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Low back pain among the working-age population: from the global burden of disease study 2021

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Abstract

Background The burden of low back pain in the global working-age population (WAP) is substantial and exhibits unique characteristics. This study aimed to evaluate global, regional, and national trends in low back pain prevalence among the WAP over a 32-year period.

Methods We utilized data from the 2021 Global Burden of Disease (GBD) study to evaluate the global impact of low back pain in the WAP from 1990 to 2021. A secondary analysis focused on temporal trends and a decomposition analysis of low back pain.

Results From 1990 to 2021, there was a continuous decrease in the rate of low back pain among the global WAP. The age-standardized incidence rate (ASIR) decreased from 4,111 (95% uncertainty interval [UI]: 2,682–5,619) to 3,676 (95% UI: 2,563–5,021), with an annual average percentage change (AAPC) of -0.36. The age-standardized prevalence rate (ASPR) decreased from 9,731 (95% UI: 7,061–12,970) to 8,632 (95% UI: 6,296–11,517), with an AAPC of -0.39. The age-standardized disability-adjusted life years (DALYs) rate (ASDR) decreased from 1,108 (95% UI: 686–1,650) to 982 (95% UI: 608–1,460), with an AAPC of -0.39. However, the number of low back pain cases in the global WAP continued to increase. Regions with a middle Socio-demographic Index (SDI), South Asia, China, and India carried a heavier burden of low back pain in the WAP. The burden was also greater among females, with the gender gap continuing to widen. Decomposition analysis revealed that population growth and population aging were the predominant driving factors.

Conclusions Despite the overall reduction in the ASIR, ASPR, and ASDR of low back pain among WAP, it remained a leading cause of disability worldwide. More attention needs to be paid to the low back pain burden among WAP in middle-SDI regions, countries with a large population base, and females. Significant gender and regional disparities persist within WAP, highlighting the necessity for targeted preventive and therapeutic interventions to alleviate the burden of low back pain and reduce the risks of disability.

Keywords Low back pain, Working-age population, Global disease Burden 2021, Epidemiology

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Introduction

Over 600 million individuals globally were affected by low back pain, a condition that stood as the foremost cause of disability worldwide [1]. The condition exerted a profound impact on individuals, families, and society, particularly within the working-age population (WAP), where it impaired productivity, led to loss of work capacity [2], and contributed to increasing poverty [3]. Low



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back pain may affect workers' mental health [4], work capacity [5], and income [6, 7]. Studies have also shown that both acute and chronic low back pain can lead to higher disability rates [8]. The economic burden caused by low back pain is substantial [9]. Meanwhile, poverty exacerbated symptoms of low back pain. Therefore, low back pain in WAP is a complex issue that may have an impact on social and economic development. Previous studies have not specifically focused on the working-age population. This study aims to analyze the epidemiological characteristics of low back pain in this group, calling for attention from individuals and relevant authorities to the health status of this age group. This study provides new insights into the global burden of low back pain in WAP, filling a critical gap in this field with potential clinical and translational value.

Implementing targeted interventions for low back pain patients reduced global disability, enhanced public health, and contributed to the sustainable development of social security systems [10], particularly in low- and middle-income countries (LMICs) [11]. However, studies had investigated the global burden of low back pain across all age groups [1], but research specifically focused on the WAP remained limited.

Using data from the GBD study, this research analyzed trends in low back pain incidence, prevalence, and disability-adjusted life years (DALYs) among WAP in 204 countries and regions from 1990 to 2021, stratified by gender, region, country, and Socio-demographic index (SDI). Countries in high SDI regions have higher incidence rates and various economic costs associated with low back pain compared to those in low SDI regions [12, 13]. There are gender differences in the incidence and prevalence of low back pain, with a higher prevalence in women than in men [14, 15]. These findings offered valuable insights for the intervention and treatment of low back pain, providing a foundation for future actions by national and relevant departments to help reduce the burden and health influence of low back pain on the global WAP. The results had significant implications for the WAP and the enhancement of socio-economic productivity.

Methods

Data sources

This study utilized data from the GBD 2021 study, which covered the disease burden in 204 countries and regions from 1990 to 2021. We collected data on patients aged 15–64 with low back pain, including incidence, prevalence, DALYs, and their respective rates, to quantify the burden of low back pain. In the GBD study, years lived with disability (YLDs) are considered equivalent to DALYs, as low back pain is not associated with mortality

within the study's statistical framework. The GBD algorithm provides rates per 100,000 population and offers 95% uncertainty intervals (UIs) for each rate. The methodology underlying the GBD study has been extensively detailed elsewhere [16]. Since this study is based on the GBD, detailed information regarding data imputation and handling of missing data can be found in the relevant studies. This study was approved by the Medical Ethics Committee of Shanxi Provincial People's Hospital. Informed consent was waived due to the anonymous, aggregated, and publicly available nature of the analyzed data.

The case definition for low back pain was specified as pain in the posterior aspect of the body, extending from the lower margin of the 12th ribs to the low gluteal folds, with or without pain radiating to one or both lower limbs, lasting for at least one day. In the International Classification of Diseases, Tenth Revision (ICD-10), low back pain is classified under codes M54.3, M54.4, and M54.5, and as code 724 in the Ninth Revision (ICD-9) [1]. This study included 10 age groups, from 15–19 years to 60–64 years, with each group spanning 5 years [17]. The age-standardized rates (ASRs) were calculated based on the age-standardized population from the GBD 2019 study [1].

The temporal trends in the burden of low back pain were assessed by calculating the annual average percentage change (AAPC), with analyses conducted across global, regional, and national levels, as well as by sex and the SDI. SDI is an indicator that reflects the impact of social and economic factors on health outcomes. Its calculation method was the geometric mean of the lagged distribution of total fertility rate for individuals under 25 years old, average years of education and per capita income for those aged 15 and above. For example, if the SDI value was higher, it meant that the average years of education were longer, the per capita income was higher, and the fertility rate was lower. SDI could be used to divide countries and regions into the high, high-middle, middle, low-middle, and low SDI groups [16]. In the GBD 2021 study, SDI values range from 0 to 1, with higher values indicating better socio-economic conditions and improved health outcomes. Based on 2021 SDI, regions are divided into five quintiles: low (0–0.466), low-middle (0.466–0.619), middle (0.619–0.712), high-middle (0.712–0.810), and high (0.810–1) [18].

Statistics analysis

The absolute values of incidence, prevalence, and DALYs were obtained by summing the corresponding values across all relevant age groups. Age-standardized methods were used to eliminate the influence of age differences on the results. Time trends were evaluated using Joinpoint software (version 5.0.2) from the National

Cancer Institute (NCI). Joinpoint regression is a statistical method used to analyze trends in time-series data, such as the incidence, prevalence, mortality, and DALYs. This method partitions the continuous time-series data's linear regression model into several statistically significant trend segments, with each portion described by a linear model to identify the optimal number of turning points. The method uses a Monte Carlo permutation test to determine the optimal number of joinpoints and their locations based on the statistical significance of the change in trend [19]. The AAPC and its 95% confidence interval (CI) were calculated using a linear regression model. A negative upper limit of 95% CI for the AAPC indicates a downward trend, while a positive lower limit indicates an upward trend [20]. Decomposition analysis was performed to determine the driving factors behind changes in the burden of low back pain during this period. This method, developed by Das Gupta and widely applicable in epidemiological research, offers a principled dissection of how each component uniquely contributes to the overall trend [21]. It summarizes the contribution of various factors to observed changes by algebraically isolating the standardized impact of each contributing multiplicative factor. Epidemiological change involves changes in the incidence or prevalence of disease due to various factors, such as improvements in healthcare, the introduction or evolution of risk factors, the effectiveness of prevention strategies, advancements in treatment, or changes in environmental or lifestyle factors. ASRs were reported per 100,000 population, with data presented as values with 95% UIs.

Results

Global trends

Table 1 presents a detailed account of the prevalence, incidence, and DALYs associated with low back pain in the WAP. In 2021, an estimated 453 million (95% UI: 330–604) individuals in the WAP suffered from low back pain globally, compared to 297 million (95% UI: 215–395) in 1990. During this period, the global age-standardized prevalence rate (ASPR) in the WAP exhibited a declining trend, decreasing from 9,731 per 100,000 (95% UI: 7,061–12,970) in 1990 to 8,632 per 100,000 (95% UI: 6,296–11,517) in 2021. The number of cases increased, with 193 million (95% UI: 134–263) reported in 2021, compared to 126 million (95% UI: 88–172) in 1990. However, the global age-standardized incidence rate (ASIR) in the WAP decreased from 4,111 per 100,000 (95% UI: 2,682–5,619) in 1990 to 3,676 per 100,000 (95% UI: 2,563–5,021) in 2021. Likewise, DALYs increased from 33.77 million (95% UI: 20.9–50.3) in 1990 to 51.51 million (95% UI: 31.9–76.6) in 2021, while age-standardized DALYs rate (ASDR) showed a downward trend, from

1,108 per 100,000 (95% UI: 686–1,650) in 1990 to 982 per 100,000 (95% UI: 608–1,460) in 2021.

Joinpoint regression analysis showed a consistent decline in the global ASIR, ASPR, and ASDR for low back pain from 1990 to 2021. Specifically, the AAPC for ASIR was -0.36 (95% CI: -0.39 to -0.33), while prevalence and DALYs followed similar trends, with AAPCs of -0.39 (95% CI: -0.42 to -0.36) and -0.39 (95% CI: -0.41 to -0.37), respectively. The steepest decline in ASIR was observed between 1990 and 1993 [average percentage change (APC)] $= -1.14$, 95% CI: -1.27 to -1.01], followed by a deceleration from 1993 to 2000 (APC $= -0.58$, 95% CI: -0.62 to -0.53). A further reduction was seen from 2000 to 2004 (APC $= -0.14$, 95% CI: -0.27 to -0.01), with a more pronounced decline from 2004 to 2010 (APC $= -0.29$, 95% CI: -0.35 to -0.24). The rate of decline leveled off from 2010 to 2015 (APC $= -0.05$, 95% CI: -0.13 to 0.04), before accelerating again from 2015 to 2021 (APC $= -0.20$, 95% CI: -0.24 to -0.15). Similar trends were discovered for the prevalence and DALYs in the WAP, with a marked decline from 1990 to 1993, followed by a deceleration in the rate of decline from 1993 to 2000. The reduction rate then slowed significantly from 2000 to 2005, increased from 2005 to 2010, decelerated again from 2010 to 2015, and finally, accelerated from 2015 to 2021 (Fig. 1).

Sex trends

Globally, the prevalence, incidence, and DALYs associated with low back pain are consistently higher in females within the WAP compared to males. In 2021, the ASPR was 10,743 per 100,000 females (95% UI: 7,838–14,264) versus 6,528 per 100,000 males (95% UI: 4,737–8,764), a decline from 1990 figures of 12,026 per 100,000 females (95% UI: 8,726–15,969) and 7,476 per 100,000 males (95% UI: 5,405–10,040). In 2021, the ASIR was 4,529 per 100,000 females (95% UI: 3,171–6,167) and 2,827 per 100,000 males (95% UI: 1,961–3,867). In 1990, the ASIR was 5,001 per 100,000 females (95% UI: 3,498–6,823) and 3,238 per 100,000 males (95% UI: 2,243–4,437). Similarly, in 2021, the ASDR were higher in females, at 1,213 per 100,000 (95% UI: 752–1,801), compared to males, at 752 per 100,000 (95% UI: 464–1,124). In 1990, the ASDR was higher in females, at 1,361 per 100,000 (95% UI: 844–2,025), compared to males, at 860 per 100,000 (95% UI: 529–1,286). From 1990 to 2021, the ASPR declined more rapidly in males than in females (females: AAPC $= -0.37$, 95% CI: -0.38 to -0.35 ; males: AAPC $= -0.44$, 95% CI: -0.49 to -0.39). These gender-specific incidence and DALYs trends are consistent with the results of prevalence. The number of female cases was also higher than that of male cases in 1990 and 2021. Further

Table 1 Incidence, prevalence, and DALYs of low back pain among WAP in 1990 and 2021, and AAPC from 1990 to 2021, by global, gender, SDI, and regional levels

Location	Incidence		Prevalence		AAPC 1990–2021	Prevalence		Prevalent cases(2021)	Prevalent cases(1990)	ASPR(1990)	Prevalent cases(2021)
	Incident cases(1990)	ASIR(1990)	Incident cases(2021)	ASIR(2021)		Prevalent cases(1990)	ASPR(1990)				
Global	125925385(87544428 to 172267414)	4111.23(2862.47 to 5618.98)	192550188(134315720 to 262878367)	3675.94(2563.49 to 5020.65)	−0.36(−0.39 to −0.33)	296642960(215204490 to 395405566)	9730.88(7060.60 to 12969.73)	452846791(330333138 to 604396309)			
Sex											
Female	75951023(53026751 to 103695789)	5000.79(3497.67 to 6823.18)	118418188(82947248 to 161150943)	4528.97(3170.70 to 6166.82)	−0.32(−0.33 to −0.31)	181779425(131887939 to 241458952)	12025.71(8726.46 to 15969.16)	281435400(205375959 to 373723566)			
Male	49974361(34573334 to 68574620)	3238(2242.53 to 4436.53)	74132000(51443798 to 101390522)	2826.69(1961.14 to 3866.76)	−0.43(−0.47 to −0.40)	114863535(83052587 to 154202535)	7476.28(5405.16 to 10040.19)	171411390(124374955 to 230170260)			
Sociodemographic Index											
High SDI	31996276(22636746 to 43257100)	5322.54(3766.51 to 7194.25)	38264233(27840059 to 50615316)	4874.22(3547.7 to 6454.88)	−0.29(−0.3 to −0.27)	77274769(57105936 to 101490300)	12837.99(9485.16 to 16863.90)	92246403(70795946 to 118421405)			
High-middle SDI	29407862(20509990 to 40183442)	4262.33(2976.47 to 5821.91)	36778634(25568300 to 50289192)	3708.61(2574.68 to 5080.53)	−0.44(−0.46 to −0.42)	69239192(50321775 to 92184033)	10056.01(7309.23 to 13387.01)	86579542(62634606 to 115920251)			
Middle SDI	3347107(22933114 to 46153891)	3488.39(2394.66 to 4802.16)	55606595(38259999 to 76458930)	3220.22(2214.56 to 4429.84)	−0.25(−0.27 to −0.23)	77479340(55355152 to 104614900)	8135.4(5812.78 to 10988.02)	12946438(92484333 to 174824719)			
Low-middle SDI	22304333(15371539 to 30651219)	3841.45(2651.7 to 5272.34)	42279629(29044383 to 58279689)	3635.29(2500.23 to 5004.14)	−0.17(−0.19 to −0.16)	52234309(37562830 to 70111395)	9060.61(6515.15 to 12160.28)	99061649(70836855 to 133825654)			
Low SDI	8604821(5940659 to 11821306)	3841.06(2658.9 to 5265.78)	19445994(13368207 to 26821070)	3637.29(2506.24 to 5003.85)	−0.17(−0.19 to −0.15)	20069793(14473489 to 26853856)	9035.4(6512.93 to 12086.17)	45072896(32387947 to 60627236)			
Region											
Andean Latin America	570301(392916 to 785348)	5866.93(4166.93 to 7904.89)	1246659(863571 to 1711670)	5356.04(4053.70 to 6816.87)	0(−0.03 to 0.02)	1300086(929913 to 1758658)	14129.53(10479.51 to 18448.14)	2847094(2047731 to 3835421)			
Australasia	842795(596044 to 1136169)	3796.38(2606.12 to 5212.98)	1235552(861674 to 1678056)	3858.83(2660.46 to 5298.81)	−0.25(−0.30 to −0.20)	2066723(1526064 to 2717767)	9041.69(6465.48 to 12166.94)	3008647(2178172 to 4015827)			
Caribbean	627518(429017 to 864096)	6265.36(4412.53 to 8499.08)	984506(686699 to 1344506)	6138.77(4310.43 to 8326.88)	−0.05(−0.06 to −0.04)	1445197(1034694 to 1945278)	15661.73(11500.55 to 20604.99)	2274842(1652979 to 3032091)			
Central Asia	1687686(1172570 to 2313336)	3822.06(2638.87 to 5234.76)	2829579(1962110 to 3876012)	3684.2(2538.58 to 5072.21)	−0.01(−0.02 to −0.01)	3907378(2836612 to 5220358)	8898.99(6407.86 to 11963.50)	6593807(4753671 to 8821861)			
Central Europe	5398459(3805760 to 7315417)	3840.14(2647.79 to 5276.63)	5212380(3669280 to 7056409)	3477.54(2387.30 to 4803.06)	−0.06(−0.07 to −0.05)	13531238(9943671 to 17789506)	9010.41(6462.07 to 12103.38)	13054958(9520426 to 17233576)			
Central Latin America	3224029(2211591 to 4433405)	5544.01(3873.49 to 7549.22)	6506259(4485666 to 8933634)	5081.45(3540.42 to 6935.53)	0.05(0.03 to 0.07)	7601306(5436561 to 10208604)	13425.48(9753.38 to 17843.67)	15531012(11181554 to 20913070)			
Central Sub-Saharan Africa	932231(640581 to 1287702)	3293.75(2252.57 to 4551.58)	2414165(1653161 to 3336430)	2698.83(1875.11 to 3703.57)	−0.11(−0.14 to −0.09)	2151323(1542370 to 2914873)	7585.01(5405.55 to 10287.25)	5558525(3969418 to 7531464)			
East Asia	24527075(16743945 to 33961801)	3526.15(2439.83 to 4833.20)	31262886(21738588 to 42798228)	3455.93(2381.02 to 4763.86)	−0.63(−0.67 to −0.58)	56107998(39955974 to 76098904)	8125.47(5861.68 to 10921.62)	71737362(51716562 to 96683286)			
Eastern Europe	8760256(6127502 to 11931222)	3872(2667.86 to 5337.34)	8331610(5841544 to 11321574)	3742.97(2568.38 to 5158.27)	−0.10(−0.10 to −0.09)	21105700(15366990 to 28015849)	9015.21(6458.16 to 12207.15)	19997331(14568950 to 26570220)			

