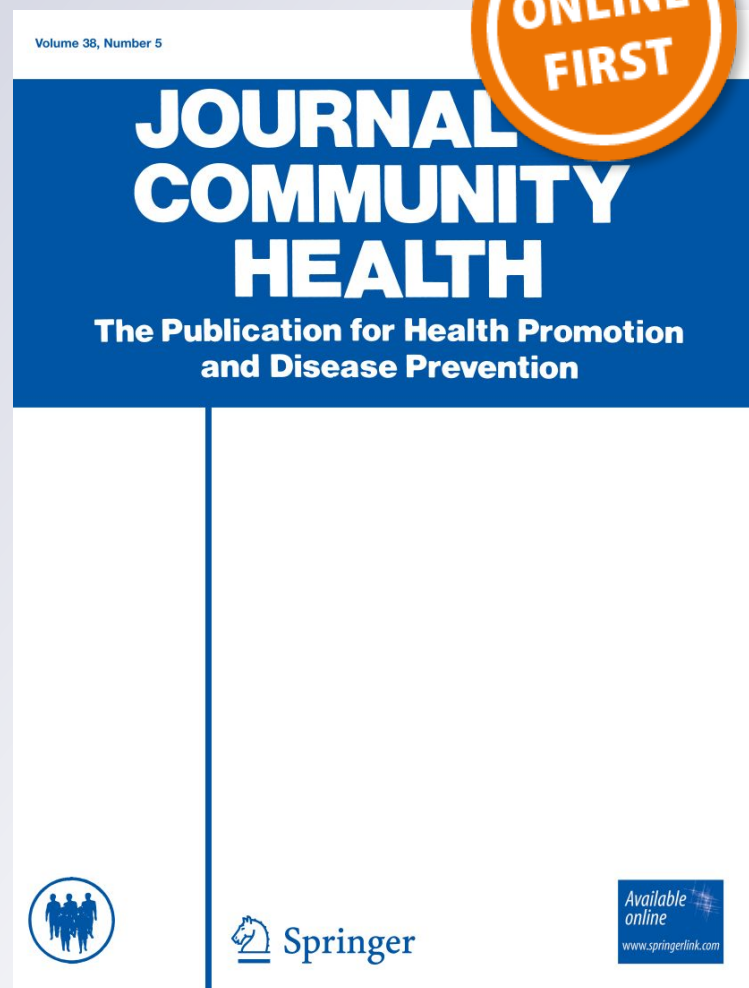# Analyzing Factors Associated with Trash Pickers' Health Status: Census Data in a Major City in Colombia

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Analyzing Factors Associated with Trash Pickers' Health Status: Census Data in a Major City in Colombia

Lina Martínez[1] · Blanca Zuluaga[2] · Sergio I. Prada[3]

Abstract
This study aims to identify factors associated with the probability of trash pickers feeling physically or mentally ill and assesses differences by gender. To achieve these, we estimated multivariate regression models by using data from a census' update of 3109 trash pickers in Cali-Colombia in 2015. Outcomes are defined by two binary variables for whether the trash picker reports 14 or more days during the last month with physical and mental illness. Factors included demographic, family, psychological, socioeconomic and job characteristics. We found gender differences in several risk factors. Also a strong link between physical and mental health was found. Trash picker women are more vulnerable than men, public policy interventions aimed at prevention and treatment of mental health problems will have a positive side effect on their physical and mental health.

Keywords Trash pickers · Gender · Colombia · Mental health · Physical health

Introduction

Trash pickers could be deemed as the poorest amongst the poor. This population lives under extreme poverty and factors such as malnourishments, lack of health access, no access to potable water and low educational attainment are prevalent.[1] Given their social stigma and lack of political influence, trash pickers have been left out of the political agenda and little is known about their living and health conditions in Colombia.

Nevertheless, a Supreme Court Ruling have pushed up the living conditions of trash pickers at the top of the political agenda in Cali, the third most populated city in Colombia (2.4 million of habitants). The Constitutional Court Sentence

T-291 of 1998 obligated the local government to implement a comprehensive package of social interventions to improve their socioeconomic conditions and quality of life. This package includes mandatory enrolment to the health system, participation in cash transfers programs, increase on educational attainment, job generation, among other strategies.

