying, and (free-pass) non-paying passengers.

The Viação Campo Grande is the newest Public Transport Company in town with 429 employees. 411 of them are male and 18 female. It has a fleet of 91 vehicles and works with 31 lines included in the Campo Grande Integrated Transport System.

Our objective in this study is to identify obesity cases and risk factors among workers in this company using the Corporal Mass Rate, Fat Percentage and Waist - Hip Ratio.

We investigated obesity cases and other risk factors because obesity is the most serious health problem nowadays and it affects individuals in all social classes. Excessive weight contributes to the development of chronic-degenerative diseases and he increase of obesity is related to sedentary life, current food availability and bad eating habits. It is possible to observe that:

Exogenous Obesity reflects excess of body fat originated from positive energetic balance between ingestion and energetic demand. This kind of obesity is probably responsible for 98% of the cases. The remaining 2% is the so called endogenous obesity, with hormonal causes derived form alterations in the thyroid, gonadal and hypothalamus-hypophysiary metabolism, from tumors such as cranium pharinxgeom and genetic syndromes. (GUEDES & GUEDES, 1998, p.15).

We could observe that the evaluated employees are individuals without enough free time which they could devote to leisure or physical activities. Thus, workers with light-effort occupations or those who spend hours working in the same position, such as drivers or money collectors, are more likely to present a high rate of obesity and sedentary habits.

Methodology

In order to develop this study the sample consisted of 171 male individuals. The Viação Campo Grande Company has a total number of 429 employees and 411 of them are male. From all the workers, 111 have incomplete high school educational level (26%), 212 have finished high school (49%). Their wages are divided into three categories: Operational (drivers and money collectors) with average monthly wages of R$ 740,00; Administrative staff with monthly wages of R$ 900,00 on average and Mechanics earning R$ 790,00 monthly. As to working hours we could identify a period of 7 hours and 20 minutes with 30-minute to one-hour breaks for the Operational group. The administrative group starts work at 7.00 am and finishes at 11.30 am. They have a one-hour- and -30- minute lunch break and come back at 1.00 pm to work until 5.00 pm.

The equipment used was: Sanny portable estadiometer with 200 cm and millimeter divisions; Fillizola portable digital scale with maximum weight capacity of 150 kg and divisions of 100g; Sanny skin fold compass with spring pressure strength of approximately 10 g/mm^2 and divisions of 0.1 mm; 150 cm Barlow Norwood measuring tape measure; Pentium IV Computer Philips model; Hawllet Parker printer model 610. The study variables were height, total body weight, abdominal and hip circumference and skin fold.

To have their stature measured, the subjects stood, having their back to the scale figures with feet keeping lateral distance from the platform, which is between them. Afterwards they were positioned onto and in the center of the platform, standing and looking at a fixed point in front of them for one measurement only. (MATSUDO, 2000).

To have their total height measured the individuals stayed in orthostatic position (standing), with the feet together, trying to make the heels´ posterior surfaces, the pelvic waist, the scapular waist and the occipital region touch the measurement instrument. The measuring was made with the subjects' inhaling apnea so as to minimize possible variations of this anthropometric variable. Their heads were positioned following the Frankfurt plan, parallel to the soil. The measurement will be taken with the cursor in a 90º angle in relation to the scale. The subjects were allowed to wear shorts and T-shirts but they had to be barefoot. Three measurements were taken considering their average as the real value of total height (MATSUDO, 2000).

The waist circumference was measured in the horizontal plan in a point coinciding with the average distance between the last rib and the iliac crest. The measurement obtained was the one after a normal exhaling without skin compression. The hip circumference was determined in the horizontal plan in the level of the highest posterior protuberance of the gluteus. (GUEDES and GUEDES, 1998).

The thoracic skin fold was measured half way between the former arm pit line and the nipple. The abdominal one was measured through a vertical fold from a distance of 2 cm beside the navel. And the thigh skin fold was a vertical fold over the thigh anterior surface, half way between the inguinal pleat and the patella superior edge. (POLLOCK, 1993).