Table 1 (continued)

Location	Incidence		Prevalence			
	Incident cases(1990)	ASIR(1990)	Incident cases(2021)	ASIR(2021)	AAPC 1990–2021	Prevalent cases(2021)
Eastern Sub-Saharan Africa	3036652(2088958 to 4170944)	3203.98(2199.76 to 4426.73)	7272284(4996304 to 10035640)	3176.15(2169.21 to 4364.85)	−0.12(−0.13 to −0.11)	16718989(12008068 to 22526836)
High-income Asia Pacific	6865578(4801616 to 9341969)	4301.16(3020.36 to 5845.58)	6616781(4615567 to 9015050)	4196.95(2893.73 to 5756.15)	−0.30(−0.38 to −0.23)	16030957(11581002 to 21474373)
High-income North America	10999385(7810364 to 14831262)	3318.51(2291.65 to 4564.46)	13781072(10424484 to 17533208)	3165.84(2178.92 to 4355.81)	−0.28(−0.33 to −0.23)	33164835(27035294 to 40447087)
North Africa and Middle East	7376602(5177808 to 10022480)	4554.67(3138.30 to 6251.17)	16809500(11598307 to 23073766)	4569.79(3163.13 to 6269.40)	−0.08(−0.09 to −0.06)	40340535(29102857 to 54118941)
Oceania	102670(70401 to 142293)	4873.64(3457.96 to 6564.54)	245452(167332 to 337938)	4690.28(3255.50 to 6414.85)	−0.03(−0.04 to −0.02)	563433(400515 to 763915)
South Asia	21481714(14785843 to 29571432)	5397.21(3777.18 to 7364.94)	40315604(27644486 to 55764381)	5227.55(3652.63 to 7126.17)	−0.31(−0.33 to −0.28)	93413074(66617610 to 126303904)
Southeast Asia	7229000(4982187 to 9939229)	5052.73(3514.85 to 6879.39)	14012052(9593895 to 19337440)	5009.77(3489.66 to 6842.56)	−0.05(−0.06 to −0.04)	32662570(23304570 to 44205634)
Southern Latin America	1517508(1055478 to 2066344)	4493.67(3133.27 to 6150.59)	2321978(1617674 to 3170624)	4471.61(3101.44 to 6124.53)	−0.08(−0.19 to 0.03)	5507152(3981218 to 7358567)
Southern Sub-Saharan Africa	824736(567621 to 1137008)	2936.47(2026.73 to 4032.27)	1539763(1058908 to 2121892)	2891.39(1979.05 to 3991.07)	−0.15(−0.17 to −0.13)	3525900(2514867 to 4762265)
Tropical Latin America	3874493(2665869 to 5320599)	3132.59(2143.38 to 4312.13)	7297263(5053407 to 10012452)	3087.22(2153.37 to 4217.86)	0.01(0 to 0.02)	17761409(12793784 to 23887660)
Western Europe	13054611(9258096 to 17573161)	6243.65(4414.83 to 8412.80)	14664075(10187235 to 20015546)	5797.57(4045.11 to 7884.31)	−0.13(−0.15 to −0.11)	35040339(25334206 to 46899586)
Western Sub-Saharan Africa	2992087(2065043 to 4109687)	2956.53(2038.30 to 4070.28)	7650770(5257615 to 10576423)	2960.96(2051.98 to 4063.38)	−0.07(−0.08 to −0.05)	17514020(12576483 to 23620977)
DALYs						
Location	Prevalence		DALYs			
	ASPR(2021)	AAPC 1990–2021	DALYs cases (1990)	ASDR (1990)	DALYs cases(2021)	ASDR (2021)
Global	8631.8(6295.99 to 11517.12)	−0.39(−0.42 to −0.36)	33774033(20852535 to 50306970)	1108.27(685.54 to 1650.01)	51510153(31892638 to 76590376)	981.79(607.53 to 1460.21)
Sex						
Female	10742.51(7838.24 to 14263.67)	−0.36(−0.38 to −0.35)	20561461(12731279 to 30601305)	1360.81(844.13 to 2024.69)	31774138(19714694 to 47167005)	1212.77(751.83 to 1800.97)
Male	6528.2(4737.02 to 8763.88)	−0.44(−0.50 to −0.38)	13212572(8113814 to 19753220)	860.15(529.13 to 1285.73)	19736015(12181688 to 29520121)	751.57(463.75 to 1124.25)

Table 1 (continued)

Location	Prevalence		DALYs			
	ASPR(2021)	AAPC 1990–2021	DALYs cases (1990)	ASDR (1990)	DALYs cases(2021)	ASDR (2021)
Sociodemographic Index						
High SDI	11662.1(8953.30 to 14956.28)	−0.31(−0.33 to −0.29)	8829101(5518929 to 13072804)	1466.26(916.52 to 2171.67)	10497420(6753939 to 15249470)	1326.75(851.47 to 1927.61)
High-middle SDI	8690.66(6282.42 to 11633.22)	−0.46(−0.48 to −0.44)	7906269(4888223 to 11755339)	1148.57(710.88 to 1708.12)	9903186(6109710 to 14795755)	993.9(611.71 to 1486.47)
Middle SDI	7480.41(5344.98 to 10095.9)	−0.27(−0.29 to −0.25)	8851163(5394085 to 13267367)	929.84(568.39 to 1392.81)	14767555(9043438 to 22110951)	852.95(521.89 to 1277.42)
Low-middle SDI	8548.07(6113.64 to 11548.96)	−0.19(−0.21 to −0.17)	5892534(3625718 to 8802658)	1022.25(631.09 to 1525.7)	11200732(6832626 to 16825861)	966.03(590.51 to 1450.43)
Low SDI	8508.7(6113.34 to 11450.33)	−0.19(−0.21 to −0.18)	2255601(1388544 to 3367474)	1016.14(627.77 to 1515.38)	5093147(3119142 to 7613299)	961.41(591.31 to 1435.42)
Region						
Andean Latin America	12785.06(10424.11 to 15587.74)	−0.01(−0.03 to 0.01)	148355(90463 to 223531)	1607.06(1011.20 to 2368.23)	324878(198942 to 485611)	1439.98(962.58 to 2012.81)
Australasia	9208.33(6629.87 to 12397.47)	−0.29(−0.33 to −0.26)	234269(146185 to 347022)	1028.51(628.56 to 1542.01)	342010(212337 to 511963)	1046.02(642.98 to 1563.09)
Caribbean	15227.76(11096.56 to 20107.97)	−0.06(−0.07 to −0.05)	164502(100238 to 247134)	1784.85(1114.60 to 2647.30)	258135(160206 to 383823)	1740.57(1082.22 to 2583.67)
Central Asia	8563.98(6146.19 to 11554.81)	−0.01(−0.01 to 0)	446427(273835 to 665486)	1004.78(619.82 to 1498.56)	753992(465989 to 1122242)	970.88(596.43 to 1450.79)
Central Europe	8087.09(5770.04 to 10931.36)	−0.09(−0.09 to −0.09)	1540921(962984 to 2283177)	1012.44(625.04 to 1512.91)	1490925(929268 to 2212244)	910.35(557.05 to 1368.62)
Central Latin America	12186.32(8805.16 to 16296.18)	0.06(0.05 to 0.07)	864199(526570 to 1296362)	1546.51(953.70 to 2311.50)	1764319(1084620 to 2636778)	1405.17(865.81 to 2100.93)
Central Sub-Saharan Africa	6162.11(4438.82 to 8301.64)	−0.12(−0.15 to −0.09)	240224(147050 to 362449)	875.13(532.15 to 1317.52)	626611(383324 to 944565)	712.00(436.87 to 1070.32)
East Asia	7985.19(5736.27 to 10774.41)	−0.65(−0.7 to −0.60)	6471913(3924938 to 9746738)	918.64(568.21 to 1367.27)	8289483(509856 to 12445169)	907.23(556.72 to 1359.03)
Eastern Europe	8692.87(6208.44 to 11765.93)	−0.12(−0.12 to −0.11)	2386881(1482552 to 3554559)	1007.72(618.73 to 1521.20)	2260500(1411454 to 3357021)	980.15(602.58 to 1473.80)
Eastern Sub-Saharan Africa	7335.42(5213.45 to 9949.60)	−0.13(−0.14 to −0.11)	788361(483789 to 1177574)	842.39(513.83 to 1263.90)	1895082(1158297 to 2835843)	836.26(507.57 to 1254.44)
High-income Asia Pacific	10073.40(7260.21 to 13526.63)	−0.34(−0.40 to −0.27)	1920757(1185510 to 2869983)	1178.56(735.66 to 1739.58)	1850364(1143256 to 2766942)	1140.42(700.57 to 1706.47)
High-income North America	7275.10(5189.33 to 9831.34)	−0.31(−0.34 to −0.28)	3013766(1894926 to 4439691)	862.38(531.88 to 1285.76)	3731787(2501266 to 5212688)	811.72(498.85 to 1214.54)

Table 1 (continued)

Location	Prevalence		DALYs				
	ASPR(2021)	AAPC 1990–2021	DALYs cases (1990)	ASDR (1990)	DALYs cases(2021)	ASDR (2021)	AAPC 1990–2021
North Africa and Middle East	11103.58(7996.39 to 14932.18)	−0.09(−0.12 to −0.07)	2009988(1251401 to 2968344)	1234.45(757.17 to 1852.26)	4571384(2806526 to 6841897)	1249.75(769.96 to 1866.82)	−0.10(−0.13,−0.08)
	11146.53(8064.98 to 14895.34)	−0.03(−0.04 to −0.01)	26704(16243 to 40154)	1325.21(830.47 to 1954.78)	64292(38915 to 96481)	1270.85(783.65 to 1892.75)	−0.03(−0.04,−0.01)
South Asia	12472.83(9071.65 to 16602.91)	−0.35(−0.38 to −0.32)	5625074(3460446 to 8415807)	1467.87(911.09 to 2187.78)	10522771(6426627 to 15827222)	1412.61(878.29 to 2100.92)	−0.34(−0.37,−0.31)
Southeast Asia	11845.21(8563.53 to 15826.19)	−0.03(−0.04 to −0.02)	1898468(1161224 to 2826889)	1357.56(832.58 to 2029.96)	3756883(2287241 to 5644606)	1346.29(827.59 to 2010.32)	−0.02(−0.03,−0.01)
Southern Latin America	10433.68(7521.68 to 13964.35)	−0.08(−0.21 to 0.05)	406761(249398 to 608336)	1196.27(735.69 to 1780.77)	626033(385018 to 934908)	1192.54(737.13 to 1775.11)	−0.08(−0.21,0.05)
Southern Sub-Saharan Africa	6727.57(4800.70 to 9104.43)	−0.15(−0.17 to −0.13)	212365(130591 to 316868)	779.40(478.29 to 1160.06)	393811(241651 to 589625)	773.62(470.78 to 1162.43)	−0.19(−0.21,−0.17)
Tropical Latin America	7120.73(5172.78 to 9490.37)	0.04(0.03 to 0.05)	1042945(638459 to 1565086)	825.99(504.04 to 1240.21)	1999829(1232711 to 2986297)	808.00(501.11 to 1201.51)	0.04(0.03,0.05)
Western Europe	14022.97(10158.57 to 18713.02)	−0.14(−0.15 to −0.13)	3559397(2232481 to 5246740)	1735.23(1083.65 to 2570.67)	3998066(2471532 to 5946859)	1592.48(988.17 to 2384.24)	−0.14(−0.16,−0.13)
Western Sub-Saharan Africa	6769.81(4868.75 to 9120.79)	−0.06(−0.07 to −0.05)	771757(475726 to 1149716)	775.05(473.94 to 1167.22)	1988999(1214258 to 2985207)	772.19(473.19 to 1153.65)	−0.04(−0.05,−0.03)

Rates are reported per 100,000 person-years. Data in parentheses are 95% uncertainty intervals for cases and age-standardized rates of incident, prevalence and DALYs, and 95% confidence intervals for AAPCs

Abbreviations: WAP working-age population, DALYs disability-adjusted life-years, ASIR age-standardized incidence rate, ASPR age-standardized prevalence rate, ASDR age-standardized DALYs rate, AAPC average annual percent change, SDI socio-demographic index, UI uncertainty interval, CI confidence interval

