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Cardiovascular and other risk factors among people who live in slums in Buenos Aires, Argentina

H.C. Doval [a], J. Mariani [a], G.C. Gómez [b], L. Vulcano [b], L. Parlanti [b], M.A. Gavranovic [b], M. Iemma [b], R. Sanchez [b], A. Macchia [a,*]

[a] Fundación GESICA, Buenos Aires, Argentina
[b] Pichón Riviere School of Social Psychology, Buenos Aires, Argentina

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ABSTRACT

Objectives: Effective planning of health policies requires the availability of accurate data, representing the burden of disease and risks to the diverse components of society. In Argentina, health information comes from the national risk factors survey (NRFS), which characterises the distribution of different risk factors. However, the NRFS has never collected information from residents living in slums, despite slums representing 10% of the population. The objective of this survey was to characterise the prevalence of cardiovascular and other risk factors among the inhabitants of one of the largest slums in Buenos Aires (Villa 31) and compare it to data from the NRFS.

Study design: This was a cross-sectional study.

Methods: A cross-sectional study was carried out in 400 slum households, using the same data structure as the NRFS. The survey obtained information about economic aspects, reproductive health, addictions and risk factors. All participants had their blood pressure, weight and height measured. A total of 406 people were interviewed and their data were compared with data from 32,365 people in the NRFS. All comparisons were made on the basis of age group.

Results: A fair/poor self-perceived level of health (odds ratio [OR] 3.19, 95% confidence interval [CI]: 2.60–3.91), anxiety and moderate to severe depression (OR 5.44, 95% CI: 4.43–6.69), problem drinking (OR 10.01, 95% CI 8.08–12.40), self-reported hypertension (OR 1.26, 95% CI: 1.01–1.57), overweight (OR 1.26, 95% CI: 1.03–1.55) and obesity (OR 1.72, 95% CI: 1.38–2.15) were significantly higher in the slum population. In people aged 18–24 years, the prevalence of diabetes was triple the national average (OR 3.17, 95% CI: 1.26–7.98). For all evaluated conditions in this study, the inhabitants of the slum received significantly less treatment compared with participants from the NRFS.

Conclusions: The prevalence of cardiovascular and other risk factors in the slum population has a different distribution to that reported in the NRFS. These data suggest the need to establish specific policies for slum populations.

* *Corresponding author*. Av. Rivadavia 2431, Ciudad Autónoma de Buenos Aires (1034), Buenos Aires, Argentina.
E-mail address: alejandromacchia100@gmail.com (A. Macchia).

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Introduction

Argentina, and the city of Buenos Aires in particular, has profound health inequalities as a result of existing social and economic conditions.[1,2] The probability of dying prematurely (understood as death before the age of 74 years) is linked to social and economic conditions, which has been verified at the international level.[3–5] A systematic review of 48 studies shows that social and economic circumstances lead to death in the same proportion as risk factors such as hypertension and obesity.[3] These results refer to differences between groups of socio-economic conditions in urban or rural settings. However, poverty, either urban or rural, cannot be extrapolated to the conditions, priorities and challenges of people living in slums. Similarly, the health of slum dwellers is not similar to those who are poor in the city.[6]

In Argentina, as in other parts of the world, the growth and permanence of slums is a current phenomenon. However, for both technical and political reasons, no surveys have gathered information related to the health of its inhabitants. These limitations result in large sectors of the population being neglected and, as a result, excluded from the traditional epidemiology and public health perspective.

In Argentina, health information comes from the national risk factors survey (NRFS), which characterises the distribution of different risk factors in a sample of more than 32,000 people. The NRFS surveys people aged ≥18 years living in centres of at least 5000 inhabitants; this represents 25.7 million Argentines who have these characteristics. However, in none of its editions has the NRFS collected information on residents living in slums, despite representing 10% of the population.[7]

The purpose of this initiative was to survey the health, social, economic and demographic information of citizens of the Autonomous City of Buenos Aires who live in one of the oldest and largest slums (Villa 31) and compare this information with the results of the NRSF.