Consequently, during the last 15 years, trash pickers have been the main target of several social policies in the city. However, in spite of the local government efforts, the latest census update carried out in 2015[2] still reveals a number of deprivations, especially in their health, levels of education, housing conditions, and income generation capacity.[3]

Taking advantage of the 2015 Census update, a unique dataset, the purpose of this paper is to identify the factors associated with physical and mental health conditions of this population. Census data showed that both past and current local government efforts aimed at improving social outcomes, and specifically health-related outcomes are still insufficient. Over a third of waste pickers self-report their health as fair or poor and an important proportion of those rating their health as poor (over 30%) do not have health insurance; 17.4% of the survey respondents reported that they were hospitalized during the last year; 41% are

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[1] Binion and Gutberlet [1].

[2] The original trash pickers Census had been carried out in 2009.

[3] Estrada et al. [2].

obese—overweight despite the physical demands of their occupation; 16% have certain type of disability, especially motor or sensorial type; and, 34% of the disabled do not have health insurance, and 30% are 60 years or older.

The data also reveals important differences by gender. Over 40% of females' waste pickers consider that their health is fair or poor. For males this proportion is 31%. Likewise, 27.4% of females had more than 14 days of poor physical health and 21.5% more than 14 days of mental distress (anxiety, depression, sadness) during the month prior the survey collection. For males this proportion is 21% and 13.4% for physical and mental health respectively.

Research on the health condition of waste pickers in this context is relevant for several reasons. First, this analysis provides a proxy of health outcomes within the most deprived population in urban Cali. Second, it makes available information about the outcomes of government intervention. By no means this analysis is an evaluation of a public policy, but this could be an initial call for a rigorous examination of the effectiveness of health intervention amongst the poor as mandated by the Constitutional Court. Third, the analysis provides information in a context where data is scarce for policy decision-making. We aim at contributing to these issues.

This paper has five parts. The second reviews the literature on health outcomes amongst the poor and trash pickers. The third part presents the data and methodology. The fourth part describes results. The fifth part concludes with a discussion.

Background

Poverty and Health Outcomes

Poverty and ill health are highly associated.[4,5] Different studies have shown that individuals living in deprived conditions and poverty display more often poor health outcomes. This association reveals an association that runs in both directions: poverty keeps people ill, and ill individuals are less able to escape poverty.[6]

Individuals living under poverty are more likely to be obese, suffer more often of depression, malnourishment, and chronic physical illnesses. The poor also has less access to health services and are disproportionately more prone to live under stressful circumstances, violence and crime.[7] Females are also more penalized. Obesity rate amongst poor females

is higher and depression and anxiety are more prevalent amongst females within this population.[8,9,10,11,12,13]

Health Outcomes of Waste Pickers

Information about health conditions of waste pickers have been reported worldwide, in particular, in developing countries like Brazil.[14,15] India,[16,17,18,19,20] Vietnam,[21] Colombia[22] and Argentina.[23] Most of the studies in this field have used mixed methods to describe health conditions of trash pickers. Several of them have used standardized surveys with self-reported health outcomes, focus groups or interviews with specific questions about health conditions, and just a few have used medical observation or testing.[24,25,26] The use of quantitative analysis is scarce in this area. Studies conducted in India[27] and Brazil[28] use census information to compare trash pickers with community comparisons groups to determine whether health conditions are more pronounced amongst trash pickers. Studies that have made gender comparisons report that females are more likely to suffer obesity or hypertension.[29]

One major conclusion of this body of research is the poor health conditions of this population. For instance, amongst trash pickers in Medellin, the second most populated city in Colombia, 32% reported having respiratory infections, 10% intestinal diseases, 47% chronic conditions (mental and physical) and 37% no access to health insurance.[30] Similar conclusions are reached by other studies in Asia where poor

