Leisure time physical inactivity among Brazilian ragpickers

Marcelo Cozzensa da Silva[1,2,4]
Anaclaudia Gastal Fassa[2]
David Kriebel[3]

[1] Programa de pós-graduação em Educação Física, Universidade Federal de Pelotas, Brasil
[2] Programa de pós-graduação em Epidemiologia, Universidade Federal de Pelotas, Brasil
[3] Departamento de Ambiente do trabalho, Universidade do Massachusetts, Lowell, USA
[4] Grupo de Estudos em Epidemiologia da Atividade Física (GEEAF)

Abstract

Ragpickers are informal workers who collect recyclable materials to earn a small wage. Their life and working conditions are extremely difficult. We examined leisure time physical inactivity (PI) among a cohort of ragpickers in Pelotas, a city in southern Brazil.
Ragpickers were matched by gender, age, and years of schooling with a sample of non-ragpickers from the same poor neighborhoods. The cross-sectional study gathered data by interview on 990 individuals. PI were assessed using a leisure time physical activities section from a standard self-reporting questionnaire (IPAQ long version). The prevalence of PI among ragpickers and non-ragpickers were 70.3% and 65.9, respectively (p=0.16). Among ragpickers PI was more common among females and those with higher ages, and among non-ragpickers with females, lower economic level and positivity to minor psychiatric disorders. Ragpickers report similar PI than other poor workers living in the same neighborhoods, with many of the same life conditions. Provide appropriate places to the practice of physical activities and organized and attractive activities could be alternatives to minimize physical, mental and emotional disorders of these workers.
Keywords: motor activity, occupational groups, employment, epidemiology

Endereço para Correspondência

Marcelo Cozzensa da Silva
Rua Luis de Camões 625 – CEP: 96055-630
Fone (fax): (53) 3273-3851
e-mail: cozzensa@terra.com.br

BACKGROUND

The resulting changes in the economy and consequently in society have led to profound changes in individuals' lifestyles, including the adoption of unhealthy food consumption patterns, prevalent tobacco use, alcohol abuse and physical inactivity, especially in large cities[1].

During recent decades, epidemiological studies have indicated that physical inactivity is associated with a variety of non-communicable diseases (NCDs) and risk factors, such as obesity, heart disease, and cancer[2, 3]. According to the World Health Organization (WHO), physical inactivity is estimated to cause, globally, about 10–16% of cases each of breast cancer, colon and rectal cancers and diabetes mellitus, and about 22% of ischemic heart disease[4] and it is responsible for 1.9 million deaths globally every year[5].

Despite this body of knowledge and sustained efforts to promote increased physical activity participation, the prevalence of physical activity in most industrialized and non-industrialized countries remains low[6-10].

A new study by the International Labor Organization Office (ILO) has reported that 2.8 billion people in the world were employed in 2003. Of these, nearly 1.4 billion were living on less than the equivalent of US$2 a day and some 550 million were living under the US$1 a day poverty line[11]. In Brazil, the official estimate for the number of unemployed people in December 2002 was 2.1 million people[12], although non-official sources say the real number may be three times higher. A large number of these unemployed in Brazil have found an alternative to survive by working in garbage. The ragpickers (catadores de materiais recicláveis) survive from the collection, separation, classification and sale of municipal solid waste.

The majority of these workers have incomes less than twice the level defined by the Brazilian government as a minimum living wage, which comes to about US$173/month. They often live near dumps or in the low income areas of cities, and collect recyclable materials and food at dumpsites, riverbanks, street corners and residential areas[13]. The ragpickers work in hazardous conditions. When moving around in the garbage, searching for materials that can be resold, the ragpickers are exposed to a wide range of health and safety hazards.

Although more than 60% of the workforce in Brazil is in the informal sector, there are few studies on work and health of this population segment[14], and ragpickers are no exception. Among this population there are not studies verifying the relation between their life and work style and physical inactivity. One reason for this lack of research is the considerable logistical challenge of conducting epidemiologic studies of people without regular places of work or residence. The objective of this paper is to examine the association of leisure time physical inactivity with some socio-economic, demographic, behavioral and health characteristics of the ragpickers and compare these to non-ragpickers from the same city.

