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ORIGINAL PAPER

# A Descriptive Study of Work Ability and Health Problems Among Brazilian Recyclable Waste Pickers

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**Abstract** To describe the work ability and health problems among Brazilian recyclable waste pickers. Sixty-one workers answered questionnaires related to the work ability (Work Ability Index—WAI), musculoskeletal problems (Nordic Musculoskeletal Questionnaire—NMQ), low back related disability (Roland Morris Questionnaire—RMQ), physical activity (International Physical Activity Questionnaire—IPAQ), smoking (Fagerström Test for Nicotine Dependence—FTND), and alcohol use (The Alcohol Use Disorders Identification Test AUDIT). Brazilian recyclable waste pickers are mostly young (25–44 years old: 54%), women (88%) with low schooling (incomplete elementary school: 54%), high turnover at work (job seniority < 12 months: 70%), low rates of sick leave (20%) and accidents at work (13%). The workers reported good (44%) or optimal (43%) work ability. The prevalence of musculoskeletal disorders in the last 12 months was high (lower back: 49%, shoulders: 28%, neck: 23%, wrists and hands: 21%), as well as the prevalence of hypertension (28%). Most of the workers reported to be physically active or very active (57%), smoke (34%) and drink alcohol (44%). This study outlined the profile of recyclable waste pickers regarding work ability and health problems, which highlight the need for preventive measures focused on musculoskeletal and cardiovascular diseases among this population.

**Keywords** Occupational health · Prevention · Low back pain · Cardiovascular diseases

## Introduction

Nowadays, material recycling is indispensable due to the increase of disposable products and the need for recovering resources [1, 2]. In Brazil, several municipalities have created cooperatives to reduce the volume of garbage [3, 4] and many people are involved in this job. For most of them, the work means social inclusion, as it brings the opportunity to participate in decisions, to be productive and to get an income.

However, the work conditions of collecting and industrializing urban waste is unhealthy according to the Brazilian legislation (NR-15). In addition to the unhealthy conditions, waste collectors are also at risk of work accidents [1, 3, 5–8].

The work of the recyclable waste pickers is predominantly physical, but also involves cognitive demands [9]. Lifting, repetitive movements and prolonged standing position are the main risk factors for work-related injuries and illnesses [3, 4, 6, 10–16].

There are few studies investigating the work ability and health problems in this population. The lack of studies diminishes the visibility of these workers to the health professionals and, thus reduces their chances of being targets of health promotion actions. Thus, the objective of this study was to describe the work ability and health problems among Brazilian recyclable waste pickers. Our purpose is to highlight this occupational group and their health promotion needs.

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## Methods

### Study Design and Population

This is a descriptive study developed in two municipalities in the countryside of São Paulo, Brazil. The population was composed by 209 workers. The workplaces were two cooperatives, which receive financial support from the municipalities. At that cooperatives the workers collect and sort recyclable materials, such as plastic, paper, cardboard, glass, aluminum cans and styrofoam.

The sample was composed by the workers who agreed to participate in the study and who had worked in the cooperative for at least three months. Subjects signed the informed consent term. The research project was approved by the Ethics and Research Committee of the University (CAAE 23974113.2.0000.5504). Of the total of 209 workers, 61 agreed to participate and fulfilled the inclusion criteria, composing the study sample.

### Instruments

The following questionnaires were used in this study:

- Work Ability Index (WAI): composed of seven items that consider the physical and mental work requirements, the health status and worker's resources. The final score can vary from 7 to 49, and this score is classified into four levels: low (7–27), moderate (28–36), good (37–43) and optimal (44–49) work ability [17].
- Nordic Musculoskeletal Questionnaire (NMQ): consisting of four questions related to the symptoms in the last 12 months, symptoms in the last 7 days, restriction in activities of daily life and seeking help from a health professional [18].
- Roland-Morris Questionnaire (RMQ): consists of 24 questions about difficulty performing daily life activities due to low back pain. The higher the score, the greater the difficulty to perform daily activities [19].
- International Physical Activity Questionnaire (IPAQ): composed by questions about the time spent in physical activities in the previous week. There are four questions about how many times per week the subject practiced physical activity and how much time was spent per day walking, doing moderate and vigorous activities. There is also a question about the time spent sitting, excluding the transportation time. Each subject was classified as: inactive, irregularly active, active or very active [20, 21].
- Fagerström Test for Nicotine Dependence (FTND): composed by six questions about tobacco use that generates a score indicating nicotine addiction: very high, high, low or very low [22].
- Alcohol Use Disorders Identification Test (AUDIT): composed of 10 questions about the risks of alcohol use, addiction symptoms and alcohol use losses, which generates a score that can be classified into 4 risk zones: low risk or abstinence use (0–7: zone I), risky use (8–15: zone II), harmful use (16–19: zone III) and dependence (20–40: zone IV) [23, 24].