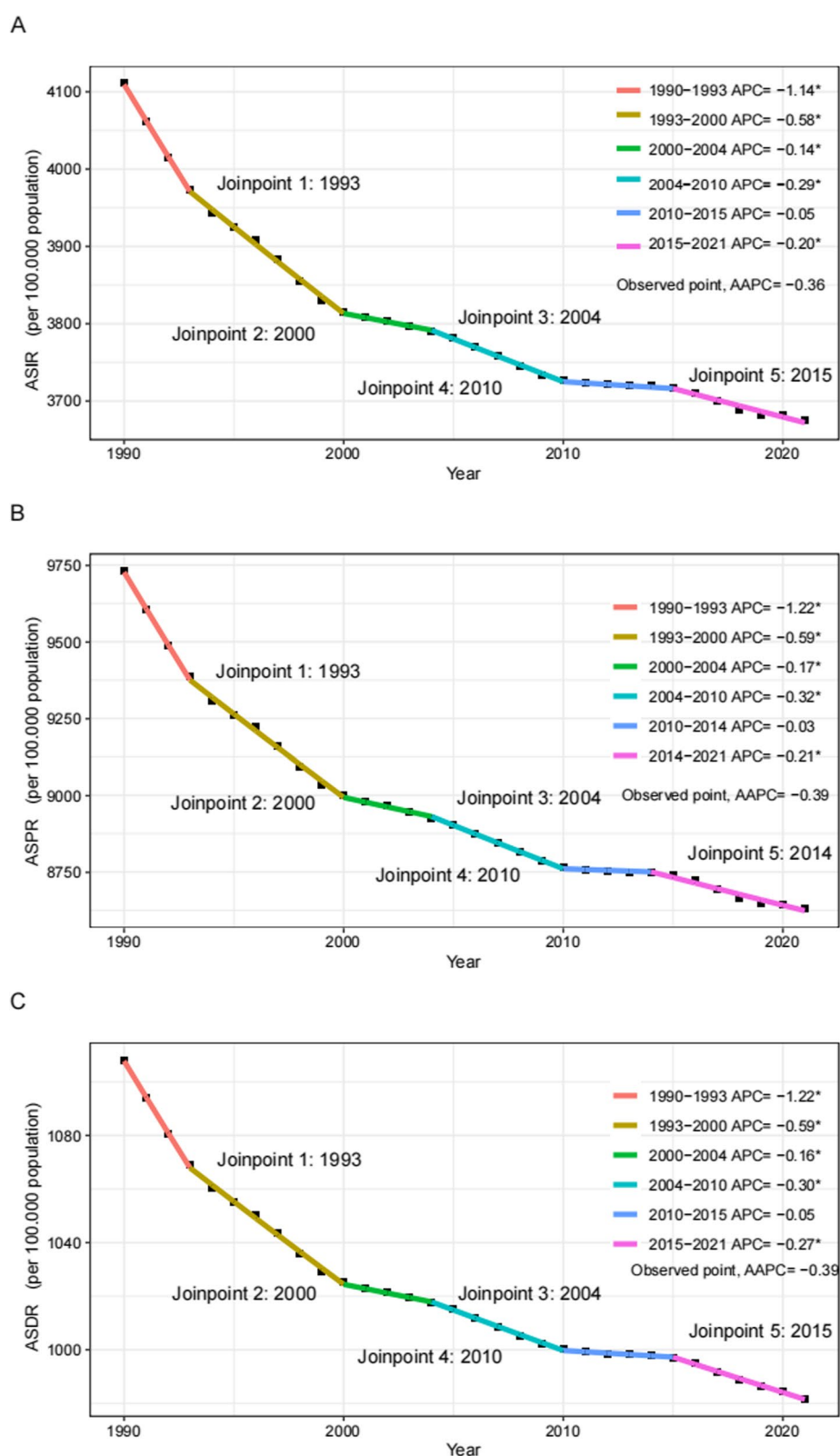


Fig. 1 Joinpoint regression analysis of the global ASIR (A), ASPR (B), and ASDR (C) for low back pain in WAP from 1990 to 2021. Abbreviations: WAP, working-age population; AAPC, average annual percent change; APC, annual percentage change; DALYs, disability-adjusted life-years; ASIR, age-standardized incidence rate; ASPR, age-standardized prevalence rate; ASDR, age-standardized DALYs rate

gender-stratified details of low back pain in the WAP can be found in Table 1 and Fig. 2.

SDI, regional, and national trends

Across SDI regions, the ASIR, ASPR, and ASDR exhibited a declining trend from 1990 to 2021. Notably, in 2021, the high SDI region recorded the highest ASIR, ASPR, and ASDR, at 4,874 per 100,000 (95% UI: 3,548–6,455), 11,662 per 100,000 (95% UI: 8,953–14,956), and

1,327 per 100,000 (95% UI: 851–1,928), respectively. In contrast, the middle SDI region exhibited the lowest ASIR at 3,220 per 100,000 (95% UI: 2,215–4,430), ASPR at 7,480 per 100,000 (95% UI: 5,345–10,096), and ASDR at 853 per 100,000 (95% UI: 522–1,277). In high-middle SDI regions, the AAPC decrease for ASIR, ASPR, and ASDR was the fastest, while in low-middle SDI regions, the AAPC decrease for ASIR and ASPR was slowest, and for ASDR, the AAPC decrease was slowest in low-SDI

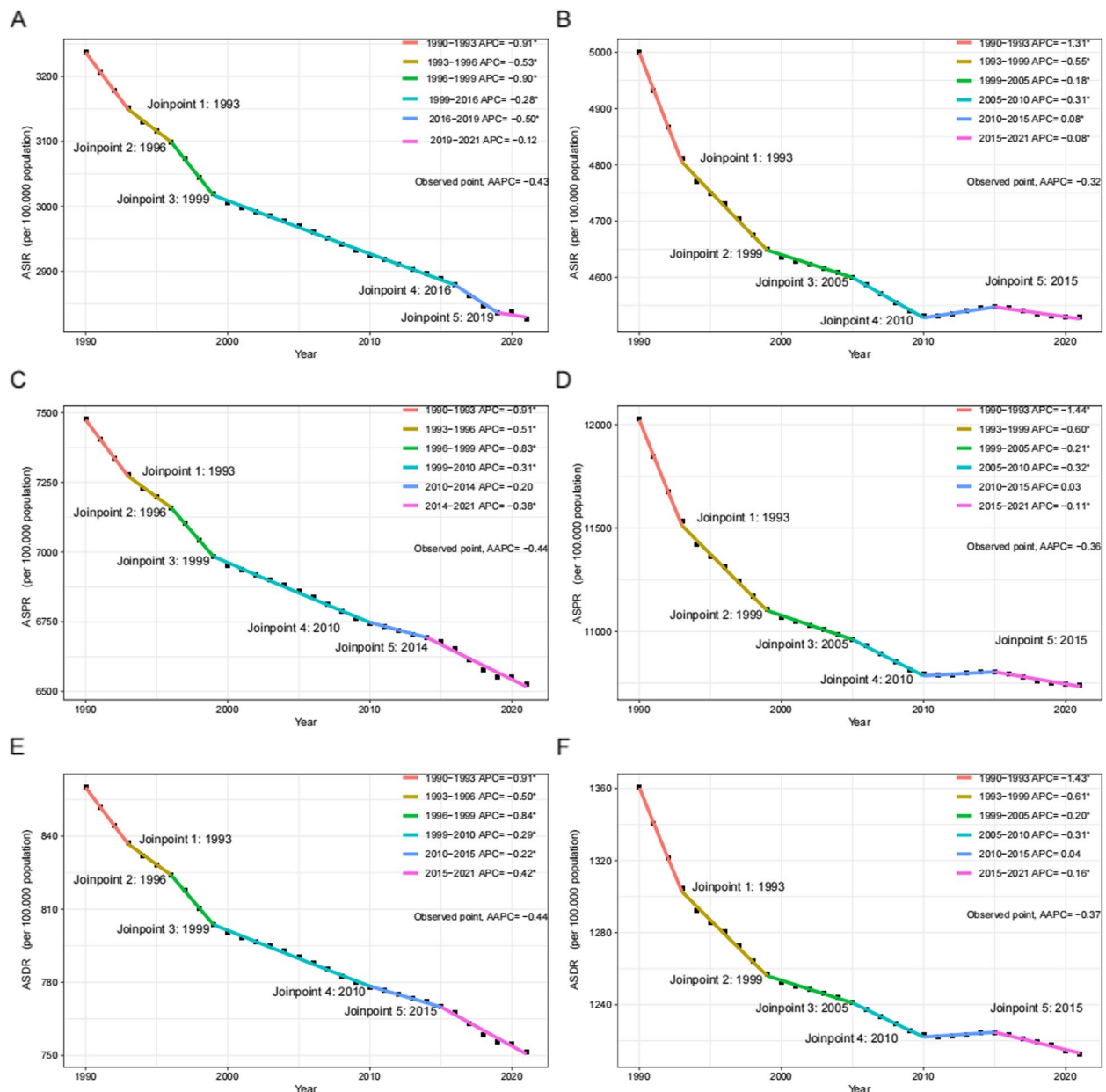


Fig. 2 Joinpoint regression analysis of the global ASIR, ASPR, and ASDR for low back pain by gender in WAP, for males (A, C, E) and females (B, D, F), from 1990 to 2021. Abbreviations: WAP, working-age population; AAPC, average annual percent change; APC, annual percentage change; DALYs, disability-adjusted life-years; ASIR, age-standardized incidence rate; ASPR, age-standardized prevalence rate; ASDR, age-standardized DALYs rate

regions. In addition, the high SDI region had the highest number of incident cases, prevalent cases, and DALYs in 1990 and 2021, indicating it had the highest burden. Specific values can be found in Table 1 and Fig. 3.

At the regional level, from 1990 to 2021, the largest declines in the ASIR, ASPR, and ASDR were observed in East Asia. (ASIR: AAPC = -0.63, 95% CI: -0.67 to -0.58; ASPR: AAPC = -0.65, 95% CI: -0.70 to -0.60; ASDR: AAPC = -0.65, 95% CI: -0.70 to -0.60). Among all regions, only Central Latin America and Tropical Latin America exhibited increasing trends, with Central Latin America experiencing the largest increases. (ASIR: AAPC = 0.05, 95% CI: 0.03 to 0.07; ASPR: AAPC = 0.06, 95% CI: 0.05 to 0.07; ASDR: AAPC = 0.05, 95% CI: 0.04 to 0.07). The region with the highest number of DALYs in 1990 was East Asia and South Asia, while in 2021, it was South Asia and East Asia. The region with the highest number of incidence cases in 1990 was East Asia and South Asia, while in 2021, it was South Asia and East Asia. The region with the highest number of prevalence cases in 1990 was East Asia and South Asia, while in 2021, it was South Asia and East Asia. Oceania has consistently had the lowest numbers across all three data sets (Table 1 and Fig. 3).

Sweden exhibited the highest AAPC in ASIR, ASPR, and ASDR, all showing an upward trend. (ASIR: AAPC = 0.91, 95% CI: 0.84 to 0.98; ASPR: AAPC = 0.86, 95% CI: 0.80 to 0.93; ASDR: AAPC = 0.87, 95% CI: 0.80 to 0.94). Conversely, China showed the most significant decline in AAPC across these indicators. (ASIR: AAPC = -0.66, 95% CI: -0.71 to -0.61; ASPR: AAPC = -0.69, 95% CI: -0.74 to -0.64; ASDR: AAPC = -0.68, 95% CI: -0.74 to -0.63). The three countries with the highest ASDR in 1990 were Hungary, Czechia, and Romania; for ASIR, they were Hungary, New Zealand, and Poland; and for ASPR, they were Hungary, Romania, and Czechia. In 2021, the three countries with the highest ASDR were Hungary, Czechia, and Albania; for ASIR, they were Hungary, Poland, and Czechia; and for ASPR, they were Hungary, Czechia, and Albania. The three countries with the lowest ASDR, ASIR, and ASPR in both 1990 and 2021 were Maldives, Myanmar, and Thailand. By 2021, China had the highest number of incident cases and DALYs globally, followed closely by India, which recorded the highest number of prevalent cases. Specific numerical values can be found in Table 2 and Fig. 4.

Decomposition analysis

From 1990 to 2021, the changes in the number of incident cases, prevalent cases, and DALYs for low back pain in the WAP were attributed to population growth, population aging, and epidemiological changes. Population growth and population aging led to an increase

in numbers, while epidemiological changes resulted in a decrease, partially offsetting the overall increase. For detailed information, please refer to Fig. 5. For example, the number of prevalent cases of low back pain in the WAP increased by 52.7%, with 55.8% attributable to population growth, 12.1% to population aging, and -15.2% due to epidemiological changes. For most regions, epidemiological changes were the primary drivers of the decline in the burden of low back pain in the WAP, whereas population growth was the main factor contributing to the increase. At the regional level, Central Sub-Saharan Africa experienced the most significant increases in the total number of incident cases, prevalent cases, and DALYs, with respective increases of 159.0%, 158.4%, and 160.8%. Among the SDI regions, the most significant increases occurred in the low SDI region (incident cases: 126.0%; prevalent cases: 124.6%; DALYs: 125.8%), whereas the smallest increases were observed in the high SDI region (incident cases: 19.6%; prevalent cases: 19.4%; DALYs: 18.9%). Specific numbers can be found in Table 3.

Discussion

This study offered a comprehensive overview of the global burden of low back pain in the WAP from 1990 to 2021. Our analysis provided the most current and comprehensive description of the prevalence, incidence, and DALYs of low back pain at the global, regional, and national levels, along with their rates of change. Research indicated that the burden of low back pain within the WAP exhibited both gender-specific and regional heterogeneity. Decomposition analysis suggested that these changes were primarily driven by population growth, although there were some regional exceptions. Population aging also contributed to these changes, while epidemiological changes had a mitigating impact.

In 2021, the number of individuals in the WAP affected by low back pain exceeded 450 million, with severe cases significantly impacting quality of life and work. Currently, low back pain has persisted as the leading cause of global disability, exerting a substantial impact on public health worldwide [22]. The widespread prevalence of low back pain across global regions may contribute to an increased disease burden at regional and national levels. For example, in Spain, the cost associated with low back pain was approximately €8.945 billion in 2017 [12]. In China, low back pain was strongly linked with a high prevalence of anxiety symptoms [23]. The opioid burden among low back pain was significant, with 27% of spinal fusion patients continuing long-term prescribed opioid use 12 months post-surgery [24]. Opioid use led to serious health risks, such as high rates of addiction and mortality [25]. Studies showed that low back pain was common

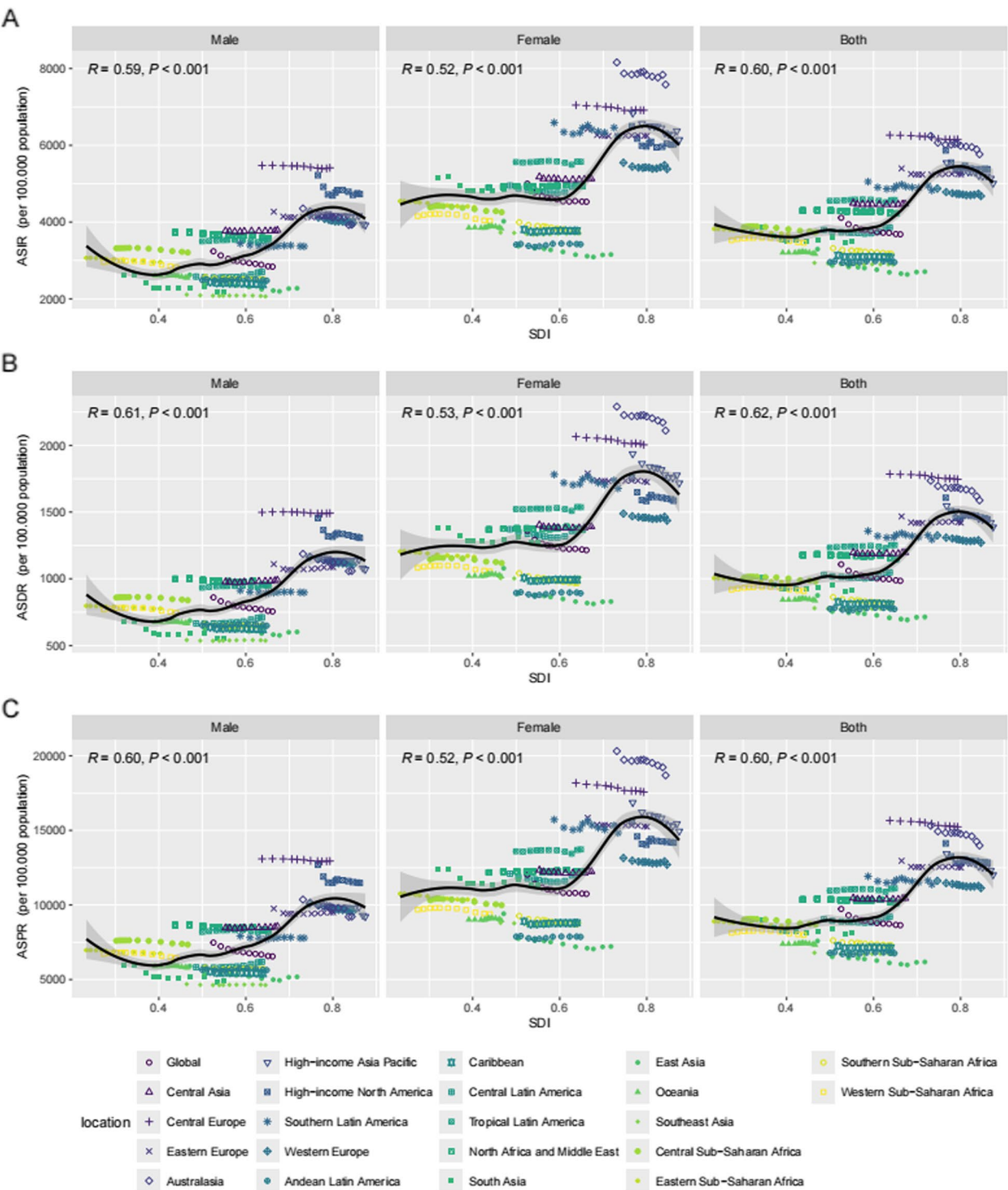


Fig. 3 Correlations between ASIR, ASPR, and ASDR of global low back pain among WAP and SDI at the regional level. Notes: ASIR of low back pain among WAP at the global level and 21 regions, by SDI, from 1990 to 2021 (A). ASDR of low back pain among WAP at the global level and 21 regions, by SDI, from 1990 to 2021 (B). ASPR of low back pain among WAP at the global level and 21 regions, by SDI, from 1990 to 2021 (C). Abbreviations: SDI, socio-demographic index; DALYs, disability-adjusted life-years; ASIR, age-standardized incidence rate; ASPR, age-standardized prevalence rate; ASDR, age-standardized DALYs rate

