

Original Article

Prevalence and Years Lived with Disability of 310 Diseases and Injuries in Iran and its Neighboring Countries, 1990–2015: Findings from Global Burden of Disease Study 2015

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Abstract

Background: Due to significant achievements in reducing mortality and increasing life expectancy, the issue of disability from diseases and injuries, and their related interventions, has become one of the most important concerns of health-related research.

Methods: Using data obtained from the GBD 2015 study, the present report provides prevalence and years lived with disability (YLDs) of 310 diseases and injuries by sex and age in Iran and neighboring countries over the period 1990–2015. Age-standardized rates of all causes of YLDs are presented for both males and females in 16 countries for 1990 and 2015. We present the percentage of total YLDs for 21 categories of diseases and injuries, the percentage of YLDs for age groups, as well as the ranking of the most prevalent causes and YLDs from the top 50 diseases and injuries in Iran.

Results: In 2015, the burden of 310 diseases and injuries among the Iranian population was responsible for 8,357,878 loss of all-age total years, which is equal to 10.58% of total years lived per year. This differs from the neighboring countries, as it ranges from 9.05% in Turkmenistan to 13.36% in Russia. During the past 25 years, a remarkable decrease was observed in all-cause YLD rates in all 16 countries. Meanwhile, in all countries, the age-standardized rate of all causes of YLDs was higher in females than males.

Conclusion: Based on our findings, one of the remarkable changes in NCDs observed among the studied age groups was increased rate of YLDs from mental disorders, which was replaced by musculoskeletal disorders in older age groups in 2015.

Keywords: Global burden of disease (GBD), Iran, prevalence, years lived with disability (YLDs)

Cite this article as: Djalalinia S, Saeedi Moghaddam S, Moradi-Lakeh M, Shahraz S, Naghavi M, Murray CJL, Vos T, Mokhdad AH, Krohn K, Danaei G, Afshin A, Sepanlou SG, Bazargan-Hejazi S, Peykari N, Rezaei N, Roshandel G, Karimkhani C, Moazen B, Pourmalek F, Esteghamati AR, Hafezi-Nejad N, Sheikhabaie S, Katibeh M, Ahmadi H, Safi S, Qorbani M, Islami F, Khosravi A, Hasanvand MS, Mahdavi M, Kiadaliri AA, Farvid MS, Karimi SM, Mohammadi A, Asayesh H, Assadi R, Khubchandani J, Heydarpour P, Fereshtehnejad SM, Safiri S, Kasaeian A, Larjani B, Malekzadeh R, Farzadfar F. Prevalence and years lived with disability of 310 diseases and injuries in Iran and its neighboring countries, 1990–2015: Findings from global burden of disease study 2015. *Arch Iran Med.* 2017; **20(7)**: 392–402.

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Introduction

Today, due to significant achievements in reducing mortality and increasing life expectancy, non-fatal health outcomes from diseases and injuries have become one of the most important priorities.^{1,2} Based on available evidence, over the past decade, years lived with disability (YLDs) from diseases and injuries have increased in most countries, whereas it has remained stable or even had a small reduction for most causes.^{3,4}

The epidemiological changes have led to an increase in life expectancy, and given the extended requirements for better quality of life, we are faced with the increasing needs of individuals with a range of disorders that largely cause disability but not mortality.^{3,5-7}

Policymakers and all other stakeholders are in need of accurate data to develop more effective policies.⁸⁻¹⁰ The present paper provides estimates of the prevalence and YLDs of 310 diseases and injuries by sex and age in Iran and neighboring countries over the period 1990 – 2015.

Materials and Methods

We used the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) estimates of prevalence and YLDs for 310 diseases and injuries to explore their epidemiological patterns among people living in Iran and 15 neighboring countries. The countries that are adjacent to Iran (by land or sea) include Afghanistan, Armenia, Azerbaijan, Bahrain, Iraq, Kazakhstan, Kuwait, Oman, Pakistan, Qatar, Russia, Saudi Arabia, Turkey, Turkmenistan, and the United Arab Emirates. The target population was divided into 20 age groups including neonatal (0 – 6 days old, 7 – 27 days old, and 28 – 36 days old), children 1 – 4 years old, and 15 other groups (each covering five years of age, including people aged from 5 to 80 years), and a group aged over 80 years. All people aged over 80 years were categorized in the oldest age group (80+ years old).

The GBD study, a comprehensive, systematic effort,¹¹ follows common frameworks for data collection, statistical analysis, and estimation, as published elsewhere. The GBD 2015 study collected data on life expectancy and disease incidence, prevalence, number of deaths, years of life lost (YLLs), years lived with disability (YLDs), and disability-adjusted life years (DALYs). The GBD 2015 also estimated the burden of disease attributable to 79 behavioral, environmental, occupational, and metabolic risk factors in 195 countries, territories, and regions by sex and 20 age groups in 1990, 1995, 2000, 2005, 2010, and 2015.^{5,7,12,13}

GBD 2015 mapped non-fatal causes, impairments, and nature

of injury based on the 9th and 10th revisions of the International Classification of Diseases (ICD-9 and ICD-10). Prevalence and incidence by cause were estimated using DisMod-MR 2.1, a Bayesian meta-regression tool.⁷ YLDs were estimated by multiplying the number of patients (as prevalence) by a disability weight. In addition, 95% uncertainty intervals were calculated as the 2.5th and 97.5th values from the YLD distribution, which are 1,000 samples of the posterior distribution of prevalence and 1,000 samples of the disability weight. More details about the data and methods of estimating YLDs have been comprehensively described and discussed elsewhere.⁷

This paper presents all-age YLDs and age-sex-standardized YLDs per 100,000 population, comparing Iran and its 15 neighboring countries based on the data extracted from the Institute for Health Metrics and Evaluation's (IHME) website.

Moreover, using appropriate visualization methods, we present the percentage of total YLDs by 21 categories of diseases and injuries, the percentage of YLDs by age groups, as well as the ranking of the most prevalent cases and YLDs from the top 50 diseases and injuries in Iran. In addition, this paper presents time trends of the top 10 diseases and injuries with the highest rates of age-standardized prevalence and YLDs. The authors used GBD 2015 estimates and deployed data visualization tools to depict the results; all coding for visualizations was performed using the Stata (version 11) and R (version 3.0.2) software.

Results

In 2015, the burden of 310 diseases and injuries among Iranian population was responsible for 8,357,878 all-age YLDs, equivalent to 10.58% of total years lived per year. The percentage of years lost per year in the 16 countries ranged from 9.05% for Turkmenistan to 13.36% for Russia.

Age-sex standardized YLDs were estimated as 11,319.8 per 100,000 population in Iran, and ranged from 10,184.2 for Turkmenistan to 13,889.8 for Afghanistan. All-age all-cause YLDs increased by 58.7% in women and 49.2% in men from 1990 to 2015 in Iran. During the 26 years covered by the study, the greatest and the smallest changes in crude YLDs were observed in the United Arab Emirates (437.76%) and Armenia (-3.90%), respectively. During this time, the greatest and the smallest changes in YLDs were observed in Turkey (-10.54%) and Pakistan (-0.75%), respectively. All-cause YLDs were reduced by 8.2% in Iran over the study period (Figure 1).