The Corporal Mass Rate (CMR) was calculated considering these data. We understand the limitations of the Corporal

Mass Rate to determine body composition because it does not analyze the distribution among the various tissues. However, its application is valid for the diagnosis of overweight and obesity in population studies, since great amounts of lean body mass are usually found only in athletes doing certain kinds of sports and the subject group to this study is formed by sedentary, non-athlete individuals.

The Waist-Hip Rate (WHR) according to Costa, 2001:46: *Waist-Hip the rate or ratio has been frequently used as an indicator of fat deposition in the abdominal region because it consists of simple, low-cost measures for individuals and population groups evaluation.* One of the most important reasons for using this ratio is to measure the regional distribution of the adipose tissue since it is possible to state if the obesity is central or peripheral. According to Dâmaso, 2003: 360: *the risk of developing metabolic alterations is increased for Waist-Hip ratio higher than 0.85 in women and 0.90 in men.*

In order to estimate the Body Fat percentage (BF %) we used Pollock and Jackson's equation (1993), which takes into consideration the Thoracic, Abdominal and Thigh skin folds. Through Siri's equation (1961, apud GUEDES 1994), we obtained the body fat percentage of each individual in the sample. The viability of the determination of the body fat estimate is that individuals presenting excess of this tissue have increased health risk factors.

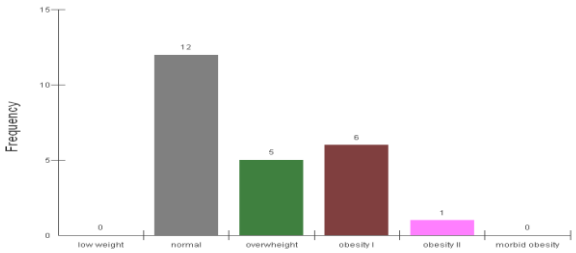
Results and Discussion

For the presentations of results, considering the professional occupation developed in the company, the group of 171 individuals was divided into two sub groups: **Operational** and **Administrative**. The Operational group had 147 individuals including drivers, money collectors, mechanics, tire mechanics and general service workers. The Administrative group had 24 individuals and included Administrative Technicians, Foremen, Inspectors, Accountants, Office work Helpers, Collectors, and Computer Technicians.

In the analysis of the Corporal Mass Rate (CMR) the subjects were classified according to risk factor. We used the table for classification of Overweight and obesity through CMR from the World Health Organization (1997, apud Costa 2001), which classifies risk factors in six levels: Low Weight with figures lower than 18.5 kg/m^2; Normal 18.5 to 24.9; Overweight with results equal or higher than 40 km/m^2.

In the Administrative group; 12 individuals presented normal CMR result; 5 individuals had an Overweight Condition; 6 presented the obesity level I of classification and 1 individual presented obesity II. Figure 1 below shows the results graphically:

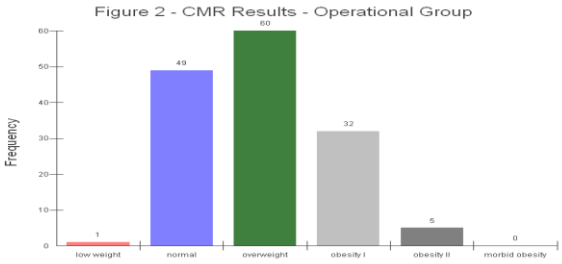
Figure 1 - CMR Results - Administrative Group



Grouping the overweight, obesity I and obesity II factors, a worrying result was found. After all, in the sample number of 24 individuals we could identify that 49.83% of this population presents risk factor as far as Corporal Mass is concerned.

In the Operational Group 1 individual presented low weight; 49 individuals had normal CMR results; 60 individuals had an overweight condition; 32 reached the obesity I level of classification and 5 individuals presented obesity II. Figure 2 below shows the results graphically:

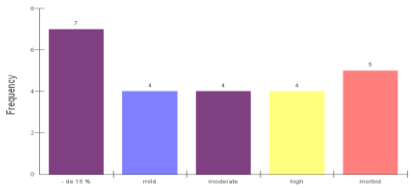
Figure 2 - CMR Results - Operational Group



Grouping the overweight and obesities I and II levels one more time we could identify that in the Operational group with 147 individuals, 65.97%, presented CMR higher than the normality patterns. As to the estimate of the body fat percentage, the individuals were classified according to the table proposed by NIDDK (1993, apud Costa 2001). This table classifies the levels of obesity as mild considering the results between 15 to 20% of body fat; moderate between 20 and 25%; high between 25 and 30% and as morbid obesity the percentage equal or higher than 30%. The data presented will be ones from individuals presenting percentage lower than 15%, who are considered healthy.