Table 2 Incidence, prevalence, and DALYs of low back pain among WAP in 1990 and 2021, and AAPC from 1990 to 2021, by nations

Location	Incidence		Prevalence					
	Incident cases(1990)	ASIR(1990)	Incident cases(2021)	ASIR(2021)	AAPC 1990–2021	Prevalent cases(1990)	ASPR(1990)	Prevalent cases(2021)
Afghanistan	201453(1 38084 to 276239)	4160.35(2850.17 to 5725.34)	598030(409944 to 818186)	3160.08(2151.03 to 4344.64)	0(−0.02 to 0.02)	482935(345071 to 653468)	7309.52(5168.98 to 9941.79)	1427141(1022338 to 1926989)
Albania	114352(79387 to 156149)	6123.28(4264.37 to 8344.99)	119581(83240 to 162821)	3631.40(2495.24 to 5002.16)	0.02(0.01 to 0.03)	283510(204585 to 378224)	8787.53(6285.49 to 1185983)	305378(221424 to 405558)
Algeria	502002(344462 to 691795)	4104.81(2820.59 to 5656.20)	1153183(794832 to 1595719)	2893.67(1983.94 to 3991.32)	−0.02(−0.03 to −0.01)	1192621(855972 to 1614522)	6499.87(4678.49 to 8788.21)	2740575(1 948430 to 3719412)
American Samoa	797(544 to 1102)	3264.55(2232.41 to 4503.05)	1067(734 to 1481)	3522.76(2399.75 to 4930.90)	−0.05(−0.06 to −0.04)	1830(1293 to 2490)	8627.22(6310.89 to 11522.79)	2483(1752 to 3358)
Andorra	1867(1283 to 2573)	4729.93(3253.69 to 6505.70)	3233(2230 to 4428)	4094.32(2815.62 to 5637.30)	−0.10(−0.13 to −0.08)	4381(3159 to 5913)	9229.38(6634.67 to 12429.27)	7663(5439 to 10401)
Angola	177238(121539 to 245674)	3886.18(2670.32 to 5378.39)	536210(366739 to 746300)	4354.72(3014.10 to 5981.21)	−0.12(−0.15 to −0.08)	410794(293958 to 555254)	10395.60(7460.99 to 14027.02)	1233626(878357 to 1669545)
Antigua and Barbuda	1054(720 to 1464)	3088.28(2113.77 to 4281.12)	2067(1422 to 2838)	4083.80(2839.52 to 5554.79)	−0.01(−0.02 to 0.00)	2410(1708 to 3274)	9908.32(7038.04 to 13389.96)	4783(3400 to 6498)
Argentina	1010713(700651 to 1382842)	5054.84(3503.33 to 6919.34)	1525777(1061028 to 2090533)	3771.31(2590.66 to 5214.57)	−0.09(−0.19 to 0.02)	2384067(1719903 to 3207500)	8926.68(6361.72 to 12073.42)	3608726(2592512 to 4846810)
Armenia	101443(69593 to 138874)	4738.89(3262.70 to 6490.18)	105165(72984 to 143706)	4143.08(2823.88 to 5731.70)	0.01(0 to 0.02)	240365(172464 to 322246)	10252.39(7325.57 to 13821.92)	251288(182281 to 336450)
Australia	697797(493822 to 940848)	6194.92(4383.26 to 8348.53)	1017122(706140 to 1385526)	6026.15(4202.35 to 8213.32)	−0.26(−0.31 to −0.21)	1716731(1268091 to 2258957)	14863.99(10753.78 to 19762.14)	2478659(1788007 to 3316173)
Austria	239713(166978 to 326424)	4403.68(3069.02 to 6000.94)	272332(188708 to 372249)	3949.83(2713.61 to 5433.15)	−0.25(−0.30 to −0.20)	549924(397862 to 741192)	9240.20(6640.14 to 12528.28)	619531(443752 to 842286)
Azerbaijan	186168(128423 to 255875)	4448.87(3082.22 to 6105.93)	355859(245787 to 485873)	3281.97(2242.46 to 4553.12)	0.04(0.03 to 0.05)	429831(308220 to 578640)	7700.29(5476.00 to 10477.58)	833493(598072 to 1119939)
Bahamas	4572(3126 to 6342)	3089.59(2116.16 to 4276.83)	8749(5998 to 12095)	3085.58(2101.75 to 4285.80)	−0.01(−0.01 to 0.00)	10452(7448 to 14266)	7152.39(5114.42 to 9698.14)	20222(14348 to 27559)
Bahrain	12153(8309 to 16842)	3956.20(2714.72 to 5458.94)	46009(31697 to 63382)	4588.73(3176.03 to 6294.90)	−0.05(−0.06 to −0.04)	28543(20463 to 38427)	11002.49(7909.38 to 14805.17)	108581(77531 to 147427)
Bangladesh	2249357(1560569 to 3061204)	4630.70(3220.07 to 6279.24)	4538741(3130869 to 6252134)	4425.63(3068.26 to 6063.35)	−0.17(−0.17 to −0.16)	5533172(4045350 to 7313629)	10566.56(7568.95 to 14126.22)	11011863(7951940 to 14828991)
Barbados	4824(3291 to 6657)	3133.83(2141.74 to 4321.97)	6971(4740 to 9631)	4073.45(2793.37 to 5646.19)	−0.03(−0.04 to −0.02)	11085(7924 to 15031)	9658.35(6892.27 to 13103.55)	16233(11469 to 22218)
Belarus	376788(261372 to 514113)	5102.60(3543.59 to 6975.53)	370122(256877 to 503585)	3217.42(2209.82 to 4472.56)	−0.02(−0.02 to −0.01)	905066(650673 to 1214573)	7576.05(5359.06 to 10312.28)	895119(649450 to 1194289)
Belgium	339486(234108 to 465251)	4830.27(3333.40 to 6619.98)	380976(264393 to 520853)	5095.53(3555.75 to 6951.44)	−0.09(−0.11 to −0.07)	804645(576941 to 1084240)	12552.46(9102.15 to 16687.44)	909189(648038 to 1229785)
Belize	2652(1808 to 3681)	3133.60(2140.46 to 4338.45)	8454(5767 to 11713)	3189.25(2253.36 to 4312.81)	0.02(0.02 to 0.03)	6093(4325 to 8292)	7524.00(5457.89 to 10041.53)	19578(13910 to 26634)

Table 2 (continued)

Location	Incidence		Prevalence		Prevalent cases(2021)
	incident cases(1990)	ASIR(1990)	incident cases(2021)	ASIR(2021)	AAPC 1990–2021
Benin	6947.4(47275 to 96060)	3643.46(2483.97 to 5027.69)	203995(139604 to 283574)	3392.92(2322.70 to 4704.93)	−0.16(−0.17 to −0.16)
Bermuda	1347(923 to 1864)	3168.02(2173.08 to 4378.27)	1535(1051 to 2120)	3646.10(2502.92 to 5074.91)	−0.04(−0.05 to −0.02)
Bhutan	12385(8558 to 17045)	4281.55(2971.47 to 5884.13)	20623(14183 to 28469)	4700.84(3257.86 to 6434.60)	−0.05(−0.07 to −0.02)
Bolivia (Plurinational State of)	95949(65729 to 133465)	3094.06(2117.66 to 4297.66)	226698(155190 to 313848)	3583.92(2477.61 to 4949.69)	0.02(−0.01 to 0.04)
Bosnia and Herzegovina	180917(127001 to 247147)	5777.48(4059.92 to 7897.38)	147849(103332 to 201785)	4618.94(3184.24 to 6338.72)	0.08(0.06 to 0.09)
Botswana	17989(12291 to 24891)	3200.20(2195.74 to 4413.38)	46221(31584 to 64192)	4576.49(3151.26 to 6276.40)	−0.05(−0.05 to −0.04)
Brazil	3797006(2610360 to 5215510)	4571.35(3147.38 to 6275.44)	7119114(4930113 to 9767292)	5977.86(4150.13 to 8181.17)	0.01(0.01 to 0.02)
Brunei Darussalam	6895(4759 to 9489)	4686.27(3236.41 to 6425.55)	14917(10320 to 20480)	4081.47(2793.85 to 5646.50)	−0.16(−0.20 to −0.13)
Bulgaria	380055(265223 to 516014)	6041.13(4206.44 to 8233.64)	295994(206589 to 401755)	3095.51(2119.03 to 4304.28)	−0.05(−0.07 to −0.04)
Burkina Faso	138923(96546 to 189196)	3584.76(2497.38 to 4880.02)	344565(234707 to 478031)	4455.28(3081.34 to 6111.18)	−0.10(−0.12 to −0.08)
Burundi	89445(61376 to 124446)	3852.47(2652.70 to 5340.52)	217220(148278 to 299271)	3116.99(2134.09 to 4312.62)	−0.18(−0.19 to −0.17)
Cabo Verde	5161(3524 to 7153)	3476.44(2382.03 to 4806.53)	11908(8139 to 16557)	4079.80(2809.44 to 5639.91)	−0.24(−0.25 to −0.23)
Cambodia	149413(102327 to 207674)	3246.94(2229.13 to 4502.82)	315927(214912 to 437651)	3082.99(2105.13 to 4252.71)	−0.26(−0.27 to −0.25)
Cameroon	168683(115378 to 233014)	3732.80(2562.63 to 5148.19)	526378(358847 to 728579)	3279.72(2242.49 to 4531.33)	−0.16(−0.17 to −0.15)
Canada	947630(654641 to 1297830)	5045.03(3484.94 to 6907.57)	1224359(847638 to 1681815)	4880.31(3401.89 to 6650.07)	−0.28(−0.30 to −0.26)
Central African Republic	47645(32630 to 65824)	3838.10(2634.27 to 5299.59)	101134(69384 to 140075)	4531.67(2856.37 to 6639.08)	−0.06(−0.07 to −0.05)
Chad	99713(69385 to 136122)	4057.18(2825.17 to 5531.55)	254770(174726 to 353660)	3850.69(2643.09 to 5302.04)	−0.27(−0.28 to −0.26)
Chile	411821(286461 to 561678)	5113.65(3560.85 to 6965.98)	678448(469008 to 927920)	2560.01(1743.98 to 3527.08)	−0.09(−0.21 to 0.03)

Table 2 (continued)

Location	Incidence		Prevalence			Prevalent cases(2021)		
	Incident cases(1990)	ASIR(1990)	Incident cases(2021)	ASIR(2021)	AAPC 1990–2021			
China	23603463(16026169 to 32772947)	3285.29(2234.90 to 4552.36)	29836929(20555460 to 41079785)	6080.75(4213.73 to 8308.96)	-0.66(-0.71 to -0.61)	53976566(38229185 to 73441772)	16240.69(11780.58 to 21566.09)	68311808(48740040 to 92641612)
Colombia	735096(506267 to 1012266)	4099.22(2825.03 to 5639.58)	1384931(962331 to 1883214)	3131.27(2139.92 to 4308.76)	-0.02(-0.03 to 0)	1762763(1251835 to 2377538)	7630.54(5427.57 to 10396.79)	3394377(2495426 to 4503091)
Comoros	7003(4882 to 9542)	3504.62(2447.62 to 4771.37)	15149(10419 to 20968)	3315.00(2273.77 to 4595.27)	-0.01(-0.02 to 0.00)	15822(11464 to 21047)	8195.29(5859.61 to 11030.61)	34547(24556 to 46745)
Congo	38952(26897 to 53613)	3633.82(2511.41 to 4997.43)	107989(74240 to 149312)	4797.53(3314.72 to 6559.71)	-0.03(-0.04 to -0.03)	88325(63420 to 119246)	11436.18(8219.94 to 15356.19)	246910(175734 to 335085)
Cook Islands	337(231 to 470)	3225.02(2210.27 to 4495.73)	419(287 to 577)	3394.48(2308.90 to 4692.85)	0.05(0.04 to 0.07)	774(551 to 1052)	7995.95(5668.61 to 10887.63)	986(699 to 1342)
Costa Rica	64731(44234 to 89001)	3959.90(2711.52 to 5440.98)	128420(88059 to 177459)	3424.33(2335.25 to 4739.62)	-0.08(-0.09 to -0.07)	153487(109877 to 207712)	8401.19(5985.67 to 11442.61)	306840(218516 to 414672)
Coted'Ivoire	192020(133102 to 262950)	3684.49(2565.74 to 5039.28)	477922(325348 to 671537)	4637.80(3205.04 to 6368.11)	-0.15(-0.16 to -0.13)	444343(324495 to 593424)	11743.86(8462.17 to 15778.01)	1110022(785405 to 1514086)
Croatia	213224(151335 to 287939)	5940.21(4214.00 to 8031.81)	179029(124483 to 242836)	4474.71(3094.03 to 6136.89)	-0.07(-0.10 to -0.04)	529143(393866 to 688690)	10955.28(7857.61 to 14747.79)	442932(320063 to 588088)
Cuba	221104(150472 to 306970)	3149.13(2143.72 to 4369.83)	259099(186008 to 345466)	4749.43(3294.92 to 6507.12)	-0.20(-0.22 to -0.19)	511716(362353 to 695861)	11261.73(8082.71 to 15090.78)	595355(452351 to 775567)
Cyprus	23864(16482 to 32634)	4781.59(3302.88 to 6534.54)	47469(32829 to 65355)	3154.19(2158.41 to 4379.77)	-0.06(-0.09 to -0.03)	56092(40160 to 75526)	7326.62(5211.89 to 9957.77)	112863(81147 to 181834)
Czechia	454151(319908 to 614403)	6361.43(4471.83 to 8613.49)	473755(33006 to 648013)	5046.22(3489.30 to 6907.84)	-0.08(-0.12 to -0.05)	116404(858517 to 1521138)	12089.83(8705.70 to 16223.53)	1217849(887362 to 1618123)
Democratic People's Republic of Korea	467907(322171 to 645625)	3542.14(2442.21 to 4886.77)	681326(467275 to 943028)	3099.80(2122.98 to 4308.31)	-0.21(-0.22 to -0.20)	1082544(773381 to 1458151)	7449.68(5287.15 to 10110.44)	1594113(1125599 to 2177594)
Democratic Republic of Congo	644383(441694 to 892496)	3893.88(2676.72 to 5382.20)	1606525(1098736 to 2213584)	4694.57(3247.96 to 6440.21)	-0.12(-0.15 to -0.10)	1487675(1063418 to 2019088)	11101.55(8106.37 to 14886.33)	3702314(2634067 to 5038197)
Denmark	183270(125258 to 252015)	5111.50(3490.74 to 7028.62)	184399(116392 to 269446)	5933.25(4137.47 to 8071.03)	-0.40(-0.49 to -0.31)	556732(436062 to 693418)	15002.30(10877.54 to 19912.60)	545400(380172 to 747335)
Djibouti	6631(4532 to 9175)	3495.22(2398.40 to 4816.34)	24767(16830 to 34349)	3755.40(2577.11 to 5157.87)	-0.16(-0.18 to -0.14)	14955(10666 to 20317)	9071.53(6484.18 to 12308.62)	55849(39684 to 75764)
Dominica	1224(837 to 1687)	3194.15(2183.48 to 4402.22)	1492(1021 to 2071)	3884.94(2665.33 to 5363.64)	-0.10(-0.11 to -0.09)	2836(2013 to 3845)	8963.83(6388.93 to 12122.27)	3469(2455 to 4723)
Dominican Republic	114366(79006 to 156731)	3096.62(2140.43 to 4246.63)	223947(152871 to 310696)	4949.53(3450.36 to 6770.72)	0.06(0.04 to 0.07)	261468(189742 to 350242)	12152.37(8750.94 to 16330.39)	520391(369606 to 708512)