METHODS

Survey populations and questionnaire

Pelotas is a city located in the state of Rio Grande do Sul, southern Brazil. It has a population of 346,000 inhabitants, the majority of them (more than 90%) living in urban areas. Almost 36% of the population earns less than twice the national minimum wage (US$ 266.67/month in 2007) with 14.6% receiving more than ten times the minimum wage. Eighty percent of the city population is of white race with most of the rest of mixed African and European descent.

A cross-sectional study was carried out among ragpickers and neighborhood matched referents in 2004. In order to identify the ragpickers, field researchers went to the main points of sale of recycled materials and gathered names and addresses of everyone that came to sell materials. Ragpickers were also identified in cooperatives of recycled materials. The main points of sale of recycled materials and cooperatives were located with the help of key-informants in poor neighborhoods, and by ragpickers who led us to others doing the same work in the neighborhoods where they lived. These strategies have been used for one month. After developed a list of ragpickers, the interviewers visited their places of residence. Only people 18 years or older were asked to participate. The interviewers excluded all individuals with mental disorders that limited their ability to answer the questionnaire.

The referent group was composed of other workers that lived in the same neighborhoods as the ragpickers. To locate referents, interviewers went to neighboring houses, starting from those immediately adjacent to each subject's home, in order to locate a suitable non-ragpicker to interview. These people were matched by gender, age (± 5 years old), and years of schooling (± 1 year) to the neighboring ragpicker. Potential referents were excluded if they were unemployed, retired or out of work because of any health problem.

Trained interviewers used a structured questionnaire to gather data on occupational, socio-demographic, economic, behavioral, health factors and work. The interview lasted approximately 40 minutes. Five percent of interviews were repeated by the principal investigator (M.S.) as a check on the quality of data collection.

To assess leisure time physical activity level, leisure time physical activities section of IPAQ long version (available at: www.celafiscs.com.br) was applied at face-to-face interviews, with a recall period of the previous 7 days. The physical activity score was calculated as the sum of minutes of moderate activity (including fast and moderately fast walking) plus twice the minutes of vigorous activity. IPAQ defines moderate activities as those that produce a moderate increase in respiration rate, heart rate, and sweating for at least 10 min of duration. Vigorous activities are defined as those producing vigorous increases in the same variables. Inactivity was defined as a score below 150 min·wk^{-1}, in accordance with the recommendations from the U.S. Surgeon General's Report [15, 16].

In this paper, we also investigated the degree to which ragpickers' exposures and outcomes varied according to several demographic and personal factors. These were: age, gender, skin color (white/non white), marital status (living with or without a partner), monthly income (categories of multiples of the official minimum wage), years of schooling, smoking (never smokers; ex-smokers; current smokers), alcoholism (using the standard CAGE instrument)[17] and economic level. This last characteristic was assessed using a standard Brazilian scale, the ABEP[18].

Statistical analysis

The data were entered into a computer database twice by different technicians and compared and discrepancies were resolved by reference to the original survey. Analyses were conducted using Stata 9.0. Prevalences and prevalence ratios were calculated to compare exposures and outcomes among groups. Prevalence ratios were calculated using Poisson regression in order to investigate potential confounding

and effect modification. Multivariate modeling to identify factors associated with PI used the approach of Victora et al.[19], in which the effects of demographic variables (age, gender, skin color, marital status, education) were investigated first. Smoking, alcoholism and an indicator variable for being a ragpicker were added in a second stage, and finally work hazards and job satisfaction were added in a third stage. After this, musculoskeletal disorders and work accidents were added to the model. This four-step "hierarchical" method helps the researchers to understand when a proximal factor related to work (lifting for example) may be acting as a mediator for a more distal social factor like education. Multivariate modeling began by adding Level One variables one at a time, to identify important predictors. Then, jobs/exposure variables were added one at a time. Two-way interactions between first and second level variables were evaluated using product terms.

