Revista Brasileira de Atividade Física & Saúde
Brazilian Journal of Physical Activity and Health
RBAFS SOCIEDADE BRASILEIRA DE ATIVIDADE FÍSICA E SAÚDE

Rev Bras Ativ Fis Saúde p. 31-42
DOI: http://dx.doi.org/10.12820/2317-1634.2012v18n1p31

Physical inactivity and associated factors: a study with metal-mechanical sector's workers of the city of Ponta Grossa – PR

Inatividade física e fatores associados: um estudo com trabalhadores do setor metalomecânico do município de Ponta Grossa – PR

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Abstract

The objective was to verify the prevalence and associated factors with low levels of physical activity of the metal mechanical sector's workers of the city of Ponta Grossa - Paraná. The sample was calculated considering the metal mechanic sector's population of the city, being composed by 298 workers (89,9% male). For the evaluation of physical activity we used the international physical activity questionnaire (IPAQ), short version. It was considered physical inactivity who had not met the recommendation of 150 minutes per week. Analyzed demographic and socioeconomic variables were gender, age, economic level, marital status, education level, occupational class and IMC. Logistic regression was used to examine the association between outcome and independent variables, considering $p \leq 0.05$. The prevalence of physical inactivity was 30,2% (CI95%: 20,5-39,9). Results on the adjusted analysis have indicated that workers who perform administrative functions (OR: 2.81, 95%CI: 1.47-5.35) and with age above 30 years (OR: 2.31, 95%CI: 1.27-4.20) were more likely to be physical inactivity. These findings may be useful in planning, implementation guidelines and specific interventions for this population.

Keywords

Physical Activity; Workers; Associated factors.

Resumo

O presente estudo teve como objetivo verificar a prevalência e fatores associados a baixos níveis de atividade física em trabalhadores do setor metalomecânico do município de Ponta Grossa/PR. A amostra foi calculada considerando a população total de trabalhadores do setor, sendo composta por 298 trabalhadores (89,8% do sexo masculino). Para a avaliação da atividade física foi utilizado o questionário internacional de atividade física (IPAQ), versão curta. Foi considerado pouco ativo fisicamente quem não atingia a recomendação de 150 minutos por semana. As variáveis demográficas e socioeconômicas analisadas foram: gênero, idade, renda familiar, situação conjugal, grau de escolaridade, classe ocupacional e IMC. A regressão logística binária foi utilizada para examinar as associações entre o desfecho e as variáveis independentes, considerando p≤0,05. Dos trabalhadores, 30,2% (IC95%: 20,5-39,9) foram considerados pouco ativos fisicamente. Os resultados na análise ajustada indicaram que os trabalhadores o que exercem funções administrativas (RC: 2,81; IC95%: 1,47-5,35) e com idade acima de 30 anos (RC: 2,31; IC95%: 1,27-4,20) apresentaram maiores chances de estarem com baixos níveis de atividade física. Tais achados podem ser úteis no planejamento, implantação e orientações de iniciativas específicas para esta população.

Palavras-chave

Atividade física; Trabalhadores; Fatores associados.

INTRODUCTION

Last century was characterized by deep changes in the lifestyle of human beings and by scientific advances in the area of health. Fostered by the industrialization, robotization and computerization of the means of production, man has become a being who depends on new daily practices that have become distant from the primitive way of living of his ancestors. The main result of these new practices is the adoption of a sedentary lifestyle that derives from changes that have occurred in the population dynamics through the process of demographic transition, modernization of transportation facilities, easy obtention of food and the inclusion of machines and computers in daily and labor tasks.

In this context, the prevalence of risk behaviors at the workplace, like sedentariness, has been gradually increasing every year, mainly in the developed and developing countries. Together with the consumption of alcoholic drinks, tobacco and inadequate diets, these behaviors form the main factors associated with the risk of cardiovascular diseases (the main cause of death in the industrialized countries)[1]. Within this scenario, the concern about the practice of physical activity has become a constant target of epidemiological studies in the last decade, as the positive effects of physical activity on the prevention of cardiovascular diseases and on health promotion are well reported in the literature[2,3,4,5,6,7].

The workplace is an adequate environment for the development of interventions aiming at health promotion and quality of life, in view of the possibility of reaching a large part of the population that devotes countless hours of their lives to labor[2]. Depending on the management's competence, the working space will provide experiences that will be favorable to the improvement in the worker's health and self-esteem, having a direct influence on his/her good physical, mental, spiritual and social conditions and, consequently, on his/her productive life[8,9].