4 Wagstaff [3].
5 Lund et al. [4].
6 See Ref. [5].
7 World Health Organization, WHO [6].
8 Rosenfield and Mouzon [7].
9 See Ref. [8].
10 Lund [9].
11 Patel and Kleinman [10].
12 Patel et al. [11].
13 Drewnowski [12].
14 Auler et al. [13].
15 Gutberlet and Baeder [14].
16 Chikarmane [15].
17 Devi et al. [16].
18 Hayami et al. [17].
19 Hunt [18].
20 Van Eerd [19].
21 Chalin et al. [5].
22 Gómez-Correa et al. [20].
23 Martin [21].
24 See Ref. [18].
25 See Ref. [13].
26 Parveen and Faisal [22].
27 See Ref. [6].
28 Da Silva et al. [8].
29 See Ref. [18].
30 See Ref. [7].

health is also latent on children and women. In Manila (Philippines), it was found that 23% of children living next to an open dump presented chronic cough, 18% wheezing, and 19% shortness of breath; children related with solid waste work had 2.5 higher elevated heavy metals in blood than children from the control group. In Bangkok, 65% of children working at or whose family members worked at the dumpsite presented intestinal infections. Likewise, in India 38% of women trash pickers have lost one child and 10% have lost three or more. The main causes children mortality were infectious illnesses such as diarrhea, tetanus, smallpox, bronchitis, and virus infections.[31]

Broadly speaking, studies have concentrated on five different health outcomes: chemical hazards, infections, mechanical trauma and ergonometric-musculoskeletal damage, emotional well-being, and psychiatric disorders.[32]

Chemical hazards and infections are highly correlated, since both are generated by improper disposition of waste (medical, chemical, human waste, etcetera). An aggravating factor is the permanent and direct contact that trash pickers have with these residues without taking protective measures and the lack of safety equipment such as gloves and proper footwear due to their limited income. Infections are one of the most perceived occupational threats amongst trash pickers.[33,34] Mechanical trauma and ergonometric-musculoskeletal damage refers to the physical illness than can be caused by lifting heavy objects, repetitive movements, fracture, falls or lacerations. In different studies, waste pickers report pain in back and limbs and frequent accidents related with the occupation are reported.[35,36,37]

Psychiatric disorders and mental health conditions have been less studied in this field. Just a few papers provide an insight in this domain.[38,39] In Pelotas, Brazil, trash pickers were matched by sex, gender and educational attainment with no trash pickers' workers from the same poor neighborhood in order to estimate the prevalence of minor psychiatric disorders. The prevalence of such disorders was 44.7% higher amongst trash pickers and particularly higher within women, alcoholics and smokers. Other studies cited by Binion and Gutberlet[40] have linked depression, anxiety and stress with the harsh living conditions of trash pickers.

The precarious socioeconomic conditions of trash pickers have a strong relationship with their health status. The results in this area or research have shown an impoverished population with low educational attainment and lack of access to health services in all countries where studies with this population have been conducted. Even though some trash pickers may have access to subsidized health insurance, time constrains and social stigma may prevent them to receive health care.[41]

Methods

Probably one of the reasons why trash pickers have not been sufficiently studied despite its relevance for public health and public debate is the considerable logistical challenge of collecting primary information of a mobile and disperse population. As mentioned above, due to a Constitutional mandate, the city government of Cali was ordered to conduct a census to define policy actions towards this population. In 2015, 3109 trash pickers were surveyed in the 22 urban districts of the city and 15 points of the metropolitan area.

Trained interviewers collected information of trash pickers and their families on different domains. Information was gathered about socioeconomic conditions, household physical conditions and access to public services, socioeconomic information about family members, income, life satisfaction, working conditions and self-reported health conditions.

We estimate multivariate regression models to assess the factors associated to trash pickers' health conditions. We constructed two binary variables as proxy for health conditions to use as dependent variables: an indicator for whether the person reported to have had 14 or more days feeling physically ill in the last 30 days; an indicator for whether the person reported to have had 14 or more days feeling mentally ill in the last 30 days.

Associated factors are characteristics at different levels: biological, demographic, psychological, family, health conditions, working conditions, community, or cultural. These factors precede and are associated with a higher likelihood of negative (positive) outcomes. Protective factors can also be thought as characteristics that reduce a risk factor's impact.