The Ethical Committee of the Federal University of Pelotas approved the study protocol and data were made anonymous before analysis. Informed consent was obtained from each subject.

RESULTS
We interviewed 455 of the 546 ragpickers initially identified (83.3%). The 91 who were not interviewed were those whose residence could not be located. This occurred when a ragpicker reported a non-existent address at first contact, the interviewer failed to find the address through lack of street signs or names, or because some had moved away between first contact and household visit. Neighborhood referents were successfully identified and interviewed for each of the 455 ragpickers, bringing the study population to 990. There were 80 household members residing with the matched referents that were excluded from analyses in order to match one ragpicker to one non-ragpicker. There were many more non-ragpickers with high levels of education (4.6% versus 3.1% with more than 8 years of schooling, respectively). Because education was a potentially important modifier of job characteristics, we chose to study only those respondents with 8 or less years of schooling. Our final sample was 881 individuals (441 ragpickers and 440 non-ragpickers).

In our study, the ragpickers reported considerably poorer living conditions than their neighbors with other occupations. For example, the majority (54.0%) of ragpickers lived in poor quality houses built of plastic, metal or wood, while only a quarter of their matched neighbors (25.0%) lived in such houses. Fifteen percent of ragpickers had no running water, but only 4.8% of non-ragpickers (p<0.001). Nearly twice as many ragpickers as non-ragpickers had no electricity (11.0% versus 5.7%; p=0.003). Eighteen percent of ragpickers, but only 3.0% of referents reported having no toilet (p<0.001). On average, there were 4.7 residents in a ragpicker's home, and only 3.9 in a non-ragpicker's.

As noted, there were no ragpickers in the first and second economic levels, ABEP category A and B, while 10.9% were in the intermediate categories C, and 89.1% in the lowest economic level categories D or E.

Both ragpickers and referents had a mean age of 38 years, and were 62.6% male (matching variables). Despite matching to within one year on schooling, ragpickers were still more poorly educated then their neighbors. Most strikingly, 23.1% of ragpickers, but only 15.2% of non-ragpickers had not completed one year of schooling (p=0.05). This discrepancy would have been much larger without matching; a non-ragpicker with one year of schooling was often matched to a ragpicker with no schooling. There were large racial differences between groups: 46.9% of ragpickers were non-white compared to 40.0% of their neighbors (p<0.001).

More than 3/5 of the ragpickers are married or live with a partner. The habit of smoke among them is three times more than what founded in general population of Pelotas city. When compared with non ragpickers, this difference is lesser, but highly significant (p< 0.001) (table 1).

Domestic work (28.0%), day laborers (33.4%) retail sales (14.6%) and construction (13.4%) were the most frequently reported occupations of the non-ragpickers neighborhood referents.

Leisure time physical inactivity (PI)
The prevalence of PI in ragpickers (70.3%) and non-ragpickers (65.9%) was not different (p=0.2). When the non-ragpickers were sub-divided by occupation, the prevalence of PI among domestic workers, day labors, industry and retail workers were 80.5%, 68.4%, 65.2%, 65.1% respectively. All occupations, except domestic work, reported inferior PI prevalences than ragpickers (Figure 1).

Univariable models identified older ages, female gender

labours

| Figure 1 | Prevalence of leisure time physical inactivity among different labours |