In relation to the productive environment, adults who practice physical activity on a regular basis get sick less frequently and cause fewer losses to their families and to the companies[10]. Robroek et al.[8] investigated the practice of physical activity related to the health of 10,624 Dutch workers over a period of 12 months and observed that the workers who were physically active were absent less frequently from work due to illness or, when they got sick, they were absent for shorter periods and produced more compared to the sedentary workers.

In the literature, it is possible to observe that special attention has been devoted to the identification of demographic and socioeconomic determinants associated with the practice of physical activity. Proper and Hildebrandt[7] and Zimmermann et al.[10] studied the association between physical activity practice and socioeconomic position in Dutch industrial workers, and found that those with low level of schooling were more likely to gradually reduce the practice of leisure-time physical activity, while those with high level of schooling (≥ higher education) were more likely to remain active in their leisure time. The authors also showed that groups of lower occupational class, like factory-floor workers of the metal-mechanical sector, agricultural and construction workers, as they perform labor activities that are intense and exhausting, were more likely to be physically active at the workplace, and workers with administrative and executive functions tended to be more active in their leisure time.

The Brazilian literature has many studies about the prevalence of physical activity and the association with socioeconomic and demographic factors among

industry workers[2,9,11,12]. However, no population-based study was found in Brazil focusing on workers of the metal-mechanical industry.

Therefore, this cross-sectional epidemiological study aimed to verify the prevalence of physical inactivity and associated factors in a representative sample of workers of the metal-mechanical sector.

METHODOLOGY

The study has a cross-sectional character, as it is an instantaneous cut in a target-population of workers of the metal-mechanical sector. We examined, in the members of the sample, the presence or absence of effects on the practice of physical activity. In addition, in view of its nature, objectives and technical procedure, the study can be characterized as a basic and descriptive survey.

Fourteen metal-mechanical companies in the region of Ponta Grossa, State of Paraná (Southern Brazil), were invited, through an official document, to participate in the research. In each participating company, the contact between the interviewer and the workers was supervised by a person who scheduled, with the workers, the day and time of their participation in the research. The meetings occurred in an adequate place inside the company, where the interviewer could explain about the research, the inclusion and exclusion criteria, and the way to fill in the questionnaires. Independently of the company's size, the interviewer asked the person in charge for an amount of 30 subjects, aiming to obtain a satisfactory final sample. At the end of the study, 330 workers had answered the questionnaire.

As for the procedure to approach the workers, the following sequence of instructions was adopted:

- Presentation of the study's objectives;
- Provision of explanations about the questionnaire;
- Signature of the Informed Consent Document;
- Filling in of the questionnaires.

The following exclusion criteria were employed: having been dismissed from the company during data collection, having been absent from work for at least four weeks without interruption or having been away from the daily routines for health reasons. The questionnaires were handed to the volunteers after they had signed the informed consent document.

The information about the level of physical activity was obtained through the international physical activity questionnaire (IPAQ)[13], short version. The IPAQ is an instrument that was validated in Brazilian adults by Pardini et al[14]. It enables to measure the amount of physical activity that was practiced in the seven previous days. To obtain each worker's weekly score of physical activities, the time spent in each activity in which the individual was involved was added, and the time spent in each vigorous physical activity was multiplied by two[2,6]. The interviewees were classified according to the score obtained in minutes: a) < 150 minutes – physically inactive; b) ≥ 150 minutes – physically active.

General, anthropometric and socioeconomic-demographic data were gathered by means of the collection of the following information: sex; age in complete years; self-reported weight (kg) and height (meters); marital status (single, married, divorced, widowed), family income (minimum salary); level of schooling (complete years).

In order to observe possible factors of interference in the outcome related to the types of labor tasks, the occupational classes were organized according to similar labor characteristics, as it was observed that the categories of metal-mechanical workers are submitted to different motor requirements. Thus, the occupational classes were divided into groups, which were classified as: Administrative, Senior Executive, Factory Floor, Commercial and General Services. For the statistical treatment, two categories of workers were considered: Administrative/Senior Executive (including the Commercial category) and Factory Floor/General Services.

Self-rated health was analyzed, as it is considered a valid and relevant indicator about the health status of individuals and populations[4,15]. The response options to the question "How do you feel about your health?" were: satisfied or dissatisfied[4].

