Dementia in Latin America and the Caribbean

Prevalence, Incidence, Impact, and Trends over Time

PAHO
Pan American Health Organization
World Health Organization Americas

Decade of healthy aging in the Americas

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situation and challenges

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Washington, D.C., 2023

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Abbreviations and acronyms

ADI	Alzheimer's Disease International
DALYs	disability adjusted life years
GDO	Global Dementia Observatory
HICs	high-income countries
LAC	Latin America and the Caribbean
LMICs	low- and middle-income countries
MRI	magnetic resonance imaging
PAHO	Pan American Health Organization
PAR	Population attributable risk
PWD	people with dementia
SRs	systematic reviews
UN	United Nations
WAR	World Alzheimer Report
WHO	World Health Organization
YLD	years lived with disability
YLL	years of life lost

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The purpose of the series is to provide continuous updates on the different areas of action of the Decade of Healthy Aging (2021–2030) in the Americas, as well as on other related aspects.

The collaboration of the experts from PAHO, the United Nations and the Inter-American System, and the academic world who participated in the initiative and formulated essential feedback and recommendations for the project to see the light is appreciated.

1. Introduction

Dementia is a progressive neurodegenerative condition characterized by the impairment of different cognitive domains that leads to a decline in an individual's level of functionality and autonomy (*1*). Dementia mainly affects older people, although it is not part of normal aging. The most prevalent form of dementia is Alzheimer's disease, which may contribute to 60%–70% of dementia cases (*2*); however, dementia in most people over the age of 80 years has more than one cause (*1*).

Dementia is a significant global health concern that also has social and economic impacts. Over 55 million people live with dementia worldwide, with forecasts that by 2050 over 150 million people will have dementia—an increase of 166% (*3*). As people are generally living longer, the number of people being affected (both individuals with dementia and their families) is increasing. Dementia is now one of the major causes of disability and dependency in older adults and the seventh leading cause of death in this age group (*2*). There has been, therefore, an increasing number of initiatives aimed at tackling dementia.

In 2017, the World Health Organization (WHO) launched the Global Action Plan on the Public Health Response to Dementia (*4*). Its first target was for 75% of Member States to have national dementia plans by 2025. During the 2021 World Health Assembly, the progress made in respect to this action plan was evaluated, and although some advancement has been made, many countries were falling behind the targets for 2025. For example, only four countries in Latin America (Chile, Costa Rica, Cuba, and Mexico) had a dementia plan in 2021, i.e., only 12.5%, far below the 75% target.

Another target of the action plan was that by 2025 at least 50% of countries should have started to collect core data on dementia every two years. This target is also not being met, but it is hoped that initiatives such as the creation of the Global Dementia Observatory (GDO) by WHO in 2017 will help countries to collect the relevant data to strengthen their response to the needs of people with dementia (PWD) and their families. Progress toward the targets can also be supported by the United Nations' Decade of Healthy Ageing (2021–2030), a global collaboration between governments, civil society, international agencies, academia, and others, established with the aim of improving the lives of older people, including those with dementia, and their families.

The Decade's action plan has four main areas of action and highlights the need to deliver comprehensive, person-centered, integrated health and social care, including for PWD. The proposal also calls attention to the development of dementia-friendly strategies to provide environments that support older adults' abilities (*5*).

Due to the fast demographic transition in the Region of the Americas, it is imperative to strengthen the agenda around healthy aging. For example, in Latin America and the Caribbean (LAC), the ageing of populations has resulted in an increase in age-related diseases such as dementia, and these diseases have taken on a greater importance in public health. A study that included five countries from LAC out of a total of seven showed that dementia is the greatest contributor to dependence and disability among older adults (*6, 7*). According to the Global Burden of Disease (GBD) project, in 2019 there were about 4.5 million PWD in LAC (*3*), with forecasts of 13.7 million by 2050—an increase of 206%, higher than the projected global increase (166%) and the predicted 100% increase in the United States of America (*3*). These rates of increase varied substantially between countries, from below 100% in countries such as the Dominican Republic (74%) and Uruguay (80%) to more than 300% (Belize, Guatemala, and Nicaragua); most of the increase is due to population aging (*3*).

Projections of increasing numbers of PWD assume that dementia prevalence will remain the same over time and that population aging alone will drive the projected increases (*3, 8–10*). However, a growing number of studies have recently shown a declining risk for dementia incidence (number of new cases) and/or prevalence (the total number of cases) in high-income countries (HICs), potentially due to increases in educational attainment and improvements in the management of cardiovascular disease and its risk factors, such as smoking, high blood pressure, and diabetes (*11–13*).

It is not clear how education may reduce dementia, but it seems to affect the brain in a way that makes it more resilient (*14*). In respect to cardiovascular diseases, studies suggest that among several mechanisms, problems in the blood supply to the brain can contribute to the development of dementia (*15*). These findings suggest that, in the long term, initiatives that address lifestyle-related risk factors will greatly help to reduce the prevalence and incidence of dementia, its impact on individuals and society, and related health costs.

Currently, the financial costs of dementia are higher in rich countries, mainly due to the age composition of the populations and higher rates

of diagnosis, treatment, and care in general. However, the proportion of informal costs is higher in poorer countries, as the burden of care often falls on the family. In Brazil, for example, almost two-thirds of the total costs of dementia are related to informal care provided by family members (*16*).

Despite its huge burden, dementia is still underdiagnosed, even in high income countries (*17*). The Alzheimer's Disease International (ADI) 2021 global report (*1*) suggests that globally 75% of PWD are not diagnosed and that these rates may reach as high as 90% in some low- and middle-income countries, where stigma and lack of awareness are significant barriers to diagnosis. In Brazil, it has been estimated that more than 70% of older people living with dementia are not diagnosed (*18*). If this rate is applied to the whole LAC, it would mean that there are more than 3 million PWD living in the region who have not been diagnosed.

It is important to monitor dementia's prevalence, incidence, and different societal impacts, as well as the current responses of countries to the disease, so that appropriate actions can be taken. This report provides an overview of the current prevalence, incidence, and impact of dementia in LAC using data available in original scientific publications, systematic reviews, and other international and local reports.

This report aims to help monitor and direct actions that can reduce dementia risk and lead to healthier lives for PWD and their families.

2. Prevalence

2.1 Background

Dementia prevalence is the number of people with dementia in a population at a given time. There have been substantial efforts to describe the global situation in respect to Alzheimer's disease and other dementias. Alzheimer's Disease International, the umbrella organization of over 100 Alzheimer's associations around the world, publishes an annual World Alzheimer Report (WAR); the 2015 edition (*8*) estimated that 46.8 million people worldwide were living with dementia in 2015 and that this number would almost double every 20 years, reaching 131.5 million by 2050.

More recently, WHO released its global status report on the public health response to dementia (*2*) estimating that 55.2 million people worldwide were living with dementia in 2019, similar to the estimates of the GBD

study (*3*). The GBD study estimates for dementia covered 195 countries, territories, and subnational locations and found that in 2019 about 57 million people were living with dementia. These estimates showed that prevalence increased with age, nearly doubling every five years after the age of 65; that prevalence was much higher among women than men; and that most PWD lived in low- and middle- income countries (LMIC).