	Ragpicker		Non ragpicker	
	n	%	n	%
Gender				
Male	276	62.6	277	62.9
Female	165	37.4	163	37.1
Skin color				
White	234	53.1	295	60.0
Non white	207	46.9	145	40.0
Age (years)				
18 to 29 years old	138	31.3	123	28.0
30 to 39 years old	118	26.8	126	28.6
40 to 49 years old	106	24.0	112	25.5
50 to 59 years old	49	11.1	56	12.7
60 or more years old	30	6.8	23	5.2
Schooling (Years)				
0	102	23.1	67	15.2
1 a 4	199	45.1	220	50.0
5 a 8	140	31.8	153	34.8
Economic level				
E	176	39.9	112	25.5
D	217	49.2	183	41.6
C	48	10.9	126	28.6
B	0	0.0	19	4.3
Alcoholism				
CAGE negative	396	89.2	405	92.0
CAGE positive	45	10.2	35	8.0
Marital status				
Live without a partner	159	36.1	179	40.7
Live with a partner	282	63.9	261	59.3
Minor psychiatric disorders				
No	244	55.3	291	66.4
Yes	197	44.7	147	33.6
Job satisfaction				
No	141	32.0	84	19.1
Yes	300	68.0	356	80.9
Physical inactivity				
No	131	29.7	149	34.1
Yes	310	70.3	288	65.9
Body mass index				
< 18	9	3.0	7	1.8
18 to 24	196	65.8	199	52.7
25 to 29	66	22.1	132	34.9
30 ou more	27	9.1	40	10.6
Smoking status				
Never	126	28.6	179	40.7
Ex	58	13.1	62	14.1
Current	257	58.3	199	45.2

and alcoholism as being associated with the studied outcome in ragpickers. Female gender and positivity to minor psychiatric disorders were the variables associated with PI in non-ragpickers (Table 2). Female gender had 20% more risk for PI than males in ragpickers and 30% more in non ragpickers. There was 30% of protection in alcoholics to non-alcoholics to PI and a risk of 1.2 for individuals with positivity to minor psychiatric disorders.

PI prevalence was not associated with skin color, schooling, economic level, marital status, job satisfaction, smoke status and body mass index.

These univariate associations with PI prevalence were then evaluated for potential confounding and effect modification in Poisson regression models for ragpickers and non ragpikers. First we analyzed the demographic and behavior variables. In ragpickers, women consistently reported a higher prevalence of PI than men, and this association was not diminished after controlling for economic level and schooling. Age showed a direct trend with PI, such that those in the highest category, sixty or more, were at the highest risk (PR= 1.3). In

	Prev.	Ragpicker PR $(CI_{95\%})$	P value	Prev.	Non ragpicker PR $(CI_{95\%})$	P value
Gender			0.04			<0.001
Male	66.7	1.0		59.8	1.0	
Female	76.4	1.2 (1.0 -1.3)		76.1	1.3 (1.1 -1.5)	
Skin color			0.9			0.6
White	70.9	1.0		66.8	1.0	
Non white	69.6	1.0 (0.9 -1.1)		64.1	0.9 (0.8 -1.1)	
Age (years)			<0.001			0.96
18 to 29	63.8	1.0		65.3	1.0	
30 to 39	65.2	1.0 (0.9 -1.2)		66.4	1.0 (0.9 -1.2)	
40 to 49	74.5	1.2 (1.0 -1.4)		64.3	1.0 (0.8 -1.2)	
50 to 59	83.7	1.3 (1.1 -1.6)		67.9	1.0 (0.8 -1.3)	
60 or more	83.3	1.3 (1.1 -1.6)		69.6	1.1 (0.8 -1.4)	
Schooling			0.2			0.3
0	75.5	1,0		68.2	1,0	
1 to 4	71.9	1.0 (0.8 -1.1)		68.8	1.0 (0.8 -1.2)	
5 to 8	64.3	0.9 (0.7 -1.0)		60.8	0.9 (0.7 -1.1)	
Economic level*			0.08			0.06
E	76.1	1,0		70.3	1,0	
D	65.9	0.9 (0.8 -1.0)		65.8	0.9 (0.8 -1.1)	
C/B	68.7	0.9 (0.7 -1.1)		65.9	0.9 (0.8 -1.1)	
A	-	-		42.1	0.6 (0.3 -1.0)	
Alcoholism			0.03			0.5
CAGE negative	72.2	1,0		66.4	1.0	
CAGE positive	53.3	0.7 (0.7 -1.0)		60.0	0.9 (0.8 -1.1)	
Marital status			0.2			0.8
Live without partner	73.6	1.0		66.1	1.0	
Live with a partner	68.4	0.9 (0.8 -1.1)		65.8	1.0 (0.8 -1.1)	
Minor psychiatric disorders			0.35			0.01
No	68.4	1,0		61.6	1,0	
Yes	72.6	1.1 (0.9 -1.2)		74.0	1.2 (1.0 -1.3)	
Job satisfaction			0.6			0.06
No	68.8	1.0		73.8	1.0	
Yes	71.0	1.0 (0.9 -1.2)		64.0	0.9 (0.7 -1.0)	
Body mass index			0.2			0.6
< 18	77.8	1,0		57.1	1,0	
18 to 24	62.2	0.8 (0.6 -1.2)		61.4	1.1 (0.6 -2.1)	
25 to 29	63.6	0.8 (0.6 -1.2)		67.4	1.2 (0.6 - 2.3)	
30 or more	77.8	1.0 (0.7 -1.5)		70.0	1.2 (0.6 -2.4)	
Smoking status			0.7			0.9
Never	67.5	1,0		67.0	1,0	
Ex	72.4	1.1 (0.9 -1.3)		66.1	1,0 (0.8 -1.2)	
Current	71.2	1.1 (0.9 -1.2)		64.8	1,0 (0.8 -1.1)	

