



Occupational health in two centers for the sorting and collection of recycled materials in the Buenos Aires Metropolitan Area, Argentina, 2015

Salud ocupacional en dos centros de clasificación y acopio de materiales reciclables en el Área Metropolitana de Buenos Aires, Argentina, 2015

Andrea Mastrangelo¹, Pablo Schamber²

¹PhD in Social Anthropology. Coordinator. Health, Environment and Work [Programa Salud, Ambiente y Trabajo], National Center for Diagnosis and Research on Endemioepidemics [Centro Nacional de Diagnóstico e Investigación en Endemioepidemias], Universidad Nacional de San Martín. Independent Researcher, National Scientific and Technical Research Council [Consejo Nacional de Investigaciones Científicas y Técnicas], Buenos Aires, Argentina. ✉ 

²PhD in Philosophy and Letters. Independent Researcher, National Scientific and Technical Research Council based in Universidad Nacional de Quilmes [Consejo Nacional de Investigaciones Científicas y Técnicas con sede en Universidad Nacional de Quilmes]. Professor, Universidad Nacional de Lanús, Universidad Nacional Arturo Jauretche, Buenos Aires, Argentina. ✉ 

ABSTRACT How can the health risks be estimated of workers who handle urban solid waste sorting recyclable materials? To answer this question, during 2015, field research was carried out with an ecoepidemiological perspective in two classification and collection centers (one urban and another peri-urban) located in the southern area of the Metropolitan Area of Buenos Aires, Argentina. In order to describe the work process, ethnographic techniques (interviews, participant observation), as well as other projective and body work techniques were utilized to characterize the conditions and environment of this nonclassical type of work using the framework of risks and demands recommended by the International Labor Organization. The demands tend to concentrate on the entry and exit of materials, the risks of the work object on the sorting of the materials, and the biological risks on the work environment. Within the work process, diversity and little planning were found. Therefore, the characterization of working conditions and environment was also an opportunity for reflexivity among workers and researchers regarding the creation and organization of the work environment and the embodiment of illness.

KEY WORDS Occupational Health; Waste Products; Environment; Argentina.

RESUMEN ¿Cómo estimar los riesgos para la salud de las y los trabajadores que manipulan residuos sólidos urbanos separando y clasificando materiales reciclables? Para responder esta pregunta, durante 2015, se realizó una investigación en terreno con una perspectiva ecoepidemiológica en dos centros de clasificación y acopio (uno urbano y otro en un descampado periurbano) ubicados en la zona sur del Área Metropolitana de Buenos Aires, Argentina. Con el propósito de describir el proceso de trabajo, se utilizaron técnicas etnográficas (entrevistas, observación participante), proyectivas y de trabajo corporal, para caracterizar las condiciones y medio ambiente según riesgos y exigencias de la Organización Internacional de Trabajo para este trabajo no clásico. Las exigencias tenderían a concentrarse en el ingreso y salida de materiales, los riesgos del objeto de trabajo resultarían de la separación y, los riesgos biológicos, del ambiente de trabajo. Se encontró diversidad y poca planificación en el proceso de trabajo. Por ello, la caracterización de las condiciones y el medio ambiente de trabajo fue también una instancia de reflexividad entre trabajadores e investigadores sobre la creación-organización del ambiente de trabajo y la corporización de los padecimientos.

PALABRAS CLAVES Salud Laboral; Residuos; Ambiente; Argentina.

INTRODUCTION

This article explores the health risks of workers handling urban solid waste when sorting recyclable materials (paper, cardboard, plastic, glass, metal) during the different stages and tasks involved in the work process that they conduct in centers of classification and collection of these materials. There is a history of this type of work in Argentina^(1,2) and abroad^(3,4,5,6) that considers this aspect of such work both on the streets (street collection) and in dump sites (open dumps or sanitary landfills). However, the conditions and the working environment in centers of classification and collection of recyclable materials – a setting usually considered to be an improvement in the working conditions in this activity – have not been studied yet.

In Argentina, a report of the National Secretariat of Environment and Sustainable Development [*Secretaría de Ambiente y Desarrollo Sustentable de la Nación*]⁽⁷⁾ released in 2011 identified 201 operative classification plants of recyclable material, 70% of which are concentrated in the central region of Argentina (provinces of Buenos Aires, Santa Fe and Cordoba). This report, which included specific surveys of each establishment, concluded that the management of the plants, in general, is not integrated with waste sorting at source and differentiated collection, thus limiting the possibilities of efficiency and sustainability of the ventures, which depend on the allocation of government subsidies. Although the study observed that in the organization of the plants there was not an adequate division of tasks among the staff and that the working conditions were inadequate, the aspects specifically related to occupational health and working conditions were not characterized in depth.