The statistical treatment was performed by means of the program SPSS, version 20. Descriptive and inferential statistics was used. To verify the relationships between the socioeconomic-demographic variables and self-rated health with the dependent variable physical activity, an analysis of independence among variables was performed. The chi-square test with level of significance of 5% was employed, which aims to measure the association among variables, normally distributed on a table two by two, thus enabling to analyze the influence or dependence among the study's variables[16].

At the last stage, in the multivariate analysis, the binary logistic regression was used. This technique enables to estimate the probability of occurrence of a certain event in view of a set of explanatory variables. It is recommended for situations in which the dependent variable is of a dichotomous or binary nature, that is, it accepts only two response possibilities. All the associations that presented $p \leq 0.20$ in the analysis of independence among variables were maintained in the regression model (Table 2). Through the binary logistic regression, the associations among the variables were measured by Odds Ratio, with a confidence interval of 95% and $p \leq 0.05$.

Based on the ethical and methodological concerns discussed in the Regulatory Guidelines and Norms of research involving Human Beings (Resolution 196/96), the research project was submitted to the Ethics Research Committee of *Universidade Estadual de Ponta Grossa* (COEP-UEPG), and it was approved under no. 80/2011. All the volunteers were aware that they could give up participating in the research at any time, without the need of presenting justifications to the head researcher and without any personal harm.

RESULTS

Of the fourteen companies that were invited to participate in the research, eleven accepted and three refused. The reasons for the refusals were: there was no available time within the company's working hours for the workers to answer the questionnaires or lack of interest in the research's results. The eleven companies that participated in the study totaled 1,642 employees. Based on this target-population, sample size was calculated, defined as 312 workers, so that the "n" had a 5% margin of error, a 95% confidence interval and a prevalence of 50%. Thus, 330 questionnaires were handed to the workers of the eleven companies and of these, 32 were returned with errors (the instructions had not been followed or

the questionnaires were blank). Thus, 298 questionnaires were considered valid, of which 268 were answered by men (33.9 ± 11.6) and 30 by women (31.1 ± 8.5). The response rate was 89.8%.

Most of the investigated workers were males, aged 30 or older, married or living with a partner, with high level of schooling, received two minimum salaries per month or less, presented a normal body mass index (BMI), worked in the occupation of Factory Floor or General Services and were satisfied in relation to their health (Table 1).

Table 1 – Sample distribution in relation to the socioeconomic and demographic characteristics and self-rated health. Ponta Grossa, Paraná, Brazil, 2011.

	n	%	IC (95%)
Sex			
Male	268	89.9	(86.4 – 93.4)
Occupational class			
Administrative/Senior executive	109	36.6	(27.9 – 45.3)
Factory floor/General Services	189	63.4	(56.8 – 70.0)
Age group (years)			
< 30	137	46.0	(38.0 – 54.0)
≥ 30	161	54.0	(46.6 – 61.4)
Family income (minimum salary)			
≤ 2	207	69.5	(63.5 – 75.5)
> 2	91	30.5	(21.4 – 39.6)
Marital status			
Married/Lives with partner	187	62.8	(56.1 – 69.5)
Single/Lives alone	111	37.2	(28.6 – 45.8)
Level of schooling			
< 11 years	127	42.6	(34.3 – 50.9)
≥ 11 years	171	57.4	(50.3 – 64.5)
Body Mass Index (kg/m^2)			
< 25	159	53.4	(46.0 – 60.8)
≥ 25	139	46.6	(38.6 – 54.6)
How he/she feels in relation to his/her health			
Satisfied	257	86.2	(82.2 – 90.2)
Dissatisfied	41	13.8	(3.7 – 23.9)

Source: Developed by the authors (2011).

The low proportion of women in the sample (10.1%) can be a result of the nature of the activities of the metal-mechanical sector – predominantly manual -, which ends up attracting male individuals[7], who work mainly in factory-floor functions and in general services (63.4%).

In the independence analysis, it was verified that the variables that are associated with low levels of physical activity were: sex, occupational class, age group, family income and years of schooling. Marital status, BMI and health perception were not associated with the outcome (p-value < 0.20) (Table 2).

Table 2 – Results of the dependence analysis between level of physical activity and independent variables. Ponta Grossa, Paraná, Brazil, 2011.