*There were no participants from economic level A

non-ragpickers women, again, reported a higher prevalence than men. There was a borderline statistical significance for the association between economic level and PI (p=0,06). Years of schooling was inversely associated with the outcome. When adjusted for variables on first and second level, minor psychiatric disorders remains associated with PI (p=0.05) (Table 3).

DISCUSSION

Work in the informal sector is increasing in most countries, and involves an estimated 60% of the workforce in Brazil, a large developing nation[20]. Understanding the health, en-vironmental, social and economic implications of this trend presents important challenges to public health researchers and administrators. This paper examined the risk factors for PI among ragpickers and their non-ragpicker neighbors in Pelotas, Brazil. PI has been described in many occupations in Brazil[21, 22], but rarely among those in the informal sector. This study is one of the first to use a quantitative analytic approach to studying the ragpickers' lives and working and health conditions, especially PI.

Before discussing the results, it is important to address certain methodological aspects of the study. Data were collected using a standardized instrument, by a trained team, and in an identical fashion in both groups, thus contributing to the

		Ragpicker			Non ragpicker	
	PR	$CI_{95\%}$	P value	PR	$CI_{95\%}$	P value
Gender[1]			0.04			<0.001
Male	1.0			1.0		
Female	1.1	(1.0 – 1.3)		1.3	(1.1 - 1.4)	
Age (years) [1]			0.001			-
18 to 29	1.0					
30 to 39	1.0	(0.8 - 1.2)				
40 to 49	1.2	(1.0 - 1.4)				
50 to 59	1.3	(1.0 - 1.5)				
60 or more	1.3	(1.0 - 1.6)				
Economic level[2]			0.1			0.06
E	1.0			1.0		
D	0.9	(0.8 - 1.0)		0.9	(0.8 - 1.1)	
C	0.9	(0.7 - 1.1)		0.9	(0.8 - 1.1)	
B	-			0.6	(0.3 - 1.0)	
Minor psychiatric disorders[3]			0.06			0.05
No	1.0			1.0		
Yes	0.8	(0.6 - 1.0)		1.1	(1.0 - 1.3)	

* Only those variables associated with PI are shown
** PR adjusted for all variables in the same level and the previous levels.
[1]First level   [2]Second level   [3]Third level

internal validity of the study.

Cross-sectional studies of working populations are often biased towards underestimation of effects through healthy worker selection[23]. Selection out of the work force of those with PI is particularly problematic in cross-sectional studies. In our study, we believe that this bias may not have been strong because the people that perform this kind of job are those who are unemployed, and have very few alternatives but to continue this work, regardless of their health status. The most important thing for them is to perform their work in order to earn some money to survive. An important limitation of our study is due to the fact that only collected information on leisure physical activity was collected on these workers who perform high levels of labor PA.