Methods

Selection of participants

Over a 27-month period, personal interviews were carried out with a convenience sample of inhabitants of different zones of the Villa 31 neighbourhood in the city of Buenos Aires. This technique was used due to the absence of a complete housing map, which prevented probabilistic sampling.

The interviewers surveyed Villa 31 in its entirety, avoiding only the areas that were considered unacceptably dangerous for the physical safety of the staff. Households that were available and willing to be interviewed were selected. The interviews were carried out in the morning for security reasons. To have greater spatial representation of the neighbourhood, a single person was selected per household, prioritising the breadth of the survey over focussing it in certain regions. The recruitment was voluntary, there was no remuneration for participation and all collected data were anonymous.

Sample size

In the absence of an official census (the estimated population of the slum is approximately 40,000 inhabitants), the selection of the number of people to interview was challenging because a weighting factor could not be attributed to each subject interviewed. For reasons of logistics and time, it was decided to interview 400 households.

Measurement tools

All interviews were conducted on a one-to-one basis, and the interviewers used paper forms. The interviews were conducted using a structured questionnaire of more than 100 questions that included aspects of demography, housing, education, economics, employment and health (all questions were exactly the same as those used in the NRFS).

The health component of the questionnaire investigated the overall state of health perception using a visual analogue scale, physical activity, access to health care, history of tobacco consumption, blood pressure, body weight, diet, cholesterol, diabetes and alcohol consumption. Comparisons between the prevalence of self-reported hypertension and all other variables assessed in the NRFS were based on exactly the same questions. In addition, our survey of the slum population also included a measurement of blood pressure with a calibrated digital sphygmomanometer.

The current survey also incorporated two questions that are not included in the NRFS: (i) the use of protective practices in reproductive health and (ii) illegal drug consumption using the Drug Abuse Screening Test-10 scale; however, the results of these questions are not included in this manuscript.

Data collection and statistical analysis

Raw data from NRFS are publicly available, including weighting coefficients to account for the multistage sampling.[8] The differences between the results of the current survey and those from the NRFS were analysed using the weighted average of both surveys by age group (18–24, 25–34, 35–49, 50–64 and ≥65 years) for all measurements. For the demographic variables, we compared the overall average obtained in both surveys without disaggregation by age groups. For the calculation of sample errors in the NRFS, we used the complex samples module of the SPSS program (SPSS version 23.0 for Windows (IBM Corp, Armonk, NY, USA)). All analyses were two tailed, and *P*-values less than 0.05 were considered to be statistically significant.

Results

Baseline characteristics

The average age within each age group was similar between the NRFS and that of Villa 31, with the exception of the ≥65-year-old group, which was higher in the NRFS than in the slum survey (Table 1). The proportion of women interviewed was significantly higher in the slum survey (67.9%, 95% confidence interval [CI]: 51.5–53.6%) than in the NRFS (52.6%, 95%

Table 1 – Baseline characteristics of NRFS and slum populations.