Table 2 (continued)

Location	Incidence		Prevalence					
	Incident cases(1990)	ASIR(1990)	Incident cases(2021)	ASIR(2021)	AAPC 1990–2021	Prevalent cases(1990)	ASPR(1990)	Prevalent cases(2021)
Ecuador	151171(104936 to 206477)	2983.88(2071.20 to 4073.26)	316955(223882 to 429497)	4017.81(2720.13 to 5617.65)	-0.20(-0.24 to -0.17)	344826(250000 to 460884)	9561.96(7480.73 to 12127.40)	713586(528264 to 949309)
Egypt	1196584(819649 to 1646662)	4098.36(2806.56 to 5636.99)	2617147(1791141 to 3610933)	3046.51(2066.63 to 4208.84)	0.08(0.06 to 0.09)	2850873(2041973 to 3857527)	7215.94(5115.16 to 9835.34)	6270610(4496376 to 8439632)
El Salvador	102719(70635 to 140896)	3898.85(2681.24 to 5340.83)	156697(107531 to 215600)	4393.50(3033.90 to 6044.00)	0.04(0.03 to 0.05)	241142(173165 to 326339)	11564.09(8478.54 to 15241.09)	374758(267409 to 507167)
Equatorial Guinea	7207(4922 to 9899)	3850.47(2631.81 to 5282.02)	26221(17939 to 36268)	3939.22(2709.84 to 5427.82)	-0.18(-0.21 to -0.14)	16597(11803 to 22455)	9076.37(6641.46 to 12058.24)	59658(42394 to 81410)
Eritrea	49173(33498 to 68398)	3341.11(2280.45 to 4637.35)	112720(76985 to 155890)	4157.80(2850.19 to 5699.54)	0(-0.01 to 0.01)	109269(77397 to 149712)	9954.22(7117.03 to 13469.10)	253247(179977 to 343586)
Estonia	56389(39926 to 76227)	5053.87(3577.42 to 6840.36)	47425(32826 to 65063)	3859.39(2647.16 to 5332.89)	-0.02(-0.04 to -0.01)	135431(99645 to 178142)	9456.63(6760.49 to 12832.12)	113849(82051 to 152446)
Eswatini	9401(6495 to 12956)	2933.89(2030.77 to 4027.12)	17231(11775 to 23908)	3374.69(2299.34 to 4680.90)	-0.04(-0.06 to -0.03)	20629(14836 to 27906)	8051.73(5706.10 to 10978.64)	38189(27128 to 52008)
Ethiopia	824505(567557 to 1135143)	3912.08(2699.65 to 5370.38)	1836512(1255171 to 2540620)	3233.28(2212.53 to 4487.79)	-0.24(-0.26 to -0.23)	1899742(1360338 to 2551890)	7963.69(5650.60 to 10768.82)	4192638(2995215 to 5662882)
Guji	13032(8902 to 18111)	3243.42(2217.61 to 4499.23)	18750(12845 to 26036)	2837.25(1934.97 to 3957.08)	-0.12(-0.12 to -0.12)	29876(21193 to 40628)	7056.21(5115.70 to 9437.79)	43151(30474 to 58697)
Finland	158625(111698 to 215357)	4475.23(3157.87 to 6062.53)	159890(110518 to 219314)	3099.71(2127.21 to 4272.82)	-0.19(-0.22 to -0.17)	364383(268575 to 482570)	7658.51(5467.34 to 10356.23)	369111(266875 to 496775)
France	1847515(1284740 to 2519266)	4719.42(3283.17 to 6437.98)	2118331(1468704 to 2898971)	3551.22(2429.11 to 4932.67)	-0.02(-0.06 to 0.03)	4343993(3171521 to 5824028)	8357.20(5966.74 to 11426.33)	5048508(3624224 to 6809404)
Gabon	16806(11552 to 23222)	3603.31(2481.95 to 4973.96)	36087(24905 to 49924)	4677.07(3251.56 to 6403.15)	-0.02(-0.03 to -0.01)	37997(26925 to 51475)	11440.47(8248.19 to 15416.15)	82143(58659 to 111535)
Gambia	13735(9401 to 18984)	3378.64(2318.62 to 4654.21)	36173(24652 to 50333)	2798.79(1909.70 to 3876.08)	-0.10(-0.11 to -0.09)	30939(21972 to 42072)	6494.46(4702.54 to 8763.14)	81571(57661 to 111432)
Georgia	161823(111921 to 221521)	4252.96(2947.44 to 5831.82)	110511(76283 to 151525)	2696.30(1826.82 to 3727.48)	-0.02(-0.04 to 0.00)	371396(267948 to 495109)	6481.40(4593.18 to 8806.80)	255048(182935 to 344118)
Germany	3203561(2238827 to 4346832)	5479.61(3832.69 to 7432.11)	3248641(2258458 to 4407433)	6138.50(4276.96 to 8377.74)	-0.15(-0.20 to -0.11)	8034340(5872596 to 10692430)	15285.51(11046.29 to 20367.87)	8167541(5921013 to 10879377)
Ghana	221565(153957 to 303069)	3331.46(2319.09 to 4552.67)	563771(397575 to 765001)	3262.70(2231.33 to 4519.96)	-0.14(-0.15 to -0.12)	496237(360405 to 662860)	7857.00(5601.41 to 10703.65)	1263945(933175 to 1667730)
Greece	337131(233973 to 458919)	4584.07(3183.77 to 6251.18)	331918(228808 to 452837)	4270.22(2943.98 to 5856.01)	-0.06(-0.09 to -0.04)	782921(564449 to 1038564)	10112.34(7275.91 to 13666.65)	778910(558037 to 1054522)
Greenland	1833(1260 to 2523)	4810.07(3315.26 to 6604.88)	1917(1322 to 2633)	5362.57(3742.75 to 7316.79)	-0.17(-0.19 to -0.16)	4217(3032 to 5689)	14083.37(10228.88 to 18697.08)	4480(3204 to 6056)

Table 2 (continued)

Location	Incidence		Prevalence					
	Incident cases(1990)	ASIR(1990)	Incident cases(2021)	ASIR(2021)	AAPC 1990–2021	Prevalent cases(1990)	ASPR(1990)	Prevalent cases(2021)
Grenada	1339(912 to 1849)	3131.78(2137.06 to 4320.98)	2271(11549 to 3131)	3651.05(2502.67 to 5032.26)	−0.05(−0.06 to −0.05)	3077(2188 to 4169)	8925.65(6345.93 to 12075.45)	5271(3740 to 7193)
Guam	2587(1772 to 3609)	3178.65(2181.24 to 4427.73)	3505(2396 to 4861)	6266.64(4407.29 to 8513.68)	−0.03(−0.04 to −0.02)	5911(4209 to 8037)	15622.10(11394.42 to 20590.87)	8138(5791 to 11075)
Guatemala	164090(114338 to 222603)	4422.77(3086.43 to 6008.00)	392552(270396 to 538827)	4068.69(2822.93 to 5574.70)	−0.14(−0.16 to −0.13)	404879(297060 to 536074)	10082.07(7298.70 to 13577.92)	964366(690080 to 1301373)
Guinea	96495(66256 to 133138)	3609.16(2480.61 to 4971.48)	209040(142712 to 291157)	3205.18(2183.21 to 4435.21)	−0.06(−0.07 to −0.04)	221963(158523 to 303104)	7639.69(5412.97 to 10385.03)	481889(343345 to 651983)
Guinea-Bissau	14459(9917 to 20144)	3490.69(2399.78 to 4848.28)	31699(21561 to 43956)	6075.45(4227.93 to 8317.42)	−0.09(−0.10 to −0.08)	32774(23250 to 44619)	15222.10(11099.45 to 20252.07)	72030(51035 to 97939)
Guyana	12546(8599 to 17406)	3122.83(2145.07 to 4330.04)	15237(10420 to 21192)	4480.09(3091.32 to 6151.92)	−0.03(−0.04 to −0.03)	28718(20466 to 38891)	10542.02(7561.80 to 14226.77)	35182(24825 to 47998)
Haiti	98001(67099 to 135504)	3128.72(2142.96 to 4322.81)	232599(158337 to 323298)	2944.44(2016.95 to 4059.49)	−0.02(−0.03 to −0.01)	225286(159901 to 305672)	7229.13(5173.53 to 9747.27)	534316(379033 to 725919)
Honduras	82541(56526 to 114272)	3916.68(2685.41 to 5417.77)	232515(159590 to 319749)	2805.74(1982.22 to 3801.18)	0.02(0.01 to 0.03)	194065(139102 to 261822)	6854.70(4972.84 to 9177.17)	554985(395104 to 749806)
Hungary	479821(336875 to 653838)	6516.68(4567.48 to 8896.51)	449701(315098 to 609016)	5075.70(3512.35 to 6929.66)	−0.04(−0.06 to −0.03)	1257141(922589 to 1653203)	12212.12(8769.69 to 16398.32)	1186787(866529 to 1564155)
Iceland	8079(5572 to 11060)	5017.99(3464.54 to 6864.62)	11545(8009 to 15759)	3855.67(2655.65 to 5323.13)	−0.19(−0.22 to −0.17)	19388(113943 to 26043)	9236.93(6579.44 to 12528.82)	27655(19876 to 37355)
India	16943862(11647210 to 23353031)	3756.76(2587.20 to 5168.47)	29828629(20522412 to 41141295)	4050.46(2780.37 to 5560.75)	−0.42(−0.46 to −0.39)	39122846(27972883 to 52696447)	9634.08(6920.94 to 13081.24)	68473989(48796759 to 92518937)
Indonesia	3095198(2116078 to 4282863)	3127.14(2141.25 to 4318.73)	5983552(4100195 to 8265177)	4241.91(2937.33 to 5822.73)	−0.10(−0.12 to −0.09)	7197341(5140382 to 9723585)	10229.78(7580.34 to 13483.41)	14090216(10074690 to 19029966)
Iran (Islamic Republic of)	13270120(917515 to 1820351)	4885.49(3383.66 to 6702.94)	2694286(1859639 to 3705654)	4575.13(3159.65 to 6287.80)	−0.29(−0.34 to −0.24)	3229149(2342484 to 4300989)	11147.23(8020.31 to 15034.06)	6553801(4725164 to 8797711)
Iraq	351694(240483 to 483320)	4113.51(2815.42 to 5648.08)	1006988(688763 to 1389501)	2666.65(1834.65 to 3681.46)	−0.04(−0.05 to −0.03)	835609(596362 to 1128312)	7564.29(5361.07 to 10293.15)	2385009(1710384 to 3223497)
Ireland	107038(73928 to 146117)	4891.68(3376.90 to 6679.93)	166792(117450 to 228476)	3986.35(2732.86 to 5508.32)	−0.05(−0.09 to −0.01)	253132(182606 to 340132)	9186.42(6564.95 to 12501.28)	400805(292185 to 536638)
Israel	144781(101517 to 195901)	5038.33(3533.23 to 6817.23)	280433(194093 to 385905)	3598.95(2474.58 to 4962.99)	−0.19(−0.22 to −0.16)	344333(250864 to 456544)	8301.41(5951.69 to 11220.17)	670786(481085 to 903340)
Italy	1984795(1375535 to 2712819)	4849.06(3361.28 to 6638.20)	2114689(1463592 to 2880449)	4213.27(2902.18 to 5801.94)	−0.03(−0.07 to 0)	4694737(3374123 to 6309630)	10323.67(7453.38 to 13864.86)	5039890(3619670 to 6785689)
Jamaica	39126(26642 to 54193)	3190.74(2176.80 to 4417.30)	61973(42382 to 85644)	3112.58(2119.86 to 4318.75)	−0.02(−0.03 to −0.01)	90237(63918 to 123009)	7238.54(5135.94 to 9831.37)	144365(102745 to 195789)

Table 2 (continued)

Location	Incidence		Prevalence			Prevalent cases(2021)		
	Incident cases(1990)	ASIR(1990)	Incident cases(2021)	ASIR(2021)	AAPC 1990–2021			
Japan	5315775(3719602 to 7213780)	5769.73(4028.68 to 7840.23)	4492810(3142580 to 61119229)	5681.55(3952.29 to 7743.18)	-0.26(-0.33 to -0.20)	13037150(9461053 to 17306216)	14007.64(10272.05 to 18509.11)	10995450(7946609 to 14664692)
Jordan	73016(50078 to 100453)	4131.84(2836.40 to 5689.52)	321342(220088 to 439324)	4505.37(3101.87 to 6191.97)	-0.03(-0.03 to -0.02)	174459(125120 to 235912)	11462.29(8370.18 to 15309.21)	765160(546450 to 1033126)
Kazakhstan	444981(310866 to 606138)	4523.57(3168.86 to 6159.53)	580799(401571 to 796986)	3136.82(2150.16 to 4347.37)	0.04(0.03 to 0.04)	1032480(749047 to 1372228)	7351.90(5210.99 to 10024.45)	1368969(982459 to 1846347)
Kenya	366012(252070 to 504726)	3985.40(2757.03 to 5480.93)	991729(683123 to 1366786)	3317.98(2269.45 to 4594.61)	-0.08(-0.09 to -0.06)	845205(609400 to 1134184)	7301.31(5197.50 to 9943.63)	2296001(1649464 to 3087889)
Kiribati	1201(822 to 1669)	3242.20(2226.55 to 4494.21)	2310(1579 to 3191)	3886.28(2673.46 to 5343.62)	0.06(0.04 to 0.08)	2744(1945 to 3732)	9358.78(6692.20 to 12649.17)	5353(3810 to 7258)
Kuwait	41188(28276 to 56855)	3909.17(2688.78 to 5382.83)	153022(105662 to 211599)	3181.45(2177.20 to 4413.73)	0.15(0.13 to 0.17)	96833(69682 to 129955)	7489.88(5316.61 to 10201.56)	365561(262028 to 496221)
Kyrgyzstan	107310(74135 to 148563)	4594.37(3184.01 to 6346.67)	185236(127147 to 253086)	5069.57(3525.31 to 6908.32)	-0.08(-0.09 to -0.07)	250318(179185 to 337476)	11108.54(8114.49 to 14813.24)	431087(307921 to 582221)
Lao People's Democratic Republic	58023(40053 to 80381)	3007.29(2078.34 to 4166.73)	127509(86766 to 177015)	5903.12(4121.81 to 8069.07)	-0.15(-0.17 to -0.14)	133192(95786 to 179550)	14001.60(10188.31 to 18589.59)	294325(208570 to 400270)
Latvia	95702(66501 to 130844)	5006.72(3477.77 to 6858.21)	68484(47425 to 93291)	4227.84(2911.68 to 5802.66)	-0.04(-0.04 to -0.03)	229602(166020 to 308120)	11031.33(8094.25 to 14624.75)	163722(118015 to 220021)
Lebanon	69805(47857 to 95942)	4054.77(2799.1 to 5576.63)	151295(103806 to 208016)	3079.67(2117.19 to 4229.71)	0(-0.01 to 0.01)	165700(119046 to 224789)	7103.82(5032.84 to 9648.14)	358811(258065 to 485747)
Lesotho	22651(15501 to 31413)	3288.21(2252.80 to 4550.69)	31035(21212 to 43056)	2885.79(1966.63 to 3999.53)	-0.18(-0.19 to -0.17)	51212(36347 to 69561)	6746.05(4863.79 to 9103.80)	69855(49573 to 95096)
Liberia	36862(25166 to 51140)	3507.25(2396.93 to 4860.38)	91058(62078 to 126855)	5741.26(4023.28 to 7810.48)	-0.13(-0.14 to -0.12)	83702(59384 to 113930)	14448.70(10505.61 to 19180.94)	208034(148228 to 282417)
Libya	82812(56637 to 114346)	4053.67(2777.71 to 5599.26)	205113(140927 to 284562)	5231.96(3638.98 to 7113.63)	0.02(0 to 0.04)	196662(140551 to 266012)	13674.16(10000.48 to 18189.85)	488666(347241 to 664520)
Lithuania	131151(90718 to 179186)	5121.60(3547.30 to 7002.40)	103370(71259 to 141484)	3508.64(2399.39 to 4831.50)	-0.06(-0.07 to -0.05)	315672(227404 to 421876)	7649.59(5536.72 to 10303.59)	248872(178717 to 335342)
Luxembourg	13465(9285 to 18429)	4840.17(3342.45 to 6625.12)	22880(15914 to 31259)	3854.88(3119.18 to 4529.98)	-0.11(-0.13 to -0.09)	31891(22979 to 42954)	8152.77(6917.36 to 9579.83)	54501(39299 to 73453)
Madagascar	200129(137519 to 276261)	3894.36(2680.46 to 5367.99)	503985(345301 to 702959)	2615.75(1781.86 to 3635.44)	-0.21(-0.23 to -0.19)	465195(330026 to 632987)	5564.27(3976.09 to 7557.21)	1159601(823070 to 1576435)
Malawi	154301(107204 to 211271)	3732.05(2604.59 to 5097.48)	322033(220404 to 446836)	3102.69(2126.39 to 4296.28)	-0.06(-0.07 to -0.05)	353866(257357 to 471639)	7212.48(5127.09 to 9813.33)	739993(525849 to 1003019)
Malaysia	267904(190666 to 360174)	2853.81(2029.62 to 3841.12)	588759(400893 to 819434)	4228.67(2921.15 to 5728.51)	-0.13(-0.15 to -0.12)	609805(455893 to 796648)	10179.38(7305.68 to 13700.78)	1351018(950643 to 1848867)

