OPEN ACCESS

Short report

Excess potential years of working life lost in six countries from Latin America and Europe in 2020 and 2021

Michael Silva-Peñaherrera [1,2] Fernando G Benavides [1,2]

► Additional supplemental material is published online only. To view, please visit the journal online (https://doi.org/10.1136/oemed-2023-109406).

[1]The Ibero-American Observatory of Safety and Health at Work, Madrid, Spain
[2]Pompeu Fabra University Center for Research in Occupational Health, Barcelona, Spain

Correspondence to
Michael Silva-Peñaherrera; michael.silva@upf.edu

Received 29 December 2023
Accepted 24 September 2024
Published Online First 7 October 2024

ABSTRACT

Objective This descriptive study aimed to measure the excess all-cause mortality potential years of working life lost (PYWLL) in the working-age population of six Ibero-American countries in 2020 and 2021.

Methods This study was based on all-cause deaths for the age group 15–69 years for men and women in six countries: Colombia, Costa Rica, México, Peru, Portugal and Spain. The expected PYWLL was the average value determined from the previous 5 years (2015–2019). To estimate the excess of PYWLL, the expected PYWLL was subtracted from the observed PYWLL values for 2020 and 2021, separately.

Results In the four Latin American countries, the excess PYWLL per death was approximately double (between 12 and 16 years) that of the two European countries (between 3 and 9 years).

Conclusions The loss of working-age individuals will probably have a profound social and economic recovery impact, affecting families and communities. The informal employment and labour market structures may be contributing to the adverse effects of the pandemic in the region. Investing in universal, comprehensive and sustainable health and social protection systems in the Latin American countries is crucial to build resilience against current and future crises.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ The loss of people of working age has a profound social impact, affecting families, communities and the labour force. This reduces the potential for future contributions to society. Recovery from the effects of the pandemic is expected to take years or even decades, particularly in low-income and middle-income countries.

WHAT THIS STUDY ADDS

⇒ There were more deaths among working-age population in Latin American countries than in European countries, and many of these deaths occurred among younger people (approximately 55 years old vs 65 years old). This fact raises significant social and economic concerns about the recovery capacity of this region.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Premature mortality, assessed in terms of potential years of working life lost, can assist in estimating the potential social and economic impact of the pandemic. Human capital is the key driver of poverty reduction and inclusive growth. It is crucial to build resilience against the current and future crises.

INTRODUCTION

The COVID-19 pandemic has had a major negative impact on health, social and economic outcomes worldwide. Recovery from the effects of the pandemic is expected to take years or even decades, particularly in low-income and middle-income countries. According to the International Monetary Fund (IMF),[1] employment and economic activity in emerging markets and low-income developing countries are unlikely to recover in the medium term.

The pandemic has significantly impacted Latin American and Caribbean countries, resulting in health, social and economic crises that have worsened the population's living conditions and health. This situation has mainly affected vulnerable social groups, widening the gaps along the axes of the social inequality matrix. The Economic Commission for Latin America estimates that in 2021 about 13% of the population was living in extreme poverty similar percentage as in 1994.[2]

The actual impact of the pandemic on different dimensions of society is difficult to estimate. Excess all-cause mortality is an indicator that has proven reliable in approximating the real impact of the pandemic.[3] A global indicator that can be complemented by the age at which people die was also considered. Although the virus has primarily affected older individuals, the working-age populations have also experienced a significant mortality toll. The working-age population is a driving force of society, and a reduction in this demographic poses an additional burden on the sustainability of the welfare state.[4] Premature mortality, assessed in terms of potential years of working life lost (PYWLL), can assist in estimating the potential social and economic impact of the pandemic.

The Ibero-American Observatory of safety and health at work (OISST, per Spanish acronym), based on Ibero-American Social Security Organization (OISS), a political alliance of Spanish and Portuguese-speaking countries from Latin America and Europe,[5] allows us to compare two European and some Latin American countries (LAC). This study aimed to measure the

To cite: Silva-Peñaherrera M, Benavides FG. *Occup Environ Med* 2024;**81**:532–534.

excess all-cause mortality PYWLL in the working-age population of six Ibero-American countries in 2020 and 2021.