Characteristic	NRFS				Slum				P-value
	N	%	Lower 95% CI	Upper 95% CI	N	%	Lower 95% CI	Upper 95% CI	
Age									
18–24 years	4341	20.89	20.78	21.01	70	21.16	20.73	21.58	0.266
25–34 years	7028	29.43	29.29	29.57	111	29.48	28.95	30.01	0.855
35–49 years	9013	41.57	41.39	41.74	121	41.44	40.67	42.21	0.742
50–64 years	6607	56.64	56.44	56.84	82	55.74	54.86	56.63	0.062
≥65 years	5376	73.66	73.30	74.03	14	69.86	66.76	72.96	0.037
Gender									
Male	14,317	47.4	46.4	48.5	129	32.1	27.7	36.8	<0.001
Female	18,048	52.6	51.5	53.6	273	67.9	63.2	72.3	
Education									
Elementary incomplete	3561	9.9	9.30	10.50	65	16.0	12.8	19.9	<0.001
High school incomplete	12,287	38.3	37.20	39.30	199	49.0	44.2	53.9	
High school complete or more	16,517	51.9	50.80	52.90	142	35.0	30.5	39.7	
Health coverage									
Social or private insurance	22,789	69.5	68.50	70.50	87	21.4	17.7	25.5	<0.001
None	9274	29.1	28.10	30.10	318	78.3	74.1	82.1	
Unknown	302	1.4	1.10	1.70	1	0.2	0	1.7	
Currently unemployed (age group)									
18–24 years	343	8.3	6.80	10.10	20	28.6	19.2	40.2	<0.001
25–34 years	360	5.9	4.90	7.00	24	21.8	15.1	30.5	
35–49 years	299	3.4	2.80	4.20	20	16.7	11	24.4	
50–64 years	157	3.2	2.40	4.20	20	25.0	16.7	35.6	
≥65 years	31	0.9	0.50	1.70	7	50.0	26	74	

CI, confidence interval; NRFS, national risk factors survey.

CI: 63.2–72.3%). Inhabitants of the slum tended to have less schooling; only 35% (95% CI: 30.5–39.7%) completed high school education compared with 51.9% (95% CI: 50.8–52.9%) in the NRFS. People living in the slum lacked health insurance in 78.3% (95% CI: 74.1–82.1%) of cases, whereas in the NRFS, this proportion was 29.1% (95% CI: 28.1–30.1%). Unemployment rates were also significantly different between the two populations in all age groups. Unemployment was more than six times (odds ratio [OR] 6.11, 95% CI: 5.11–8.56) more common among the citizens of the slum (23.1%, 95% CI: 19.2–27.5%), compared with the NRFS (4.3%, 95% CI: 3.9–4.8%).

Self-perceived health status

People living in the slums stated that their health was fair to poor with a higher proportion than in the NRFS (46.2%, 95% CI: 41.4–51.2% versus 21.2%, 95% CI: 20.4–22.1%, respectively; OR 3.19, 95% CI: 2.60–3.91), particularly among the 25- to 49-year-old groups (Table 2).

Furthermore, at all age groups, slum inhabitants reported moderate or severe pain (50.5%, 95% CI: 45.6–55.5%) with greater frequency than people in the NRFS (24.1%, 95% CI: 23.2–25.0%; OR 3.22, 95% CI: 2.63–3.95). The same was true for the prevalence of anxiety or moderate to severe depression, which was five times more frequent (OR 5.44, 95% CI: 4.43–6.69) among the inhabitants of the slums (51.5%, 95% CI: 46.6–56.5%) than in those of the NRFS (16.3%, 95% CI: 15.6–17.1%). The likelihood of problem drinking was 10 times higher (OR 10.0, 95% CI 8.08–12.4) in people living in the slums (46.0%, 95% CI: 41.1–50.9%) than those of the NRFS (7.8%, 95% CI: 7.3–8.5%). This difference was verified in all age groups but especially prevalent in people aged 18–34 years.

Cardiovascular risk factors

Hypertension

The self-reported hypertension rate was higher in people in the slum (36.1%, 95% CI: 31.4–41.2%) than among those of the NRFS (31.0%, 95% CI: 30.0–32.0%; OR 1.26 1.01–1.57). These differences were particularly significant between the ages of 25 and 34 years, with a 37.0% (95% CI: 28.1–46.8%) prevalence rate in the slum and 17.3% (95% CI: 15.7–19.1%) in the NRFS (OR 2.8, 95% CI 1.8–4.3) [Table 3].