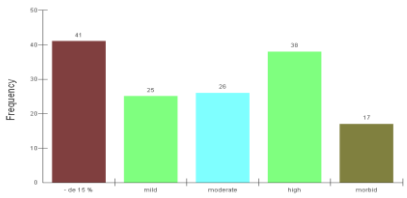
In the Administrative group 7 individuals were identified with estimate of fat percentage under 15%; 4 other individuals presented mild obesity; 4 presented moderate obesity; 4 presented high obesity and 5 presented morbid obesity. Considering the results, it is possible to say that from the 24 employees involved with the company's administrative activities, the 17, who together represent 70.81% of the sample, present body fat percentage over the levels considered healthy.

Figure 3 - Obesity results though Body Fat % - Administrative Group



In the Operational group 41 individuals were identified as having estimate of body fat under 15%; other 25 individuals presented mild obesity; 26 had moderate obesity, 38 had high obesity and 17 individuals had morbid obesity. Figure 4 shows the results below.

Figure 4 - Obesity Results through Body Fat % - Operational Group



We can state that from the 147 individuals related to the company's operational activities, a total of 106 individuals representing 72.09% of the sample presented percentage of body fat oven healthy patterns.

In both Operational and Administrative groups it was possible to identify that 126 individuals presented risk factor between moderate, high and very high. And only 45 subjects presented low risk. That is, 73.68% of the individuals presented increased risk factor.

The data are shown in Table 1 below:

Table 1 - Waist - Hip Rate Results - Administrative and Operational Groups

Ages	Group	Risk			
		Low	*Moderate*	*High*	*Very High*
20 - 29	*Administrative*	8	3	1	0
	Operational	12	21	9	2
30 - 39	*Administrative*	0	4	0	0
	Operational	12	34	6	5
40 - 49	*Administrative*	0	7	0	0
	Operational	10	20	2	1
50 - 59	*Administrative*	0	0	1	0
	Operational	3	3	6	1
Total		45	92	25	9

These data reinforce the need for participation in physical exercising and nutritional control programs so as to lower the metabolic risks and propensity for developing coronary diseases.

Conclusions

Considering the Corporal Mass Rate in the Administrative group (n = 24) we found risk factor in 49.83 % of the sample. In the Operational group (n = 147) , this risk factor is increased to 65.97 % of the investigated population. Risk factors related to Obesity and Waist - Hip Rate were found in 70% of the sample in both groups. We can state that the employees in the Viação Campo Grande Company present high levels of risk factors based on the CMR, Body Fat % and WHR anthropometric data.

Obesity and fat distribution in the abdominal region lead to metabolic problems and consequently to the development of chronic-degenerative diseases. The risk factors are classified into three groups: hereditary, socioeconomic and environmental, and behavioral. Taking all of these into consideration, the most productive intervention is surely action concerning the behavioral risk factors such as sedentary habits, feeding habits, smoking and elitism. It is important that the company devise guidance programs to develop healthy habits among its workers. Some suggestions are the organization of lectures on good eating habits and on the harm caused by bad habits such as smoking and elitism. They should also develop programs which give incentive to regular physical exercising and contribute to reduce body weight, improving health and life quality.

Bibliographic References

COSTA, Roberto Fernandes da. *Composição Corporal: Teoria e Prática da Avaliação*. 1ª Edição. São Paulo - SP. Editora Manole, 2001.

DÂMASO, Ana. *Obesidade*. 1ª Edição. Rio de Janeiro - RJ. Editora Medsi, 2003.

GUEDES, Dartagnan Pinto. *Composição Corporal: Princípios, Técnicas e Aplicações.* 2ª Edição. Londrina - PR. Editora APEF, 1994.