In 2015, in view of this situation, through the Technological and Social Research and Development Program of the National Center for the Diagnosis and Research in Endemioepidemics of the National Administration of Health Laboratories and Institutes [*Programa de Investigación y Desarrollo Tecnológico y*

Social del Centro Nacional de Diagnóstico e Investigación en Endemioepidemias de la Administración Nacional de Laboratorios e Institutos de Salud] and Universidad Nacional de San Martín, along with professionals from Universidad Nacional de Lanús that had been studying informal waste recovery circuits, an exploratory survey was conducted at two waste collection centers. These centers became complementary study sites of the diversity of working conditions and environment, as well as of the different types of tasks that are carried out there, including the promotion of household sorting of waste and recyclables; waste collection on public roads; transportation and unloading at the collection center; internal transportation; loading and unloading of carts, bales and bags; bag breaking; sorting by types; glass bottle crushing; plastic and metal compression; and – due to the disconnection existing between the sorting of waste and materials at the source – the manipulation of organic matter and other potential pathogenic pollutants (originating from unclassified industrial waste).⁽⁸⁾

In theory, the workers of these centers were considered “non-traditional”⁽⁹⁾ as they are neither defined by the condition of being salaried employees, nor by a formal employment relationship with the owner of the means of production, but because they create their own jobs – they are self-employed – and they both negotiate the value of their goods and create the market where they get those goods from and commercialize them. Understanding this practice as part of the social dynamics of employment, implies acknowledging a type of “extended working subject”⁽⁹⁾ as the worker depends on other simultaneous institutional insertions (the social networks of the analyzed cooperatives) for the production and social reproduction of his/her role as worker.

METHODOLOGY

This article presents part of the results of an interdisciplinary descriptive research study⁽⁸⁾

with a broader ecoepidemiological⁽¹⁰⁾ perspective. The research team was made up of social anthropologists, parasitologists, entomologists, virologists, photographers and a eutony specialist. In an already published article⁽¹¹⁾ and a book chapter still in press, different results of this interdisciplinary research were developed, which were mainly related to biological demands and risks (for example, the presence of vectors and parasites) and to the analysis of the institutional history and organizational modality of the cooperatives that manage these centers.⁽¹²⁾ Additionally, in this article special emphasis is placed on the presentation of results obtained by using ethnographic methods (interviews, participant observation), focus groups, bodywork and projective techniques, referring to the work risks of those who conduct different tasks in the abovementioned sorting and collection centers.

The cases

A non-probabilistic intentional sample consisting of two waste sorting and collection centers with complementary features in terms of the environment (one of them a clearly urban setting and the other surrounded by an open field in a peri-urban area), the available technology (with and without waste sorting belt conveyors, balers and vehicles of their own) and the social relations of production ("cooperatives" of different origins and organizational modalities). Both cases have in common that they receive recyclable household waste that ideally should arrive "clean and dry" at the centers, as they are differentially collected in accordance with the municipal "Green Bag" programs. Through these programs, the municipalities promote the domestic sorting of recyclable waste, which must be placed in green bags by the residents and establish the specific waste collection days and times using municipal vehicles or vehicles hired for that purpose.

The center located in the urban area is a partially collapsed warehouse with a covered surface of about 30 x 48 meters. The center

was assigned by the municipality for the sole purpose of differentiated waste collection in the district. The "Green Bag" in this case is collected by members of the organization exclusively in a middle-income residential area, located nearby the study site. During the fieldwork we documented that this collection center also receives spontaneous donations of materials from public and private medium and small-size establishments (offices, stores and industries) from other areas of the municipality.

The peri-urban center, on the other hand, is a rented parcel of land of approximately 10,000 m², on which a warehouse of 30 x 50 meters has been erected. Thus, several sorting tasks are carried out indoors while others are conducted out in the open. The center is surrounded by an empty field, where part of the selective collection of the "Green Bag" campaign covering the entire city is dumped. This center also receives waste from third parties: some as donations (industries and stores); others, thanks to provincial regulations implemented in 2013 which allow large waste generators (in this case, gated neighborhoods) to be charged for transport and treatment services (Resolutions No.137, 138 and 139 of the Provincial Agency for Sustainable Development of the province of Buenos Aires [*Organismo Provincial para el Desarrollo Sostenible de la provincia de Buenos Aires*]).