### Procedures

The researcher made observations at the workplaces with the purpose of understanding the work process. After the period of observation, the workers were invited for an interview. Before data collection, the formal consent was obtained for each worker. The questionnaires were applied at a private office in the workplace during paid working hours. The researcher applied the standardized questionnaires by interviews due to the low educational level of the workers. Data were analyzed using descriptive statistics using SPSS program.

## Results

Most of the waste pickers were female (88%), with age varying between 25 and 44 years (54%), did not complete elementary school (54%) and were single, separated or divorced (52%). Most of the collectors (70%) worked in the cooperatives for a maximum of 12 months. Thirty-seven workers (61%) have the function of sorting recyclable materials and 33% worked in the collection of the materials at the streets and sorting. The majority of respondents (80%) reported not having be absent from work due to health problems and 87% reported never having suffered work accidents (Table 1).

The work ability was good or excellent for 87% of the workers, moderate for 11% and low for 2%. The most frequently diagnosed diseases in the WAI were: back injuries (n = 20, 33.8%); hypertension (n = 17, 27.9%); injuries in arms and hands (n = 12; 19.7%); mild emotional disturbance (n = 6, 9.8%); allergy (n = 6, 9.8%); sinusitis (n = 5, 8.2%) and anemia (n = 5, 8.2%).

Musculoskeletal symptoms were highly prevalent for the low back (49%), shoulders (28%), neck (23%), ankles (23%), wrist and hands (21%) in the last 12 months. For the last 7 days, low back still remains as the most affected body part (41%), followed by the shoulders (18%), knees (15%) and neck (15%). Low back symptom was also the most prevalent for the restrictions in activities of daily life (10%) and seeks for health care (31%) (Table 2).

RMQ results showed that about 30% of the workers have some low back related disability. The most frequent was sleep less (20%); followed by change body position more

**Table 1** Personal and occupational characteristics of the recyclable waste pickers (n = 61)

| Characteristics | n | % |
|---|---|---|
| Gender | | |
| Female | 54 | 88.5 |
| Male | 7 | 11.5 |
| Age | | |
| 19–24 years | 8 | 13.1 |
| 25–44 years | 33 | 54.1 |
| 45–59 years | 15 | 24.6 |
| 60 years or more | 5 | 8.2 |
| Scholarly | | |
| No formal education | 1 | 1.6 |
| Incomplete elementary school | 33 | 54.1 |
| Elementary school | 13 | 21.3 |
| Incomplete high school | 6 | 9.8 |
| High school | 8 | 13.1 |
| Marital status | | |
| Single/separated/divorced/ | 32 | 52.5 |
| Married | 25 | 41.0 |
| Widower | 3 | 4.9 |
| Did not answer | 1 | 1.6 |
| Job seniority (months) | | |
| 3–12 months | 43 | 70.5 |
| Over 12 months | 18 | 29.5 |
| Function | | |
| Collection and sorting | 20 | 32.8 |
| Sorting | 37 | 60.7 |
| Management | 2 | 3.3 |
| Driver | 1 | 1.6 |
| Styrofoam recycling | 1 | 1.6 |
| Occurrence of sick leave | 12 | 19.7 |
| Occurrence of work accident | 8 | 13.1 |