The 2015 WAR and the 2019 GBD both provided information on the prevalence of dementia in LAC but in different ways: while the ADI WAR report presented data according to WHO regions, the GBD provided prevalence by country and region. There has also been an effort to understand the prevalence of dementia in Latin America, with an increased number of prevalence studies in the region and several systematic reviews trying to synthesize the evidence on both a country and regional level. This section summarizes and highlights the main points regarding the estimates of dementia prevalence by looking at currently available systematic reviews on the subject in the region, summarizing the recently published data from the 2019 GBD study for LAC, and critically comparing estimates from previous reports.

2.2 Systematic reviews on prevalence

Nine systematic reviews (SRs) (*9, 19–26)* were identified in the search, for a total of 10 with the inclusion of the 2015 systematic review contained in the WAR. Significant methodological diversity was found among the reviews, such as different inclusion criteria regarding the types of studies (study design), the age of the participants (≥60, ≥65, ≥50) and the dementia diagnostic criteria used. This methodological diversity and the different levels of comprehensiveness in the search strategies used in the reviews may explain, at least in part, important differences in the number of studies included in each of the reviews and their estimates in respect to dementia prevalence.

Four SRs presented pooled prevalence estimates of dementia for LAC specifically (*21–24)*, which ranged from 7.1% among people age 65+ in the review by Nitrini et al. (*21*) and 8% in the review by Xiang et al. among people age 60+ (*22*), to 11% in two other systematic reviews, one among those 65+ (*23*) and another (*24*) that mixed studies with estimates for different age groups (50+, 60+, 65+). Findings from the SRs are consistent in reporting that dementia in LAC countries is more prevalent in women than in men and in rural samples compared to urban ones (*22, 24*). The reviews also agree that the prevalence of dementia increases exponentially with age, doubling approximately every five years after the age of 65 years (*21–24*).

From the SRs it was possible to identify 24 population-based studies included in 20 publications (*27–46*) that evaluated the prevalence estimates of dementia in LAC countries. However, they covered only 11 out of 33 countries (Argentina, Brazil, Chile, Colombia, Cuba, the Dominican Republic, Jamaica, Mexico, Peru, Trinidad and Tobago, and Venezuela [Bolivarian Republic of]) and were concentrated in three: Brazil (n = 6), Mexico (n = 4), and Cuba (n = 3) (Figure 1). Moreover, most of the studies evaluated the prevalence of dementia only in participants living in urban areas in LAC countries. This scenario does not give a real picture of the prevalence of dementia in the whole LAC, a widely diverse region characterized by a great ethnic, cultural, educational, and socioeconomic diversity. Even within one country, studies were often concentrated on one area. For example, in Brazil nearly all the studies were conducted in the state of São Paulo—the richest state in the country—highlighting the lack of representativeness of the available evidence (*47*).

Figure 1. Distribution of published studies on dementia prevalence in LAC countries according to the SRs. Countries in gray had no published studies.

For this report, the prevalence of dementia in LAC was estimated by re-analyzing the data from the population-based studies included in the systematic reviews. Table 1 shows the estimated prevalence for

each age group for studies for which the information was available. The pooled estimates were as follows: 2.6% (60–64), 2.7% (65–69), 5% (70–74), 10.2% (75–79), 16% (80–84) and 23.4% (85–89). The pooled prevalence for those aged 60 and above was 9.5%; for those aged 65+ it was 8.2%; for those aged 80 and above it was 23.5%; and for those aged 90 and above it was 39%.

Table 1. LAC-wide pooled dementia prevalence estimates by age group

Age	60 – 64	65 – 69	70 – 74	75 – 79	80 – 84	85 – 89	90+
POOLED ESTIMATE	2.6	2.7	5.0	10.2	16.0	23.4	39.3
95% CI	(1.7–3.5)	(1.9–3.4)	(3.8–6.1)	(7.7–12.7)	(12.7–19.3)	(13.5–33.4)	(25.3–53.2)
NUMBER OF STUDIES	n = 5	n = 13	n = 15	n = 16	n = 10	n = 5	n = 5

60–64	65–69	70–74	75–79	80–84	85–89	90 plus
2.6	2.7	5.0	10.2	16.0	23.4	39.3
(1.7–3.5)	(1.9–3.4)	(3.8–6.1)	(7.7–12.7)	(12.7–19.3)	(13.5–33.4)	(25.3–53.2)
n = 5	n = 13	n = 15	n = 16	n = 10	n = 5	n = 5
2.6	2.7	5.0	10.2	16.0	23.4	39.3
(1.7–3.5)	(1.9–3.4)	(3.8–6.1)	(7.7–12.7)	(12.7–19.3)	(13.5–33.4)	(25.3–53.2)
n = 5	n = 13	n = 15	n = 16	n = 10	n = 5	n = 5

There was a large variation in the prevalence estimates which, as described above, the studies' different methods and inclusion criteria may explain.

2.3 Global Burden of Disease 2019 – dementia prevalence

The GBD estimates for dementia prevalence in LAC suggested that about 4.5 million (95% CI 3.9–5.1) people aged 40 and above in the region were living with dementia in 2019 (*3*), with projections of 13.7 million cases by 2050. This increase of 205% compares to a 102% increase in North America countries (Table 2). The projected increase in numbers is highest for Central America (221%), followed by South American (206%) and the Caribbean (152%). As demonstrated by the proportion of people aged 65 and above in 2019 shown in the table, regions with the lowest proportion of older people will have higher increases, as most of the projected increase will be due to the aging of the population. This same total estimate, when limited to those aged 60 and over, produces a total of 4.1 million (95% CI 3.6–4.8).

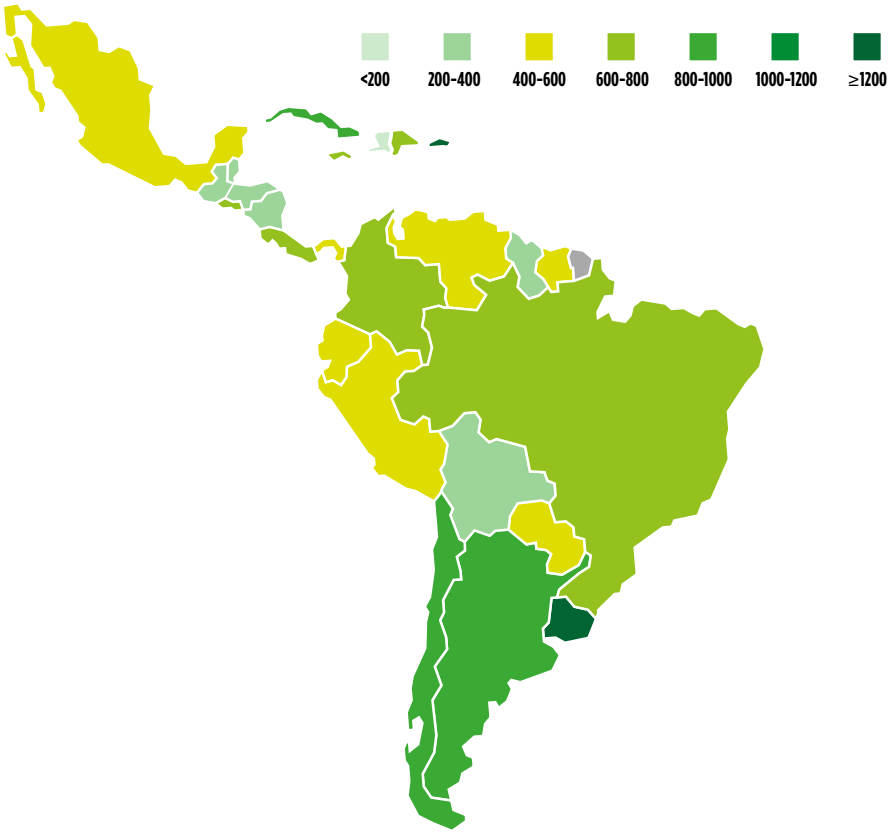
Table 2. Proportion of population over 65, estimated number of PWD (2019–2050), and percentage increase (2019–2050), by region according to the GBD 2019 study (*3*)