Variable	Active		Inactive		Total		p-value
	n	%	n	%	n	%	
Sex							
Male	194	72.4	74	27.6	268	100.0	
Female	14	46.7	16	53.3	30	100.0	0.007
Occupational class							
Administrative/Senior executive	57	52.3	52	47.7	109	100.0	
Factory floor/General services	151	79.9	38	20.1	189	100.0	0.000
Age group (years)							
< 30	110	80.3	27	19.7	137	100.0	
≥ 30	98	60.9	63	39.1	161	100.0	0.120
Family income (minimum salary)							
≤ 2	160	77.3	47	22.7	207	100.0	
> 2	48	52.7	43	47.3	91	100.0	0.000
Marital status							
Married/Lives with partner	127	67.9	60	32.1	187	100.0	
Single/Lives alone	81	73	30	27	111	100.0	0.430
Level of schooling							
< 11 years	96	75.6	31	24.4	127	100.0	
≥ 11 years	112	65.5	59	34.5	171	100.0	0.080
Body Mass Index (kg/m^2)							
< 25	110	69.2	49	30.8	159	100.0	
≥ 25	98	70.5	41	29.5	139	100.0	0.903
How he/she feels in relation to his/her health							
Satisfied	181	70.4	76	29.6	257	100.0	
Dissatisfied	27	65.9	14	34.1	41	100.0	0.682

Source: Developed by the authors (2011).

In the crude analysis, the indicators that were associated with the condition of physical inactivity were: sex, occupational class, age group and family income. In the adjusted analysis, the results indicated that workers from the occupational class administrative/senior executive (OR: 2.81; 95%CI: 1.47-5.35) and aged 30 years or older (OR: 2.31; 95%IC: 1.27-4.20) had higher odds of presenting low levels of physical activity compared to their peers who work in the functions of factory floor/general services and who are younger than 30 years, respectively. According to the Omnibus test, the model proved to be valid ($p<0.001$) (Table 3).

Table 3 – Results of the crude and adjusted regression analysis between low level of physical activity and independent variables. Ponta Grossa, Paraná, Brazil, 2011.

	Physical Inactivity %	Crude Analysis OR (95%CI)	p-value	Adjusted Analysis* OR (95%CI)	p-value
Total of the sample	30.2				
Sex					
Male	27.6	1		1	
Female	53.3	2.99 (1.39-6.44)	0.005	2.00 (0.85-4.73)	0.114
Occupation					
Factory floor/ General services	20.1	1		1	
Administrative/Senior executive	47.7	3.62 (2.16-6.08)	0.000	2.81 (1.47-5.35)	0.002
Age group (years)					
< 30	19.7	1		1	
≥ 30	39.1	2.62 (1.55-4.43)	0.000	2.31 (1.27-4.20)	0.006
Family income (minimum salary)					
≤ 2	22.7	1		1	
> 2	47.3	3.05 (1.81-5.15)	0.000	1.61 (0.87-3.00)	0.131
Level of schooling					
< 11 years	24.4	1		1	
≥ 11 years	34.5	1.631 (0.97-2.72)	0.062	0.93 (0.48-1.80)	0.831

Source: Developed by the authors (2011).
OR – odds ratio; CI – confidence interval; * - Analysis adjusted for all the variables, independently of the p-value in the crude analysis.

DISCUSSION

The main discovery of this study was the identification of the groups of workers of the metal-mechanical sector of the city of Ponta Grossa who had the highest odds of presenting low levels of physical activity, that is, those who have administrative and commercial jobs, senior executives and individuals older than 30 years. This finding can be useful to the planning of initiatives that aim at specific interventions in relation to the practice of physical activities for this population. In addition, the high response rate of the questionnaires (89.8%) and the standardization of the data collection methods are aspects that should be emphasized, as this is the first study with this approach developed with industry workers of the municipality of Ponta Grossa.

The amount of men who work in the metal-mechanical sector, compared to women (89.9% versus 10.1%), had also been identified by Proper and Hildebrandt[7]. The authors analyzed the total level of physical activity of a representative sample of Holland workers and verified that 89% were men. This percentage was justified by the characteristics of the labor activities that were performed inside of companies and industries of the sector, in which intense physical work predominates, with the handling of heavy machinery and manual load transportation.