METHODS

This study was based on all-cause deaths for the age groups 15–69 years for men and women. These data were provided directly by the statistics offices or health administrations of each country on request from the OISST. Data on deaths were requested for the years 2015 and 2021. Six countries, including Colombia, Costa Rica, México, Peru, Portugal and Spain, provided us with data disaggregated by age and sex on a weekly or monthly basis throughout the entire period (except Mexico, which provided data up to September 2021). In a previous study,[6] we estimated excess mortality in nine countries in 2020. In this study, the same estimation was performed for 2021. Excess mortality is calculated as the difference between reported deaths in 2020 and 2021 and the expected deaths, based on the average deaths from 2015 to 2019.[3]

The PYWLL was calculated by subtracting the age at which the person died from 70 years, which serves as the cut-off age. Subsequently, the resulting differences in years were summed to obtain the PYWLL per year for each country

$$\sum_{i=1}^{n} (70 - age\_at\_death_i) = \text{PYWLL}$$

n=last death of the year between 15 and 70 years old.

The expected PYWLL was the average value determined from the previous 5 years (2015–2019), while the observed values were based on 2020 and 2021 data, respectively. To estimate the excess PYWLL, the expected cases were subtracted separately from those observed in 2020 and 2021. Finally, the average PYWLL per excess death was calculated by dividing the excess PYWLL by the number of excess deaths in 2020 and 2021. All the estimates were stratified according to sex.

RESULTS

The number of excess deaths among the 15–69 age group in 2020 and 2021 was significantly higher for men (approximately 229 000) than for women (approximately 112 000) (see table 1). However, the average PYWLL per excess death was similar for both sexes: approximately 14 years for women and 15 years for men. Moreover, the PYWLL per excess death increased slightly from 2020 to 2021 for both women (from 13.6 years to 14.1 years) and men (from 14.5 years to 15.6 years). Data disaggregated by 5-year period are shown in the online supplemental table.

However, the excess PYWLL per death was approximately double in the four Latin American countries (between 12 and 16 years) than that of the two European countries (between 3 and 9 years).

DISCUSSION

Our study indicates that the excess PYWLL per death in the four LAC was approximately twice that of Portugal and Spain. Therefore, there were more deaths in LAC than in European countries, and many of these deaths occurred in younger people (approximately 55 years old vs 65 years old). An IMF statement regarding this fact raises significant social and economic concerns about the recovery capacity of this region.[1] An exception is Costa Rica, where the male excess PYWLL per death in 2020 was the lowest among the countries assessed. However, in 2021, it increased, approaching the values of the countries in the region. This could be attributable to a delayed impact of the pandemic in the country or to a better registration of deaths in 2021. Further investigation of this phenomenon is recommended.

A study estimated the premature mortality costs associated with COVID-19-related excess mortality in nine European countries, including Spain and Portugal, during the initial months of the pandemic. The study found that premature mortality costs per death for employed individuals aged between 30 and 74 years, expressed in 2020 euros, were €46 633 for Spain and €56 013 for Portugal.[6] This estimation will probably be higher at the end of the pandemic.

The high number of PYWLL in LAC could be mainly attributed to the interaction between high informal employment and low healthcare coverage. More than half the workforce in LAC is engaged in an informal economy. Recent research on labour transitions in Latin

Table 1 Excess mortality in the population aged 15–69 years (absolute and rate × 100 000) potential years of working life lost (PYWLL) and PYWLL per excess death, for men and women in Ibero-American countries, 2020–2021

	2020				2021			
	Excess mortality (15–69)			PYWLL per excess death	Excess mortality (15–69)			PYWLL per excess death
	n	Rate × 100 000	Excess of PYWLL		n	Rate × 100 000	Excess of PYWLL	
Men								
Colombia	17 444	97.2	261 287	15.0	41 370	230.6	652 425	15.8
Costa Rica	809	43.8	3582	4.4	2560	138.7	35 970	14.1
Mexico*	160 111	369.8	2 454 432	15.3	117 505	271.4	1 889 225	16.1
Peru	41 204	360.2	566 344	13.7	46 033	402.4	701 056	15.2
Portugal	916	26.5	5774	6.3	794	23.0	2239	2.8
Spain	5664	34.2	43 858	7.7	4152	25.0	39 709	9.6
Total Men	220 483		3 291 419	14.9	208 262		3 280 915	15.8
Women								
Colombia	10 518	56.2	146 771	14.0	24 560	136.9	332 983	13.6
Costa Rica	575	31.2	7277	12.7	1541	83.6	20 800	13.5
Mexico*	78 865	171.1	1 090 964	13.8	68 335	148.2	987 314	14.4
Peru	18 367	159.1	253 438	13.8	26 353	159.1	373 379	14.2
Portugal	223	6.0	1108	5.0	360	10.4	3216	8.9
Spain	3869	23.5	26 408	6.8	2372	14.3	18 257	7.7
Total Women	112 417		1 525 966	13.6	123 521		1 735 949	14.1