Field techniques and analysis

During 2015, eight successive and seasonally distributed visits were made. Through participant observation and open interviews initially and semi-structured interviews later, the work process of each sorting and collection center was characterized, and stages, tasks and job posts were determined. All the interviews and field activities took place at the collection centers, during working hours or hygiene or meal breaks. For the survey of variables related to working conditions and environment, a methodological design based on the recommendations of the International

Labor Organization (ILO)^(13,14) was implemented and all external situations beyond the workers' control that constitute the risks as well as the demands internal to the workers were defined. Risks can arise from the physical conditions in the workplace (light, noise, vibrations, humidity and heat), hazardous substances (dust, chemical and biological substances – vectors and reservoirs are included here), they may be generated by the operating equipment and materials (machines, tools and facilities of the workplace) or may derive from the natural environment. Demands are classified as static or postural physical burdens, uncomfortable and forced postures, dynamic physical activity (which includes physical effort, general and repetitive movements) and work organization and division (extended working hours, remuneration according to quantity, management type, work content).

In order to be eligible, the interviewees had to work in any of the two sorting and collection centers. Based on the testimonies of all the workers (n = 40) in the two study sites, through participant observation of the work process and focus groups – in which projective techniques were implemented including graphic representation (paper figure) and the body (eutony) – the work of each waste sorting plant was described by dividing it into stages, tasks and jobs, and by defining risks and demands in terms of these job positions.

To ensure that the narratives of work-related distress included the life trajectories of each worker, two projective techniques were used with the workers during three meetings: a human figure made of paper with the identification of tension-pleasure points and the indication of symptoms on a human silhouette.⁽¹⁵⁾ In this group activity, the practice of embodiment⁽¹⁶⁾ through eutony exercises⁽¹⁷⁾ was promoted. The projective techniques using bodywork took place in focus groups with workers from the same stage of the work process and in-depth interviews were used when only one worker was in charge of the stage. Paper figures of approximately 25 cm were made, on which the workers marked colors, lines and dates to show how the body

felt before, during and after work. Another set of data emerged when the workers assumed a horizontal position on the floor or when female workers in the same stage (waste sorting in a conveyor belt) identified tension points in their backs using cane rods or a tennis ball while they were performing eutony exercises. The individual oral testimonies obtained in the previous conversations were compared with this instance of group bodywork using projective techniques. The record of this set of collective research practices was the source of data based on which the demands on the body were systematized in the classification and hauling work; therefore, the oral testimony material cannot be cited literally, because it is relative to the shared practices between researchers and subjects participating in the study regarding the points of tension or overload, building a collective vision of the demands of the job position based on the experience of the workers themselves.

Figure 1 shows the workers indicating the points of tension and pleasure to determine the demands of the standing position in the job, while Figure 2 shows workers doing eutony exercises.

Using this same procedure, “mosquito points” and “rat points” were identified, as the places where, from the actor's point of view, there were vectors and reservoirs, which were then identified and analyzed using specific methodologies that were detailed in another publication.⁽¹¹⁾

The field records (digital audios, photographs, the material records of the projective techniques and graphic materials supplied by the workers) were analyzed with the *Atlas.ti* software, in accordance with the grounded theory⁽¹⁸⁾ of data, the results of which were organized in the a matrix of work stages, tasks and job posts proposed by the International Labor Organization (ILO).⁽¹³⁾

Ethics Review

This research project was submitted to a bioethics review and was approved by the Ethics Committee of the National Institute



Figure 1. Workers at the waste sorting and classification peri-urban center indicating the points of tension and pleasure to determine the demands of the standing position in the job. Buenos Aires Metropolitan Area, Argentina, 2015.

Photo: Pía Leavy.



Figure 2. Workers at the waste sorting and classification peri-urban center doing eutony exercises. Buenos Aires Metropolitan Area, Argentina, 2015.

Photo: Pía Leavy.

of Human Viral Diseases “Dr. Julio I. Maiztegui,” National Administration of Laboratories and Health Institutes [*Instituto Nacional de Enfermedades Virales Humanas “Dr. Julio I. Maiztegui” - Administración Nacional*

de Laboratorios e Institutos de Salud] (IN-EVH-ANLIS). All interviewees gave their informed consent, and the researchers agreed to preserve the anonymity of the people and places involved.

RESULTS

To determine risks and demands, it was necessary to characterize the work process in the sorting/classification and collection centers selected in the sample. Although both centers share the same legal identification as “service cooperative” and the same social identification as a “cooperative of *cartoneros*” [trash pickers], these productive undertakings differ in their origin, the history of their configuration, the labor trajectories of the workers that they employ, the labor continuity in the organization, the centrality of kinship ties in the organization of the production process, the way in which seniority is pondered as a hierarchical element in the organization, the access to food or subsidies to be distributed among the cooperative members and the greater or lesser levels of participation of municipal political actors in the formalization and/or articulation with the municipal authorities in charge of waste management, among other aspects. Even with these disparities, these “cooperatives” constitute the organizational form which the municipalities in the study area implement to delegate the classification and collection of recyclables.