Region	PERCENTAGE OF POPULATION 65+ 2019A	NUMBER OF PWD		PROPORTIONATE INCREASE
		2019	2050	
Caribbean	10.4	232 662	586 973	152%
Central America	7.1	815 039	2 614 812	221%
South America	9.2	3 379 072	10 347 517	206%
Latin America and Caribbean	8.7	4 478 679	13 683 303	205%
North America	16.4	5 856 696	11 830 056	102%

Note: United Nations Department of Economic and Social Affairs. World Population Ageing 2019. New York: UN; 2020. Available from: https://www.un.org/en/development/desa/population/publications/pdf/ageing/WorldPopulationAgeing2019-Report.pdf.

Figure 2 shows the prevalence of dementia per 100 000 inhabitants, indicating higher prevalence in Argentina, Chile, and Uruguay

Figure 2. Prevalence of Alzheimer's disease and other dementias (per 100 000) in LAC according to the GBD 2019 study



Source: Institute for Health Metrics and Evaluation. GBD Compare. Seattle: University of Washington; 2022. Available from: http://ihmeuw.org/5n3e.

2.4 Comparing estimates of dementia prevalence from different sources and over time

Table 3 presents the prevalence estimates stratified by age groups over the last two decades, evaluated by meta-analysis and the data from the GBD. This analysis stratified the data according to the period in which the studies collected the data (2000–2010; 2011–2019) and used data from the GBD 2005, 2015, and 2019 reports. The prevalence estimates increase exponentially with age for each source and period. There is no clear trend of an increase in prevalence over the years, as is demonstrated in Figure 3 and 4; however, the number of PWD increased over time for each of the age groups studied.

Table 3. Prevalence estimates of dementia in LAC stratified by age and time period according to the metanalysis conducted for this report and the GBD

		PREVALENCE % (95% CI)									
Period	Data	60–64	65–69	70–74	75–79	80–84	85–89	90+	60+	65+	80+
2000 - 2010	Prevalence (95% CI) Number of studies	2.4 (1.3–4.6) n = 1	2.1 (1.4–2.9) n = 9	3.8 (3.0–4.7) n = 10	8.3 (6.3–10.4) n = 10	12.6 (11.5–13.8) n = 5	20.1 (18.2–21.9) n = 2	30.9 (27.4–34.3) n = 2	9.0 (7.8–10.1) n = 2	8.0 (6.9–9.1) n = 10	22.5 (17.5–27.4) n = 11
2011 - 2019	Prevalence (95% CI)) Number of studies	2.8 (1.4–4.2) n = 4	5.5 (1.7–9.2) n = 4	8.2 (4.4–11.9) n = 5	14.0 (6.9–21.2) n = 6	19.2 (12.3–26.1) n = 5	27.8 (6.6–49.0) n = 3	43.5 (26.8–60.2) n = 3	8.3 (6.5–10.0) n = 7	9.5 (8.1–10.9) n = 2	25.0 (15.4—34.6) n = 7
GBD (2005)	Prevalence (95% CI) Total numbers of PWD	1.0 (0.8–1.3) 136 980.17	1.9 (1.5–2.3) 196 850.34	3.3 (2.7–4.1) 266 210.50	6.1 (5.0–7.5) 344 198.68	10.7 (8.5–13.4) 360 031.19	16.6 (13.0–20.8) 284 703.41	30.8 (30.7–30.9) 260 752.55	2.8 (2.8–2.8) 1 849 726.83	3.1 (3.1–3.1) 1 712 746.66	15.0 (12.4–18.1) 905 487.14
GBD (2016)	Prevalence (95% CI) Total numbers of PWD	1.1 (0.9–1.4) 215 222.63	2.0 (1.6–2.5) 300 582.44	3.5 (2.8–4.4) 387 477.92	6.3 (5.1–7.8) 494 367.97	10.8 (8.6–13.7) 542 649.76	16.7 (13–20.9) 455 783.19	29.8 (29.8–29.8) 435 691.72	3.9 (3.9–3.9) 2 831 775.70	5.4 (5.4–5.4) 2 616 553.07	15.5 (12.7–18.6) 1 434 124.74
GBD (2019)	Prevalence (95% CI) Total numbers of PWD	1.1 (0.8–1.3) 236 849.67	1.9 (1.5–2.4) 334 308.71	3.4 (2.7–4.4) 445 855.82	6.2 (5.0–7.8) 555 937.38	10.9 (8.6–13.9) 633 893.76	17.1 (13.2–21.2) 538 935.80	33.1 (33.1–33.2) 529 865.33	4.0 (4.0–4.0) 3 275 646.49	5.1 (5.1–5.1) 3 038 796.82	15.8 (12.9–19.0) 1 702 694.90

Figure 3. Distribution of prevalence of dementia in LAC, stratified by age, 1990–2019