In Iran, about 87.4% of total years lost were attributed to non-communicable diseases and the highest percentages of total YLDs were due to mental (20.4%) and musculoskeletal disorders (19.7%). In addition, 6.3% of total YLDs were attributed to communicable diseases and the remaining 6.3% to injuries. In all other countries, the highest level of total YLDs was attributed to non-communicable diseases (Figure 2). Table 1 presents all-cause YLDs and the prevalence of cases by sex and location in 1990 and 2015.

In both sexes, the majority of YLDs were due to communicable diseases in the under-5-years age groups; the largest share of burden shifted to non-communicable diseases in the 5 – 9 through 80+ age groups. One of the remarkable changes in NCDs observed among the studied age groups was the increased percentage of YLDs from mental disorders. This was replaced by musculoskeletal disorders in older age groups (Figure 3).

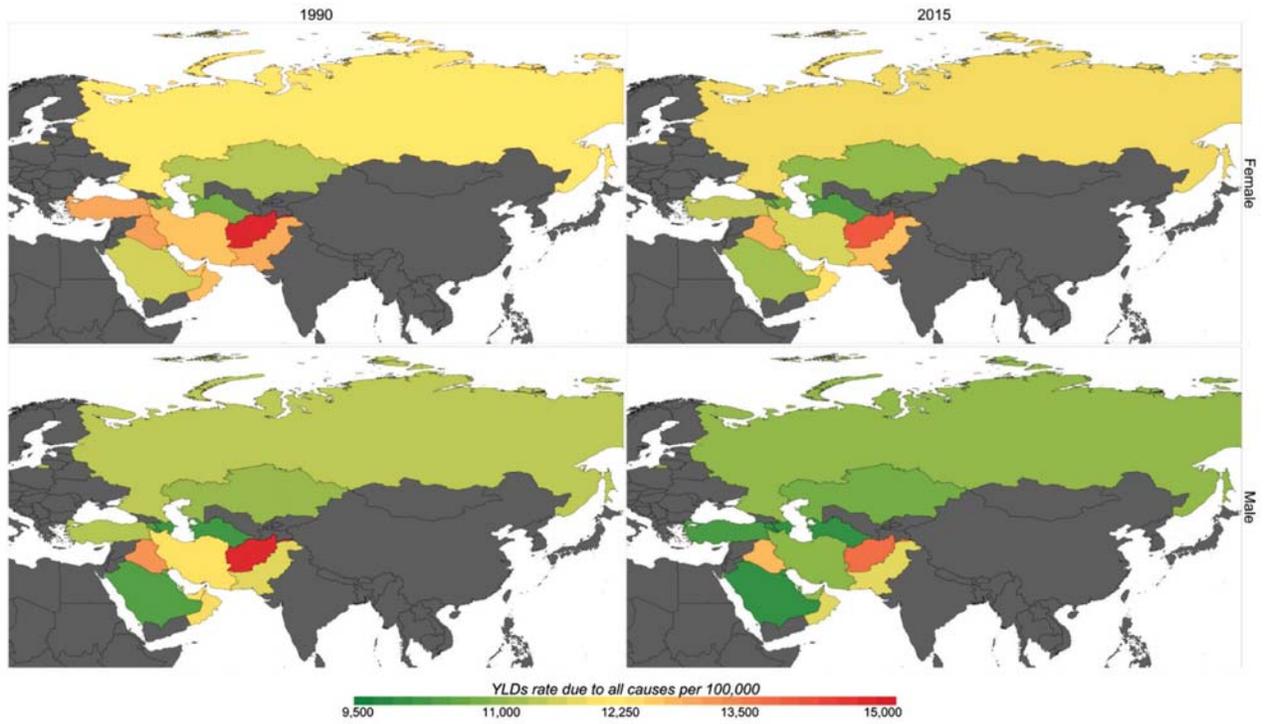


Figure 1. Age-standardized rate of all-cause YLDs in males and females in 1990 and 2015, by country

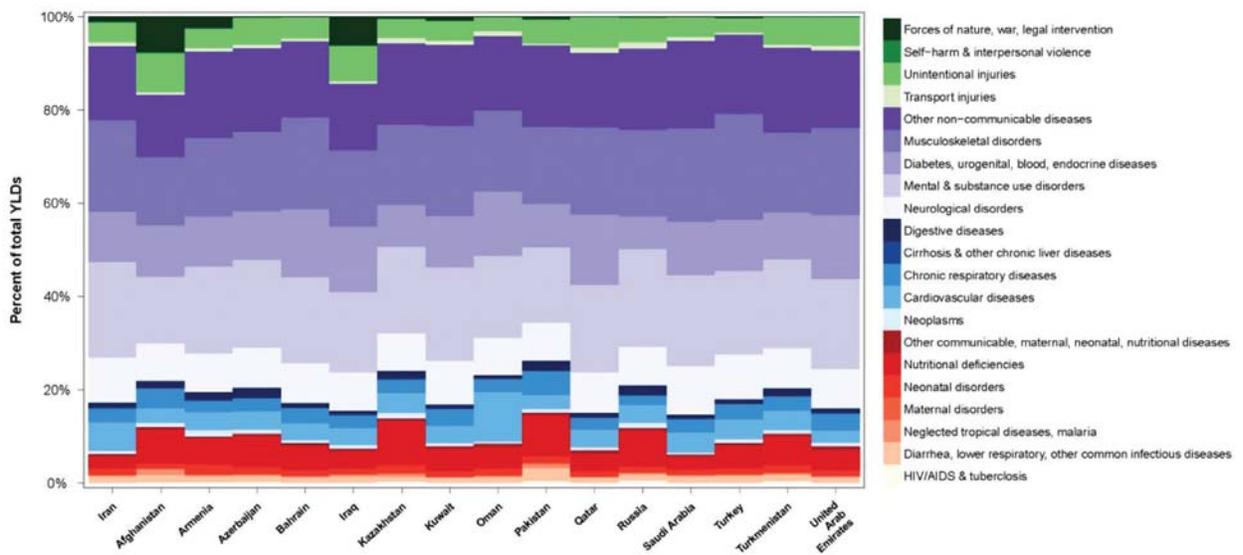


Figure 2. Percentage of total YLDs by 21 categories of diseases and injuries by country, 2015

Table 1. All-cause YLDs and the prevalence of cases by sex and location in 1990 and 2015