In the case of the urban center, this initiative is coordinated by a municipal officer holding the rank of director, who defines the internal distribution of the tasks within two clearly differentiated groups: one that works a part-time morning shift, whose work activities are subject to weather conditions (for example, no waste collection is carried out on rainy days), and which is in charge of the promotion of household waste sorting and the “door-to-door” removal of the materials that the residents voluntarily offer; and another group that works full-time inside the warehouse unloading and manually classifying the contents of the removed bags, collecting the different materials according to their type, transporting and selling these materials in wholesale stores and calculating the proportional distribution of the income obtained in the transactions (75% for them and 25% for the other group). It should be noted that the members of the group

performing the promotion and removal tasks are beneficiaries of the “Argentina Works” Social Income with Work Program [*Programa Ingreso Social con Trabajo “Argentina Trabaja”*], whereas the group working in the warehouse are not.

The president of the organization is fully responsible for the management and operation of the peri-urban center. She is the third generation in her family devoted to the recycling activity (her father and grandfather were engaged in glass bottle washing and managed warehouses for the purchase and sale of recyclable materials). She is also the leader of a series of social activities that take place in a nearby venue, in which different types of social promotion actions are carried out (school tutoring, study plans for adults, computing, hairdressing, afternoon snack services, clothing donations and library). The cooperative warehouse also serves as a space for the collection and distribution of food supplied by different state bodies or obtained from large food suppliers (supermarkets). This food is offered as an incentive for presenteeism, punctuality or extra work carried out by the workers in this center. Unlike the workers in the urban center, the income of those employed in the peri-urban center is fixed per month and is not proportional to the sales.

The projective and body techniques, in addition to the methodology proposed by the ILO, helped us to elucidate, during the fieldwork, how the work process was structured based on the previous and daily illness and distress experienced by the workers, weighing risks and demands with personal, economic and political conflicts.

The elaboration of maps of the waste sorting centers and the printing of photographs showing the workers in the workplace or participating in focus groups, made it possible for the workers to associate the stages of the work process with spaces on the premises and to establish which should be signaled, what modifications should be made to avoid accidents or physical hardships, what protective measures should be taken, how to control the reproduction of vectors and reservoirs, and how to cover the costs of

these actions. Therefore, when the observation, interview and focus group techniques were implemented, the recommendations for prevention and health surveillance were discussed with the workers, which resulted in the decision to make a 2016 calendar including photos of both centers with the aim of selling it. Proceeds from the sale would be directed to the purchase of rodenticides

and larvicides for chemical control.⁽¹⁹⁾ Furthermore, all the researchers involved in the study continued to contribute to the development of a health surveillance system in the workplace, which included a health record for the activity.

Table 1 shows a summary of the work organization together with the identification of risks and demands for both centers. It is a

Table 1. Summary of the health demands and risks, according to the stages and tasks of two sorting and collection centers (urban and peri-urban). Metropolitan Area of Buenos Aires, Argentina, 2015.