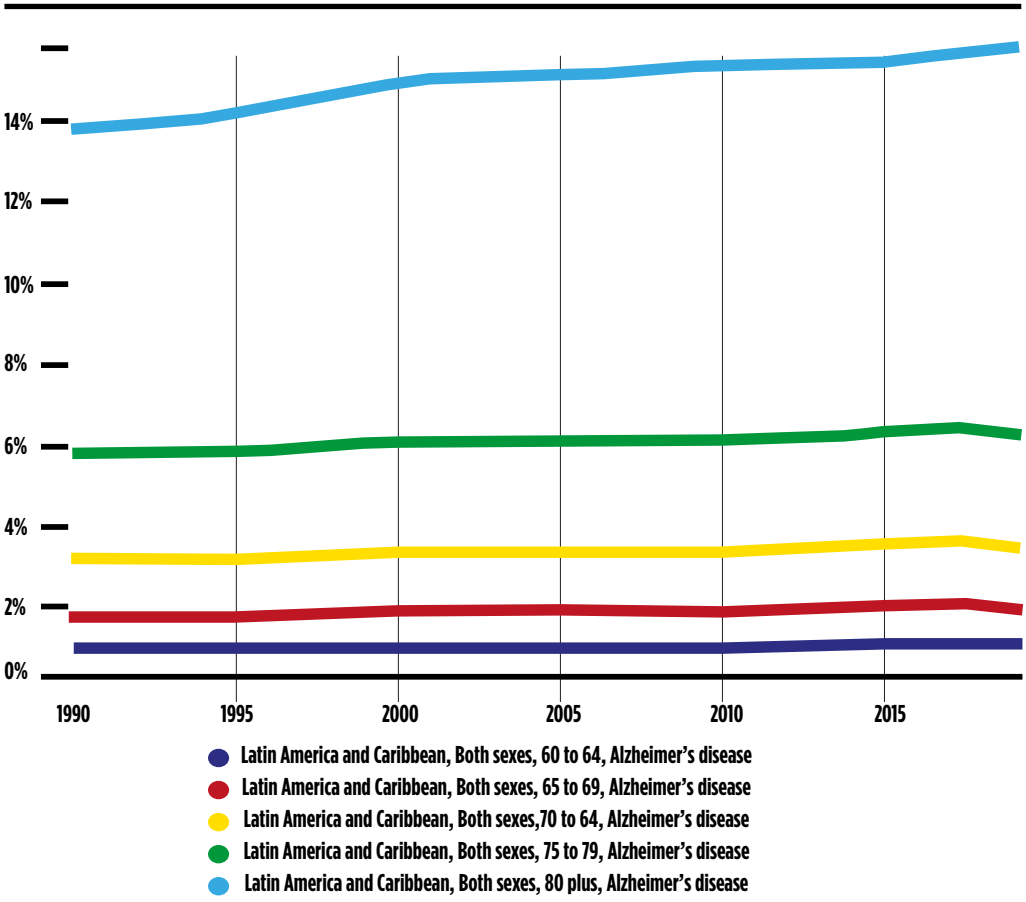
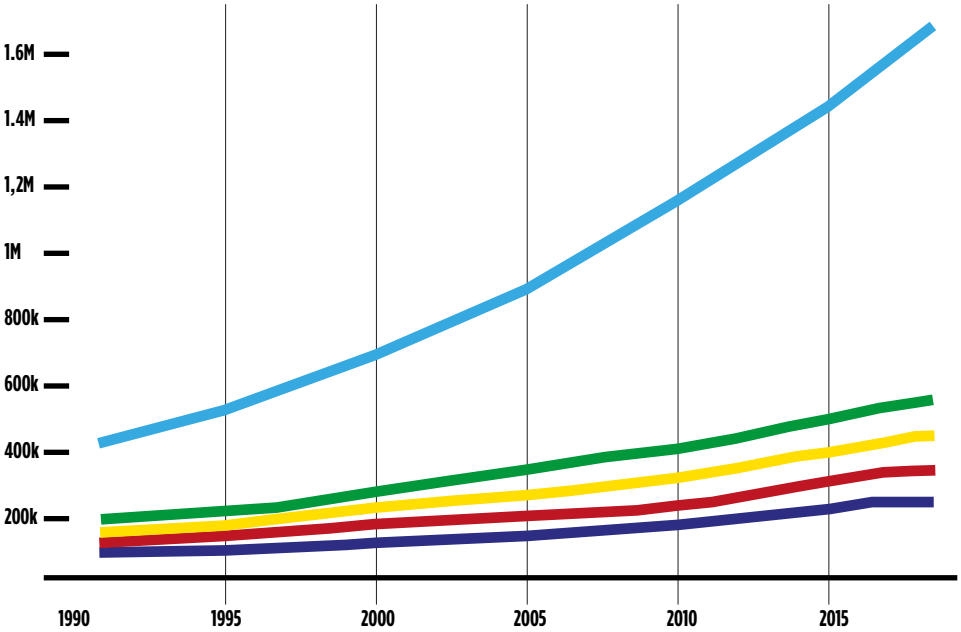


Figure 4. Distribution of the number of individuals with dementia in LAC, stratified by age, 1990–2019



Source: Institute for Health Metrics and Evaluation. GBD Compare. Seattle: University of Washington; 2022. Available from: http://ihmeuw.org/5n3e.

According to the 2019 GBD, about 4.5 million people were living with dementia in LAC, and it is estimated that 4.1 million were aged 60 and above (95% CI varying from 3.6 million to 4.8 million). This estimate is similar to that of the WAR 2015 if applied to the 2019 regional population aged 60 and above (4.6 million), but it is below the pooled estimate from studies published in the last decade for this specific age group (5.6 million) and of other recent systematic reviews (*22*) which estimated that there were 6.8 million PWD aged 60+ in 2020 in the region.

3. Incidence

As described above, prevalence is the number of existing people with dementia in a population at a given time. Incidence is the number of new cases of dementia in a given time period and is a measure of risk. This section will synthesize and highlight the main points regarding the estimates of dementia incidence for the region, identify the current local evidence, summarize the data from the 2019 GBD study for LAC, and critically compare estimates from previous reports.

3.1 Recent evidence

Studies investigating dementia incidence in LAC are relatively scarce, with only four studies covering just six countries (Brazil, Cuba, Dominican Republic, Mexico, Peru, and Venezuela [Bolivarian Republic of]) published in the last decade (*42, 48–50*). Again, as per the prevalence studies, there are important methodological differences between them, including the criteria used for dementia diagnosis. A Venezuelan study (*49*) among those aged 55 years and older found an incidence of dementia of 9.10 per 1000 person-years. Two studies were conducted among people aged 60 years and older: one in Mexico, published in 2011, used a nationally representative sample (*42*), and the other was a smaller study conducted in Brazil and published in 2021 (*50*). Both studies reported a similar incidence: 25.6 and 26.1 per 1000 person-years, respectively. The study conducted by the 10/66 Dementia Research Group included people aged 65 and above and was developed in five countries in the region (Cuba, Dominican Republic, Mexico, Peru, and Venezuela [Bolivarian Republic of]) (*48*) (Table 4). Using the same protocol, these studies found incidence rates that varied from 18.2 in Peru to 30.4 per 1000 person-years in Mexico.

All the studies were consistent in finding that incidence increased with age and was higher in rural than in urban areas. This finding was particularly evident in the study by Prince et al. conducted in Mexico (*48*), which found an incidence in the rural area that was double that in

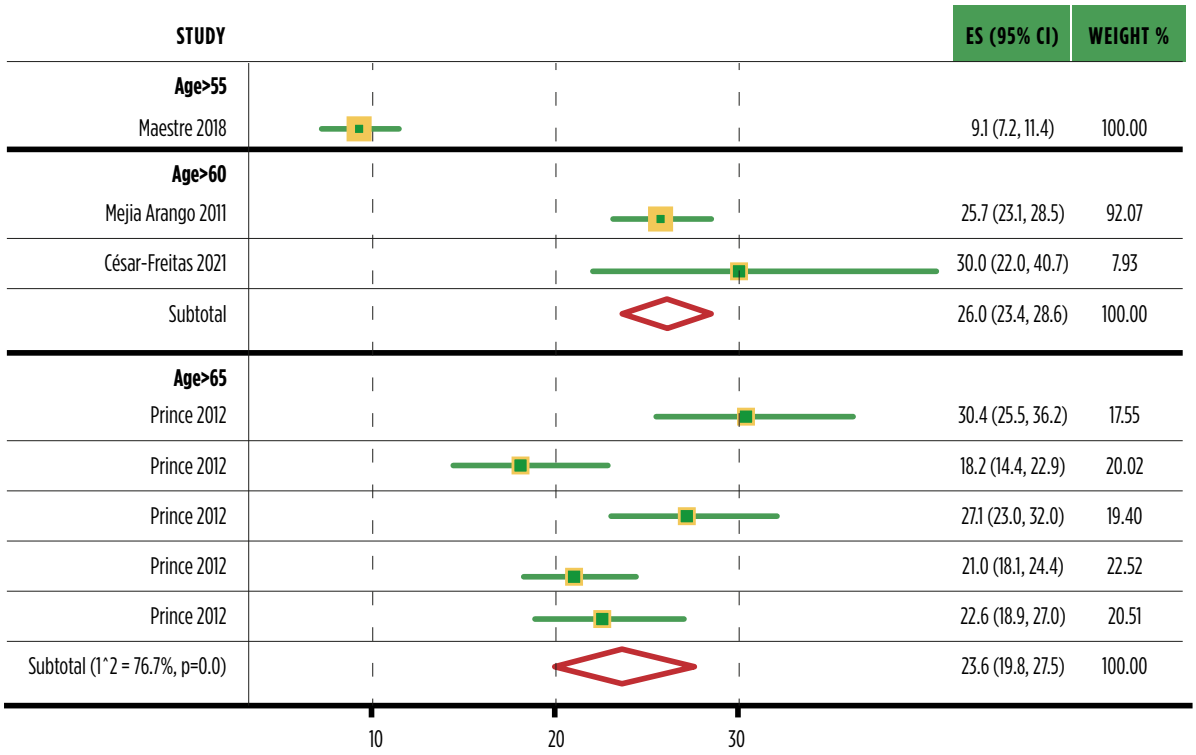
the urban area (42.4 and 19.6 per 1000 person-years, respectively). All studies were also consistent in showing a higher incidence rate among women compared to men, except for the small study conducted in Brazil (*50*) that showed a higher incidence among men than women (35 and 22.2 per 1000 person-years, respectively).