People with hypertension were treated significantly more frequently (57.6%, 95% CI: 55.8–59.5%) in the NRFS than in the slum survey (16.1%, 95% CI: 12.7–20.2%; OR 7.1, 95% CI: 5.3–9.4). Similarly, the population of the slums admitted adding salt to food always or almost always more frequently (23.7%, 95% CI 19.8–28.1%) than was recorded in the NRFS (17.3%, 95% CI: 16.4–18.1%; OR 1.48, 95% CI: 1.17–1.88).

According to the new criteria for hypertension, only 47.8%, 45.4%, 26.1%, 19.8% and 7.1% of people from 18 to 24, 25 to 34, 35 to 49, 50 to 64 and ≥ 65 years, respectively, had normal blood pressure (Fig. 1). These figures cannot be compared to the NRFS because blood pressure was not measured in the national survey.

Diabetes

The prevalence of diabetes was higher among slum inhabitants (12.1%, 95 CI: 9.2–15.7%) than in the NRFS (9.8%, 95% CI: 9.2–10.4%; OR 1.26, 95% CI: 0.92–1.72), particularly in those aged 18–24 years (8.7%, 95% CI: 4.0–18.0% among slum citizens; 2.9%, 95% CI: 2.0–4.2% in the NRFS; OR 3.13, 95% CI: 1.24–7.88) (Table 3). Among patients with diabetes, 61.3% (95% CI: 58–64.4%) in the NRFS but only 8.3% (95% CI: 5.3–12.6%) of

Table 2 – Self-rated health conditions of NRFS and slum populations.

Self-rated health condition (age group)	NRFS				Slum				OR (95% CI)
	N	%	Lower 95% CI	Upper 95% CI	N	%	Lower 95% CI	Upper 95% CI	
Fair/poor self-perceived health status									
18–24 years	353	7.7	6.3	9.4	17	24.3	15.7	35.6	3.83 (2.13–6.89)
25–34 years	804	11.5	10.10	13.10	48	43.2	34.4	52.6	5.84 (3.90–8.74)
35–49 years	1586	17.8	16.30	19.30	62	51.2	42.4	60	4.87 (3.36–7.06)
50–64 years	2206	32.0	29.90	34.20	47	57.3	46.4	67.5	2.85 (1.82–4.47)
≥65 years	2314	42.1	39.50	44.70	10	71.4	43.9	88.9	3.44 (1.07–11.0)
All	7263	21.2	20.40	22.10	184	46.2	41.4	51.2	3.19 (2.60–3.91)
Moderate to severe pain									
18–24 years	514	10.5	8.9	12.2	24	34.8	24.5	46.7	4.56 (2.70–7.71)
25–34 years	1054	15.0	13.5	16.6	50	45.9	36.8	55.3	4.80 (3.23–7.14)
35–49 years	1899	22.0	20.4	23.7	60	50.8	41.9	59.7	3.67 (2.53–5.34)
50–64 years	2137	32.8	30.7	35.0	53	65.4	54.5	75.0	3.88 (2.43–6.19)
≥65 years	2330	44.2	41.7	46.8	10	76.9	47.8	92.4	4.20 (1.15–15.3)
All	7934	24.1	23.2	25.0	197	50.5	45.6	55.5	3.22 (2.63–3.95)
Moderate to severe depression									
18–24 years	498	12.4	10.50	14.50	34	49.3	37.7	60.9	6.89 (4.14–11.4)
25–34 years	837	13.4	11.90	15.10	52	47.7	38.5	57.1	5.87 (3.93–8.77)
35–49 years	1322	17.2	15.70	18.90	54	45.8	37	54.8	4.05 (2.78–5.92)
50–64 years	1243	19.6	17.90	21.40	54	66.7	55.8	76	8.20 (5.10–13.19)
≥65 years	985	19.1	17.20	21.10	7	53.8	28.2	77.6	4.95 (1.65–14.8)
All	4885	16.3	15.60	17.10	201	51.5	46.6	56.5	5.44 (4.43–6.69)
Problematic alcohol consumption									
18–24 years	480	10.7	9.0	12.7	43	61.4	49.6	72.0	13.28 (7.91–22.31)
25–34 years	549	9.6	8.3	11.2	58	52.3	43.0	61.4	10.25 (6.83–15.39)
35–49 years	580	6.7	5.8	7.9	49	40.5	32.1	49.5	9.41 (6.32–14.02)
50–64 years	429	6.7	5.6	8.1	31	37.8	28.0	48.7	8.41 (5.17–13.68)
≥65 years	247	5.4	4.3	6.9	2	14.3	3.6	42.7	2.90 (0.63–13.24)
All	2285	7.8	7.3	8.5	183	46.0	41.1	50.9	10.01 (8.08–12.40)