Table 2 (continued)

Location	Incidence		Prevalence			Prevalent cases(2021)		
	Incident cases(1990)	ASIR(1990)	Incident cases(2021)	ASIR(2021)	AAPC 1990–2021		Prevalent cases(1990)	ASPR(1990)
Maldives	2639(1785 to 3679)	2737.92(1858.44 to 3808.39)	9795(6704 to 13625)	3430.92(2344.32 to 4746.36)	−0.28(−0.30 to −0.25)	5931(4196 to 8142)	8018.34(5719.35 to 10874.03)	22079(15574 to 30161)
Mali	117742(81417 to 162168)	3148.08(2180.24 to 4327.04)	315904(215298 to 440036)	3825.63(2627.78 to 5289.47)	0.07(0.06 to 0.09)	261519(188848 to 351892)	9131.41(6495.15 to 12392.54)	709785(502187 to 967294)
Malta	12494(8676 to 17131)	4978.52(3454.32 to 6824.46)	15133(10573 to 20577)	2986.00(2049.29 to 4120.59)	−0.07(−0.09 to −0.05)	29761(21379 to 40032)	6641.28(4684.81 to 9105.36)	36730(26571 to 49019)
Marshall Islands	576(393 to 799)	3137.15(2141.00 to 4343.44)	1067(735 to 1485)	4701.63(3250.12 to 6468.43)	−0.07(−0.07 to −0.06)	1300(926 to 1764)	11245.45(8053.25 to 15142.09)	2430(1719 to 3307)
Mauritania	28890(20125 to 39612)	3227.04(2254.83 to 4416.73)	65885(44758 to 91316)	3465.53(2377.49 to 4804.96)	−0.01(−0.03 to 0)	64499(47160 to 86247)	8451.96(5985.07 to 11468.24)	148535(105126 to 202182)
Mauritius	19725(13656 to 26948)	3022.23(2096.35 to 4126.79)	28050(19116 to 39069)	5013.93(3470.21 to 6893.65)	−0.20(−0.21 to −0.19)	45669(33117 to 61068)	12070.19(8869.20 to 15880.87)	65541(46302 to 89746)
Mexico	1579749(1075637 to 2187429)	3603.22(2455.55 to 4981.55)	3282081(2246712 to 4530877)	5438.44(4138.58 to 6887.38)	0.14(0.12 to 0.16)	3690222(2625853 to 4996361)	14388.98(10700.23 to 18773.18)	7747362(5513423 to 10506925)
Micronesia (Federated States of)	1495(1020 to 2072)	3269.99(2235.63 to 4519.16)	2117(1451 to 2948)	3247.24(2216.38 to 4507.49)	−0.02(−0.03 to 0)	3423(2433 to 4664)	7440.52(5395.35 to 9988.30)	4915(3488 to 6676)
Monaco	1043(724 to 1432)	4753.89(3297.30 to 6534.10)	1247(862 to 1703)	4193.89(2868.76 to 5787.35)	−0.12(−0.14 to −0.09)	2459(1764 to 3305)	9782.98(7010.70 to 13256.56)	2953(2112 to 3994)
Mongolia	44555(30737 to 61548)	4513.36(3126.12 to 6209.07)	94671(65647 to 129860)	3082.19(2112.03 to 4262.29)	−0.06(−0.07 to −0.06)	103250(73996 to 138161)	7114.99(5070.17 to 9724.31)	219172(157220 to 294015)
Montenegro	25129(17597 to 34289)	6008.70(4210.57 to 8207.18)	27322(19092 to 37137)	3156.77(2155.67 to 4377.19)	0.01(0 to 0.02)	62220(45018 to 82700)	7130.23(5146.30 to 9566.31)	68944(49833 to 91399)
Morocco	610112(426070 to 834871)	4585.80(3206.03 to 6276.64)	1118555(770280 to 1537448)	3973.00(2736.27 to 5446.26)	−0.06(−0.07 to −0.04)	1516374(1108464 to 2023301)	9794.36(7020.21 to 13192.09)	2770112(1984353 to 3737425)
Mozambique	230499(157673 to 319203)	3883.69(2661.13 to 5369.77)	508399(348376 to 704299)	3663.71(2511.41 to 5072.61)	−0.05(−0.05 to −0.04)	537570(382072 to 729411)	8658.91(6296.67 to 11539.47)	1184485(843091 to 1601639)
Myanmar	545408(372549 to 753900)	2564.36(1754.37 to 3540.74)	939482(639938 to 1294421)	3031.56(2076.43 to 4187.27)	−0.01(−0.02 to 0)	1206898(862176 to 1636942)	7345.75(5239.92 to 9922.12)	2114524(1496120 to 2892765)
Namibia	20260(14045 to 27783)	3264.86(2269.51 to 4469.86)	43251(29486 to 60209)	2655.81(1796.66 to 3664.73)	−0.02(−0.02 to −0.01)	45780(33182 to 61444)	6402.44(4511.82 to 8705.05)	99082(70201 to 134456)
Nauru	164(112 to 228)	3244.51(2215.82 to 4494.25)	196(134 to 272)	4632.30(3206.51 to 6372.25)	0.04(0.02 to 0.05)	376(267 to 510)	11815.33(8532.19 to 15852.67)	452(321 to 616)
Nepal	482054(336848 to 653636)	5153.13(361047 to 6978.14)	902969(620642 to 1245004)	3946.00(2709.52 to 5426.38)	−0.20(−0.23 to −0.17)	1265119(928171 to 1671526)	9303.69(6656.34 to 12568.32)	2280727(1644073 to 3068790)
Netherlands	462093(319802 to 629477)	4424.77(3062.27 to 6026.32)	521652(359931 to 711714)	4153.82(2845.14 to 5737.23)	−0.15(−0.18 to −0.11)	1063931(763566 to 1432101)	9967.96(7104.42 to 13526.59)	1201658(858305 to 1628690)

Table 2 (continued)

Table 2 (continued)

Table 2 (continued)

Location	Incidence		Prevalence					
	Incident cases(1990)	ASIR(1990)	Incident cases(2021)	ASIR(2021)	AAPC 1990–2021	Prevalent cases(1990)	ASPR(1990)	Prevalent cases(2021)
Sierra Leone	67084(45826 to 93131)	3595.11(2460.83 to 4975.24)	143065(97737 to 198888)	4477.03(3075.96 to 6110.78)	−0.19(−0.20 to −0.18)	153645(109365 to 208292)	10784.77(7728.23 to 14514.36)	326019(231361 to 444587)
Singapore	92450(63957 to 125824)	4313.80(2985.01 to 5864.34)	182613(125824 to 249871)	4587.14(3164.73 to 6288.20)	−0.28(−0.37 to −0.18)	208997(149937 to 281141)	11147.18(8013.23 to 14991.23)	414091(295684 to 562481)
Slovakia	214122(1150510 to 288383)	6167.56(4334.25 to 8307.98)	244424(170086 to 333836)	5805.41(4030.15 to 7899.18)	−0.10(−0.11 to −0.08)	542378(402725 to 710706)	14671.00(10902.76 to 19123.46)	617498(446715 to 825391)
Slovenia	80956(57166 to 109758)	5750.20(4060.67 to 7800.45)	87177(60737 to 118449)	6121.08(4292.01 to 8304.70)	−0.03(−0.05 to −0.01)	19793(145252 to 261497)	15699.74(11435.38 to 20802.29)	213527(154697 to 286140)
Solomon Islands	4698(3213 to 6501)	3172.22(2175.70 to 4385.49)	12067(8256 to 16747)	3328.83(2261.27 to 4601.74)	0.14(0.14 to 0.15)	10683(7590 to 14549)	7975.93(5679.87 to 10823.04)	28005(19920 to 38042)
Somalia	121219(83378 to 167627)	3691.55(2542.56 to 5078.59)	321436(219440 to 446363)	3122.99(2134.07 to 4325.44)	0(−0.01 to 0.01)	276711(197777 to 376132)	7304.28(5217.68 to 9988.55)	740054(528363 to 1000107)
South Africa	615049(421297 to 850728)	3327.38(2286.63 to 4589.68)	1140105(782188 to 1573270)	3596.93(2463.95 to 4975.35)	−0.23(−0.25 to −0.20)	1403801(1001160 to 1899687)	8362.68(5939.40 to 11324.23)	2601847(1851389 to 3516537)
South Sudan	90860(61813 to 126515)	3621.46(2474.28 to 5030.89)	159578(109304 to 221107)	3649.33(2482.91 to 5040.80)	−0.02(−0.03 to −0.01)	207435(147529 to 280810)	8744.13(6233.44 to 11791.09)	366859(261982 to 497433)
Spain	1173133(874820 to 1517674)	4434.81(3306.54 to 5741.96)	1376815(932382 to 1925514)	3158.68(2156.70 to 4375.00)	−0.30(−0.33 to −0.27)	2533802(1983643 to 3210919)	7270.31(5155.69 to 9899.90)	2967502(2083921 to 4076494)
Sri Lanka	281694(194474 to 386787)	2844.37(1964.37 to 3900.18)	434209(296390 to 600824)	3341.00(2281.84 to 4609.64)	−0.05(−0.06 to −0.05)	638078(462393 to 860849)	7492.64(5312.79 to 10263.86)	1002833(706687 to 1363189)
Sudan	391475(267571 to 543065)	4158.50(2841.27 to 5774.22)	968067(662824 to 1336629)	5679.84(3947.84 to 7744.43)	0(−0.01 to 0.01)	935690(667912 to 1268107)	13852.35(9984.88 to 18576.67)	2303237(1656708 to 3093624)
Suriname	6784(4622 to 9414)	3101.99(2118.12 to 4300.58)	12547(8585 to 17445)	3519.53(2409.56 to 4877.91)	0.04(0.04 to 0.05)	15589(11017 to 21235)	7974.56(5676.22 to 10777.64)	29205(20663 to 39894)
Sweden	159123(114568 to 212291)	2743.90(1973.47 to 3665.78)	255765(170190 to 359481)	5025.97(3459.00 to 6895.53)	0.91(0.84 to 0.98)	362250(274432 to 472349)	12277.67(8848.10 to 16413.46)	576312(396702 to 804649)
Switzerland	264643(196064 to 344563)	5437.42(4024.78 to 7079.09)	320761(221209 to 441082)	3154.78(2155.62 to 4347.75)	−0.35(−0.38 to −0.32)	664526(535676 to 818753)	7346.25(5199.41 to 9997.62)	779962(557193 to 1053068)
Syrian Arab Republic	241760(165325 to 332830)	4200.65(2875.38 to 5784.52)	394707(272054 to 541154)	4767.15(3296.30 to 6566.58)	0.01(0 to 0.02)	579196(414977 to 781078)	12002.24(8740.27 to 15929.56)	949096(678826 to 1279709)
Taiwan (Province of China)	455704(352052 to 563155)	3530.67(2732.47 to 4361.44)	744631(597243 to 876722)	2958.61(2119.32 to 3956.77)	0.29(0.25 to 0.32)	1048888(888336 to 1234858)	7309.62(5175.38 to 9940.53)	1831441(1697905 to 1952602)
Tajikistan	107213(73614 to 148140)	4377.39(3019.29 to 6037.88)	249453(171587 to 342770)	3501.99(2404.20 to 4827.30)	−0.08(−0.09 to −0.07)	245749(176467 to 331571)	8115.90(5812.82 to 10968.34)	568781(407700 to 767808)
Thailand	854713(587163 to 1180646)	2506.24(1723.51 to 3458.33)	1428356(972455 to 1982825)	3715.14(2561.51 to 5127.12)	0.13(0.11 to 0.16)	1866291(1349217 to 2556948)	8988.98(6410.47 to 12209.41)	3266880(2317906 to 4522944)

Table 2 (continued)

Table 2 (continued)