Table 4. Incidence rate of dementia in Latin America per 1000 person-years (published between 2011–2021)

STUDY	YEAR PUBLICATION	COUNTRY	AGE GROUP	TOTAL PERSON-YRS	NUMBER OF CASES	INCIDENCE (95% CI) PER 1000 PERSON-YRS
Mejia-Arango (42)	2011	Mexico	≥ 60 years	12 980	333	25.6 (22.9–28.5)
Prince (48)	2012	Mexico	≥ 65 years	3978.4	121	30.4 (25.5–36.3)
Prince (48)	2012	Peru	≥ 65 years	3798.9	69	18.2 (14.3–23.0)
Prince (48)	2012	Venezuela	≥ 65 years	4973.9	135	27.1 (22.9–32.1)
Prince (48)	2012	Cuba	≥ 65 years	8078.5	170	21.0 (18.1–24.5)
Prince (48)	2012	Dom. Rep.	≥ 65 years	5217.3	118	22.6 (18.8–27.0)
Maestre (49)	2018	Venezuela	≥ 55 years	8026	73	9.10 (7.13–11.4)
César-Freitas (50)	2021	Brazil	≥ 60 years	1301	39	26.1 (18.7–36.6)
Pooled estimate			≥ 60 years ≥ 65 years			26.0 (23.4–28.6) 23.6 (19.8–27.5)

A meta-analysis was performed to summarize the incidence rates for those aged 60 years and older and for those above 65 years (Figure 5). The pooled estimates showed an incidence of 26.0 (23.4–28.6) and 23.6 (19.8–27.5) per 1000 person-years for those aged 60 years and older and 65 and older, respectively. The evidence base for the meta-analysis of incidence estimates in LAC is even smaller than that for prevalence.

Figure 5. Meta-analysis of incidence rates (per 1000 person-years) from studies published in the last decade by age group (60+ and 65+)



3.2 Comparing estimates of dementia incidence from different sources

The WAR 2015 (*8*) estimated that there were over 9.9 million new cases of dementia each year worldwide, meaning that there was one new case every 3.2 seconds. The incidence of dementia in LAC for individuals aged 60 and older was estimated at 15.1 per 1000 person-years, with estimated annual numbers of incident cases of 750 383; in other words, 1.4 new cases every minute. The age and gender standardized incidence per 1000 person-years for those 60+ (15.1) was lower than that for Europe (17.3) and North America (17.8) but higher than that for East Asia (13.5).

According to the GBD methodology (*3*), the incidence of dementia for those aged 60 years and older in 2019 was 7.0 (95% CI 6.1–8.1) per 1000 person-years (6.2 for men and 7.6 for women). According to the GBD's online tools, the estimates of the total number of new dementia cases in the region in 2019 was 504 696 (95% CI 436 082–573 926), i.e., nearly one new case every minute. This incidence is lower than that provided by the systematic review included in the WAR 2015 (*8*).

4. Risk reduction: trends in dementia prevalence and incidence

4.1 Background

According to the GBD project, in 2019 there were about 4.5 million people with dementia in LAC (*3*). Projected to reach 13.7 million by 2050, this increase of 206% is double the increase projected for the United States. Most projections for the number of people with dementia assume that dementia prevalence will remain the same over time and that population growth and aging (which increases the number of people at risk) will be the main driver of the projected increases (*3, 8–10*). However, a growing number of studies have recently shown a decline in dementia incidence and prevalence in a few HICs (*13, 51–55*).

The most direct evidence of this decline comes from the Rotterdam Study (*51*), which has suggested that improved cardiovascular risk factor control may be leading to healthier brains. This study showed that dementia incidence decreased between 1990 and 2010 and that brain magnetic resonance imaging (MRI) showed significantly less brain atrophy and fewer vascular-related brain lesions in the most recent cohorts compared with MRIs performed in the earlier cohorts (*51*).

It seems that the evidence of a decline over time is stronger for incidence than prevalence (*55*), and it has been argued that the current evidence suggests that "age-specific prevalence of dementia is unlikely to change significantly in coming years, even if the incidence of dementia falls in response to secular improvements in public health in high-income countries" (*55*). This new evidence of a decline in the age-specific risk of dementia in HICs over the last two decades brings hope to LMICs for a potential reduction in dementia risk, which would bring important benefits for future generations.

4.2 Risk factors

According to recent estimates, approximately 40% of dementia cases worldwide could be attributable to 12 modifiable risk factors: low education, midlife hypertension and obesity, diabetes, smoking, excessive alcohol use, physical inactivity, depression, low social contact, hearing loss, traumatic brain injury and air pollution. Therefore, there is clear potential for prevention (*56*). Some studies have estimated the potential impact of a small reduction in the main risk factors over the next few decades on the dementia prevalence in 2050 (*57, 58*).

It has been shown that seven of these modifiable risk factors (educational attainment, physical inactivity, hypertension, obesity, depression, smoking, and diabetes) are responsible for 28.2% of worldwide dementia cases, and a 10% decrease in this set of factors per decade would produce a reduction in dementia prevalence of 8.3% by 2050 (*57*). A very similar result was found in Brazil (*59*) using the same set of risk factors (accounting for 32.3% of dementia cases, and a reduction in prevalence of 8.7% by 2050). However, in Barbados, six of these factors (not including depression) account for 50.9% of dementia cases, and a 10% decrease in these factors would produce a reduction in prevalence of 14.3% by 2050 (*60*). Combining the data of six different Latin America countries and territories (Cuba, Dominican Republic, Mexico, Peru, Puerto Rico, and Venezuela [Bolivarian Republic of]), another study (*61*) found that nine risk factors (the same seven risk factors, plus hearing loss and low social contact) were responsible for 55.8% of dementia cases.

Table 5 compares the weighted population attributable risk (PAR) for the risk factors included in in each study. There are important differences in the estimated PAR, which may be explained by the number of risk factors included, but also by the risk factors definition that was used. These differences may partially be explained by the methods used to measure each risk factor and when in the life-course they were measured, but they may also reflect real differences in risk factors, showing that the room for prevention may be higher for LAC countries compared to the United States of America and the United Kingdom, for example.