*Mexico data until September 2021.

America has found that partial recovery in employment since mid-2020 has been led by an increase in informal jobs.[7] Informal workers are particularly vulnerable to severe outcomes of the pandemic. Preliminary study found that the pandemic had generated at least 68 million additional poverty years and 4.3 million years of life lost across 150 countries[8] During the lockdown, the income of informal workers in the LAC decreased more than that of any other worker. This income loss has increased the economic hardships of more than 150 million informal workers, especially young women and those living in urban areas.[9] On the other hand, informal workers face greater health risks due to their exposure to the virus and lack of access to adequate health services; they may be less likely to seek medical care promptly, thereby increasing the risk of severe disease and death. Weaknesses in the population's health coverage may have generated greater mortality in Latin American populations aged <60 years. The influence of labour market structures seems to have contributed most to the observed differences. Future studies could further explore these labour market dynamics.

Conversely, in European countries, social protection and healthcare systems provide support for workers, including those in precarious employment situations. Portugal and Spain have public expenses on healthcare coverage at 5.8% and 6.3% of GDP, and social protection at 17.1% and 16.8% of GDP, respectively, while Colombia has social protection and healthcare at 9% and 5.5%, Costa Rica at 7.3% and 5.5%, Mexico at 7.5% and 2.7% and Peru at 2.7% and 3.3%, respectively.[10]

This study has several limitations. First, this study is the restricted number of included countries, mainly because of the unavailability of the data disaggregated by age and sex. We should exercise caution when interpreting the obtained results, especially given the heterogeneous impact of the pandemic between countries. However, this is a valid estimate from a sample of countries that can be replicated in other countries. Second, not all persons who died between 15 and 69 years of age were employed; therefore, not all the potential years of life lost would have been work related. However, this was the best approximation currently available. Additionally, while the methodology used is consistent across countries, testing alternatives approaches as suggested by Nepomuceno *et al*[11] could provide additional robustness to the findings. On the other hand, the study possesses the following strengths. Excess mortality and PYWLL not only provide insight into the health impact but also shed light on the social and economic impact of the pandemic, allowing a multifaceted view of the excess mortality phenomenon. Additionally, this study has reliable data directly provided by the national statistical offices of each country, facilitating comparisons among countries with different geographical and economic scenarios.

CONCLUSIONS

The loss of working-age individuals has a profound social impact, affecting families, communities and the labour force. This disrupts households, creates caregiver burdens and diminishes the potential for future contributions to society. The informal employment and labour market structures may be contributing to the adverse effects of the COVID-19 pandemic in the region.[12] Consequently, it was concluded that there is a growing importance in advancing comprehensive and inclusive policies that foster labour formalisation through social dialogue, administrative simplification, effective control, education and training, entrepreneurship and innovation, and the application of digital technologies.

Acknowledgements The authors wish to express their gratitude to the Organización Ibero-Americana de Seguridad Social (OISS) and the National Statistics Institutes of Colombia, Costa Rica, Mexico, Peru, Portugal and Spain for providing the data used in this study. They also thank Marta Zimmermann from the National Institute of Safety and Health at Work in Spain for her useful comments.

Contributors Both authors contributed to the conception and design of the study, data analyses, interpretation of data and drafting the article. Both authors have read and agreed to the published version of the manuscript.

Funding This study was partially funded by the Centre for Research in Occupational Health, Pompeu Fabra University (award/grant:N/A).

Competing interests None declared.

Patient consent for publication Not applicable.

Ethics approval Not applicable.

Provenance and peer review Not commissioned; internally peer reviewed.