Location	YLDs						Prevalent cases					
	1990		2015		1990		2015		1990		2015	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Iran	2,707,078 (1,992,929-3,488,493)	2,721,733 (2,000,619-3,533,103)	4,295,890 (3,211,319-5,525,076)	4,061,988 (3,025,550-5,179,453)	25,800,000 (25,600,000-26,000,000)	26,300,000 (26,100,000-26,500,000)	37,600,000 (37,400,000-37,800,000)	37,000,000 (37,100,000-37,500,000)	37,600,000 (37,400,000-37,800,000)	37,000,000 (37,100,000-37,500,000)	37,600,000 (37,400,000-37,800,000)	37,300,000 (37,100,000-37,500,000)
Afghanistan	679,762.8 (501,578.8-894,413.9)	709,397.4 (509,722.1-971,179.6)	1,689,874 (1,245,737-2,188,233)	1,711,798 (1,247,16-2,248,801)	5,840,665 (5,797,536-5,881,424)	6,042,087 (5,986,282-6,099,305)	15,300,000 (15,200,000-15,400,000)	16,000,000 (15,900,000-16,200,000)	15,300,000 (15,200,000-15,400,000)	15,300,000 (15,200,000-15,400,000)	15,300,000 (15,200,000-15,400,000)	16,000,000 (15,900,000-16,200,000)
Armenia	193,829.9 (146,309.6-245,820.2)	157,805.8 (116,683.8-203,623)	193,070.6 (144,975.9-247,441.1)	144,844.2 (107,203.7-187,185.1)	1,729,825 (1,719,428-1,739,759)	1,576,080 (1,561,436-1,588,315)	1,554,566 (1,548,666-1,560,217)	1,305,854 (1,297,417-1,313,041)	1,554,566 (1,548,666-1,560,217)	1,576,080 (1,561,436-1,588,315)	1,554,566 (1,548,666-1,560,217)	1,305,854 (1,297,417-1,313,041)
Azerbaijan	357,307.5 (262,938.8-464,241.2)	292,676.8 (216,680.9-383,055.1)	532,247.4 (389,210.6-690,862.4)	456,663.3 (337,143.9-593,293.6)	3,488,261 (3,468,005-3,510,203)	3,223,123 (3,197,113-3,251,242)	4,734,875 (4,711,040-4,752,921)	4,517,314 (4,485,538-4,543,330)	4,734,875 (4,711,040-4,752,921)	3,223,123 (3,197,113-3,251,242)	4,734,875 (4,711,040-4,752,921)	4,517,314 (4,485,538-4,543,330)
Bahrain	21,731.76 (16,110.62-28,140.75)	26,983.93 (20,083.22-34,721.73)	58,882.16 (43,694.15-75,867.28)	83,721.92 (62,510.27-107,925.5)	205,868.1 (204,800.1-206,690.4)	271,791.9 (268,906.6-273,384)	507,250.9 (504,902.7-508,779.6)	806,848.4 (801,374-811,356.8)	507,250.9 (504,902.7-508,779.6)	271,791.9 (268,906.6-273,384)	507,250.9 (504,902.7-508,779.6)	806,848.4 (801,374-811,356.8)
Iraq	874,154.4 (654,930.5-1,123,095)	890,817.1 (666,346.9-1,137,531)	1,822,375 (1,344,102-2,352,969)	1,791,130 (1,326,483-2,303,188)	8,155,947 (8,071,876-8,220,663)	8,081,770 (7,988,174-8,157,020)	17,000,000 (16,800,000-17,100,000)	16,900,000 (16,700,000-17,100,000)	8,155,947 (8,071,876-8,220,663)	8,081,770 (7,988,174-8,157,020)	17,000,000 (16,800,000-17,100,000)	16,900,000 (16,700,000-17,100,000)
Kazakhstan	918,169.1 (674,533-1,187,644)	767,108.1 (564,598.4-995,041.6)	998,917.4 (734,407-1,291,233)	829,975 (612,619.3-1,074,400)	8,287,534 (8,241,868-8,326,203)	7,649,799 (7,599,351-7,700,605)	8,791,194 (8,747,041-8,828,414)	8,045,557 (8,001,874-8,097,579)	8,287,534 (8,241,868-8,326,203)	7,649,799 (7,599,351-7,700,605)	8,791,194 (8,747,041-8,828,414)	8,045,557 (8,001,874-8,097,579)
Kuwait	88,217.1 (65,293.79-114,254.6)	97,122.47 (70,879.58-126,469.9)	170,225.7 (126,738.6-219,696.7)	196,352.3 (145,844.7-253,240.3)	893,673.8 (888,207.8-898,749.5)	995,117.5 (985,985.8-1,002,630)	1,616,801 (1,607,916-1,625,684)	2,017,927 (1,999,684-2,033,461)	893,673.8 (888,207.8-898,749.5)	995,117.5 (985,985.8-1,002,630)	1,616,801 (1,607,916-1,625,684)	2,017,927 (1,999,684-2,033,461)
Oman	76,957.64 (56,349.67-100,128.8)	96,496.5 (70,941.07-125,320.8)	154,496.4 (114,043.9-199,930.8)	299,389.1 (221,114.8-390,638.9)	779,747.9 (774,573.3-783,492.2)	962,473.3 (955,735.8-968,719.8)	1,458,755 (1,451,743-1,465,428)	2,836,183 (2,815,371-2,849,284)	779,747.9 (774,573.3-783,492.2)	962,473.3 (955,735.8-968,719.8)	1,458,755 (1,451,743-1,465,428)	2,836,183 (2,815,371-2,849,284)
Pakistan	5,387,389 (3,979,058-6,971,246)	5,384,631 (3,999,649-6,967,388)	9,996,875 (7,377,921-12,900,000)	9,695,896 (7,168,231-12,500,000)	49,300,000 (49,100,000-49,700,000)	52,300,000 (51,900,000-52,600,000)	87,100,000 (86,500,000-87,600,000)	90,300,000 (89,600,000-90,900,000)	9,996,875 (7,377,921-12,900,000)	9,695,896 (7,168,231-12,500,000)	49,300,000 (49,100,000-49,700,000)	52,300,000 (51,900,000-52,600,000)
Qatar	14,157.11 (10,508.23-18,266.01)	30,889.24 (22,919.19-39,956.72)	61,007.28 (45,342.68-79,071.08)	154,350 (114,112-199,946.9)	147,713.3 (145,679.8-149,445.4)	294,509.3 (291,820.8-296,841)	577,235 (573,109.3-580,705.1)	1,508,977 (1,492,599-1,521,085)	61,007.28 (45,342.68-79,071.08)	154,350 (114,112-199,946.9)	147,713.3 (145,679.8-149,445.4)	577,235 (573,109.3-580,705.1)
Russia	10,600,000 (7,766,540-13,600,000)	7,617,373 (5,660,500-9,860,530)	11,600,000 (8,526,305-15,000,000)	8,225,615 (6,139,248-10,600,000)	75,700,000 (75,400,000-76,000,000)	64,500,000 (64,100,000-64,900,000)	77,700,000 (77,500,000-78,000,000)	64,200,000 (63,800,000-64,500,000)	11,600,000 (8,526,305-15,000,000)	8,225,615 (6,139,248-10,600,000)	75,700,000 (75,400,000-76,000,000)	64,200,000 (63,800,000-64,500,000)
Saudi Arabia	616,678.3 (455,490.6-798,472.4)	734,622.5 (542,634.7-953,837.6)	1,312,240 (971,804.7-1,687,243)	1,595,472 (1,182,693-2,062,637)	6,765,117 (6,742,719-6,784,545)	8,380,677 (8,349,471-8,408,933)	13,100,000 (13,000,000-13,100,000)	16,600,000 (16,500,000-16,600,000)	1,312,240 (971,804.7-1,687,243)	1,595,472 (1,182,693-2,062,637)	6,765,117 (6,742,719-6,784,545)	8,380,677 (8,349,471-8,408,933)
Turkey	3,108,762 (2,312,570-4,012,827)	2,601,785 (1,934,261-3,366,434)	4,580,103 (3,402,439-5,944,642)	3,732,777 (2,762,128-4,811,081)	26,400,000 (26,200,000-26,600,000)	25,000,000 (24,900,000-25,200,000)	38,400,000 (38,200,000-38,500,000)	35,900,000 (35,700,000-36,100,000)	4,580,103 (3,402,439-5,944,642)	3,732,777 (2,762,128-4,811,081)	26,400,000 (26,200,000-26,600,000)	35,900,000 (35,700,000-36,100,000)
Turkmenistan	166,144.6 (122,582.2-216,254.5)	144,247.6 (106,699.9-187,840.4)	259,794 (191,030.9-336,772.8)	227,156.5 (167,462.7-294,457.9)	1,757,614 (1,746,413-1,770,480)	1,656,261 (1,640,038-1,669,632)	2,610,035 (2,593,474-2,620,949)	2,444,854 (2,423,577-2,458,133)	259,794 (191,030.9-336,772.8)	227,156.5 (167,462.7-294,457.9)	1,757,614 (1,746,413-1,770,480)	2,610,035 (2,593,474-2,620,949)
United Arab Emirates	58,071.77 (43,128-75,158.03)	122,096.3 (91,313.94-157,283)	249,898.7 (184,337.3-322,167.6)	718,967.9 (533,799.4-921,889.3)	581,364.6 (576,647.4-585,138.3)	1,108,071 (1,100,101-1,114,524)	2,331,034 (2,318,491-2,341,042)	6,344,301 (6,298,070-6,380,974)	249,898.7 (184,337.3-322,167.6)	718,967.9 (533,799.4-921,889.3)	581,364.6 (576,647.4-585,138.3)	1,108,071 (1,100,101-1,114,524)