Table 5. Population attributable risk (PAR) estimates comparing Latin America, Barbados, and Brazil with United Kingdom and United States of America

	WEIGHTED PAR (%)
Barbados (*60*)[a]	50.9
Brazil (*59*)[b]	32.3
United Kingdom (*57*)[b]	30.0
United States (*57*)[b]	30.6
Latin America (six countries) (*61*)[c]	55.8
Brazil (*62*)[d]	50.5
Brazil (*63*)[e]	48.2
World (*56*)[e]	40.0

[a] Six RFs: low education, midlife hypertension and obesity, diabetes, smoking, physical inactivity

[b] Seven RFs: low education, midlife hypertension and obesity, diabetes, smoking, physical inactivity, and depression

[c] Nine risk factors: low education, midlife hypertension and obesity, diabetes, smoking, excessive alcohol use, physical inactivity, depression, low social contact, hearing loss, and traumatic brain injury

[d] Ten risk factors: low education, midlife hypertension and obesity, diabetes, smoking, excessive alcohol use, physical inactivity, depression, low social contact, and hearing loss

[e] Twelve risk factors: low education, midlife hypertension and obesity, diabetes, smoking, excessive alcohol use, physical inactivity, depression, low social contact, hearing loss, traumatic brain injury, and air pollution

Increasing levels of education and more effective treatments and care in respect to some of these risk factors may be partially responsible for the decline in dementia risk seen in HICs and could potentially result in a decline in LMICs in the near future. At the moment, there is no evidence on trends over time regarding dementia prevalence and incidence in LAC. Future studies that monitor prevalence and incidence over time as populations age are important in the region, as they can help to identify the key factors that governments should address to decrease dementia risk.

The World Health Organization has recently launched the first risk reduction recommendations for cognitive impairment and dementia (*63*), which include evidence-based, multisectorial interventions for reducing dementia risks. Many of these interventions are primarily interventions for managing risk factors for cardiovascular diseases and diabetes. It is important that prevention strategies for dementia are integrated with already existing strategies to reduce the risk of these other conditions.

5. Dementia impact

Dementia has no cure and shortens people's lives. It has a huge impact on those living with the condition, their families, and society as a whole. It is a degenerative condition, with care needs and dependence increasing as the disease progresses. Its social impact is immense, and it was estimated to have a global financial cost of US$ 1.3 trillion in 2019, mostly in HICs even though most people with dementia live in LMICs (*2*).

This section will summarize the GBD data for LAC, as well as the available published literature on dementia-related mortality, disability, dependence, and costs. It will also examine and critically compare information from different reports.

5.1 Mortality

There has been a clear increase in the number of deaths caused by dementia in the last two decades. Globally, dementia has become the seventh leading cause of death among all diseases (*2*). Fifty percent of a total of 1.6 million worldwide deaths due to dementia in 2019 occurred in HICs, while most people with dementia live in LMICs (*2*). The relatively higher proportion of dementia-related deaths in HICs may partially be explained by the high levels of underdiagnosis in LMICs (*17, 18*).

These low rates of diagnosis are likely to be reflected in death certificates, which would underestimate dementia related deaths. According to the 2019 GBD data, dementia became the sixth leading cause of death among all diseases in LAC, causing a total of about 130 000 deaths (59% female) in that year. This reflects an increase of 132.5% from 2000, when dementia was the ninth cause of death. Table 6 shows that, as individuals age, dementia increases as a leading cause of death. Women were predominant in all age groups, with a slight increase in predominance with age.

Table 6. Dementia-related deaths in LAC in 2019 by age group, with percentage increase from 2000 to 2019

AGES	RANK	DEATHS	FEMALE %	INCREASE 2000 TO 2019
All ages	6th	129 414	59.0	132.5%
70+	3rd	120 655	59.5	136.0%
80+	2nd	99 342	60.3	146.0%
95+	2nd	17 643	62.5	230.3%

Source: Institute for Health Metrics and Evaluation. GBD Compare. Seattle: University of Washington; 2022. Available from: http://ihmeuw.org/5n3e.

There is evidence of higher mortality rates among people with dementia compared to the general population in the same age group. A study conducted by the 10/66 Dementia Research Group in five Latin American countries (Cuba, Dominican Republic, Mexico, Peru, and Venezuela [Bolivarian Republic of]) among people aged 65 and over found that mortality rates were 1.6–5.7 times higher in individuals with dementia than in those who were dementia-free (*48*). This difference was greatest in urban areas. In Mexico, for example, mortality hazards in rural areas were 1.6 times higher among people with dementia compared to those without it and 2.7 times higher in urban areas (*48*). A study of 1400 people aged 65 and over in Brazil (*64*) conducted in the 2000s found mortality hazards to be as much as 5.2 times higher in those with dementia. In the study, dementia was compared with other health conditions and was found to be the leading predictor of death (*64*).

Predictors of death among people with dementia have also been studied in the region. The 10/66 Dementia Research Group studies have shown that age, being male, and disease severity are the main predictors of death among people with dementia (*65*). They have also shown the importance of nutrition as a predictor of death among people with dementia, and they have highlighted the importance of studying death predictors in order to establish better end-of-life care strategies for people with dementia.

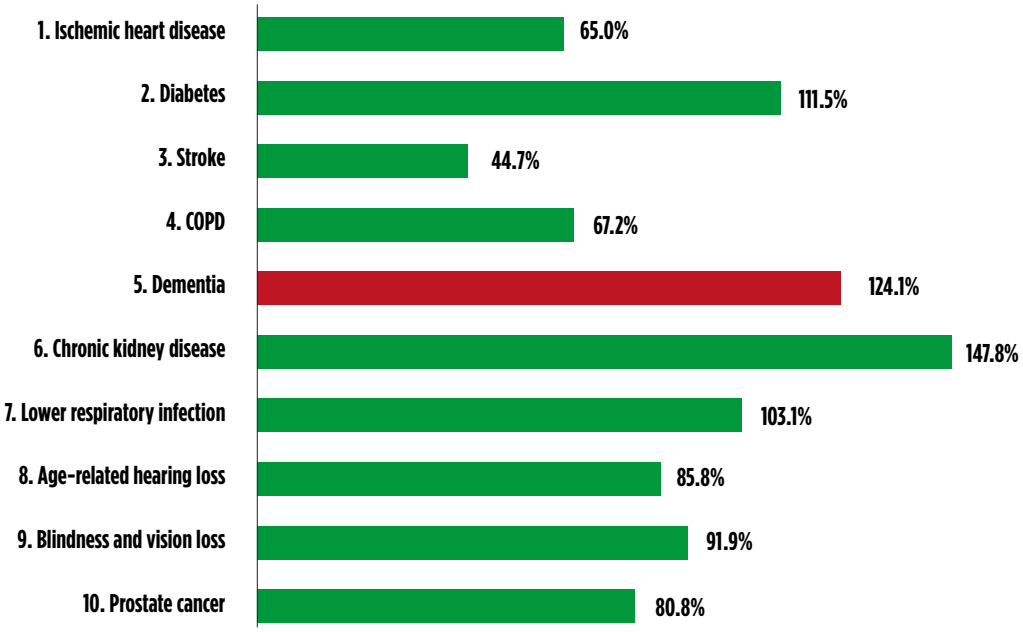
5.2 Disability and dependence

Population-based surveys carried out by the 10/66 Dementia Research Group that included five LAC countries (Cuba, Dominican Republic, Mexico, Peru, and Venezuela [Bolivarian Republic of]) have shown that among 17 diseases, dementia is the largest independent contributor to disability and dependence (*6, 7*).