The prevalence of subjects with low levels of physical activity that was found in the present study (30.2% 95%CI 20.5-39.9) was higher than that of the majority of the studies developed with workers[7,12,17]. Proper and Hildebrandt[7] described the practice of occupational and leisure-time physical activities in a representative

sample of Dutch workers, and found that only 45.3% of the workers had high levels of physical activity and that, on average, the occupational physical activities contributed with a percentage of 30%. On the other hand, in the city of Rio Grande, State of Rio Grande do Sul (Southern Brazil), it was verified that only 19.5% of the temporary dock workers were insufficiently active. In the Vale do Jequitinhonha, State of Minas Gerais (Southeastern Brazil), the prevalence of workers who do not practice 150 minutes of physical activity per week was 17.1%.

Some studies with workers have found higher prevalences of low levels of physical activities compared to the one reported in the present study[2,18,19]. Silva et al.[2] investigated leisure-time physical activity among industry workers in the State of Rio Grande do Sul and identified the barriers perceived by the workers that prevent or hinder the practice of physical activity. The prevalence of sedentariness was of 45.4%. The most prevalent answers to justify the lack of leisure-time physical activities were tiredness (15.1%), followed by work overload (12.7%) and family obligations (9.2%). Among the sedentary workers, only 21.3% did not have difficulties in practicing leisure-time physical activities. Another study, conducted in the Federal District, found that 56% of the industry workers were physically inactive[19]. In Australia, this prevalence was of 53%[18].

The present study found that the workers who have administrative and commercial functions and senior executives had higher odds of being inactive compared to those who work in the factory floor and in general services, which corroborates other studies carried out with workers[7,18,20]. The conditions that favor the prevalence of physical inactivity among workers have been well discussed by researchers. Tigbe et al.[20] have found that the researched individuals who worked at offices spent 1.5 hours more in sedentary postures than the group of deliverers who performed tasks of transportation of light and heavy loads. The group of deliverers spent 0.5 hours more standing up and 1.2 hours more walking (a total of 1.5 hours/day). There were also significant differences between the mean number of steps taken per day between the groups (7,700 steps/day more to the deliverers). Duncan et al.[18] have found that administrative workers and senior executives were less likely to practice physical activities and were more likely to perform sedentary tasks during the working hours (OR = 0.36, 95%CI 0.14–0.95) when compared to the factory-floor workers and to those who performed general services. Although the study did not find an association between level of physical activity and occupation category, it concluded that administrative workers and senior executives are more likely to practice high levels of sedentary tasks.

The majority of the studies conducted with workers considered only demographic and economic factors and excluded the occupational class as one of the factors that may be associated with lack of physical activity. Even so, it is possible to make associations with the findings of these studies. Sávio et al.[19], for example, after evaluating the level of physical activity in a global way, found that individuals who had completed only the elementary school and whose income was equal to or lower than four minimum salaries were twice as likely to be physically active than individuals whose income was higher than four minimum salaries and who had undergraduate or postgraduate education. In the present study, the variables family income and years of schooling did not present a significant association with the outcome that enabled to establish the odds ratio. However, the majority of the workers of the occupational classes factory floor and general services belong to the categories that have lower incomes and levels of schooling.

On the other hand, studies that evaluated the outcome leisure-time physical activity have shown that level of schooling has been strongly associated with the level of physical activity among workers[17,19] and in the population as a whole[21,22]. The authors of these studies argue that adults with higher level of schooling have better access to knowledge, besides material conditions, which facilitates the practice and maintenance of healthy habits. Individuals in disadvantaged schooling and socioeconomic conditions tend to live farther from the workplace, in areas that are less safe and which do not have adequate places for the practice of physical activities. Furthermore, the time they spend using the public transportation system, walking or cycling as a way of moving between their homes and the workplace, limits the time they have for leisure activities[22].

The lack of association observed in the present study between level of physical activity and years of schooling is attributed to the fact that the first was measured in a global way. For this reason, people with lower level of schooling may practice a higher amount of physical activity during the working hours or while they are moving (on foot or by bicycle) between the workplace and their home[20]. This finding is confirmed by the results of the other studies that were carried out in Brazil, which show that global physical inactivity is more prevalent in individuals with higher level of schooling[17,23].

Being physically active at the workplace, while going to the workplace or in domestic activities does not provide the same amount of health benefits as leisure-time activities do. This happens because the biomechanical patterns that characterize these activities are: lifting and manual transportation of light or heavy loads, standing up during a long period of time, repetitive work, working with the hands raised at shoulder height, and working with the spine rotated or flexed, all of these for an indeterminate period of time[24]. Leisure-time activities, in turn, if performed with supervision, aim at health promotion and are exercised by means of dynamic or static contractions of major muscle groups, generate an increase in the body's metabolism and allow time to rest when muscle fatigue occurs[25].