Due to privacy and confidentiality requirements, biological factors were not collected in the survey and, therefore, not included in the analyses. Focal groups were the methodology chosen to collect community and cultural factors, which implies that they cannot be included in the statistical analyses at an individual level. However, they will be used in the discussion section.

[31] Cointreau [23].

[32] See Ref. [13].

[33] See Ref. [23].

[34] Hunt [24].

[35] See Ref. [13].

[36] See Ref. [11].

[37] See Ref. [8].

[38] See Ref. [13].

[39] See Ref. [8].

[40] See Ref. [13].

[41] See Ref. [13].

Table 1 Socioeconomic characteristics of trash pickers by gender

Variable	N	Mean		t stat	P value
		Women	Men		
Demographics and income					
Age (years)	2886	41.8	46.1	7.95	0.000
Schooling (years)	2854	5.4	4.9	−3.64	0.000
Monthly income (U.S. dollars)[a]	2896	143	166	5.65	0.000
Monthly expenses (U.S. dollars)[a]	2878	130	139	2.31	0.021
People living in household (number)	2915	4.2	3.8	−5.03	0.000
Children					
Total (number)	2487	3.3	3.0	−3.55	0.000
Total in household (number)	2468	2.0	1.4	−10.31	0.000
Age first born (years)	2471	18.7	23.6	21.26	0.000
Health					
Felt physically ill (days per month)	2459	8.1	6.4	−4.39	0.000
Felt mentally ill (days per month)	2302	6.4	4.0	−6.21	0.000
		% Women	% Men	Z stat	P value
Selected demographic variables					
Household head	2901	83.4	84.8	−1.04	0.300
Literate	2934	81.5	83.6	−1.52	0.129
Single	2930	54.0	32.8	11.53	0.000
High score life satisfaction (9 to 10)	2894	30.4	42.2	−6.60	0.000
Health					
Uninsured	2937	26.3	33.9	−4.51	0.000
Had inpatient stay	2917	19.0	16.3	1.92	0.055
Disabled	2929	13.3	17.8	−3.30	0.001
Alcohol/drugs abuse	2925	0.6	7.2	−7.12	0.000
Dwelling					
Rented home	2915	56.2	54.8	0.76	0.449
Overcrowded	2704	33.9	24.3	5.33	0.000
Job conditions					
Is part of a trash pickers organization	2935	53.3	53.1	0.08	0.940
Trash picker for more than 10 years	2633	40.2	59.1	−9.63	0.000
Contributes to a retirement fund	2919	6.1	11.5	−5.00	0.000
Workplace accident insurance	2884	5.2	9.2	−4.11	0.000

[a]Calculated with an exchange rate of 2000 Colombian pesos for 1 U.S. dollar

Demographic factors included in our analyses are: age, number of years of education, and monthly income. Family factors included are: whether the individual is a household head, number of children, type of housing,[42] and whether household receives conditional cash transfers from government. Psychological factors included are: whether the person is satisfied with current weight, a score of life satisfaction on a 1–10 point-scale, and whether she had at least 1 day with no good mental health (only in physical illness analyses).

Physical health factors included are: whether the person had an inpatient stay in last 12 months, whether had a disability condition (self-reported), whether she had at least 1 day with no good physical health (only in mental illness analyses), and whether insured by any health coverage program. We stress the importance of obesity as a factor associated to poor health outcomes. Lastly working conditions included are: number of years working as a trash picker, and whether she works daily on the streets.

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[42] Dummy equals to one if the trash picker lives in a house or apartment, or zero otherwise (tent, room, others).