Although PWD will experience the disease differently, because of its progressive and disabling nature, at some point they will need help with their activities of daily living, and as the disease progresses these needs will increase. One way of assessing the impact of dementia and comparing it with other health conditions is to use the GBD estimates, which combine information on disability and mortality to estimate disease burden. The key indicator—disability adjusted life years (DALYs)—is calculated as the sum of years lived with disability (YLD) and years of life lost (YLL) and reflects the disease's effect on both the quality and quantity of life. One DALY represents the loss of one year of full health due to disability or death.

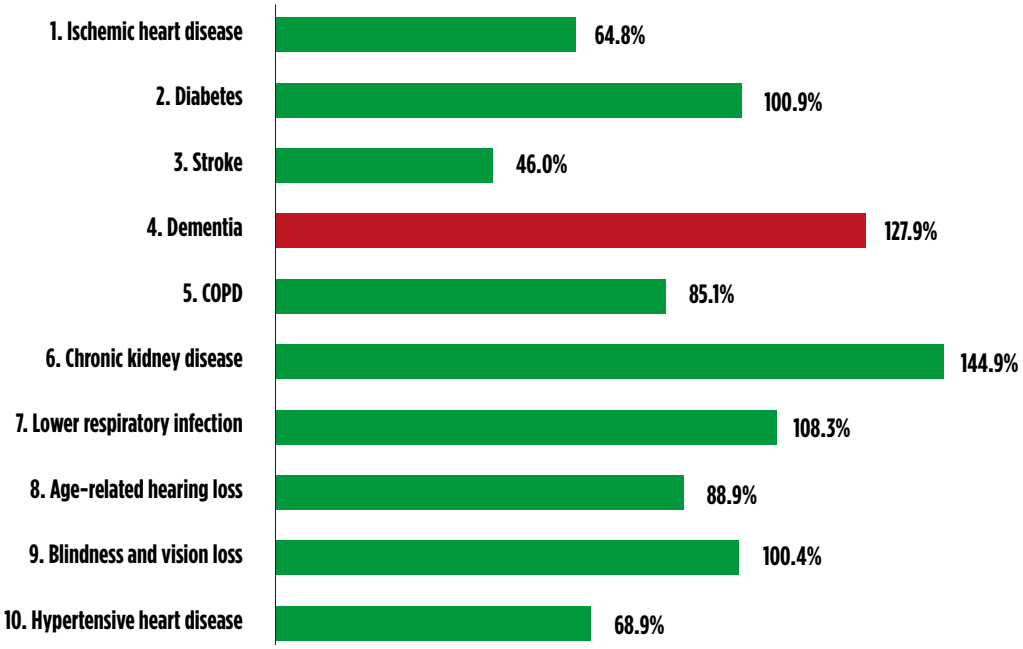
In LAC, about 1.6 million (95% CI 0.7–3.5) DALYs were attributed to dementia in 2019 for people age 70+, with Brazil and Mexico accounting for nearly two-thirds of the DALYs attributed to dementia for this age group in the region (1 million; 95% CI 0.4–2.2). According to the GBD 2019 online tools, dementia was the fifth leading cause of DALYs in 2019 for people aged 70 years and older in LAC, and having the second highest increase of DALYs (124.1%) from 2000 to 2019 (Figure 5). As Figures 6 and 7 show, dementia ranked fourth among women and eighth among men aged 70 years and older in 2019. The increases from 2000 to 2019 are among the three highest among the 10 leading conditions contributing to total DALYs for males (127.9%) and females (118.9%).

Figure 6. Ten conditions responsible for the greatest number of DALYs among people aged 70+ in LAC in 2019, with percentage increase from 2000 to 2019



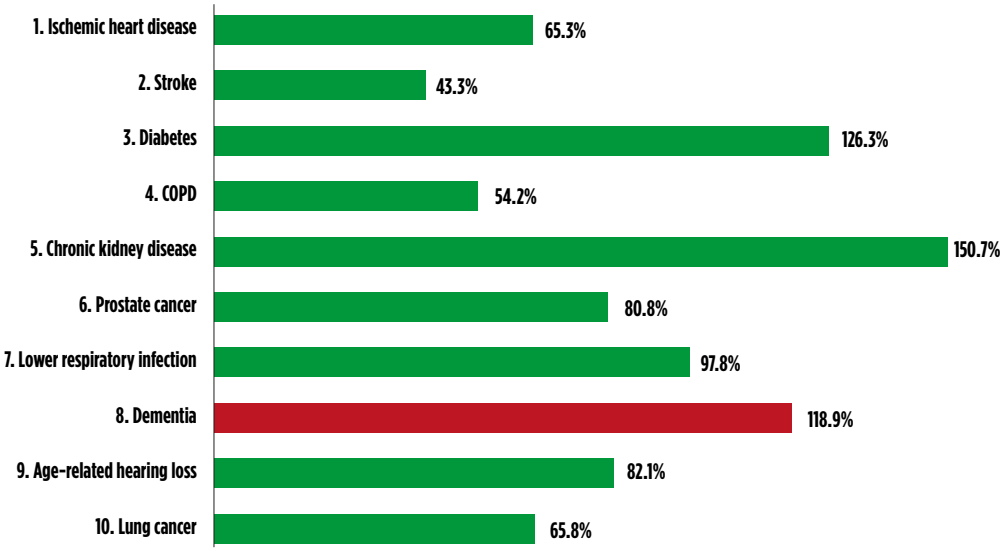
Source: Institute for Health Metrics and Evaluation. GBD Compare. Seattle: University of Washington; 2022. Available from: http://ihmeuw.org/5n3e.

Figure 7. Ten conditions responsible for the greatest number of DALYs among women aged 70+ in LAC in 2019, with percentage increases from 2000 to 2019



Source: Institute for Health Metrics and Evaluation. GBD Compare. Seattle: University of Washington; 2022. Available from: http://ihmeuw.org/5n3e.

Figure 8. Ten conditions responsible for the greatest number of DALYs among men aged 70+ in LAC in 2019, with percentage increases from 2000 to 2019



Source: Institute for Health Metrics and Evaluation. GBD Compare. Seattle: University of Washington; 2022. Available from: http://ihmeuw.org/5n3e.

While dementia is fifth in terms of the diseases responsible for the highest number of DALYs in LAC in the 70+ age group, it rises to second in the 80+ and 95+ age groups (Table 7), with a higher proportion of female-related DALYs compared to male. The increase of dementia-related DALYs from 2000 to 2019 was higher in the older age groups, reaching 229.8% among people 95+.

Table 7. Dementia rank as cause of DALYs and increase from 2000 to 2019, by age group

	RANK	FEMALE %	INCREASE 2000 TO 2019
70+	5th	59.1	124.1%
80+	2nd	60.4	138.2%
95+	2nd	63.0	229.8%

Source: Institute for Health Metrics and Evaluation. GBD Compare. Seattle: University of Washington; 2022. Available from: http://ihmeuw.org/5n3e.

5.3 Costs

The global cost of dementia was estimated to be US$ 1.3 trillion in 2019 (*2*); three-quarters of the total costs occurred in HICs although most PWD live in LMICs. This disparity had already been identified in the 2015 WAR, when the total dementia costs in LAC had been estimated to be US$ 46.2 billion. Although double what they had been in 2010, these costs still only represented 5.6% of the total global costs at that time (US$ 818 billion). In the same year, it was estimated that the number of PWD in the region represented about 10% of the global number estimated in the report.