Leisure time physical inactivity is not the only important problem that ragpickers face. Rather, we wanted to show that careful application of standard epidemiologic methods enabled us to systematically evaluate a range of problems faced by workers in the informal sector. A second and third papers reports our findings on musculoskeletal pain and minor psychiatric disorders in this population[24-26].

The reported prevalence of PI (70.3%) was similar or higher than reported for formal sector workers in other studies using the same instrument. For example, prevalences of about 70% have been reported for studies in health service workers[26], and 46.2% among industrial workers[21].

Physical inactivity was considerably more common among women than men in our study. This pattern has been reported in many other populations[21, 27, 28]. Our findings could be harness to the fact that we used only leisure-time physical activity from IPAQ long version. Household activities, which in many cases are largely specific to women, are not considered and an inclusion of this category of activities is an important factor contributing to the lack of gender differences to physical inactivity.

The positive association between PI prevalence and age is consistent with the literature [29]. In spite of higher increase in inactivity level occur after 50 yr (PR=1.3), it is lesser than we find in population based studies[7, 30]. It could be happened because the population based studies considered information in leisure, occupation, housework and transportation activities what after retirement may contribute to sedentary lifestyle.

CONCLUSIONS

In Brazil and many other developing countries, a large fraction of the population works outside the formal labor market and have no social safety net. Over the past 20 years in Brazil, the number of people who work in the collection of recyclable materials (ragpickers) has increased dramatically. We found that the prevalence of PI was similar in a sample of ragpickers than among neighbors who worked in other traditional manual labor, such as transportation and construction. Moreover, this group of workers presents intense and stressful labour physical activity (mean = 5.9 walking/hours sd=3.0), which, in general, brings them great damage, like musculoskeletal pain and minor psychiatric disease[24, 25]. More attention should be paid to these workers that play an increasingly important role in the Brazilian economy and its environmental management. Collective sports at leisure-time, could influence positively in several health aspects of these workers, improving self-respect and reducing depression, anxiety and

musculoskeletal pain. Moreover collective physical activities are important to the socialization process of these workers, which are greatly distinguished by the population.

Trinh OTH , Nguyen ND , Dibley MJ , et al. The prevalence and correlates of physical inactivity among adults in Ho Chi Minh City. BMC Public Health. 2008;9(8):204.

Waxman A. WHO's global strategy on diet, physical activity and health: response to a worldwide epidemic of non-communicable diseases. Scandinavian Journal of Nutrition. 2004;48:58–60.

Contribuição dos autores

Marcelo Cozzensa da Silva participou de todas fases do processo, desde a criação do questionário até a escrita final do artigo. Anaclaudia Fassa e David Kriebel ajudaram na análise dos dados e escrita final do artigo.