Data availability statement Data are available upon reasonable request. Data are available online or upon request from the National Statistics Institutes of Colombia, Costa Rica, Mexico, Peru, Portugal and Spain.

ORCID iDs
Michael Silva-Peñaherrera http://orcid.org/0000-0001-5133-181X
Fernando G Benavides http://orcid.org/0000-0003-0747-2660

REFERENCES

1 International monetary fund. IMF annual report 2022 crisis upon crisis. 2022.
2 Economic commission for latin america and the caribbean (ECLAC). Santiago Social Panorama of Latin America and the Caribbean; 2023.
3 World Health Organisation. Methods for estimating the excess mortality associated with the covid-19 pandemic. 2023.
4 Hanly P, Ahern M, Sharp L, *et al*. The cost of lost productivity due to premature mortality associated with COVID-19: a Pan-European study. *Eur J Health Econ* 2022;23:249–59.
5 OISS. Medidas tomadas por los gobiernos de iberoamérica en relación con el covid-19. Available: https://oiss.org/medidas-tomadas-por-los-gobiernos-de-iberoamerica-en-relacion-con-el-covid-19/ [Accessed 6 Sep 2024].
6 Benavides FG, Vives A, Zimmerman M, *et al*. Exceso de mortalidad en población en edad de trabajar en nueve países de Latinoamérica, año 2020. *Rev Panam Salud Pública* 2022;46:1.
7 Maurizio R, Monsalvo AP, Catania MS, *et al*. Short-term labour transitions and informality during the COVID-19 pandemic in Latin America. *J Labour Mark Res* 2023;57:15.
8 Decerf B, Ferreira FHG, Mahler DG, *et al*. Lives and livelihoods: Estimates of the global mortality and poverty effects of the Covid-19 pandemic. *World Dev* 2021;146:105561.
9 Chen MA, Vanek J. WIDER Working Paper 2023/94-Impact of the COVID-19 pandemic on employment: Findings from national labour surveys in five Latin American countries. 2023.
10 International Labour Organization. World social protection report 2020-22: social protection at the crossroads – in pursuit of a better future. Geneva, 2021.
11 Nepomuceno MR, Klimkin I, Jdanov DA, *et al*. Sensitivity Analysis of Excess Mortality due to the COVID-19 Pandemic. *Popul Dev Rev* 2022;48:279–302.
12 Organización Iberoamericana de la Seguridad Social. Conclusiones del ii foro iberoamericano sobre retos de la formalización laboral: 'Experiencias de reformas previsionales y fortalecimientos de la seguridad social en iberoamérica. 2023. Available: https://oiss.org/conclusiones-del-ii-foro-iberoamericano-sobre-retos-de-la-formalizacion-laboral-experiencias-de-reformas-previsionales-y-fortalecimientos-de-la-seguridad-social-en-iberoamerica/

Annex

Supplementary table. Excess mortality in the population aged 15–69 years and potential years of working life lost (PYWLL) for men and women in Ibero-American countries, 2020–2021 by age range.