*Data in parenthesis are 95% uncertainty interval

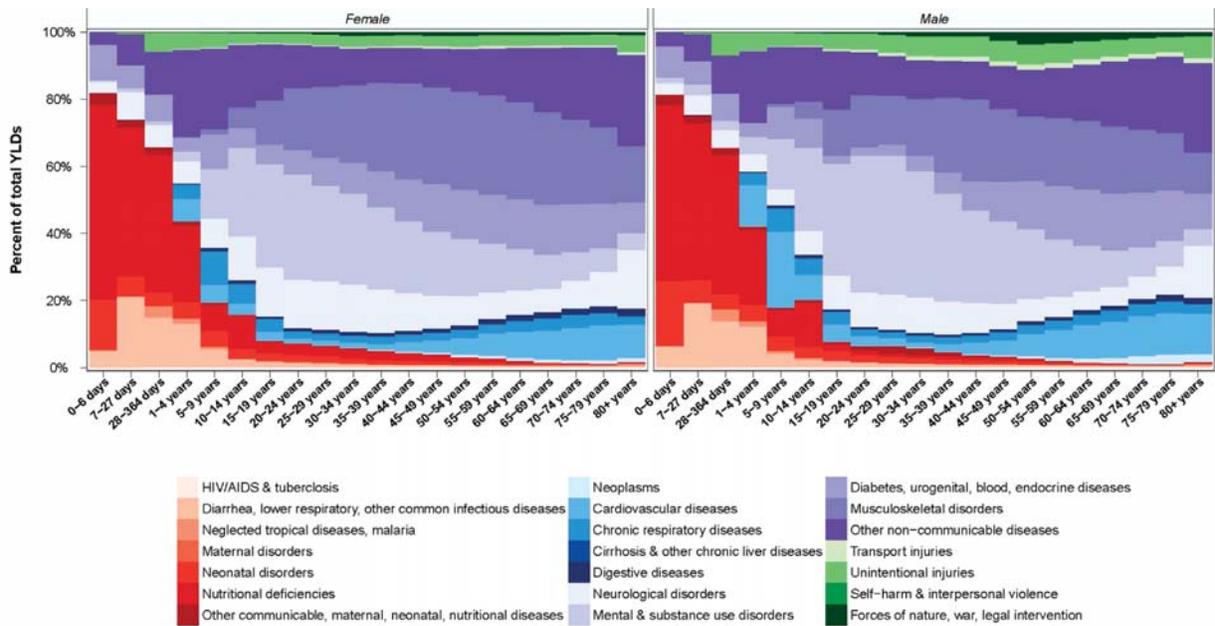


Figure 3. Percentage of YLDs from 21 categories of diseases and injuries by sex and age in Iran, 2015

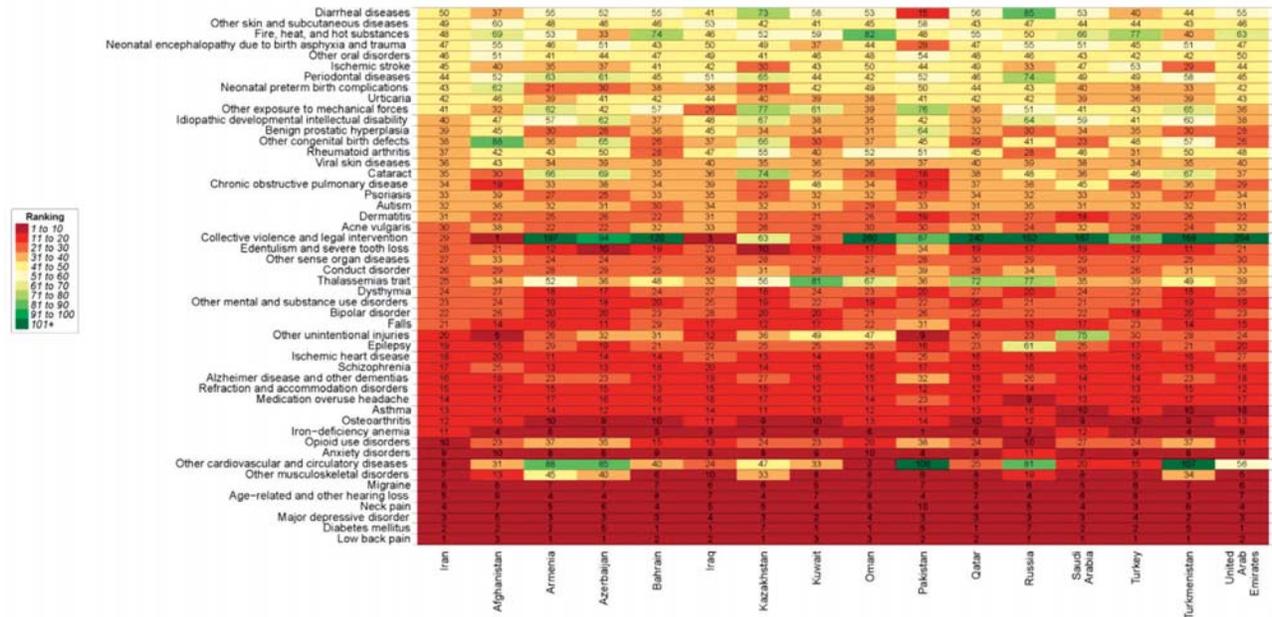


Figure 4. Heat map of 50 diseases and injuries with the highest YLDs in Iran and their ranking in neighboring countries, 2015