CI, confidence interval; NRFS, national risk factors survey; OR, odds ratio.

Table 3 – Self-reported cardiovascular risk factors of NRFS and slum populations.

Risk factor (age group)	NRFS				Slum				OR (95% CI)
	N	%	Lower 95% CI	Upper 95% CI	N	%	Lower 95% CI	Upper 95% CI	
Self-reported hypertension									
18–24 years	510	10.4	8.8	12.4	11	17.2	9.8	28.4	1.78 (0.91–3.51)
25–34 years	1332	17.3	15.7	19.1	37	37.0	28.1	46.8	2.80 (1.83–4.27)
35–49 years	2298	26.4	24.7	28.3	38	34.2	26.0	43.5	1.45 (0.97–2.17)
50–64 years	3028	46.1	43.8	48.4	35	43.8	33.3	54.7	0.91 (0.58–1.43)
≥65 years	3278	61.2	58.6	63.7	12	92.3	60.9	98.9	7.61 (0.99–58.73)
All	10,446	31.0	30.0	32.0	133	36.1	31.4	41.2	1.26 (1.01–1.57)
Self-reported diabetes									
18–24 years	141	2.9	2.00	4.20	6	8.7	4.0	18.0	3.17 (1.26–7.98)
25–34 years	394	4.9	4.00	5.90	8	7.3	3.7	14.0	1.53 (0.73–3.24)
35–49 years	761	8.4	7.30	9.50	18	15.4	9.9	23.1	1.98 (1.18–3.34)
50–64 years	1016	14.7	13.20	16.30	13	16.0	9.6	25.7	1.11 (0.60–2.03)
≥65 years	1035	20.3	18.30	22.50	2	14.3	3.6	42.7	0.65 (0.14–2.94)
All	3347	9.8	9.20	10.40	47	12.1	9.2	15.7	1.26 (0.92–1.72)
Self-reported high cholesterol									
18–24 years	189	15.6	11.9	20.2	5	8.8	3.7	19.4	0.52 (0.20–1.37)
25–34 years	597	16.5	14.3	18.9	10	10.2	5.6	17.9	0.57 (0.29–1.13)
35–49 years	1507	27.0	24.8	29.3	26	24.3	17.1	33.3	0.87 (0.55–1.37)
50–64 years	2134	39.9	37.4	42.4	31	40.8	30.4	52.1	1.04 (0.65–1.66)
≥65 years	1809	38.5	35.9	41.2	7	53.8	28.2	77.6	1.86 (0.62–0.57)
All	6236	29.9	28.7	31.1	79	22.5	18.4	27.2	0.68 (0.53–0.88)

CI, confidence interval; NRFS, national risk factors survey; OR, odds ratio.