**Table 2** Proportion of recyclable waste pickers who reported musculoskeletal symptoms for each body part (n = 61)

| Region | n (%) | CI 95% |
|---|---|---|
| Neck | | |
| Symptoms in the last 12 months | 14 (23.0) | 14–35% |
| Restrictions in activities of daily life | 0 (0.0) | – |
| Seeking health care | 10 (16.4) | 9–28% |
| Symptoms in the last 7 days | 9 (14.8) | 8–26% |
| Shoulders | | |
| Symptoms in the last 12 months | 17 (27.9) | 18–40% |
| Restrictions in activities of daily life | 3 (4.9) | 2–13% |
| Seeking health care | 11 (18.0) | 10–29% |
| Symptoms in the last 7 days | 11(18.0) | 10–29% |
| Elbows | | |
| Symptoms in the last 12 months | 4 (6.6) | 2–15% |
| Restrictions in activities of daily life | 1 (1.6) | 0–1% |
| Seeking health care | 2 (3.3) | 0–11% |
| Symptoms in the last 7 days | 1 (1.6) | 0–1% |
| Wrists and hands | | |
| Symptoms in the last 12 months | 13 (21.3) | 13–33% |
| Restrictions in activities of daily life | 3 (4.9) | 2–13% |
| Seeking health care | 7 (11.6) | 1–22% |
| Symptoms in the last 7 days | 6 (9.8) | 4–20% |
| Hips | | |
| Symptoms in the last 12 months | 3 (4.9) | 2–13% |
| Restrictions in activities of daily life | 1 (1.6) | 0–13% |
| Seeking health care | 3 (4.9) | 2–13% |
| Symptoms in the last 7 days | 2 (3.3) | 1–11% |
| Knees | | |
| Symptoms in the last 12 months | 12 (19.7) | 12–31% |
| Restrictions in activities of daily life | 3 (4.9) | 2–13% |
| Seeking health care | 7 (11.5) | 6–22% |
| Symptoms in the last 7 days | 9 (14.8) | 8–26% |
| Ankles | | |
| Symptoms in the last 12 months | 14 (23.0) | 14–35% |
| Restrictions in activities of daily life | 2 (3.3) | 1–11% |
| Seeking health care | 7 (11.5) | 6–22% |
| Symptoms in the last 7 days | 8 (13.1) | 7–24% |
| Upper back | | |
| Symptoms in the last 12 months | 11 (18.0) | 10–30% |
| Restrictions in activities of daily life | 3 (4.9) | 2–13% |
| Seeking health care | 6 (9.8) | 5–20% |
| Symptoms in the last 7 days | 7 (11.5) | 6–22% |
| Low back | | |
| Symptoms in the last 12 months | 30 (49.2) | 37–61% |
| Restrictions in activities of daily life | 6 (9.8) | 5–20% |
| Seeking health care | 19 (31.1) | 21–44% |
| Symptoms in the last 7 days | 25 (41.0) | 30–54% |

frequently (16%) and difficulty to turn over in bed (16%) (Table 3).

Table 4 shows the characteristics related to the worker's lifestyle. Fifty-seven percent were classified as physically active or very active. Thirty-four percent were smokers, and among them, 43% had high or very high nicotine dependence. The alcohol use was reported by 44% of the workers, and 85% of them were classified in zones I and II.

## Discussion

This descriptive study among Brazilian recyclable waste pickers showed that this population is mainly composed by young female workers who did not complete elementary school, had a high turnover at work, low rates of sick leave and accidents at work. The majority reported good or

**Table 3** Characterization of the low back related disability according to the Roland Morris questionnaire (n = 61)

| Rolland morris questionnaire (RMQ) | n | % |
|---|---|---|
| No disability | 43 | 70.5 |
| Some disability | 18 | 29.5 |
| I stay at home most of the time because of my back | 3 | 4.9 |
| I change position frequently to try to get my back comfortable | 10 | 16.4 |
| I walk more slowly than usual because of my back | 7 | 11.5 |
| Because of my back, I am not doing any jobs that I usually do around the house | 5 | 8.2 |
| Because of my back, I use a handrail to get upstairs | 6 | 9.8 |
| Because of my back, I lie down to rest more often | 5 | 8.2 |
| Because of my back, I have to hold on to something to get out of an easy chair | 2 | 3.3 |
| Because of my back, I try to get other people to do things for me | 1 | 1.6 |
| I get dressed more slowly than usual because of my back | 2 | 3.3 |
| I only stand up for short periods of time because of my back | 3 | 4.9 |
| Because of my back, I try not to bend or kneel down | 8 | 13.1 |
| I find it difficult to get out of a chair because of my back | 6 | 9.8 |
| My back is painful almost all of the time | 6 | 9.8 |
| I find it difficult to turn over in bed because of my back | 10 | 16.4 |
| My appetite is not very good because of my back | 1 | 1.6 |
| I have trouble putting on my socks (or stockings) because of the pain in my back | 4 | 6.6 |
| I can only walk short distances because of my back pain | 2 | 3.3 |
| I sleep less well because of my back | 12 | 19.7 |
| Because of my back pain, I get dressed with the help of someone else | 0 | 0.0 |
| I sit down for most of the day because of my back | 1 | 1.6 |
| I avoid heavy jobs around the house because of my back | 7 | 11.5 |
| Because of back pain, I am more irritable and bad tempered with people than usual | 7 | 11.5 |
| Because of my back, I go upstairs more slowly than usual | 7 | 11.5 |
| I stay in bed most of the time because of my back | 1 | 1.6 |