	2020											
	Colombia		Costa Rica		Mexico*		Peru		Portugal		Spain	
	Excess mortality (15-69)	Excess of YPWLL	Excess mortality (15-69)	Excess of YPWLL	Excess mortality (15-69)	Excess of YPWLL	Excess mortality (15-69)	Excess of YPWLL	Excess mortality (15-69)	Excess of YPWLL	Excess mortality (15-69)	Excess of YPWLL
Men												
15 to 19	-288	-15285	-34	-1781	565	29956	107	5660	5	265	-15	-816
20 to 24	62	2986	-53	-2525	1502	72096	355	17050	19	931	49	2371
25 to 29	516	22179	-24	-1032	3681	158292	537	23074	28	1187	20	877
30 to 34	516	19616	-10	-395	4786	181853	897	34094	6	213	47	1794
35 to 39	801	26440	40	1320	6738	222361	1510	49837	-29	-970	-63	-2092
40 to 44	1223	34233	34	946	9998	279938	2337	65430	-67	-1870	71	1988
45 to 49	1323	30429	45	1044	17206	395747	3534	81277	21	488	7	156
50 to 54	2059	37062	47	842	21873	393707	5190	93416	-43	-774	192	3460
55 to 59	3434	44642	152	1979	27412	356361	7066	91861	119	1544	851	11058
60 to 64	5075	40603	270	2157	33015	264118	9126	73010	438	3502	2309	18474
65 to 69	6128	18383	342	1026	33334	100003	10545	31636	419	1258	2196	6589
15 to 69	20849	261288	809	3581	160110	2454432	41204	566345	916	5774	5664	43859
Women												
15 to 19	-25	-329	-3	-180	156	8257	111	5862	-1	-42	11	488
20 to 24	63	4253	0	-10	589	28282	199	9562	2	106	-14	-816
25 to 29	189	9348	6	258	1247	53630	282	12117	-3	-112	18	576
30 to 34	189	8497	5	182	1797	68294	481	18270	-14	-532	24	783
35 to 39	434	15741	31	1016	2505	82678	689	22724	-7	-231	-23	-726
40 to 44	558	17382	52	1462	4213	117958	1058	29624	-7	-196	30	801
45 to 49	560	14899	47	1086	7553	173724	1393	32034	1	32	17	179
50 to 54	1081	21164	39	702	9820	176760	2013	36234	46	821	123	2300
55 to 59	1645	23566	75	970	13965	181548	2974	38657	44	569	608	8031
60 to 64	2528	21941	164	1309	17755	142043	4170	33357	19	154	1313	10453
65 to 69	3145	10307	161	482	19264	57791	4999	14997	180	539	1243	3676
15 to 69	10367	146769	577	7277	78864	1090965	18369	253438	260	1108	3350	25745

	2021											
	Colombia		Costa Rica		Mexico*		Peru		Portugal		Spain	
	Excess mortality (15-69)	Excess of YPWLL	Excess mortality (15-69)	Excess of YPWLL	Excess mortality (15-69)	Excess of YPWLL	Excess mortality (15-69)	Excess of YPWLL	Excess mortality (15-69)	Excess of YPWLL	Excess mortality (15-69)	Excess of YPWLL
Men												
15 to 19	-144	-7653	-33	-1728	186	9858	220	11649	1	106	35	2046
20 to 24	652	31306	-15	-701	792	38026	460	22090	2	163	97	4915
25 to 29	1430	61481	27	1161	2933	126128	876	37651	-15	-619	29	1952
30 to 34	1505	57198	75	2835	4397	167101	1350	51308	3	365	49	2668
35 to 39	2289	75544	160	5280	6599	217754	2027	66898	-46	-1300	-103	-2356
40 to 44	3260	91269	218	6098	8283	231924	3144	88026	-134	-3382	-28	420
45 to 49	3476	79948	228	5253	13919	320142	4646	106853	-35	-432	-200	-2926
50 to 54	4579	82422	385	6926	15707	282719	6044	108788	-69	-414	-327	-3560
55 to 59	6517	84721	400	5203	19159	249062	8008	104107	90	1999	695	11474
60 to 64	8554	68435	460	3677	21984	175874	9182	73458	368	3574	2089	18722
65 to 69	9252	27755	655	1965	23546	70639	10076	30229	629	2179	1816	6355
15 to 69	41370	652426	2560	35969	117505	1889227	46033	701057	794	2239	4152	39710
Women												
15 to 19	22	1155	5	244	29	1548	197	10420	-3	-148	5	276
20 to 24	210	10061	5	230	402	19315	240	11530	-5	-230	20	960
25 to 29	428	18421	14	602	1224	52632	415	17836	-3	-69	-15	-542
30 to 34	670	25445	32	1208	1779	67617	621	23590	11	456	9	479
35 to 39	848	27984	83	2732	2956	97535	1032	34043	-5	0	-27	-627
40 to 44	1590	44514	126	3534	4023	112633	1557	43596	-14	-224	-67	-1159
45 to 49	1607	36956	82	1891	7111	163544	2217	50986	9	538	-60	-557
50 to 54	2644	47588	151	2718	8315	149674	3229	58122	-60	-691	-14	896
55 to 59	4188	54441	269	3492	12220	158863	4535	58950	61	1180	219	4222
60 to 64	5871	46965	365	2917	14626	117005	5874	46989	171	1682	1199	10525
65 to 69	6484	19451	411	1232	15650	46950	6438	19314	198	722	1104	3784
15 to 69	24562	332981	1543	20800	68335	987316	26355	375376	360	3216	2373	18257