The annual cost per person with dementia in 2015 (*8*) was estimated to vary from US$ 3375 in the Latin America Andean region, to US$ 13 488 in the Latin America Southern region (Table 8). The highest increase, between 2010 and 2015 (86.5%), took place in the Latin America Central region. Only a few studies have been published on the cost of dementia in Latin American countries (*16, 66–68*). The costs of dementia can be divided into three components: direct medical costs (medical care, drugs, tests); direct social costs (social service, daycare); and indirect costs (mostly associated with informal care provided by family and friends) (*67*).

A study conducted in Argentina (*68*) reported that the annual costs per person increased with disease severity, from US$ 3420 in mild cases to US$ 9657 in severe cases. Costs also increased with institutionalization: on average outpatient care costs US$ 3189.20 per person, and

institutionalized patient care costs US$ 14 447.68. A study conducted in Brazil (*16*) also found that the annual costs per person varied with disease severity: US$ 12 146 for mild, US$ 20 198 for moderate, and US$ 16 467 for severe. The Brazilian study also found that almost two-thirds of the total cost came from informal care provided, in general, by family members.

A study conducted in Chile demonstrated that the average monthly cost per patient was estimated at US$ 1463 (US$ 17 556 annual costs), of which direct medical costs represented 20%, direct social costs 5%, and indirect costs 75% of the total cost (*67*). The financial costs of dementia are higher in richer countries because of those countries' age composition, the higher rates of diagnosis, and the generally higher levels of treatment and care in these countries. However, the proportion of costs attributable to informal cost is greater in poorer countries.

Table 8. Annual costs of dementia in 2010 and 2015 (per person, in US$) and percentage change from 2010 to 2015, by GBD regional classification

REGION	2010 [a]	2015 [a]	CHANGE (%)
The Caribbean	9092	9387	3.2
Latin America Andean	3663	3375	–7.9
Latin America Central	5536	10 349	86.5
Latin America Southern	8243	13 448	63.2
Latin America Tropical	6881	9426	37.0

[a] Adapted from Prince M, Wimo A, Guerchet M, Ali GC, Yutzu W, Prina M. World Alzheimer Report 2015. The global impact of dementia: an analysis of prevalence, incidence, cost and trends. London: Alzheimer's Disease International; 2015. Available from: https://www.alzint.org/resource/world-alzheimer-report-2015/.

6. Key points

Prevalence and incidence

Most countries do not have reliable estimates of dementia prevalence, incidence, and mortality.

- Dementia prevalence studies are concentrated in a few countries, and most were conducted in urban areas. Even within countries, studies are not representative of the older national population.

- There is important heterogeneity between the systematic reviews on dementia prevalence in the region as well as between original studies regarding the methodology used.

- Twenty-four population-based studies on the prevalence of dementia were identified through the systematic review. From these studies the pooled prevalence for the region among those aged 80 years and above was 23% and for those aged 90 years and above was 39%.

- Dementia prevalence and incidence increase exponentially with age and are higher among women and people in rural settings compared to urban areas.

- The Global Burden of Disease estimated that 4.5 million people were living with dementia in LAC in 2019, 4.1 million of whom were aged 60 and above (95% CI 3.6–4.8).

- The Global Burden of Disease projected that the number of people with dementia in Latin America and the Caribbean will reach 13.7 million cases by 2050, a 205% increase and twice the projected increase for North America (United States and Canada) compared to 2019. The increase is mainly due to population aging.

- Only four studies, covering just six countries, on dementia incidence in the region were published in the last decade, and only one was actually conducted during this period.

- Total estimates for the region show an incidence varying from 0.96 to 1.4 new cases every minute.

Trends over time

- There is some evidence from high-income countries that dementia risk has decreased in the last two decades. These reductions have been partially attributed to improvements in education and the treatment and care of cardiovascular diseases.
- There is no study looking at these trends over time in LAC.
- Twelve risk factors have been identified as being responsible for 40% of dementia cases globally.
- A few studies have estimated the population attributable risk in respect of the similar set of factors in the region and have shown some heterogeneity (ranging from 30% to 55.8%), probably mainly due to the different number and definition of risk factors.

Mortality

- Dementia became the sixth leading cause of death among all diseases in 2019 (Global Burden of Disease) in the region, with an increase of 132.5% compared to 2000.
- Dementia ranks higher in the older age groups as a leading cause of death.
- In the total number of deaths, women were predominant in all age groups, with a slight increase in predominance with age.
- Mortality rates among people aged 65+ in the region are 1.6 to 5.7 higher among people with dementia compared to people without dementia in the same age groups; this ratio was higher in urban areas.

Dependence and disability

- Dementia is the leading contributor to dependence and disability in older people in LAC, and most of the care provided is informal, usually by family members.
- In LAC, about 1.6 million (95% CI 0.7–3.5) DALYs were attributed to dementia in 2019 for people age 70+. Brazil and Mexico account for nearly two-thirds of these DALYs.

- Dementia was the fifth leading cause of DALYs in 2019 for people aged 70+ in LAC, with the second highest increase among the top ten causes of DALYs from 2000 to 2019.

- Dementia-related DALYs increase with age, and dementia is the second highest cause of DALYs for both males and females aged 80+ and 95+, with a higher proportion of DALYs in females than males.

Costs

- There are a limited number of studies on dementia costs in the region.

- The total dementia costs in the region were estimated to be US$ 46.2 billion in 2015; double what had been estimated for 2010.

- In high-income countries, most of the total dementia costs come from formal costs, while in low- and middle-income countries, such as those in LAC, almost two-thirds of costs are from informal care.

7. Recommendations

- The harmonization of the methodologies used in prevalence, incidence, and mortality studies is crucial. Researchers must also gather evidence from a greater number of countries. Ongoing monitoring is essential, with studies repeated over time as well as population-based longitudinal studies with longer follow-ups to gather evidence of trends in the region.

- Countries in the region need to identify priority factors to target locally.

- It is important that dementia risk reduction strategies are integrated with countries' preexisting strategies for other noncommunicable diseases.

- Countries need to assess the needs of people living with dementia and their families, and they need to determine if and how their services are meeting those needs adequately.

- The Decade of Healthy Aging, as well as the WHO Global Action Plan on the Public Health Response to Dementia, are opportunities to foster action on this important topic in the Region of the Americas in order to address the projected increase in the number of people with dementia, as well as its impacts on individuals, families, and health systems.

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Dementia in Latin America and the Caribbean: Prevalence, Incidence, Impact, and Trends over Time is part of the publication series titled "Decade of HealthyAging in the Americas: Situation and Challenges." This document aims to provide an outline of the current situation in Latin America and the Caribbean in respect to the prevalence and incidence of dementia and its impact on the health status of older people.

As dementia is a significant global health problem that also has social and economic impacts, this document highlights the importance of monitoring dementia in the region. The document evidences that dementia is one of the main contributors to dependence and disability in older people in Latin America and the Caribbean and, although its prevalence and incidence, increase exponentially with age, it is not part of normal aging. Alzheimer's disease is the most common dementia, and there is no cure for this condition, but with timely diagnosis it is possible to ameliorate symptoms. It is important to assess what are the needs of people living with dementia and their families and to integrate dementia risk reduction strategies in preexisting strategies for other noncommunicable diseases.

As shown in the report, despite the huge burden, dementia is still underdiagnosed, and it is fundamental to better monitor its prevalence, incidence and the different societal impact that dementia can have. For that, it is crucial to promote the use of harmonized methodologies to address this information in a broader number of studies and countries in the region. This can contribute to the generation of direct actions to decrease dementia risk and lead to healthier lives for people with dementia and their families.

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