Table 2 Probability of physical and mental illness

	Probability of physical illness		Probability of mental illness	
	Women	Men	Women	Men
Demographic factors				
Age	0.005	0.014***	−0.003	−0.002
	(1.33)	(3.58)	(−0.59)	(−0.33)
Schooling	0.006	0.004	0.017	0.002
	(0.46)	(0.28)	(1.07)	(0.09)
Monthly income	−0.000*	−0.000*	−0.000	−0.000
	(−2.19)	(−2.42)	(−0.20)	(−0.54)
Family factors				
Is household head?	−0.038	0.058	0.286*	0.262
	(−0.31)	(0.42)	(1.98)	(1.48)
Number of children	−0.019	−0.026	0.044	−0.005
	(−0.77)	(−1.04)	(1.63)	(−0.18)
Type of housing	0.061	0.002	0.038	0.348***
	(0.61)	(0.02)	(0.34)	(2.58)
Received conditional cash transfer?	−0.112	0.169	−0.074	0.232
	(−1.14)	(1.27)	(−0.69)	(1.54)
Psychological factors				
Life satisfaction	−0.060	−0.167	−0.400***	−0.315*
	(−0.59)	(−1.64)	(−3.39)	(−2.52)
Did not have good mental health? (days)	0.008***	0.010***		
	(5.59)	(6.65)		
Physical health factors				
Health Insurance?	0.041	0.022	−0.011	0.036
	(0.41)	(0.21)	(−0.10)	(0.29)
Did not have good physical health? (days)			0.017***	0.017***
			(6.94)	(7.22)
Had inpatient stay last 12 months?	0.301**	0.430***	0.175	0.084
	(2.81)	(3.66)	(1.45)	(0.58)
Disability	0.526***	0.305**	0.185	0.493***
	(4.15)	(2.61)	(1.27)	(3.68)
Obesity—overweight	0.204*	0.118	0.037	−0.339*
	(2.30)	(1.11)	(0.37)	(−2.45)
Working conditions				
Time working as a trash picker	0.164*	0.026	−0.035	0.041
	(2.13)	(0.35)	(−0.40)	(0.46)
Working on the streets?	0.370*	−0.113	0.189	0.291
	(2.29)	(−0.78)	(1.05)	(1.47)
_cons	−1.540***	−1.467***	−1.454***	−2.013***
	(−4.92)	(−4.40)	(−4.16)	(−5.00)
N	999	960	925	904
PseudoR^2	0.09	0.12	0.08	0.14

$*p < 0.05; **p < 0.01; ***p < 0.001$

Findings

Table 1 presents descriptive statistics on the main socio-economic characteristics of male and female trash pickers in the city of Cali. The last column showed p-values on a two-tailed pair test on whether figures are statistically different from zero. The lion´s share of both males and females are household heads (85%) and are literate but have lower educational attainment, particularly the elder. Females are considerable younger than males (4.3 years) and more educated (0.5 years), however they earn 86% of what males earn and consequently are able to expense less money on food and to supply their basic needs. The gender gap in earnings is in itself concerning, but the situation is aggravated by the fact that female trash pickers are more likely to be single and to have children as teenagers,

staying in their already numerous household and making it even more overcrowded.

Regarding health outcomes, the census showed that females reported being physically ill 8.1 days on average per month, 1.7 days more than males; and, mentally ill 6.4 days on average per month, 2.4 days more than males. Similarly, females were more likely to be uninsured and to have an inpatient stay than males, but less likely to be disabled. Lastly, females were less likely to be substance abusers.

Multivariate regression analyses are shown in Table 2. Regarding physical illness we found gender differences: age is a risk factor for males but not for females; moreover, working conditions such as number of worked hours and whether the person works on the streets, increases women's probability of feeling ill, while no association was found in the case of men. As expected, for women, working on a harsher environment takes a toll on their physical health. Similarly, obesity is a risk factor for women's physical health.

With respect to the other demographic factors (besides age), we found, as expected, that higher income is associated to lower risk of physical illness. As reported, schooling is not an important factor for this population, presumably because there is little variation on their low levels of education.

None of the family factors is associated to physical illness. As for psychological factors we found our proxy for mental health to be a strong risk factor for the probability of physical illness and that does not change with gender. Interestingly people´s own score on life satisfaction is not associated with self-reported physical health.

As expected having a disability condition is a risk factor as well as having had an inpatient stay in the last year, and there are no gender differences. Health insurance does not appear as either a positive or negative factor, which could also be associated with the low levels of insurance reported in surveys.

Turning to mental health discomfort, we found that demographic factors do not play a role. As for family factors, being a head household is associated to a higher probability for women to experience mental illness, while this factor is not relevant for men. Surprisingly, living in their own house or apartment as compared to pay rent is a risk factor for men, which is counterintuitive result unless we can associate homeownership with increasing maintenance costs or repaying loans taken in black or illegal financial local markets.