Location	Incidence		Prevalence					
	Incident cases(1990)	ASIR(1990)	Incident cases(2021)	ASIR(2021)	AAPC 1990–2021	Prevalent cases(1990)	ASPR(1990)	Prevalent cases(2021)
Vanuatu	2358(1610 to 3270)	3410.20(2336.02 to 4718.39)	5797(3957 to 8028)	6424.08(4490.96 to 8718.94)	0.01(0 to 0.02)	5474(3902 to 7422)	17023.52(12463.35 to 22403.67)	13653(9676 to 18473)
Venezuela (Boli- varian Republic of)	375599(258094 to 516286)	3748.70(2576.28 to 5142.83)	661485(455191 to 911103)	3197.80(2192.07 to 4434.90)	−0.11(−0.13 to −0.09)	873020(625072 to 1175720)	7496.41(5372.31 to 10080.14)	1548541(1108897 to 2102261)
Viet Nam	975207(670662 to 1342429)	2934.11(2020.48 to 4035.55)	2061882(1406276 to 2856326)	4097.37(2806.03 to 5604.05)	−0.06(−0.07 to −0.04)	2211124(1592553 to 2984118)	9900.55(7101.57 to 13382.52)	4823821(3390498 to 6581701)
Yemen	238872(163981 to 329875)	4245.26(2911.64 to 5864.58)	715466(488124 to 988507)	3748.13(2565.73 to 5205.82)	−0.08(−0.10 to −0.06)	574615(411021 to 773090)	9089.62(6513.78 to 12262.39)	1697904(1214762 to 2298456)
Zambia	102755(71302 to 141393)	3191.36(2217.60 to 4382.90)	305634(208282 to 426281)	3155.58(2156.03 to 4375.60)	0.22(0.21 to 0.23)	225550(162141 to 302542)	7268.70(5163.15 to 9914.67)	688945(488625 to 938204)
Zimbabwe	139387(96156 to 191719)	3332.49(2311.13 to 4584.09)	261920(178832 to 362532)	3890.72(2686.48 to 5348.88)	0.17(0.16 to 0.18)	316513(228321 to 426043)	9337.56(6736.06 to 12523.30)	611882(435710 to 833474)
Location	Prevalence		DALYs					
	ASPR(2021)	AAPC 1990–2021	DALYs cases (1990)		ASDR (1990)	DALYs cases(2021)		ASDR(2021)
Afghanistan	7285.26(5174.26 to 9887.40)	−0.01(−0.02 to 0.01)	53869(33203 to 81287)	831.24(506.57 to 1253.19)	15921(697122 to 242408)	830.43(501.89 to 1244.98)	−0.02(−0.04 to −0.01)	
Albania	8468.67(6064.85 to 11492.11)	0.05(0.05 to 0.06)	324561(9880 to 48898)	1003.15(607.69 to 1512.56)	34915(21684 to 52254)	965.00(585.92 to 1469.57)	0.05(0.04 to 0.06)	
Algeria	6465.67(4593.52 to 8798.52)	−0.03(−0.04 to −0.02)	135476(82858 to 205480)	740.29(456.56 to 1111.63)	311909(189999 to 472439)	718.72(439.44 to 1087.99)	−0.03(−0.05 to −0.02)	
American Samoa	8260.46(5843.65 to 11263.21)	−0.05(−0.06 to −0.04)	210(127 to 319)	9691.3(6033.54 to 14391.9)	281(171 to 425)	938.58(568.16 to 1427.84)	−0.08(−0.10 to −0.06)	
Andorra	9758.18(6978.80 to 13245.52)	−0.10(−0.11 to −0.09)	503(307 to 758)	1056.43(646.62 to 1594.67)	877(538 to 1330)	1107.38(673.74 to 1664.92)	−0.10(−0.12 to −0.09)	
Angola	10084.49(7210.56 to 13692.04)	−0.14(−0.16 to −0.13)	46345(27905 to 70110)	1190.01(731.09 to 1798.13)	139128(85039 to 210348)	1155.43(704.36 to 1743.35)	−0.15(−0.16 to −0.14)	
Antigua and Barbuda	10001.64(7352.50 to 13267.75)	0(−0.01 to 0.01)	275(165 to 416)	1131.87(689.16 to 1710.35)	544(331 to 820)	1142.58(704.77 to 1700.34)	−0.02(−0.03 to 0)	
Argentina	8785.43(6235.15 to 11924.81)	−0.10(−0.23 to 0.03)	271742(166502 to 407584)	996.24(616.38 to 1497.82)	410709(251786 to 618252)	985.32(598.85 to 1490.00)	−0.10(−0.21 to 0.01)	
Armenia	9869.10(7060.49 to 13355.11)	0.02(0 to 0.03)	27533(16796 to 41199)	1152.50(702.97 to 1739.88)	28748(17740 to 43083)	1109.91(679.40 to 1664.55)	0.02(0.00 to 0.03)	
Australia	15063.61(10878.92 to 20001.04)	−0.31(−0.33 to −0.28)	19481.4(121636 to 289106)	1705.19(1053.69 to 2545.82)	281841(174999 to 421473)	1720.64(1064.38 to 2568.45)	−0.30(−0.33 to −0.27)	
Austria	9468.18(6755.14 to 12816.83)	−0.27(−0.29 to −0.24)	62785(38757 to 94386)	1049.54(639.12 to 1574.64)	70888(43546 to 106746)	1075.89(655.97 to 1635.70)	−0.28(−0.30 to −0.26)	
Azerbaijan	7482.54(5276.57 to 10219.62)	0.07(0.06 to 0.08)	49288(30112 to 74058)	876.15(536.24 to 1318.04)	95579(58414 to 142929)	847.52(513.89 to 1280.61)	0.07(0.05 to 0.09)	
Bahamas	7127.07(5039.01 to 9733.71)	−0.01(−0.01 to 0)	1194(718 to 1822)	817.31(498.16 to 1241.14)	2299(1390 to 3473)	812.09(489.46 to 1227.61)	−0.02(−0.03 to −0.02)	
Bahrain	11154.37(8033.27 to 15003.61)	−0.07(−0.08 to −0.05)	3267(1985 to 4962)	1239.27(759.67 to 1860.61)	12371(7516 to 18624)	1255.30(773.68 to 1875.17)	−0.08(−0.10 to −0.07)	
Bangladesh	10271.51(7367.17 to 13776.56)	−0.26(−0.29 to −0.23)	625430(388006 to 930871)	1207.05(742.37 to 1804.42)	1247861(767777 to 1878082)	1171.28(724.07 to 1757.65)	−0.26(−0.29 to −0.22)	
Barbados	9682.91(6877.23 to 13178.80)	−0.03(−0.03 to −0.02)	1268(770 to 1908)	1100.96(673.87 to 1660.80)	1847(1131 to 2793)	1094.41(669.36 to 1656.39)	−0.04(−0.04 to −0.03)	
Belarus	7457.50(5266.57 to 10085.83)	−0.01(−0.02 to −0.01)	102973(63579 to 154168)	868.34(526.39 to 1317.26)	101655(62754 to 152241)	845.37(513.98 to 1278.37)	−0.01(−0.03 to 0)	
Belgium	12074.40(8758.33 to 16092.74)	−0.07(−0.09 to −0.06)	91953(66451 to 137875)	1420.24(879.89 to 2115.92)	103552(63614 to 155756)	1366.83(846.72 to 2035.65)	−0.09(−0.11 to −0.06)	
Belize	7191.57(5308.82 to 9491.38)	0.03(0.02 to 0.04)	696(419 to 1049)	854.54(530.48 to 1270.05)	2227(1348 to 3404)	81960(51034 to 121865)	0.01(0 to 0.02)	

Table 2 (continued)

Location	Prevalence		DALYs			
	ASPR(2021)	AAPC 1990–2021	DALYs cases (1990)	ASDR (1990)	DALYs cases(2021)	ASDR(2021)
Benin	7815.25(5536.22 to 10673.95)	−0.16(−0.18 to −0.15)	17969(10885 to 27103)	9415.4(570.41 to 14272.4)	53275(32075 to 81159)	887.54(542.53 to 1335.34)
Bermuda	8468.96(6001.97 to 11501.94)	−0.04(−0.04 to −0.03)	359(218 to 544)	1036.99(630.60 to 1567.52)	417253 to 626)	964.35(583.91 to 1461.02)
Bhutan	11177.47(7992.39 to 15102.75)	−0.05(−0.06 to −0.04)	3341(2055 to 5014)	1304.73(800.40 to 1958.36)	5641(3467 to 8479)	1272.71(781.55 to 1913.63)
Bolivia (Plurinational State of)	8194.43(5851.77 to 11117.88)	0.03(0.02 to 0.03)	25149(15149 to 38200)	924.87(560.59 to 1385.49)	59622(36134 to 90828)	922.90(565.26 to 1395.35)
Bosnia and Herzegovina	10864.88(7761.84 to 14684.66)	0.13(0.12 to 0.15)	50039(31202 to 74127)	1288.07(787.96 to 1950.31)	42024(26155 to 62582)	1239.86(760.70 to 1867.83)
Botswana	10780.06(7676.57 to 14615.88)	−0.02(−0.03 to −0.02)	4594(2775 to 6914)	1273.76(780.38 to 1920.09)	11780(7129 to 17800)	1230.86(753.55 to 1870.33)
Brazil	14985.61(10829.58 to 20023.82)	0.04(0.03 to 0.05)	1022345(625489 to 1535151)	1782.87(1120.63 to 2633.92)	1951785(1203591 to 2914640)	1712.57(1054.39 to 2559.87)
Brunei Darussalam	9697.72(6947.00 to 13142.53)	−0.16(−0.25 to −0.08)	1836(1112 to 2759)	1141.65(702.17 to 1725.84)	4005(2441 to 6072)	1094.07(666.56 to 1664.14)
Bulgaria	7150.09(5048.67 to 9750.58)	−0.07(−0.08 to −0.06)	108504(66823 to 161886)	812.64(495.50 to 1226.58)	84340(52533 to 126154)	800.64(490.87 to 1212.63)
Burkina Faso	10418.60(7478.48 to 13999.71)	−0.07(−0.09 to −0.06)	35800(22180 to 53380)	1263.23(776.50 to 1898.47)	90094(54690 to 136847)	1191.60(731.37 to 1789.01)
Burundi	7067.21(5014.48 to 9617.64)	−0.19(−0.21 to −0.18)	23468(14196 to 35574)	849.44(521.12 to 1278.62)	56818(34225 to 85837)	782.83(477.19 to 1180.09)
Cabo Verde	9693.46(6887.28 to 13167.24)	−0.25(−0.26 to −0.24)	1331(807 to 2018)	1113.78(684.21 to 1686.61)	3078(1879 to 4658)	1101.85(671.64 to 1670.69)
Cambodia	7132.18(5066.27 to 9713.03)	−0.29(−0.30 to −0.28)	39880(24118 to 60397)	824.57(498.05 to 1251.36)	84892(51643 to 129048)	809.82(493.58 to 1225.02)
Cameroon	7652.87(5444.18 to 10417.48)	−0.18(−0.19 to −0.17)	44364(26966 to 67326)	856.38(518.76 to 1306.55)	138278(83632 to 209821)	871.74(529.57 to 1321.16)
Canada	11790.76(8516.47 to 15744.32)	−0.28(−0.29 to −0.27)	254290(156984 to 381286)	1358.36(837.22 to 2053.37)	328830(202705 to 496108)	1347.38(839.11 to 2016.31)
Central African Republic	13309.95(9295.03 to 18181.93)	−0.05(−0.06 to −0.04)	12268(7550 to 18475)	1761.54(1154.94 to 2527.42)	26239(15907 to 39674)	1520.68(914.08 to 2337.25)
Chad	9110.04(6482.87 to 12368.77)	−0.33(−0.36 to −0.29)	27016(16723 to 40309)	1070.50(656.41 to 1615.56)	67962(41065 to 102498)	1034.08(630.20 to 1557.84)
Chile	5762.71(4077.65 to 7883.48)	−0.10(−0.23 to 0.03)	109787(67246 to 164801)	655.30(400.65 to 991.73)	183454(112643 to 274830)	661.00(402.41 to 997.06)
China	15296.12(11026.96 to 20395.23)	−0.69(−0.74 to −0.64)	6225364(3763691 to 9406580)	1849.72(1153.09 to 2758.40)	7893310(4825939 to 11911828)	1751.54(1079.72 to 2620.44)
Colombia	7274.26(5155.40 to 9957.01)	0.03(0.01 to 0.04)	201256(122116 to 304828)	866.93(528.36 to 1320.44)	387794(239197 to 577252)	825.03(504.65 to 1253.00)
Comoros	7705.35(5449.60 to 10512.86)	0.01(−0.01 to 0.03)	1798(1106 to 2674)	947.28(574.40 to 1433.11)	3941(2405 to 5951)	892.73(538.95 to 1362.01)
Congo	11348.91(8160.69 to 15270.71)	−0.02(−0.03 to −0.01)	9942(6069 to 14939)	1302.09(801.92 to 1950.59)	27880(16916 to 42040)	1296.78(796.91 to 1940.63)
Cook Islands	7809.81(5536.94 to 10645.88)	0.08(0.07 to 0.10)	89(54 to 135)	904.05(550.02 to 1368.41)	112(68 to 170)	885.58(537.53 to 1338.11)
Costa Rica	7880.72(5615.04 to 10687.37)	−0.09(−0.10 to −0.08)	17558(10620 to 26360)	953.67(580.25 to 1445.75)	34948(21342 to 52536)	897.37(547.61 to 1353.72)
Coted'Ivoire	10930.81(7849.49 to 14759.48)	−0.14(−0.15 to −0.13)	49928(30887 to 74161)	1347.61(824.50 to 2027.11)	126166(76075 to 192022)	1257.68(764.93 to 1882.97)
Croatia	10448.91(7502.13 to 14071.85)	−0.10(−0.11 to −0.10)	60487(37942 to 88806)	1260.56(768.04 to 1889.70)	50655(31373 to 75718)	1200.22(732.46 to 1818.78)
Cuba	11313.07(8189.49 to 15155.24)	−0.25(−0.27 to −0.24)	58468(35583 to 88969)	1290.73(789.82 to 1932.86)	67973(43072 to 99187)	1295.08(798.52 to 1941.02)
Cyprus	7272.94(5178.89 to 9881.19)	−0.03(−0.06 to 0.00)	6424(3930 to 9728)	846.33(515.29 to 1282.23)	12940(8007 to 19537)	836.97(516.72 to 1262.93)
Czechia	11970.93(8621.60 to 16016.03)	−0.09(−0.09 to −0.09)	132798(82943 to 197001)	1372.67(843.03 to 2057.05)	139007(86505 to 207605)	1357.26(833.03 to 2031.55)
Democratic People's Republic of Korea	7179.14(5087.02 to 9767.00)	−0.20(−0.21 to −0.19)	125128(75802 to 189545)	850.59(518.66 to 1287.59)	184716(111908 to 281672)	816.16(499.74 to 1229.34)
Democratic Republic of the Congo	11151.87(8023.38 to 15022.20)	−0.13(−0.15 to −0.11)	165533(101112 to 250291)	1264.91(786.33 to 1900.56)	417377(254784 to 631346)	1269.44(779.60 to 1913.09)

Table 2 (continued)