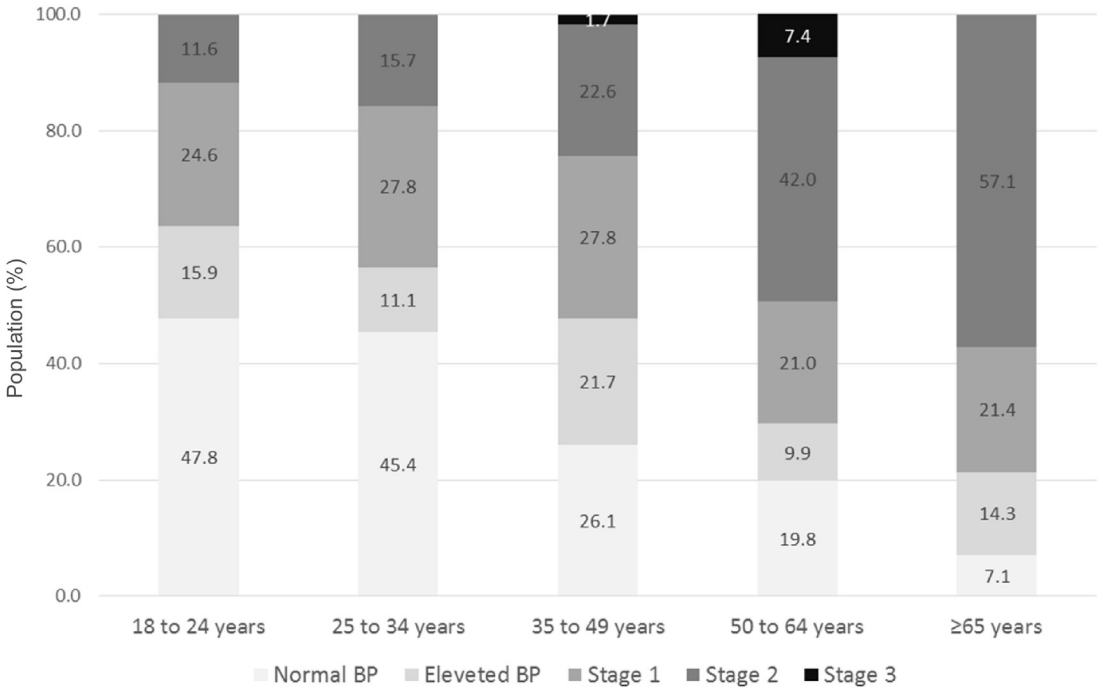

Fig. 1 – Categories of blood pressure (BP) by age group in the residents of the slums. Normal blood pressure is less than 120/80 mm Hg; elevated is systolic between 120-129 and diastolic less than 80; stage 1 is systolic between 130-139 or diastolic between 80-89 and stage 2 is systolic at least 140 or diastolic at least 90 mm Hg. Hypertensive crisis: Stage 3 is a systolic over 180 and/or diastolic over 120, with patients needing prompt changes in medication if there are no other indications of problems, or immediate hospitalization if there are signs of organ damage.

those living in the slums were receiving pharmacologic treatment (OR 17.6, 95% CI 10.8–28.6).

High cholesterol

The declared prevalence of hypercholesterolaemia was lower in the inhabitants of the slums (22.5%, 95% CI: 18.4–27.2%) compared with the NRFS (29.9%, 95% CI: 28.7–31.1%; OR 0.68, 95% CI: 0.53–0.88), mainly before the age of 50 years. However, cholesterol was less frequently measured among persons living in the slums (53.5%, 95% CI: 48.6–58.4%) than in the NRFS (64.1%, 95% CI: 63.0–65.1%; OR 0.64, 95% CI: 0.53–0.79). Among persons who declared having high cholesterol, treatment with statins was offered to 53.2% (95% CI: 50.8–55.6%) of people in the NRFS but only to 13.0% (95% CI: 9.7–17.2%) of slum inhabitants (OR 7.62, 95% CI: 5.39–10.77).

Overweight/obesity

Rates of overweight (40.2%, 95% CI: 35.5–45.1%) and obesity (29.4%, 95% CI: 25.1–34.1%) in the slums were significantly higher than those of people in the NRFS, where 34.7% (95% CI: 33.7–35.8%) were overweight (OR 1.26, 95% CI: 1.03–1.55) and 19.5% (95% CI: 18.7–20.3%) were obese (OR 1.72, 95% CI: 1.38–2.15).