GUEDES, Dartagan Pinto; GUEDES, Joana Elisabete Ribeiro Pinto. *Controle do Peso Corporal: Composição Corporal, Atividade Física e Nutrição.* 1ª Edição. Londrina - PR. Editora Midiograf, 1998.

INSTITUTO BRASILEIRO DE GEOGRAFIA E ESTATÍSTICA (IBGE). Cidades@. Disponível em <http://www.ibge.gov.br>. Acesso em 01/jun/06.

MATSUDO, Vitor Keihan Rodrigues. *Testes em Ciências do Esporte*. [CD-ROM]. São Paulo -SP. FGA Multimídia, 2000.

POLLOCK, Michael L.; WILMORE, Jack H. *Exercícios na Saúde e na Doença: Avaliação e Prescrição para Prevenção e Reabilitação*. 2ª Edição. . Rio de Janeiro - RJ. Editora Medsi, 1993.

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OBESITY AND RISK FACTORS AMONG WORKERS OF A PUBLIC TRANSPORT COMPANY - CAMPO GRANDE/MS.

Abstract

As part of the Extension Community Projects of the Dom Bosco Catholic University (UCDB), The Laboratory for Physical Aptitude Evaluation (LPAE), develops diagnosis of physical aptitude and guidance on practice of physical exercises so as to promote community health. The Viação Campo Grande Public Transport Company aims to improve its employee's life quality as well as preserve the environment. In one of these actions, it developed a partnership with UCDB in order to give a profile of the workers' physical aptitude. This work aims to identify obesity cases and health risk factors among the staff of the Viação Campo Grande public transport company. The methodology consists of collecting anthropometric data. The variables this study were: stature, total corporal weight, abdominal and hip circumference and skin fold.

After that we identified the risk factors considered in cases of Obesity, Corporal Mass Rate (CMR) and Waist-Hip Rate (WHR). Analyzing CMR we found among the Administrative staff (n=24), risk factor in 49.83% of the sample and in the Operational staff (n=147) this risk factor rose to 65.97% of the sample. Analyzing Obesity and Waist-Hip Rate, the risk factor was

found in 70% of the sample for both Administrative and Operational groups. It is possible to state that the employees of the Viação Campo Grande present high level of risk factors based on the body fat percentage, CMR and WHR.

Key words: Obesity, health, Public Transport.

OBÉSITÉ ET FACTEURS DE RISQUE À LA SANTÉ DES EMPLOYÉS D'UNE SOCIÉTÉ DE TRANSPORT COLLECTIF - CAMPO GRANDE/MS.

Résumé

En composant les Projets Communautaires et d'Extension de l'Université Catholique Dom Bosco (UCDB), le Laboratoire d'Évaluation de l'Aptitude Physique (LAAF), développe un diagnostic de l'aptitude physique et l'orientation à la pratique d'exercices physiques, qui promeuvent la santé de la communauté. L'entreprise de Transport Collectif "Viação Campo Grande" se préoccupe en promouvoir l'amélioration de la qualité de vie de ses employés et la préservation de l'environnement. Dans une de ces actions, l'entreprise a développé un partenariat avec l'UCDB pour repérer le profil de l'aptitude physique de ses fonctionnaires. L'objectif de cet article est d'identifier les cas d'obésités et les facteurs de risque à la santé des employés de l'entreprise de transport collectif, "Viação Campo Grande". La méthodologie utilisée a été le rassemblement de données anthropométriques. Les variables de cette étude ont été: stature, poids, circonférence abdominale, rapport taille/ hanche, et plis cutanés. Ensuite nous avons identifié les facteurs de risque considérant les cas d'obésité, l'indice de masse corporelle (IMC) et l'indice du rapport taille/hanche (ICQ). En analysant l'IMC nous avons rencontré dans le groupe d'employés Administratifs (n=24) le facteur de risque en 49,83% de l'ensemble, et dans le groupe d'employés Opérationnels (n=147) ce facteur de risque s'élève à 65,97%. En analysant l'obésité et l'indice taille/hanche nous avons trouvé le facteur de risque en 70% de l'ensemble pour les groupes Administratif et Opérationnel. Nous pouvons affirmer que les employés de l'entreprise "Viação Campo Grande" ont des niveaux élevés de facteurs de risque basé sur le pourcentage de Graisse Corporelle, IMC et ICQ.