Work stage	Tasks	Demands	Risks due to work process	Biological risks
Collection	Folding green bags to be delivered to the community residents	-	-	-
	Transportation to the location and going "door-to-door" on foot, handing in empty bags and collecting full bags	-	Presence of sharp materials	Contamination with cat feces (parasite reservoir). Risk of parasite presence (reservoir in dogs). Presence of <i>Aedes aegypti</i> and <i>Culex pipiens</i> vectors
	Placement of full bags at the edge of the sidewalks to facilitate waste collection	-	-	-
Loading	Loading the green bags into the truck	Physical effort	Road safety due to the use of deteriorated vehicles	Contamination with cat feces (parasite reservoir). Risk of parasite presence (reservoir in dogs). Presence of <i>Aedes aegypti</i> and <i>Culex pipiens</i> vectors
Transportation	Driving the vehicles	-	Road safety due to the use of deteriorated vehicles	-
Unloading	Manual green bag unloading at the plant	Physical effort	Presence of sharp materials	Contamination with cat feces (parasite reservoir). Risk of parasite presence (reservoir in dogs). Presence of <i>Aedes aegypti</i> and <i>Culex pipiens</i> vectors
Hauling	Loading of carts and dollies	Physical effort	Physical effort	Physical effort
	Hauling the materials to the work stations	Physical effort	Presence of sharp materials	Contamination with cat feces (parasite reservoir). Risk of parasite presence (reservoir in dogs). Presence of <i>Aedes aegypti</i> and <i>Culex pipiens</i> vectors
Classification	Unloading carts and trolleys at the work stations	Poor lighting. Use of force in the upper limbs. Asymmetrical wear and tear in the lower back	Presence of sharp materials	Contamination with cat feces (parasite reservoir). Risk of parasite presence (reservoir in dogs). Presence of <i>Aedes aegypti</i> and <i>Culex pipiens</i> vectors
	Classification of materials	Poor lighting. Use of force in the upper limbs. Asymmetrical wear and tear in the lower back	Presence of sharp materials	Contamination with cat feces (parasite reservoir). Risk of parasite presence (reservoir in dogs). Presence of <i>Aedes aegypti</i> and <i>Culex pipiens</i> vectors
Bagging and bailing processes	Transfer of materials in small bags or containers to larger sacks	Poor lighting. Use of force in the upper limbs. Asymmetrical wear and tear in the lower back	Presence of sharp materials	Contamination with cat feces (parasite reservoir). Risk of parasite presence (reservoir in dogs). Presence of <i>Aedes aegypti</i> and <i>Culex pipiens</i> vectors
Collection	Hauling of sacks for collection	Physical effort. Strain on the knees, workers inside the sacks to reduce the volume of waste	Presence of sharp materials	Contamination with cat feces (parasite reservoir). Risk of parasite presence (reservoir in dogs). Presence of <i>Aedes aegypti</i> and <i>Culex pipiens</i> vectors
Loading	Hauling of sacks to the truck	Physical effort	Physical effort	Physical effort
	Manual loading into the truck	Physical effort	Presence of sharp materials	Contamination with cat feces (parasite reservoir). Risk of parasite presence (reservoir in dogs). Presence of <i>Aedes aegypti</i> and <i>Culex pipiens</i> vectors
Transportation	Driving the truck	-	Road safety due to the use of deteriorated vehicles	-
Sales	Unloading sacks at the points of sale	Physical effort	Physical effort	Physical effort
	Record of sales and calculation of the percentages for distribution among the groups	Physical effort	Road safety due to the use of deteriorated vehicles	Contamination with cat feces (parasite reservoir). Risk of parasite presence (reservoir in dogs). Presence of <i>Aedes aegypti</i> and <i>Culex pipiens</i> vectors
Cleaning	Sweeping	Physical effort	Physical effort	Physical effort
	Collection of disposable materials	Physical effort	Road safety due to the use of deteriorated vehicles	Contamination with cat feces (parasite reservoir). Risk of parasite presence (reservoir in dogs). Presence of <i>Aedes aegypti</i> and <i>Culex pipiens</i> vectors
	Loading disposable materials into the truck	Physical effort	Road safety due to the use of deteriorated vehicles	Contamination with cat feces (parasite reservoir). Risk of parasite presence (reservoir in dogs). Presence of <i>Aedes aegypti</i> and <i>Culex pipiens</i> vectors

Source: Own elaboration.

scheme that was designed and agreed upon with the workers of the centers between May and November 2015.

In summary, despite the variables that show structural and contingent differences in the classification and collection centers studied, we conclude that in both cases the demands tend to concentrate on the tasks related to the entry and exit of materials, while the risks due to the work itself have to do with the the sorting process and the biological risks in the work environment.

DISCUSSION

The right to health in non-traditional work: an open debate

To consider these workers as non-traditional (rather than characterizing them as “informal” or “precarious workers”) is a theoretical choice,⁽⁹⁾ as we understand that the social situation in which they are inserted is not temporary nor will it be overcome by the expansion of the productive forces. It is non-traditional work developed by the workers themselves who generated a service, by simultaneously considering two opportunities: on the one hand, to satisfy the demand for raw materials in low-cost industries using industrial and domestic waste, and on the other hand, to offer the municipal management the possibility of reducing the volumes of garbage to be buried and the expenses arising from its transport and final disposal.

In this study we did not characterize the workers as “informal”, which, in fact, has been productive for other analyses of this multidimensional phenomenon,^(20,21) because whether or not labor laws are complied with, it is the workers who, with different levels of capitalization, generate the product, the market (public or private contracts) and the job positions.

The non-traditional work of the classification and collection centers also implies, an “extended working subject”⁽⁹⁾ that is integrated into “economic subsystems,”^(22,23,24) producing physical or virtual interactions

with others. In this sense, the work of suppliers and customers is relevant to enable the work of classifiers. Without the residents that hire the transport (gated communities) or separate the waste in “Green Bags” (public service of selective waste collection), without the industrial generators that give away their trash, without the tax regulation of “sustainable destinations,” without the industry or wholesale intermediaries of materials, the work in the collection centers would not exist as such. The availability of other permanent or sporadic sources of income for those employed in the classification and collection centers and the possibility of returning to them, is also part of this expanded labor scenario.