Smoking

Prevalence of smoking was lower in the slums (20.6%, 95% CI: 15.3–27.1%) than in the NRFS (38.7%, 95% CI: 37.2–40.2%; OR 0.41, 95% CI: 0.28–0.59).

Discussion

The main findings of this survey can be summarised in the following points: (1) the self-perceived, as well as the objectively measured, state of health was significantly different among slum dwellers than their fellow citizens; (2) the prevalence of hypertension, obesity, overweight and diabetes, especially among young people, were particularly alarming (the same was true for the prevalence of depression and alcohol abuse); and (3) the results of this survey suggest that the health priorities and health planning needs of the slum population deserve special consideration as they are not necessarily similar to those of the general population (as assessed in NRFS).

The estimated population of slums constitutes approximately 10% of the Argentine population (nearly 44 million).[7] The slum population is possibly the group with the highest demographic growth, both in Argentina and in the world, with a high likelihood of becoming the most numerous social group in the near future.[6] The slums in low- and middle-income countries are anything but temporary, and their growth is independent of macroeconomic variables and migratory flows. This huge conglomerate of people live in extremely precarious housing in overcrowded conditions, and despite being eligible for a myriad of potential rights, they are insufficiently represented in general daily life and health planning.

For reasons of logistics, security and planning, slums are sites rarely recorded by traditional medical/health investigations. The NRFS, an indispensable instrument for health planning in Argentina, was carried out among more than 36,000

people who, by sample design, represented 25.7 million Argentines who live in cities. However, the inhabitants of slums are not part of these represented Argentines because slums have not been identified as different residential areas within the cities. In the NRFS, the absolute number of people who lived in a location not suitable for housing or in a space of precarious structure represents only 0.4% of the sample; however, this omission is not only a technical problem. As described by our findings, the inhabitants of slums have health problems and risk factors that make them different from their fellow citizens of the same age. Their lack of visibility is not a local peculiarity; in fact, the Global Burden of Disease did not identify living in slums as a determinant of health.[6] The massive growth of slums has not been matched by commensurate growth in the scientific literature, which remains rudimentary when compared with the many studies of urban health, rural health and the association between poverty and health.

Self-perceived health, a deliberately subjective and simply structured question, nevertheless, is a strong indicator of early mortality in the general population.[9] At any age, the perception of poor health was two to three times more frequent among inhabitants of the slums. This finding is coupled with an unemployment rate triple that of the Argentines who do not live in the slums and with the absence (among more than 75% of slum citizens) of any kind of health insurance, making this population dependent on public assistance to find solutions to their many health problems.

Rates of depression and anxiety, as well as the greater presence of moderate to severe pain, are also socially conditioned. The rate of dangerous use of alcohol in the population of the slums is alarming, and the likelihood of problem drinking was 10 times more than that reported in the NRFS. It is difficult to put these findings into context because there is very little direct literature on the mental health of those living in slums. However, it has been reported that living and working conditions in slums predispose to stress, and stress leads to psychological disorders.[10,11]

Despite the fact that non-communicable diseases outweigh communicable diseases as a cause of loss-of-life years, there is a shortage of studies that have investigated the distribution of cardiovascular risk factors in slum dwellers, and most of them focus on respiratory diseases.[12–14]

This study reports a series of linked cardiovascular risk factors, especially among young people. Both overweight and obesity were double the national rates, and the incidence of diabetes, high cholesterol and hypertension was unusually high. Similarly, the rate of treatment was low in all age groups among slum citizens, reaching 10 times less than their counterparts of the NRFS.