Low back pain (7.49%), major depressive disorder (6.71%), diabetes mellitus (5.98%), neck pain (5.55%), and age-related and other types of hearing loss (3.22%) were the main causes of YLDs among the Iranian population in 2015 (Figure 4). The prevalence of the top 50 diseases in the Iranian population is presented in Figure 5.

Comparing the 16 countries, low back pain had the highest age-standardized YLDs per 100,000 persons in eight countries:

Russia (1,130.9), Kazakhstan (989.9), Turkey (970.3), Azerbaijan (900.6), Armenia (895.1), Turkmenistan (878.1), Iran (820.6), and Saudi Arabia (819.3). In six countries—Iraq (1,345.5), Qatar (1,309.1), Oman (1,261.1), Bahrain (1,229.6), the United Arab Emirates (1,165.2), and Kuwait (805.8)—diabetes mellitus was the main cause of YLDs.

Age-standardized YLDs for the top 10 diseases showed different time trajectories [in Iran].

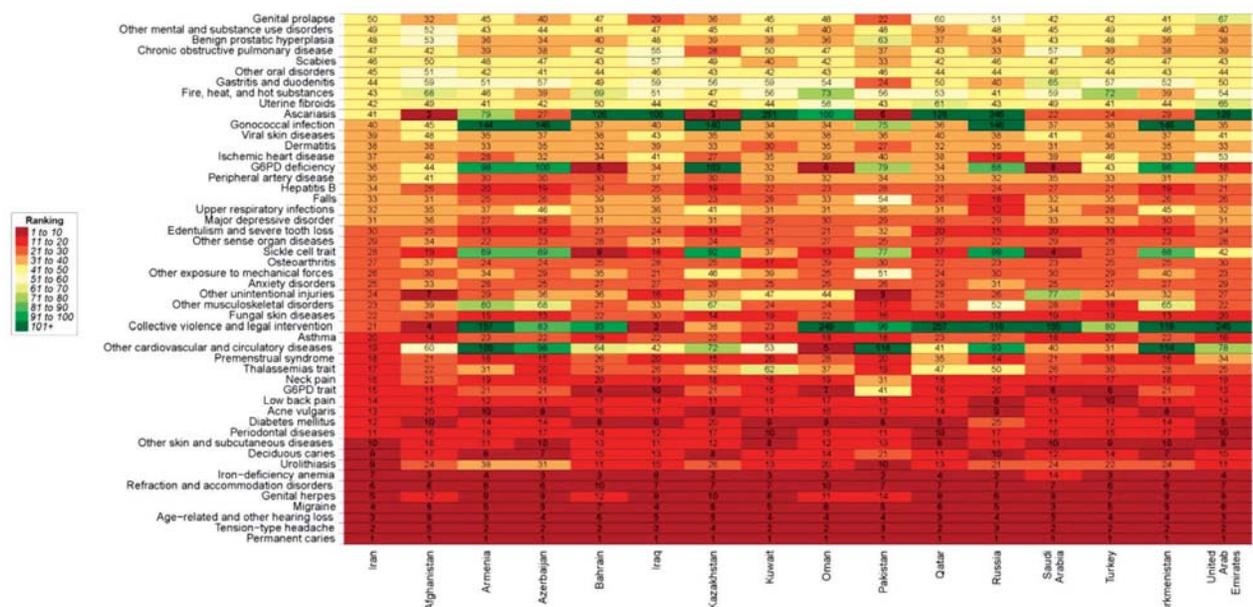


Figure 5. Heat map of 50 prevalent diseases in Iran and their ranking in neighboring countries, 2015