We found that self-reported life satisfaction is the only protective factor (the higher the score the lower the probability) for both genders. On the contrary, the number of days reported with some physical health problem is a risk factor with no gender differences. Being disabled is a risk factor associated to mental illness for men and not for women. An interesting result is the role of obesity: a risk for women (although not significant) and protective for men; it seems that male obesity does not mentally affect the individual. Lastly, working conditions turned not significant to explain the probability of mental illness.

Discussion

There is not a robust body of research referencing trash pickers' health conditions even though they are permanently exposed to risk factors. The few studies available point to the precarious health conditions of trash pickers that are aggravated by their low socioeconomic status.[43] Chemical hazards, infections, mechanical trauma and ergonometric-musculoskeletal damage, emotional well-being and psychiatric disorders are the outcomes studied in the literature. Risk and protective factors have not being sufficiently studied. One of the main reasons that may explain the lack of literature amongst this population is the difficulty of collecting data. We use a unique data set, a census of over 3000 trash pickers in Cali, Colombia to provide more evidence on such a key population.

There are several relevant issues worth discussing, but we highlight those that might be raw material for public policy. First, it was found that, in average, women report a higher number of both physical and mental illness days compared to men. This gender difference has also being reported in other studies.[44] Public intervention on this aspect might be directed to improve the working conditions of female trash pickers, in terms of protective elements and better means of transportation of the recyclable material. Information collected in focus groups showed that women usually bear greater responsibilities in domestic activities than their spouses which in addition to the heavy work on the streets, make them more vulnerable to health problems. Also, in the case of women, we found a direct association of age with health problems.

There are other factors related to trash pickers´ risk factors that have not been fully developed in the literature. For instance, we found that one factor associated to trash pickers' physical health is their monthly income. It seems that the ability to generate income has an influence on individual health. One of the main commands to the municipal government of the already mentioned Court Sentence T-291 was precisely to enhance the capacity of trash pickers to generate income. This had to be made through incorporating this group into formal solid waste management small businesses, as the Court ordered to the local government of Cali. Census' information revealed, nonetheless that efforts on this direction are still insufficient.

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[43] See Ref. [13].

[44] See Ref. [8].

Our results on the association between health and the places where waste pickers collect recyclable material, corroborate the importance of organizing the current collection system because women working on the street instead of malls or offices, where more likely to get sick.

The more interesting result from a health perspective is the intertwined association between mental health and physical health. Our analyses suggest that public health investments on prevention of mental health problems will have a positive side effect on physical health and vice versa. This is another argument in favor of some analysts' claim towards giving more attention to addressing the determinants of mental health with respect to protective and risk factors for both mental and physical health.[45]

Another relevant issue in terms of health policy is the influence of female obesity on the probability of being physically ill. It was found that 41% of trash pickers have overweight problems. What it reveals is that while in a job that is physically demanding, trash pickers eat unhealthy food. Nutritional campaigns directed to this population seem to be important to reduce their morbidity level. This public spending is beneficial in itself and also helps to avoid future health spending in conditions for which a weight problem is a risk factor such as cardiovascular disease, diabetes, osteoarthritis, and some types of cancer.

Disability is also an issue scarcely studied in this population. Disability was a clear risk factor for being both mentally and physically ill. The vulnerability condition of this subgroup is even stronger, and the current public programs to attend the disabled are insufficient at both national and local level. Given the low frequency of this condition, a more proactive effort by the local government to find them jobs in the formal sector is necessary and manageable.

Also interesting in terms of public policy is the association between being a head of household and the probability of women to feel mentally ill. In many cases, female-headed households are single-parent households, which imposes an economic and emotional pressure to women, affecting her mental health.

Finally, being satisfied with life is associated to a lower probability of experiencing mental health problems. This finding justifies further studies to better understand what makes trash pickers feel happier with their deteriorated living conditions.

Compliance with Ethical Standards

Conflict of interest The authors declare no potential conflict of interest.

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45 See Ref. [25].

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