**Table 4** Characteristics related to the lifestyle of the recyclable waste pickers (n = 61)

| Lifestyle characteristics | n | % |
|---|---|---|
| Level of physical activity (IPAQ) | | |
| Inactive | 6 | 9.8 |
| Irregularly active | 20 | 32.8 |
| Active | 32 | 52.5 |
| Very active | 3 | 4.9 |
| Smoke (yes) | 21 | 34.4 |
| Nicotine dependence (FTQ) | | |
| Very low | 5 | 23.8 |
| Low | 4 | 19.0 |
| Mean | 3 | 14.3 |
| High | 6 | 28.6 |
| Very high | 3 | 14.3 |
| Alcohol use (yes) | 27 | 44.3 |
| Alcohol consumption (AUDIT) | | |
| Zone I | 13 | 48.0 |
| Zone II | 10 | 37.0 |
| Zone III | 2 | 7.5 |
| Zone IV | 2 | 7.5 |

optimal work ability and high prevalence of musculoskeletal disorders and hypertension. The workers reported a high level of physical activity, tobacco and alcohol consumption.

These results revealed the profile of the recyclable waste pickers and highlight some health promotion needs. The high percentage of young female workers with low educational level in this occupation was also evident in other Brazilian studies [10–12, 25, 26].

In addition, most collectors worked in the actual job for less than 12 months (70%), confirming one of the problems faced in this sector, which is the high turnover due to the low income and poor work conditions, such as contact with garbage, work related injuries, illness and accidents [16]. However, only 12 workers (20%) reported health related sick leave and eight (13%) reported to had suffered work accident. This low rate of work-related accidents reports may due to the use of protective equipment or the low perception of risk in this population. In another study, the percentage of work-related accidents was higher, since 41% suffered cuts and scratches and 15% suffered falls during work.

Most of the workers reported good (44%) and excellent (43%) work ability. To the best of our knowledge, no other studies evaluated the work ability in this population.

However, studies found with other Brazilian populations, such as workers in the electrical sector, also found high proportion of good work ability [27] as well as found for administrative workers [28]. In a research among workers from an industry of office materials, 87% of the men presented WAI between good and excellent and among women, 47% have good or excellent WAI, this was probably due to the fact women are more affected by musculoskeletal symptoms [29]. These findings differ from our results, because despite the majority of the population collectors were composed by female waste pickers, they had high WAI. We can hypothesize that the high work ability is related to the work satisfaction and commitment which was already shown in this occupational group [26], as a result of their recognition of the importance of their work for the environment.

Low back, shoulders, neck, ankles and wrists/hands were most affected by symptoms during the last 12 months. This body parts are also highly demanded during work, since the waste collection involves moving, standing and high upper arms and wrists/hands motions during sorting materials and collecting waste at streets. In a study that examined the prevalence of musculoskeletal symptoms in collectors from various regions of Brazil, 38% reported back pain and 91% musculoskeletal pain [12]. In another studies carried out with Brazilian waste pickers it was observed that 91% reported musculoskeletal pain and 96% physical fatigue [10], mainly at upper and low back [16].

In a study conducted in Sweden with employees of recycling centers 44% reported cervical pain, 45% shoulder pain, 21% upper back pain, 47% low back pain, 26% knee pain and 14% feet pain in the last 12 months [13]. These data show that in our study the prevalence of low back pain was similar to other studies, indicating that the waste collector work involves high physical demands for the low back and arms.

The hypertension prevalence was also high, as in other study with similar sample [11]. However, the majority of respondents were considered active or highly active. This large percentage of active individuals might be explained by the fact that most people exercised as a form of commuting, most of them used the bicycle as a means of transportation and others walked from home to work, which demonstrates that the physical activity practiced only occurred due to the need to move to the workplace.

The proportion of smokers was high (34%), since in Brazil there was a reduction in the prevalence of smoking from 1997 (33%) to 2011 (15%). This reduction occurred due to restriction of availability, marketing and control of consumption in public places [30]. Our data show that among the recyclable waste pickers the prevalence of smoking is much higher than the Brazilian population, probably due to low education and lack of access to information in this population [31].

Concerning alcohol consumption, our results indicated a lower rate of alcohol use than other researches, and it could be due to the fact that our population of collectors is predominantly female, considering that men have a higher prevalence of alcohol consumption in relation to women [32]. In addition, many workers reported that drinking is an expensive addiction.

## Conclusion

This descriptive study outlined the profile of recyclable waste pickers regarding work ability and health problems, which may help to identify risk factors and to propose preventive measures focused on musculoskeletal and cardiovascular diseases.

### Compliance with Ethical Standards

**Conflict of interest** The authors declare that there is no conflict of interest to disclose.

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