However, there is one sense in which the workers of the collection centers are traditional workers. When they started working in the warehouses, they separated their work from their home, although they took with them all the inherent risks and demands of their specific task. In the case of the collection centers studied, leaving behind the collection in the streets and creating “the warehouse” for classification and “the cooperative” as a legal entity implied a process of organization of the labor process, political alliances and economic contributions, while separating domestic life from work, a fact that was especially relevant given that most of the workers are women.

The numerous social studies on risk and labor are based on a few theories.^(1,25,26,27,28,29) Considering that, in the previous century, the primary source of risk reduction was the wage society⁽¹⁾ through which the State acknowledged rights and provided access to social security, we should ask ourselves whether, at present, and in reference to non-traditional work, labor risk and occupational health can (or must, in terms that respect the legal equality of individuals) be addressed in the same way in the case of heterogeneous social actors such as the “cooperatives” that classify, collect and market materials recovered from waste.

The work conducted by those who recover materials, just like any other job, secures an income but at the same time

produces a risk. In a time in which the State and social security are becoming limited, the vulnerability of non-salaried workers is even greater. Thus, we maintain that, in the work conducted in the collection centers, there is an inversely proportional relationship between risk and income: income reduces uncertainty, but the way this income is obtained in socially vulnerable subjects makes the exposure to risk potentially greater, as they work outside any safeguard mechanism and with a lower symbolic capital.

In view of this situation, we understand that it is not a question of imposing a notion of the risk of salaried collectives on non-traditional workers, by extrapolating their labor trajectories or failing to contemplate vulnerability or social risk. Nor is it a matter of achieving a numerical value or risk assessment as required by insurance companies. Our proposal, based on the implemented qualitative methodologies, is to attempt a transactional definition of the work risk, health, conditions and environment, reflecting with the workers on the tasks involved in their job position, in the organization in which they participate.

When studying the risks and demands along with the organization of the work process, we understand the maximization of productivity is not the only criterion that governs the organization of stages and tasks. Age and gender, seniority in the work group, preexisting health conditions in the workers, kinship or affinity relationships, as well as the donation of conveyor belts, scales and compressors by public or private social actors, and the availability of water and motor system energy shape the organization and condition its safety and productivity.

The grounded theory methodology relationship in the case studies

The interventions of local waste management policies with regards to urban waste recyclers have been changing over time⁽³⁰⁾ and the pace of the changes has accelerated in the last 20 years.⁽³¹⁾ The work practice of the *cartoneros* is no longer invisible and has begun to be

valued positively in the public policy agenda.

Although they share the fact of being “cooperatives of *cartoneros*,” as we have previously characterized them,⁽¹²⁾ the organizational modalities, the ways in which the job positions are generated, the hiring and capitalization vary drastically. Moreover, to understand the subjectivation in collective processes, the legal category of “cooperative” must be made more complex in a number of dimensions to describe covert labor relationships and subalternizing hierarchizations.

In the already mentioned studies on the occupational health of *cartoneros*,^(1,2,3,4,5,6) there is a predominance of cases with diverse social relations of production, to which structured surveys are applied based on risk and occupational health parameters that are standard to some extent, and which can be applied *mutatis mutandis* to any income-generating activity. Some articles determine risks only from the perspective of workers^(4,5) or the public health system.⁽¹⁾ If similar methodologies had been applied in our study, the singularities mentioned for each case, which include particular personal and organizational trajectories resulting in the working conditions and environment, could not have been easily noticed.

Unlike other studies that group the *cartoneros* into a universal and somewhat homogeneous work identity,⁽¹⁾ we consider that the groups of workers studied here do not correspond to a specific collective identity; hence, the different cultural poles⁽²⁹⁾ with regard to risk are neither associated with variables that are external to the conditions and the environment nor are they completely individual. Therefore, the implemented methodology was oriented towards collectively determining the productive and organizational rationality that is endogenous to the work process, defining the risks and demands emerging from it. In the case studies presented here, the ethnographic work, along with the projective techniques, the photographs and the bodywork were central to building knowledge while reflecting with the workers. We consider that the involvement of the workers in the embodiment⁽¹⁶⁾ of the

distress⁽³²⁾ associated with the job positions, is also central to thinking about prevention, as prevention rests in the hands of the same workers' organizations and requires them to play a prominent role.

It was with this intention that we transformed the somewhat typological and prescriptive tool of the ILO^(13,14) into an instrument of reflection in the focal groups using projective and body techniques shared with the workers. Thus, while collecting information about the work process, the interviews gave an account of the delicate balances achieved

in the organization of the productive process, the productive, political and gender-related hierarchies, the switching of workers in the different work positions, the demands that cause pain and disease, as well as the coexistence with domestic and synanthropic animals that were eventually reservoirs of disease and vectors of viruses and parasites.^(11,12) Therefore, we consider that the interdisciplinary methodological design presented in this study is useful for understanding occupational health in non-traditional work and can be replicated in other studies.