Mots clés: Obésité, Santé, Transport Collectif.

OBESIDAD Y FACTORES DE RIESGO A LA SALUD EN EMPLEADOS DE UNA EMPRESA DE TRANSPORTE COLECTIVO - CAMPO GRANDE / MS.

Resumen

Por componer los proyectos comunitarios y de extensión de la Universidad Católica Dom Bosco (UCDB), el laboratorio de evaluación de la aptitud física ("LAAF"), desarrolla diagnósticos de aptitud física y de orientación hacia la práctica de ejercicios físicos que promuevan la salud de la comunidad. La empresa de transporte colectivo "Viação Campo Grande", se preocupa en promover la mejora de la calidad de vida de su plantilla y la preservación del medio ambiente. En una de estas acciones, estableció una colaboración con la UCDB para trazar el perfil de la aptitud física de sus empleados. El objetivo de este artículo es identificar los casos de obesidad y los factores de riesgo a la salud en empleados de la empresa de transporte colectivo "Viação Campo Grande". La metodología utilizada fue la colecta de datos antropométricos. Las variables del estudio fueron: estatura, peso corporal total, circunferencia abdominal y caderas, y pliegues cutáneos. Enseguida identificamos los factores de riesgo considerando casos de obesidad, índice de masa corporal (IMC) e índice cintura - cadera (ICC). Analizando el IMC encontramos en el grupo administrativo (n=24), factor de riesgo en el 49,83% de la muestra, y en el grupo operativo (n=147), este factor de riesgo se eleva al 65,97% de la muestra. Analizando obesidad e índice cintura - cadera, se encontró factor de riesgo en el 70% de la muestra en los grupos administrativo y operativo. Podemos afirmar que los empleados de la empresa "Viação Campo Grande", están con niveles elevados de factores de riesgo basados en el porcentaje de gordura corporal, IMC e ICC.

Palabras clave: Obesidad, Salud, Transporte Colectivo.

OBESIDADE E FATORES DE RISCO À SAÚDE EM FUNCIONÁRIOS DE UMA EMPRESA DE TRANSPORTE COLETIVO - CAMPO GRANDE/MS.

Resumo

Compondo os Projetos Comunitários e de Extensão da Universidade Católica Dom Bosco (UCDB), o Laboratório de Avaliação da Aptidão Física (LAAF), desenvolve diagnóstico da aptidão física e orientação à prática de exercícios físicos, que promovam a saúde da comunidade. A empresa de Transporte Coletivo Viação Campo Grande, preocupa-se em promover a melhora da qualidade de vida de seus funcionários e a preservação do meio ambiente. Numa dessas ações, desenvolveu parceria com a UCDB para traçar o perfil da aptidão física de seus funcionários. O objetivo desse artigo é identificar os casos de obesidade e fatores de risco à saúde, em funcionários da empresa de transporte coletivo, Viação Campo Grande. A metodologia utilizada foi coleta de dados antropométricos. As variáveis de estudo foram: estatura, peso corporal total, circunferência abdominal e quadril, e dobras cutâneas. Em seguida identificamos os fatores de risco considerando casos de Obesidade, Índice de Massa Corporal (IMC) e Índice Cintura e Quadril (ICQ). Analisando o IMC encontramos no grupo Administrativo (n=24), fator de risco em 49,83% da amostra, e no grupo Operacional (n=147), este fator de risco eleva-se para 65,97% da amostra. Analisando Obesidade e Índice Cintura Quadril, foi encontrado fator de risco em 70% da amostra para os grupos Administrativo e Operacional. Podemos afirmar que os funcionários da empresa Viação Campo Grande, estão com níveis elevados de fatores de risco com base no Porcentual de Gordura Corporal, IMC e ICQ.

Palavras-chave: Obesidade, Saúde, Transporte Coletivo.