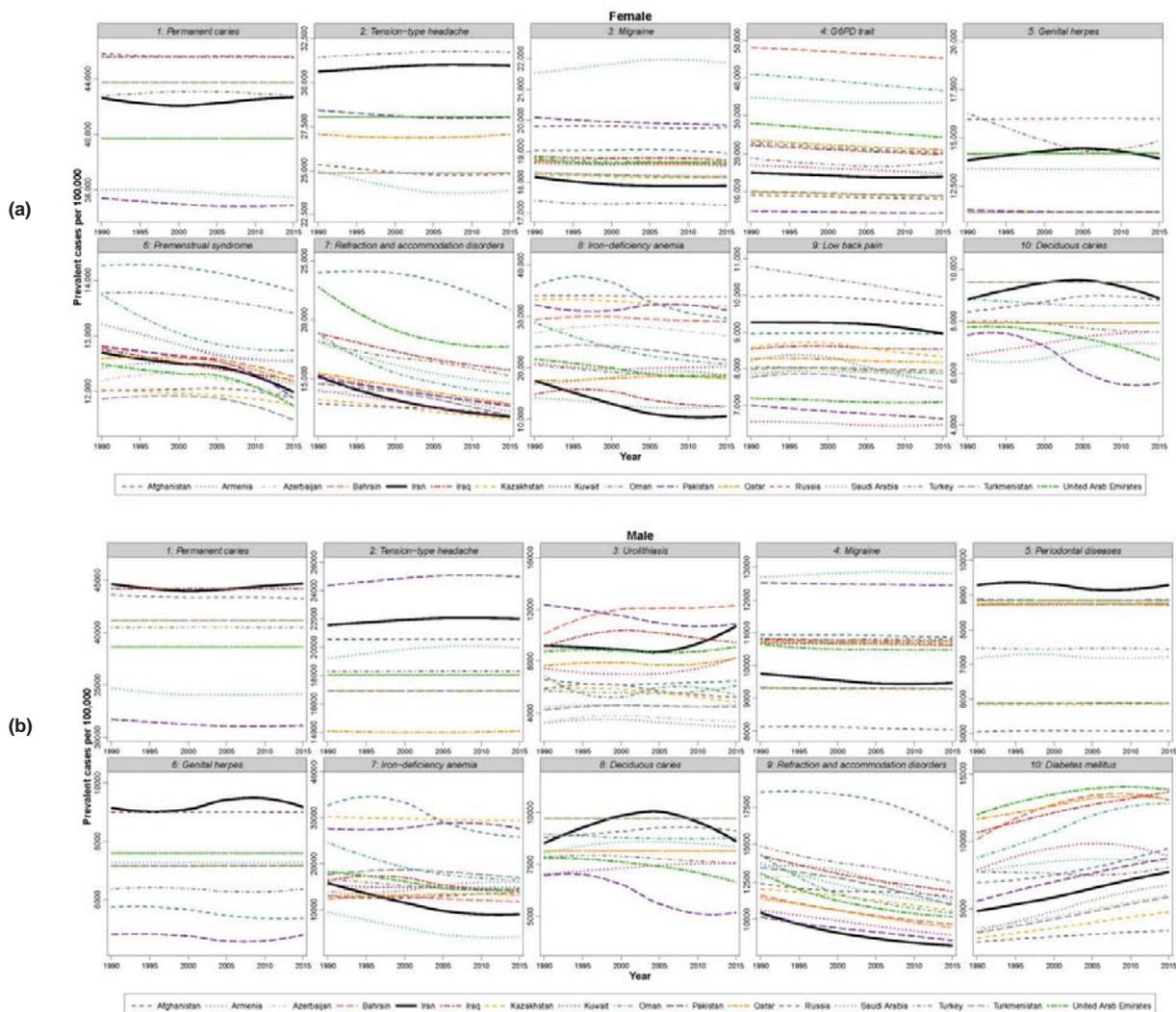


Figure 6. Time trends of age-standardized prevalence of cases from top 10 diseases by country, 1990–2015, a) Female; b) Male

Causes are ranked based on the highest age-standardized prevalence by sex in 2015. Among them, diabetes mellitus had a considerable ascending trend among Iranian males, which is also observed in most neighboring countries. “Age-related and other types of hearing loss” and “Other skin and subcutaneous diseases” ranked 6th and 11th, respectively, among females, and 3rd and 10th, respectively, among males (Figure 6).

Between 1990 and 2015, the rates (per 100,000 population) of age-standardized YLDs from the top 10 diseases showed different trends. Causes are ranked based on the highest age-standardized YLDs by sex in 2015. Among them, diabetes mellitus and opioid

use disorders showed a considerable ascending trend among Iranian males, which was also observed in most neighboring countries. Among females, “Other skin and subcutaneous diseases,” “Age-related and other types of hearing loss,” and “Other cardiovascular and circulatory diseases” ranked 7th, 8th, and 10th, respectively. For males, “Age-related and other types of hearing loss,” “Other cardiovascular and circulatory diseases,” and “Other musculoskeletal disorders” ranked 5th, 6th, and 8th, respectively. However, this figure does not present the time trends of other diseases (Figure 7).

Among the top 10 causes of YLDs, in females; only two causes

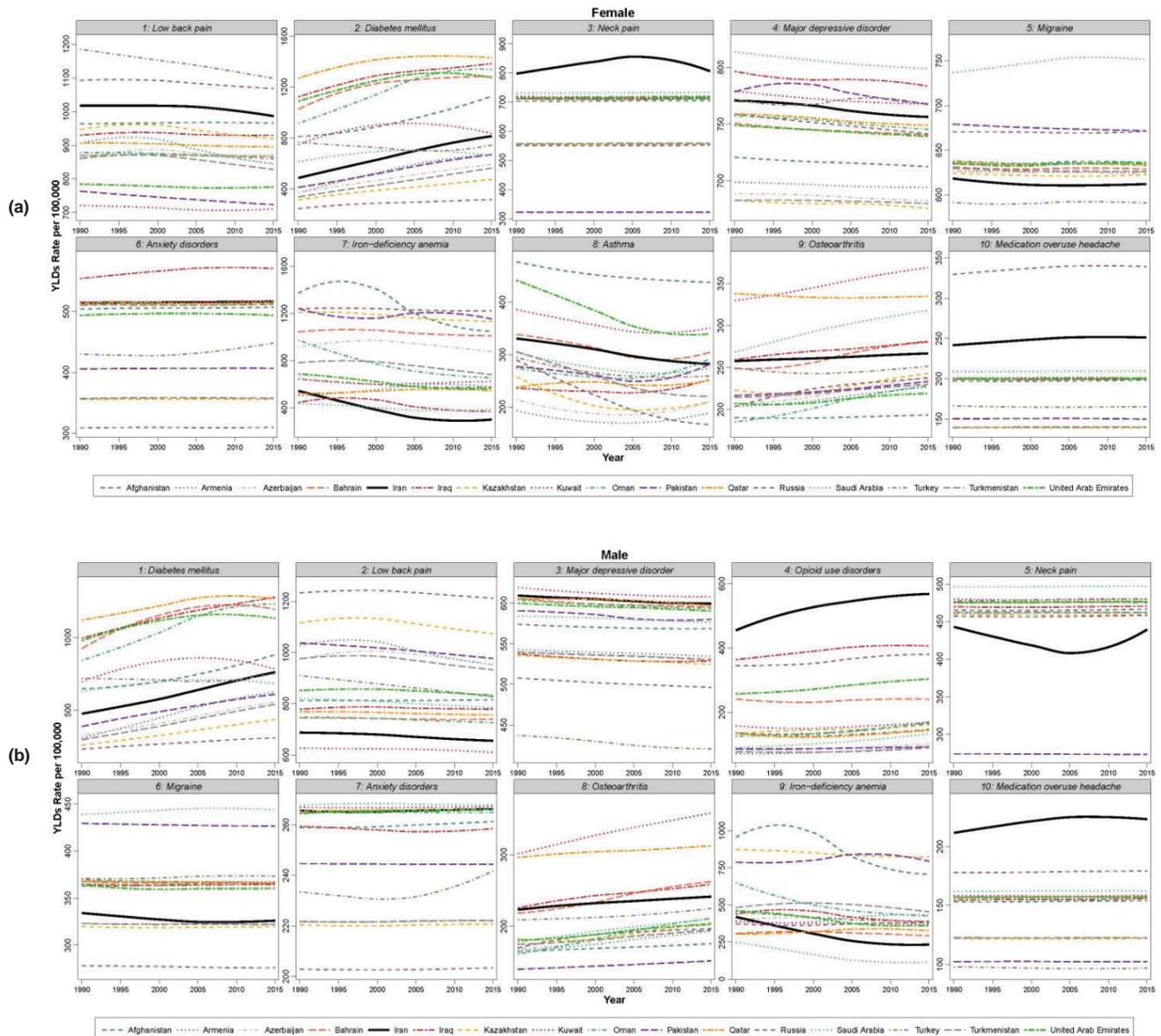


Figure 7. Time trends of age-standardized YLDs from top 10 diseases by country, 1990–2015, a) Female; b) Male