Few studies have investigated the prevalence of hypertension in slums; however, a study from Brazil[15] reported a prevalence of 21%, which is significantly lower than our findings in Buenos Aires. In that study, the prevalence of hypertension among the inhabitants of the slums was lower than that of the general population, whereas in our survey, the opposite situation occurred.[15]

Recommendations and reflections about healthy eating, regular physical activity and good habits are commonplace in any publication that investigates cardiovascular and other risk factors. However, the poor in general, but in this case, the poorest among the poor, do not have the freedom to choose what to eat or when to exercise. Eating and exercising smartly usually costs time and money. In Argentina, the price of fruits and vegetables is usually high, which explains their low presence in the diet of the inhabitants of the slum. Also, the lower incidence of smoking in the people of the slums may not respond to prudence or intelligent decisions but, probably as in the rest of the world, to the cost of cigarettes.[16,17] It is not enough to recommend prudence and hygiene but to understand how to reach people who have to make complex decisions in a unique setting full of challenges.[18,19]

The reasons the inhabitants of the slum are not sufficiently treated were not directly elucidated by this investigation. Although slum dwellers rely on the public health services to provide antihypertensive, statins and antidiabetic drugs for free, the restricted schedule of primary care facilities may constitute an obstacle to access.[6] In addition, the priorities of basic survival and looking for work will come ahead of prevention of asymptomatic diseases at an early stage.

The results, the gradients and the inequities can be discussed at length and from different perspectives. However, we believe that this communication serves to document and discuss two aspects that deserve more attention than outrage and surprise.

First, the inappropriate visibility/representation of the slum population; the distribution of the medical conditions found in the general population cannot be automatically transferred to the population of the slums in the city of Buenos Aires. Neither diabetes nor hypertension nor depression nor access to consultations and treatment resemble in any way that of the inhabitants of 'the city'. Therefore, the health planning of the collective 'city' is not transferable to the inhabitants of the slums because this population is not part of the city as understood by those who measure, plan and execute public policies. A policy that incorporates these subjects, their needs, perspectives, capacities and disabilities is essential to establish a health policy.[17]

The second point is precisely how this health policy should be articulated. The passive offer of services is far from being a good approximation in light of these results. It is not only about establishing a policy of containment of spontaneous demand but also about promoting and reversing a burden of disease and risk among the young population who will soon confront a significant number of events as well as suffering and disabilities.[16] The challenge is enormous and implies a demographic and cultural revolution. The only thing that cannot be done is to continue doing the same.

Study limitations

The most important limitation of the survey lies in the use of convenience sampling. The reasons for this choice were because of the fact that there was no census or complete cartography of the slum at the time of the survey, the simplicity and the low costs (this was an independent study with no public or private funding, so the resources were limited). Convenience sampling may lead to bias, and the results may not be representative of the entire slum population. As a result, the study cannot generalise these results to the entire population of either Villa 31 or other slums in Argentina. We believe that the results should be taken with caution and as a hypothesis generator.

Conclusions

In conclusion, this survey suggests that the burden of cardiovascular diseases is significantly different among the inhabitants of the slum than their fellow citizens. The best approach to prevention and treatment strategies is a topic that needs to be studied formally in this socially vulnerable population.

Author statements

Ethical approval

This survey falls outside of the national requirement for ethical review. The current legal norm (resolution 1480–11) in Argentina in relation to the obligations regarding clinical research allows exceptions to the registration of informed consent. Specifically, the rule states "In the following situations, applicable only to observational investigations could be exempt from obtaining consent: (a) when the research uses only non-binding data or samples, or information from public knowledge. That is, it is not possible to establish the identity of the people".

This is exactly the case in our study, where the data of the people living in the slums were collected anonymously. Similarly, the NRFS data are public information published anonymously by the highest health authority in Argentina. In relation to the approval by a committee of ethics, article 58 of the civil code leaves out the health surveys as those carried out in our study.

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Competing interests

We declare no competing interests.

Contributors

All authors participated in designing the study, generating hypotheses, interpreting the data and critically reviewing the report. H.C.D., J.M. and A.M. wrote the first draft of the report. J.M. and A.M. analysed the data. All authors had full access to anonymised individual participant data from all constituent studies. The corresponding author (A.M.) had full access to all the data in the study and had final responsibility for the decision to submit for publication.

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