ACKNOWLEDGEMENTS

Arturo Lizuain was responsible for the research on biological risks and María Soledad Santini (CeNDIE-ANLIS) on entomology; Natalia Guerreiro Martins and Rosario Robles (CEPAVE-CO-NICET-UNLP) were in charge of the parasitological research on rodents and dog and cat feces; Victorio Palacio and Silvina Goenaga (INEVH-ANLIS) for virological research; Verónica Eggers (Healthy Work) was the eutony specialist; Pia Leavy (CO-NICET-UBA) and Laura Díaz Galán (Social Atlas) were the photographers.

This research was funded by the "Carrillo-Oñativia" fellowship in the category of multicenter collaborative study, awarded by the Directorate of Health Research, Ministry of Health of Argentina [*Dirección de Investigación para la Salud, Ministerio de Salud de la Nación, Argentina*], and registered under number IS000925 in the National Register of Health Research [*Registro Nacional de Investigaciones en Salud*] (RENIS) of the Integrated System of Argentine Sanitary Information [*Sistema*

Integrado de Información Sanitaria Argentina]. Andrea Mastrangelo was the study coordinator.

REFERENCES

1. Panaia M. Accidentes de trabajo en el "cartoneo". Identidad y medioambiente. In: Panaia M. Sociología del riesgo accidentes de trabajo en el sector informal. Buenos Aires: Miño y Dávila; 2008.
2. Parizeau K. Un estudio de la Salud de los Cartoneros de Buenos Aires: Peligro y desigualdad. In: Suárez F, Schamber P. Recicloscopio II: Miradas sobre recuperadores urbanos de América Latina. Buenos Aires: Ciccus; 2011.
3. Gómez-Correa Jaime A, Agudelo-Suárez Andrés A, Ronda-Pérez Elena. Condiciones sociales y de salud de los recicladores de Medellín. *Revista de Salud Pública*. 2008;10(5):706-715.
4. Velloso MP, Guimaraes MBL. A imagem na pesquisa qualitativa em saúde. *Ciência & Saúde Coletiva*. 2013;18(1):245-252.