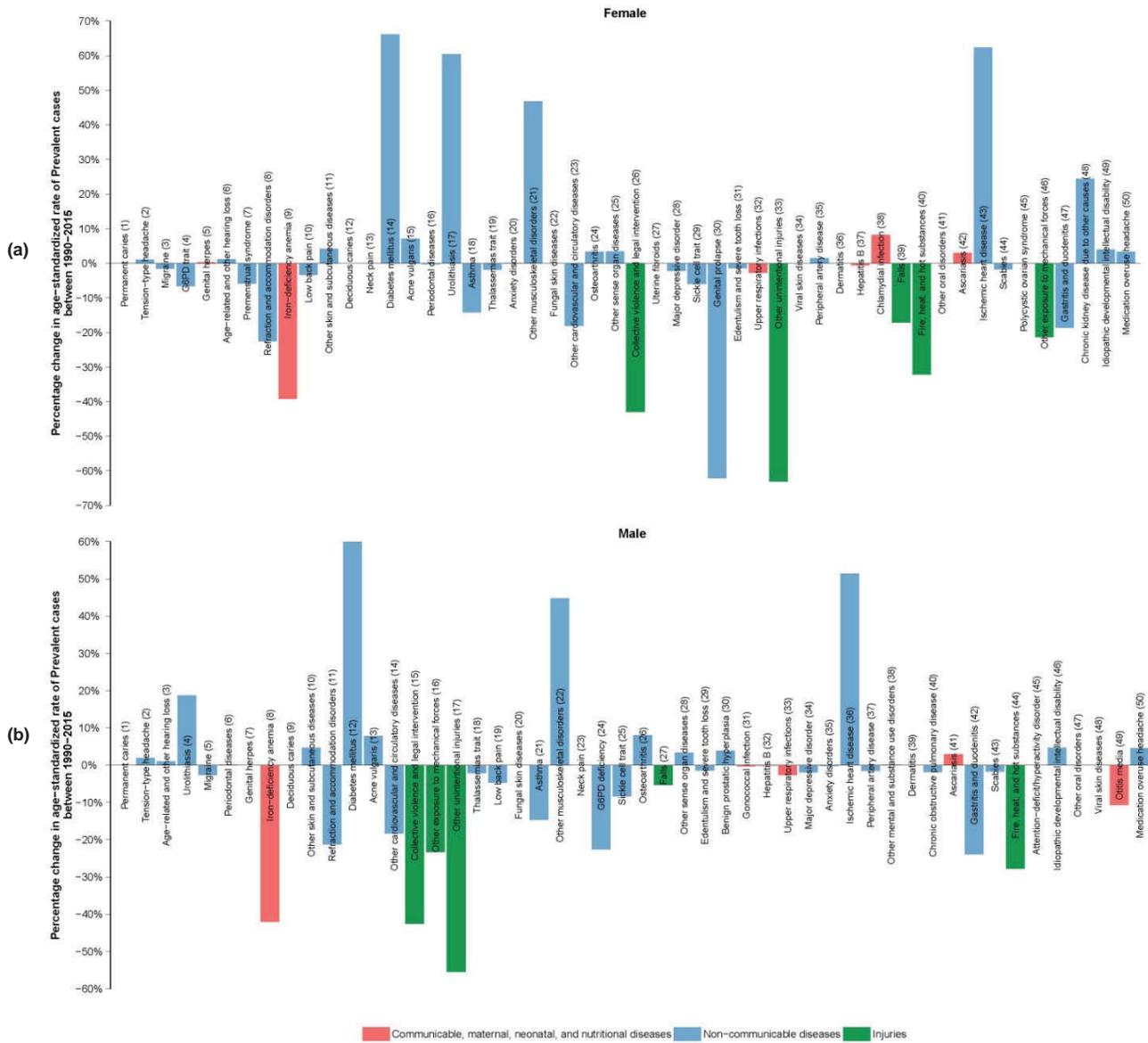


Figure 8. Percentage change for 50 causes with the highest age-standardized prevalence of cases in 2015 between 1990 and 2015 in Iran, a) Female; b) Male

other than diabetes mellitus and other musculoskeletal disorders showed a real increase from 1990. Diabetes mellitus, opioid use disorders, and other musculoskeletal disorders increased among males (Figures 8 and 9).

Discussion

Consistent and comparative data about non-fatal health outcomes from diseases and injuries is considered crucial for making decisions and planning processes for individual and public health.^{8,14-16} To meet this need, GBD studies provide comprehensive information on distribution of diseases and risk factors and their attributed burden at global and national levels.¹⁰⁻¹²

The proportional difference between life expectancy and healthy life expectancy led to a considerable gap of disability in young

and middle age groups.^{16,17} It is crucial to understand how well health systems could address these challenges.^{3,17,18}

Recent investigation confirmed that YLDs per 100,000 have largely remained constant over time but rise steadily with age.³ Accordingly, during the past two decades, population growth and aging were identified as the most important determinants of the increase in YLDs and its crude rates.³

Our findings showed that in 2015, 310 diseases and injuries were responsible for 8,357,878 all-age YLDs among the Iranian population, equivalent to 9.07% of total YLDs studied by GBD. Among the neighboring countries, Afghanistan showed the highest age-sex-standardized YLDs per 100,000 (13,889.75) and Iran ranked seventh (11,319.75).

During the past 26 years, a remarkable decrease was observed in all-cause YLD rates in all 16 countries. The age-standardized rate