The non-association that was found between family income and level of physical activity (p-value = 0.131) is controversial in relation to some studies found in the literature[19,26]. The economic level of a population is a factor that directly influences the individual's practice of leisure-time physical activities. However, in analyses such as the present one, in which physical activity was considered in a global way, this relationship can be inverted[27].

Some studies[4,28] conducted with the general population have shown that the prevalence of physical inactivity grows as age increases. In the study by Tigbe et al.[20], conducted with workers, such association was found. In the study by Savio et al.[19], on the other hand, the individual's age was not a factor associated with level of physical activity. These controversial reports corroborate the literature concerning the effect of age on the levels of sedentariness in the population. Hallal et al.[6] identified that physical inactivity was positively associated with age. Matsudo et al.[29], in turn, observed that there were no significant differences in the proportion of inactive individuals in distinct age groups at some capital cities. In the present study, the association between workers' age and level of physical activity can be explained by the occupational and economic class to which the age group younger than 30 years belongs. This group represents 66.4% of the occupational class factory floor/general services and 85.4% of the low income workers. As it was shown above, occupational class and low economic level can be associated with

high levels of total physical activity, because they include the activities performed at the workplace.

FINAL REMARKS

The results and proposals presented in this study motivate the development of actions for promotion of health and quality of life in companies, and it is necessary to monitor characteristics and behaviors that translate the reality in each context[23]. In relation to the workers of the metal-mechanical sector, further studies are recommended in order to analyze the level of physical activity in each domain, BMI and other variables connected with health status, like Waist to Hip Ratio and fat percentage, health status perception and behaviors related to use of tobacco, alcohol and drugs, so that it is possible to learn more about this population and make more efficient and effective investments in actions to promote these workers' health.

It is possible to conclude that the workers of the metal-mechanical sector of the city of Ponta Grossa, State of Paraná, who are older than 30 years and perform administrative functions, as well as senior executives, were the groups with the highest odds of presenting low levels of physical activities. Therefore, the findings of the present study support recommendations that encourage the companies of the investigated sector to create initiatives to stimulate physical activity practice, both inside the company and during leisure time. There are, in the literature, several examples of initiatives aiming at the promotion of physical activities outside and inside the working environment, as well as evidences that actions of this type provide a preventive action in relation to morbidity and mortality caused by chronic-degenerative diseases. Moreover, these actions promote weight loss, reduce absenteeism and increase productivity[8,11,18,20,24,27].

A practical and simple example of an initiative that has produced results during the last five years is the program *Agita Indústria*, which develops actions with the aim of raising the workers' awareness to a change in behavior concerning the adoption of a healthy lifestyle, having the practice of physical activities as flagship. The program includes the promotion of sports, recreational, educational and social events, like the distribution of posters in the company with messages that stimulate workers to change to an active lifestyle[11].

It is necessary to mention some limitations of the present study, like the cross-sectional design that was used, which does not allow to infer cause-effect relationships between the associated variables and low levels of physical activity. The utilization of the present results in other populations should be consulted with caution, as the investigated sample was selected in a non-probabilistic way and comes from companies that accepted to participate in the research. Another limitation that must be mentioned and which may have masked the associations among other socioeconomic-demographic variables is the utilization of the questionnaire as an instrument to measure physical activity. According to Holtermann et al.[24], the evaluation of an outcome through self-reported information may overestimate it, mainly when we are dealing with a behavior that is considered desirable by the individual, like physical activity. The ideal way would be to employ physiological indicators and motion sensors to detect the level of physical activity[2].

As for the advantages of the research, the main ones are: first, it is a study based on a representative sample of the working population of a sector that is economically important to the municipality of Ponta Grossa; secondly, it uses a

standardized questionnaire that measures all the domains of physical activity that is the most administered in Brazil[30], which enables to compare the results with those of other studies.

Authors' contributions

LM Vargas presented the idea for the research, analyzed and interpreted the data, and wrote the final version of the paper. **LA Pilatti** coordinates the project that enabled the research, coordinated the fieldwork and reviewed the study. **G L Gutierrez** collaborated with the writing of the manuscript.

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Received 01/04/2012
Revised 02/15/2013
Approved 03/04/2013