REFERÊNCIAS

1. Trinh OTH , Nguyen ND , Dibley MJ , et al. The prevalence and correlates of physical inactivity among adults in Ho Chi Minh City. BMC Public Health. 2008;9(8):204.
2. Waxman A. WHO's global strategy on diet, physical activity and health: response to a worldwide epidemic of non-communicable diseases. Scandinavian Journal of Nutrition. 2004;48:58–60.
3. Powell KE, Blair SN. The public health burdens of sedentary living habits: theoretical but realistic estimates. Med Sci Sports Exerc. 1994;26(7):851-6.
4. World Health Organization. The World Health report 2002. Geneva: World Health Organization; 2002.
5. World Health Organization. Annual global Move for Health initiative: A concept paper. Geneva: World Health Organization 2005.
6. Centers for Disease Control and Prevention. Adult participation in recommended levels of physical activity-United States, 2001 and 2003. JAMA. 2006;295:27-9.
7. Hallal PC, Victora CG, Wells CJK, et al. Physical Inactivity: Prevalence and Associated Variables in Brazilian Adults. Med Sci Sports Exerc. 2003;35(11):1894–900.
8. Jones DA, Ainsworth BE, Croft JB, et al. Moderate leisure-time physical activity: who is meeting the public health recommendations? A national cross-sectional study. Arch Fam Med. 1998;7:285-9.
9. Martinez-Gonzalez MA, Varo JJ, Santos JL, et al. **Prevalence of physical activity during leisure time in the European Union. Med Sci Sports Exerc. 2001;33:1142-6.**
10. Schaller N, Seiler H, Himmerich S, et al. Estimated physical activity in Bavaria, Germany,and its implications for obesity risk: results from the BVS-II Study. Int J Behav Nutr Phys Act. 2005;2:6.
11. http://www.ilo.org/public/english/bureau/inf/pr/2004/54.htm. Acessado em 17 de novembro de 2007.
12. http://www.abep.org/default.aspx?usaritem=arquivos&iditem=23. Acessado em 20 de agosto de 2006.
13. http://www.lixoecidadania.org.br/lixoecidadania/. Acessado em 12 de setembro de 2009.
14. Wunsch Filho V. Variações e tendências na morbimortalidade dos trabalhadores. In: Monteiro C, ed. *Velhos e novos males da saúde no Brasil: a evolução do país e de suas doenças*. São Paulo: Hucitec 1995:289-330.
15. Haskell WL, Lee IM, Pate RR, et al. Physical activity and public health: updated recommendation for adults from the American College of Sports Medicine and the American Heart Association. Circulation. 2007 Aug 28;116(9):1081-93.
16. U.S. Department of Health and Human Services. Physical activity and health: a report from the Surgeon General. Atlanta: National Center for Chronic Disease Prevention and Health Promotion; 1996.
17. Beigel A, Hunter EJ, Tamerin J, et al. Planning for the development of comprehensive community alcoholism services: I. the prevalence survey. American Journal of Psychiatry. 1974;131(10):1112-6.
18. http://www.abep.org/default.aspx?usaritem=arquivos&iditem=23. Acessado em 10 de março de 2010.
19. Victora CG, Huttly SR, Fuchs SC, et al. The role of conceptual frameworks in epidemiological analysis: A hierarchical approach. International Journal of Epidemiology. 1997;26:224-7.
20. Wunsch Filho V. Variações e tendências na morbimortalidade dos trabalhadores. In: Monteiro C, ed. *Velhos e novos males da saúde no Brasil: a evolução do país e de suas doenças*. São Paulo: Hucitec 1995:289-330.
21. Barros MV, Nahas MV. Comportamentos de risco, auto-avaliação do nível de saúde e percepção de estresse entre trabalhadores da indústria. Rev Saúde Pública. 2001;35(5):554-63.
22. Santos JFS, Coelho CW. Atividade física e obesidade em trabalhadores da indústria Lecturas Educación Física y Deportes. 2003;9(67).
23. Checkoway H, Pearce N, Kriebel D. Research methods in occupational epidemiology. New York: Oxford 2004.
24. da Silva MC, Fassa AG, Kriebel D. Minor psychiatric disorders among Brazilian ragpickers: a cross-sectional study. Environ Health. 2006;5:17.
25. da Silva MC, Fassa AG, Kriebel D. Musculoskeletal pain in ragpickers in a southern city in Brazil. Am J Ind Med. 2006 May;49(5):327-36.
26. da Silva MC, Fassa AG, Kriebel D. Musculoskeletal Pain in Ragpickers in a Southern City in Brazil. American Journal of Industrial Medicine. 2006;49:327 - 36.
27. Jurado D, Gurpegui M, Moreno O, et al. Association of personality and work conditions with depressive symptoms. European Psychiatry. 2005;20:213-22.
28. Lindeman S, Hamalainen J, Isometsa E, et al. The 12-month prevalence and risk factors for major depressive episode in Finland: representative sample of 5993 adults. Acta Psychiatr Scand. 2000;102:178-84.
29. Panagiotakos DB, Pitsavos C, Lentzas Y, et al. Determinants of physical inactivity among men and women from Greece: a 5-year follow-up of the ATTICA study. Ann Epidemiol 2008;18(5):387-94.
30. Gal DL, Santos AC, Barros H. Leisure-time versus full-day energy expenditure: a cross-sectional study of sedentarism in a Portuguese urban population. BMC Public Health 2005;5:16.