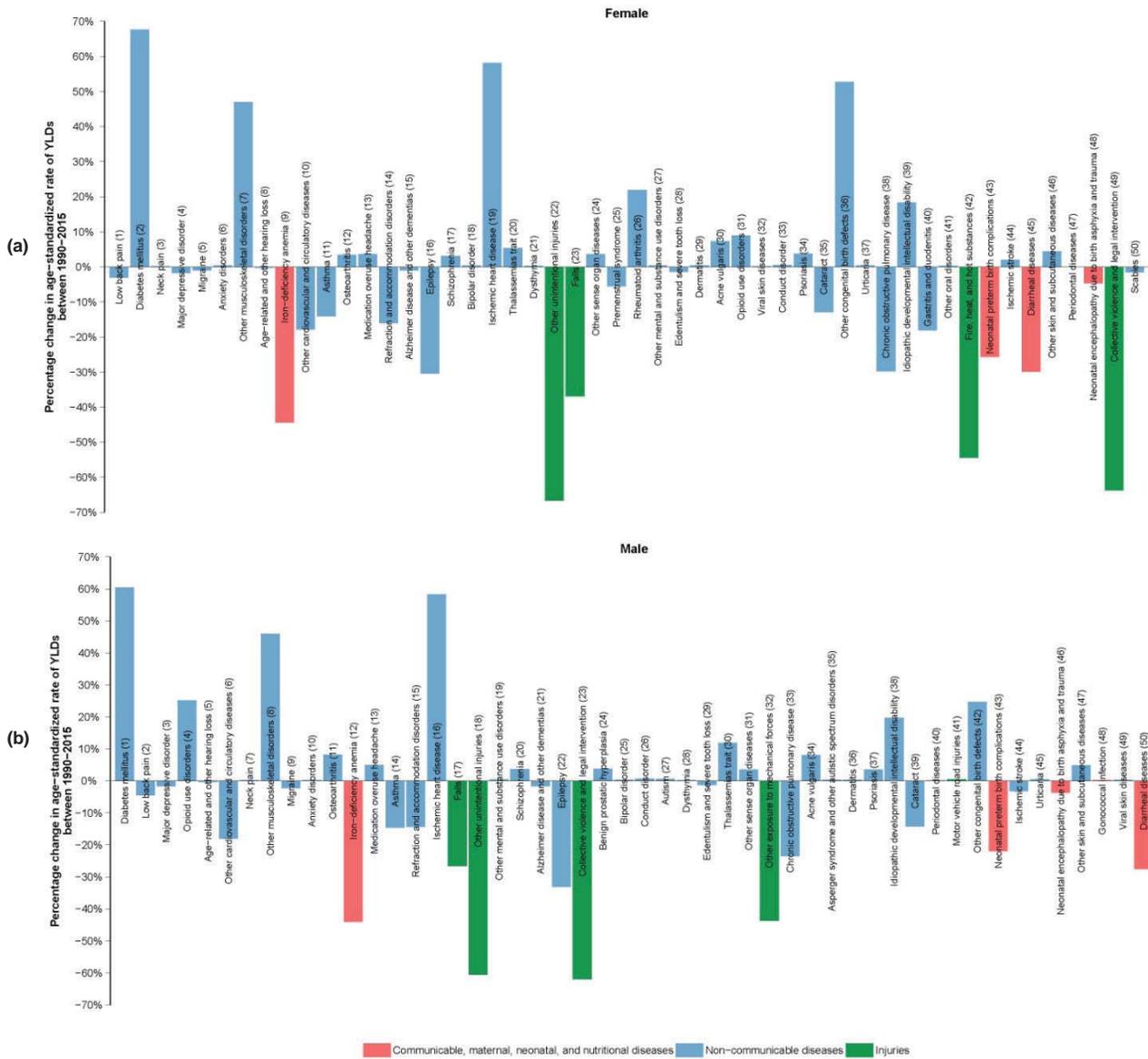


Figure 9. Percentage change of top 50 causes by age-standardized YLDs in 2015, between 1990 and 2015, a) Female; b) Male

of all causes of YLDs was higher in females than males.

Low back pain, diabetes mellitus, major depressive disorder, neck pain, age-related and other types of hearing loss were responsible for the highest levels of YLDs among the Iranian population. Based on global estimates, mental and behavioral disorders and musculoskeletal disorders are considered the main causes of YLDs. Neurological disorders, chronic respiratory diseases, some neglected tropical diseases, gynecological disorders, and long-term disability from injuries are other important causes of YLDs.^{3,15,17}

Considering the patterns of changes in both sexes, the majority of YLDs in the under-5-years age group are due to communicable diseases; this pattern shifts to non-communicable diseases, accounting for the majority of YLDs in the 5-9-year through 80+ age groups. Among NCDs, mental disorders are responsible for the highest percentage of YLDs in younger age groups but are replaced by musculoskeletal disorders in older age groups.

Other studies have discussed a transition in the disease profile of the Iranian people, shifting from the dominance of communicable diseases to that of non-communicable diseases and road traffic injuries.^{16,18,19}

Compared with people in other neighboring countries, diabetes mellitus has a remarkable ascending trend among Iranian males. Moreover, despite reductions in the prevalence of diabetes in Iran, it has one of the highest levels of prevalence among neighboring countries.

There has been considerable change in the prevalence of risk factors and diseases across the world,^{4,20} reflecting the global epidemiological transition. More attention should be paid to disease outcomes and their predisposing factors, including behavioral changes in smoking, physical activity, and alcohol intake, psychosocial factors, and demographic characteristics such as sex, age, and ethnicity.^{16,21,22} Recent evidence has provided many controversial findings about the effects of demographic and epidemiological changes on increasing or decreasing the

prevalence of morbidity and disability.^{3,23} During the past two decades, in most of high-income countries, mortality rate, mortality-to-incidence ratios, and DALYs from many non-communicable diseases have decreased significantly – a trend that could be attributed to better health care delivery.²⁴

Prevention and control of mental disorders must be addressed as a top priority in health interventions. Extensive advocacy for predisposing factors of common mental disorders, capacity-building among the general population, promotion of life skills, specific programs for at-risk groups, and problem-focused supported interventions for people diagnosed with depression and/or anxiety must be pursued as priorities in policymaking and programming; at the same time, further research is needed to target gaps in the evidence.^{7,15,19}

Concerning diabetes, given the extent of the problem, we need to perform more investigations to cover our ongoing needs. Cost-effective up-to-date technology such as mobile apps and web-based interventions should be utilized in parallel with existing programs.^{4,20,22} Evidence supports lifestyle interventions, especially in the field of physical activity, to target the main earlier discussed priorities.^{5,25,26}

As the main strengths of the present study, we used all available data and our estimates are based on the most comprehensive data. We estimated the values for 16 countries, 20 age groups, and 261 causes of YLDs. Age-standardized rates of all-cause YLDs were calculated for males and females in 16 countries in 1990 and 2015. Moreover, appropriate visualization approaches were used to present the percentage of total YLDs for 21 categories of diseases and injuries, percentage of YLDs by age, ranking of prevalent cases and YLDs due to the top 50 diseases and injuries in Iran, time trends of the top 10 diseases and injuries with the highest age-standardized prevalent cases and YLDs. Moreover, uncertainty intervals were measured for more exact data visualization.

We also faced many limitations. Despite the use of data from GBD 2015 for estimating the burden of diseases, the estimated values have some crucial limitations due to lack of accurate data, especially in developing countries. Modeling of data was limited to causes and countries. Furthermore, due to computational limitations, several sources of uncertainty were ignored including redistributing and cleaning. In addition, the GBD 2015 estimates were available only at the national level. Most importantly, the results for developing countries were based mostly on modeling compared to those for the more data-rich developed countries.

In conclusion, the present study is a comprehensive report of the prevalence and years lived with disability of 310 diseases and injuries by sex and age in Iran and its neighboring countries from 1990 to 2015.

Our results show that age-standardized YLDs decreased during the 26-year period. Among neighboring countries, Afghanistan had the highest age-sex-standardized YLDs per 100,000 and Iran ranked seventh. Our findings could be used as a vital source of information for future planning and implantation of health programs, research, resource allocation, policies, and practices.

Authors' contributions

Under the supervision of Farshad Farzadfar, Shirin Djalalinia and Sahar Saeedi Moghaddam had equal contribution as first authors. All of the co-authors participated in manuscript revision.

Competing interest

The authors declare that they have no competing interests.

Acknowledgments

We would like to express our thanks to the Institute for Health Metrics and Evaluation (IHME) team for providing us with the results of the GBD study. We also thank the Ministry of Health and Medical Education of Islamic Republic of Iran for their kind help and support.

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