5. Cavalcante S, Franco MFA. Profissão perigo: percepção de risco à saúde entre os catadores do Lixão do Jangurussu. *Revista Subjetividades*. 2007;7(1):211-231.
6. Castilhos Junior AB, Ramos NF, Alves CM, Forcellini FA, Gracioli OD. Catadores de materiais recicláveis: análise das condições de trabalho e infraestrutura operacional no Sul, Sudeste e Nordeste do Brasil. *Ciência & Saúde Coletiva*. 2013;18(11):3115-3124.
7. Grupo Arrayanes. Proyecto nacional para la gestión integral de residuos sólidos urbanos BIRF 7362-AR [Internet]. Buenos Aires: Observatorio Nacional de Gestión de Residuos Sólidos Urbanos; 2011 [cited 6 Mar 2019]. Available from: <https://tinyurl.com/y6evqwdn>.
8. Mastrangelo A, Schamber PJ, Lizuain AA, Guerreiro Martins N, Palacio V. Descripción y análisis de la percepción y exposición a riesgo de enfermedades zoonóticas en trabajadores de plantas cooperativas de acopio y separación de residuos para reciclado en el Área Metropolitana de Buenos Aires. Buenos Aires: Registro Nacional de Investigaciones en Salud (IS000925); 2015.
9. De la Garza Toledo E. Trabajo no clásico y flexibilidad. *Caderno SRH*. 2013;26(68):315-330.
10. Susser M, Susser E. Choosing a future for epidemiology: I Eras and paradigms. *American Journal of Public Health*. 1996;86(5):668-673.
11. Mastrangelo AV, Schamber PJ, Lizuain AA, Guerreiro Martins N, Palacio V. Estudio descriptivo sobre salud ocupacional en centros de clasificación de material reciclable en el área metropolitana de Buenos Aires. *Revista Argentina de Salud Pública*. 2016;7(Número especial):13.
12. Mastrangelo AV, Schamber PJ, Lizuain AA, Guerreiro Martins N, Palacio V. Salud y trabajo en centros de acopio de material reciclable del AMBA: Exploración interdisciplinaria a partir del estudio descriptivo de dos casos. In: Schamber PJ, Suárez F. *Recicloscopio VI*. Buenos Aires: UNGS-UNLa-CICCUS. (In press, 2019).
13. Organización Internacional del Trabajo. Las condiciones y medio ambiente de trabajo para los facilitadores [Internet]. Buenos Aires: OIT; 2003 [cited 29 Mar 2016]. Available from: <https://tinyurl.com/yay4sto3>.
14. Organización Internacional del Trabajo. La salud y la seguridad en el trabajo (series) [Internet]. Buenos Aires: OIT; 1996 [cited 29 Mar 2016]. Available from: <https://tinyurl.com/yy5ouf8u>.
15. López Barberá E. La escultura y otras técnicas proyectivas aplicadas en psicoterapia. Barcelona: Paidós; 1997.
16. Citro S. La antropología del cuerpo y los cuerpos en-el-mundo: Indicios para una genealogía (in)disciplinar. In: Citro S. *Cuerpos Plurales: Antropología de y desde los cuerpos*. Buenos Aires: Biblos; 2011.
17. Rovella A. La eutonía: Sus principios. *Jornadas de Cuerpo y Cultura, Universidad Nacional de La Plata* [Internet]. 2008 [cited 29 Mar 2016]. Available from: <https://tinyurl.com/yagqztze>.
18. Glaser B, Strauss A. *The discovery of grounded theory: strategies for qualitative research*. New York: Aldine Publishing; 1967.
19. Leavy P, Díaz Galán L. *Calendario 2016, sobre el trabajo en los centros de acopio del Estudio colaborativo multicéntrico salud ocupacional en centros de acopio de reciclable*. Buenos Aires: PDS UNAJ, UNLa, UNQ, CONICET, UNSAM-CeNDIE ANLIS; 2015.
20. Saraví G. *Detrás de la basura: cirujas; Notas sobre el sector informal urbano*. In: Quirós G, Saraví G. *La informalidad económica, ensayos de antropología urbana*. Buenos Aires: CEAL; 1994.
21. Schamber P, Suárez F. El cirujeo y la gestión de los residuos: Una mirada sobre el circuito informal del reciclaje en el conurbano bonaerense. *Revista Realidad Económica*. 2002;190:32-63.
22. Lacabana M, Schamber P, Moreno F. *Subsistemas económicos, territorio y ambiente: El reciclaje en el conurbano sur de Buenos Aires*. *Proyección*. 2015;IX(18):118-145.
23. Schamber P, Lacabana M, Moreno F. De convertidor industrial a depositero polirubro: Trayectoria y actividad productiva de un acopiador de residuos reciclables de Quilmes. *Revista de Ciencias Sociales, segunda época*. 2015;7(27):139-161.
24. Schamber P, Lacabana M, Bressano C. *Detritus del consumo y producción industrial en el territorio del reciclaje: Análisis de la intermediación en el sur del conurbano bonaerense*. *Revista Iberoamericana de Estudios Municipales (RIEM)*. 2015;VI(11):120-143.
25. Douglas M. *La aceptabilidad del riesgo según las ciencias sociales*. Barcelona: Paidós; 1996.
26. Ewald F. *L'Etat providence*. Paris: Grasset; 1986.
27. Beck U. *La sociedad del riesgo: Hacia una nueva modernidad*. Barcelona: Paidós; 2000.

28. Giddens A. Consecuencias de la modernidad. Madrid: Alianza Editorial; 2001.
29. Douglas M, Wildavsky J. Risk and culture. Oakland: University of California Press; 1984.
30. Suárez F. La Reina del Plata, Buenos Aires: sociedad y residuos. Los Polvorines: Ediciones Universidad Nacional de General Sarmiento; 2016.
31. Dimarco S. Entre el trabajo y la basura: socio-historia de la clasificación de residuos en la Ciudad de Buenos Aires (1870-2005). [Tesis de Doctorado en Ciencias Sociales]. Buenos Aires: UBA; 2010.
32. Fassin D. Gobernar por los cuerpos, políticas de reconocimiento hacia los pobres y los inmigrantes en Francia. Cuadernos de Antropología Social. 2003;(17):49-78.

CITATION

Mastrangelo A, Schamber P. Occupational health in two centers for the sorting and collection of recycled materials in the Buenos Aires Metropolitan Area, Argentina, 2015. Salud Colectiva. 2019;15:e1348. doi: 10.18294/sc.2019.1348.

Received: 13 March 2017 | Modified: 20 December 2017 | Accepted: 29 January 2018



Content is licensed under a Creative Commons

Attribution — you must attribute the work in the manner specified by the author or licensor (but not in any way that suggests that they endorse you or your use of the work).

Noncommercial — You may not use this work for commercial purposes.

<http://dx.doi.org/10.18294/sc.2019.1348>

This article was translated by María Victoria Illas, and reviewed by Vanessa Di Cecco.