Location	Prevalence		DALYs			
	ASPR(2021)	AAPC 1990–2021	DALYs cases (1990)	ASDR (1990)	DALYs cases(2021)	ASDR(2021) AAPC 1990–2021
Denmark	14664.53(110696.66 to 19441.47)	−0.49(−0.56 to −0.43)	63528(41742 to 91094)	1713.00(1052.43 to 2559.33)	62348(37366 to 95862)	1672.83(1037.48 to 2503.66) −0.49(−0.55 to −0.42)
Djibouti	8731.45(6217.13 to 11872.22)	−0.18(−0.20 to −0.16)	1708(1033 to 2580)	1010.44(618.01 to 1528.94)	6393(3875 to 9672)	984.82(603.54 to 1485.68) −0.18(−0.21 to −0.15)
Dominica	9171.11(6535.49 to 12486.48)	−0.12(−0.13 to −0.11)	323(197 to 489)	1025.14(627.53 to 1556.26)	394(241 to 593)	1044.68(640.24 to 1583.78) −0.13(−0.15 to −0.12)
Dominican Republic	11924.19(8677.90 to 15900.33)	0.09(0.09 to 0.10)	29819(18158 to 44854)	1380.39(848.71 to 2072.25)	59198(36076 to 90078)	1356.43(839.56 to 2028.04) 0.08(0.06 to 0.09)
Ecuador	8638.41(6092.70 to 11854.97)	−0.26(−0.29 to −0.23)	39388(24192 to 59260)	1093.77(709.05 to 1569.20)	81358(50941 to 120364)	986.91(599.82 to 1499.10) −0.27(−0.29 to −0.24)
Egypt	7018.23(4960.02 to 9553.36)	0.09(0.08 to 0.10)	32429(19885.5 to 48805.7)	819.38(492.62 to 1238.92)	71286(43454 to 1072876)	797.24(485.49 to 1210.30) 0.09(0.06 to 0.11)
El Salvador	10698.70(7728.76 to 14403.18)	0.08(0.07 to 0.09)	27315(16614 to 41004)	1307.40(816.07 to 1943.00)	42588(25934 to 64805)	1211.82(746.60 to 1822.02) 0.08(0.07 to 0.09)
Equatorial Guinea	9408.06(6729.07 to 12734.99)	−0.19(−0.22 to −0.17)	1855(1138 to 2795)	1033.09(647.84 to 1535.75)	6734(4083 to 10174)	1064.85(648.35 to 1607.02) −0.17(−0.21 to −0.13)
Eritrea	9936.21(7112.36 to 13425.28)	0.03(0.02 to 0.04)	12306(7455 to 18629)	1113.20(683.69 to 1677.25)	28727(17406 to 43487)	1104.58(675.07 to 1673.19) 0.04(0.03 to 0.05)
Estonia	9203.53(6557.07 to 12435.98)	−0.03(−0.05 to −0.02)	15372(9523 to 22800)	1082.09(657.04 to 1625.28)	12964(8018 to 19493)	1048.02(640.05 to 1575.47) −0.02(−0.04 to −0.01)
Eswatini	7769.94(5541.52 to 10539.70)	−0.02(−0.03 to 0.00)	2346(1436 to 3526)	895.15(546.27 to 1350.02)	4252(2588 to 6452)	866.64(528.58 to 1309.27) −0.09(−0.11 to −0.08)
Ethiopia	7523.67(5343.57 to 10288.61)	−0.27(−0.29 to −0.25)	214495(130968 to 321574)	91202(551.16 to 1387.59)	476337(290131 to 715121)	857.25(521.91 to 1298.78) −0.25(−0.26 to −0.23)
Fiji	7676.80(4649.11 to 8988.71)	−0.14(−0.15 to −0.13)	3420(2074 to 5173)	806.23(498.18 to 1210.05)	4913(2966 to 7443)	750.69(457.16 to 1133.06) −0.16(−0.18 to −0.14)
Finland	7088.97(5043.10 to 9588.84)	−0.16(−0.20 to −0.11)	41632(26116 to 61661)	864.63(531.63 to 1296.01)	42132(26184 to 63219)	788.89(483.50 to 1179.64) −0.17(−0.20 to −0.14)
France	8272.78(5887.79 to 11203.17)	0.01(−0.01 to 0.04)	49498(307766 to 743010)	949.18(579.81 to 1424.81)	574903(354383 to 865093)	941.05(571.93 to 1417.96) 0.01(−0.01 to 0.03)
Gabon	11119.24(8023.99 to 14969.79)	0(−0.01 to 0.00)	4280(2582 to 6417)	1303.35(798.06 to 1961.26)	9252(5657 to 13996)	1269.86(777.70 to 1911.92) −0.01(−0.02 to 0)
Gambia	6435.05(4537.31 to 8740.86)	−0.10(−0.11 to −0.08)	3514(2134 to 5300)	743.72(457.17 to 1124.17)	9240(5568 to 13974)	736.31(444.91 to 1120.31) −0.11(−0.12 to −0.10)
Georgia	6160.51(4344.15 to 8423.68)	−0.02(−0.03 to 0.00)	42571(26014 to 63294)	739.74(447.98 to 1126.54)	29046(18048 to 43609)	704.97(426.58 to 1068.14) −0.03(−0.05 to −0.01)
Germany	15519.16(11243.50 to 20649.50)	−0.16(−0.20 to −0.12)	917518(573102 to 1373124)	1750.30(1075.61 to 2634.68)	931201(582779 to 1396647)	1776.37(1103.46 to 2658.55) −0.16(−0.21 to −0.12)
Ghana	7594.15(5406.22 to 10325.29)	−0.14(−0.16 to −0.13)	56286(34748 to 83800)	903.45(548.86 to 1362.47)	144071(89047 to 214571)	868.35(528.95 to 1316.81) −0.13(−0.14 to −0.12)
Greece	9791.48(7020.79 to 13217.02)	−0.03(−0.05 to −0.01)	89397(55301 to 133317)	1159.31(715.06 to 1748.21)	88908(54763 to 133269)	1121.51(683.57 to 1680.73) −0.04(−0.07 to −0.01)
Greenland	12987.43(9396.21 to 17305.75)	−0.16(−0.17 to −0.14)	479(292 to 724)	1623.46(1003.36 to 2424.63)	509(311 to 770)	1498.83(923.61 to 2246.91) −0.16(−0.17 to −0.14)
Grenada	8414.14(5978.04 to 11468.30)	−0.05(−0.06 to −0.05)	350(210 to 531)	998.27(614.52 to 1502.15)	598(365 to 905)	948.47(579.33 to 1433.75) −0.06(−0.07 to −0.05)
Guam	15119.88(11001.51 to 19961.88)	−0.03(−0.03 to −0.02)	683(414 to 1037)	1775.36(1105.09 to 2638.13)	935(578 to 1411)	1727.09(1072.07 to 2568.74) −0.04(−0.05 to −0.03)
Guatemala	9232.11(6624.52 to 12501.31)	−0.17(−0.19 to −0.16)	45560(28294 to 67502)	1150.76(709.64 to 1729.04)	108797(66196 to 163450)	1054.84(647.09 to 1585.35) −0.18(−0.19 to −0.16)
Guinea	7407.80(5245.43 to 10097.31)	−0.03(−0.05 to −0.01)	25190(15346 to 37847)	876.08(529.58 to 1330.05)	54793(33073 to 82489)	847.76(514.81 to 1285.20) −0.03(−0.05 to −0.01)
Guinea-Bissau	15266.95(11053.82 to 20373.54)	−0.08(−0.09 to −0.07)	3703(2241 to 5615)	1743.50(1079.93 to 2600.50)	8171(4927 to 12368)	1747.25(1077.99 to 2621.62) −0.07(−0.10 to −0.04)
Guyana	10438.23(7479.05 to 14049.38)	−0.03(−0.04 to −0.02)	3237(1963 to 4896)	1205.29(737.55 to 1821.07)	3939(2414 to 5974)	1193.07(731.97 to 1789.20) −0.05(−0.06 to −0.04)
Haiti	6903.78(4931.85 to 9317.20)	−0.02(−0.03 to −0.01)	25261(15302 to 38104)	825.95(505.02 to 1239.58)	60025(36766 to 91055)	790.27(481.27 to 1189.51) −0.03(−0.04 to −0.01)
Honduras	6322.51(4680.07 to 8410.39)	0.06(0.05 to 0.07)	22096(13273 to 33476)	783.86(482.62 to 1181.47)	62971(38439 to 95148)	72072(451.57 to 1065.92) 0.04(0.03 to 0.05)
Hungary	12158.75(8801.03 to 16269.57)	−0.06(−0.07 to −0.05)	14293(89252 to 212435)	1391.16(858.04 to 2086.13)	135598(84905 to 201583)	1383.17(851.00 to 2077.65) −0.05(−0.06 to −0.04)
Iceland	9054.04(6447.73 to 12245.95)	−0.21(−0.22 to −0.19)	2219(1364 to 3345)	1053.27(643.67 to 1599.03)	3170(1949 to 4786)	1031.78(629.30 to 1561.30) −0.21(−0.24 to −0.19)
India	9622.32(6916.20 to 13033.66)	−0.47(−0.50 to −0.43)	4392500(2695202 to 6570556)	1090.91(666.69 to 1648.37)	7702009(4714781 to 11568428)	1083.03(665.14 to 1631.85) −0.46(−0.49 to −0.43)
Indonesia	9749.84(7090.64 to 13039.30)	−0.10(−0.11 to −0.09)	826439(502404 to 1246294)	1167.84(733.65 to 1727.37)	1621657(986468 to 2443824)	1112.85(691.18 to 1665.24) −0.09(−0.10 to −0.08)

Table 2 (continued)

Location	Prevalence		DALYs			
	ASPR(2021)	AAPC 1990–2021	DALYs cases (1990)	ASDR (1990)	DALYs cases(2021)	ASDR(2021)
Iran (Islamic Republic of)	10619.92(7619.29 to 14334.19)	−0.32(−0.36 to −0.28)	365084(225474 to 544676)	1263.99(773.39 to 1910.80)	741534(458230 to 1114327)	1205.88(737.75 to 1822.75)
Iraq	6076.56(4330.16 to 8238.33)	−0.06(−0.07 to −0.04)	94028(57194 to 141597)	872.65(529.03 to 1318.05)	268131(163753 to 403221)	702.07(427.71 to 1061.07)
Ireland	9454.34(6721.56 to 12817.79)	−0.01(−0.02 to 0)	288800(17845 to 43693)	1044.40(640.82 to 1577.07)	45749(28151 to 68269)	1071.15(653.10 to 1627.25)
Israel	8269.57(5877.33 to 11231.95)	−0.19(−0.21 to −0.16)	39455(24524 to 58610)	93.585(57.54 to 1404.34)	76849(47103 to 116049)	933.27(567.38 to 1407.42)
Italy	10167.96(7295.39 to 13719.58)	−0.02(−0.03 to −0.01)	534362(329537 to 800220)	1171.86(725.87 to 1754.46)	576460(355222 to 862016)	1158.27(714.69 to 1739.40)
Jamaica	7192.33(5095.94 to 9789.39)	0(−0.01 to 0.01)	10325(6231 to 15702)	812.45(494.08 to 1227.15)	16474(9976 to 24856)	807.28(495.76 to 1225.99)
Japan	13738.61(9939.19 to 18404.04)	−0.30(−0.36 to −0.23)	1503289(930475 to 2245566)	1596.28(992.53 to 2358.64)	1270641(785195 to 1906588)	1572.26(974.94 to 2349.86)
Jordan	11154.75(7988.35 to 15050.23)	−0.05(−0.05 to −0.04)	19819(11995 to 30109)	1300.33(812.03 to 1949.77)	86847(53353 to 131228)	1257.22(774.74 to 1884.13)
Kazakhstan	7272.06(5146.45 to 9876.91)	0.07(0.06 to 0.09)	117633(72183 to 175420)	843.69(512.81 to 1276.81)	156013(95789 to 234226)	833.69(508.85 to 1265.23)
Kenya	7759.31(5517.97 to 10549.58)	−0.08(−0.10 to −0.06)	95858(58797 to 143847)	836.82(503.68 to 1270.06)	260569(159471 to 390897)	886.85(541.44 to 1338.52)
Kiribati	9159.46(6532.10 to 12436.37)	0.09(0.07 to 0.10)	311(188 to 471)	1067.33(653.07 to 1621.24)	608(369 to 920)	1039.67(632.37 to 1565.88)
Kuwait	7350.25(5195.33 to 9976.44)	0.18(0.16 to 0.20)	11108(6776 to 16770)	859.13(522.74 to 1311.30)	41653(25319 to 62517)	837.56(510.74 to 1259.31)
Kyrgyzstan	12009.23(8605.11 to 16088.24)	−0.09(−0.10 to −0.09)	285660(17504 to 42937)	1268.31(790.73 to 1899.84)	49362(30459 to 74622)	1364.97(838.53 to 2054.73)
Lao People's Democratic Republic	14574.87(10493.04 to 19499.22)	−0.15(−0.16 to −0.13)	15223(9275 to 22829)	1598.03(996.26 to 2368.45)	33888(20516 to 51333)	1660.70(1030.76 to 2478.62)
Latvia	10453.79(7477.45 to 14122.23)	−0.06(−0.07 to −0.04)	26020(16121 to 39068)	1243.89(775.19 to 1842.90)	18599(11405 to 28092)	1179.04(718.71 to 1771.47)
Lebanon	7097.85(5042.38 to 9628.41)	0(−0.02 to 0.02)	18740(11447 to 28318)	811.61(488.23 to 1225.67)	40464(24800 to 60918)	807.07(489.60 to 1217.04)
Lesotho	6729.33(4730.33 to 9181.84)	−0.18(−0.19 to −0.17)	5813(3554 to 8756)	777.68(472.63 to 1160.30)	7749(4693 to 11703)	778.84(466.49 to 1177.44)
Liberia	13963.63(10125.28 to 18557.79)	−0.12(−0.13 to −0.11)	9297(5645 to 14036)	1637.07(1012.62 to 2435.89)	23231(14111 to 35165)	1580.62(984.28 to 2364.11)
Libya	13030.76(9452.40 to 17335.89)	0.01(0 to 0.02)	22358(13633 to 33767)	1559.86(973.23 to 2336.77)	55319(33885 to 83724)	1485.12(925.16 to 2231.25)
Lithuania	8279.58(5894.06 to 11278.42)	−0.08(−0.09 to −0.07)	35824(22200 to 53877)	869.88(536.87 to 1297.20)	28211(17495 to 42298)	933.68(572.61 to 1420.19)
Luxembourg	9354.74(8652.62 to 9971.57)	−0.10(−0.13 to −0.07)	3636(2229 to 5465)	943.48(636.21 to 1311.38)	6234(3822 to 9381)	1081.27(762.08 to 1458.57)
Madagascar	5917.46(4201.68 to 8163.62)	−0.25(−0.26 to −0.24)	52640(31811 to 79763)	637.00(391.03 to 960.17)	131900(79436 to 200381)	680.39(409.61 to 1036.52)
Malawi	7193.37(5098.53 to 9804.16)	−0.05(−0.07 to −0.04)	39803(24635 to 59500)	824.67(495.64 to 1258.39)	83989(50838 to 128397)	816.69(496.64 to 1237.93)
Malaysia	9695.88(6945.26 to 13106.17)	−0.12(−0.14 to −0.10)	70032(44162 to 102611)	1167.52(712.56 to 1756.31)	155340(93175 to 237036)	1109.63(684.25 to 1674.31)
Maldives	8137.99(5770.13 to 11018.37)	−0.28(−0.29 to −0.26)	677(407 to 1033)	918.52(562.65 to 1393.72)	2553(1531 to 3852)	929.36(571.29 to 1407.68)
Mali	9027.81(6426.61 to 12214.33)	0.12(0.12 to 0.13)	29567(18118 to 44198)	1024.59(625.43 to 1542.99)	80491(48486 to 122026)	1008.28(623.06 to 1516.47)
Malta	6838.66(4849.84 to 9304.33)	−0.02(−0.03 to −0.01)	3413(2103 to 5156)	759.48(460.01 to 1154.62)	4202(2625 to 6285)	781.37(469.23 to 1183.45)
Marshall Islands	11162.83(8025.53 to 15011.32)	−0.07(−0.08 to −0.07)	149(90 to 224)	1287.52(787.92 to 1949.42)	276(168 to 416)	1277.49(789.04 to 1930.65)
Mauritania	8043.23(5688.04 to 10953.93)	0.01(0 to 0.02)	7348(4565 to 11052)	953.88(580.84 to 1435.25)	16950(10281 to 25512)	914.59(554.58 to 1393.89)
Mauritius	11943.19(8600.45 to 15969.06)	−0.23(−0.24 to −0.22)	5221(3222 to 7836)	1371.54(848.90 to 2036.67)	7471(4560 to 11270)	1360.92(840.22 to 2043.90)
Mexico	13011.22(10657.66 to 15724.03)	0.14(0.11 to 0.16)	41872(254469 to 630394)	1635.44(1030.35 to 2404.40)	877947(537081 to 1320290)	1463.50(982.78 to 2036.04)
Micronesia (Federated States of)	7493.34(5305.01 to 10159.56)	−0.01(−0.02 to 0.01)	391(237 to 595)	847.01(524.02 to 1272.14)	560(339 to 843)	844.35(515.34 to 1278.53)
Monaco	10062.07(7211.76 to 13553.47)	−0.11(−0.12 to −0.10)	282(173 to 429)	1114.51(684.90 to 1676.53)	337(206 to 508)	1143.63(697.68 to 1722.05)

Table 2 (continued)

Location	Prevalence		DALYs			
	ASPR(2021)	AAPC 1990–2021	DALYs cases (1990)	ASDR (1990)	DALYs cases(2021)	ASDR(2021)
Mongolia	7105.72(5043.36 to 9673.43)	−0.09(−0.10 to −0.07)	11786(7215 to 17648)	813.03(491.21 to 1238.95)	25024(15456 to 37545)	807.78(488.11 to 1220.05)
Montenegro	7345.01(5216.34 to 10001.21)	0.05(0.04 to 0.05)	7135(4408 to 10642)	814.89(498.03 to 1226.18)	7865(4882 to 11746)	835.21(509.57 to 1270.09)
Morocco	8959.58(6404.28 to 12156.55)	−0.09(−0.11 to −0.06)	171823(106860 to 257119)	1129.10(689.05 to 1698.83)	312228(192418 to 467889)	1036.35(633.78 to 1570.66)
Mozambique	8517.33(6053.02 to 11547.70)	−0.04(−0.04 to −0.03)	60253(36639 to 90827)	976.21(608.76 to 1457.12)	132195(81290 to 198706)	967.28(588.76 to 1477.36)
Myanmar	7127.62(5096.24 to 9626.06)	0.01(0 to 0.03)	137878(83918 to 208551)	843.65(514.60 to 1271.06)	242494(147575 to 365791)	819.88(498.44 to 1235.68)
Namibia	6073.83(4273.04 to 8259.15)	0.02(0.01 to 0.04)	5200(3205 to 7823)	738.95(443.90 to 1124.30)	11175(6792 to 16951)	697.20(421.70 to 1054.43)
Nauru	10812.02(7787.79 to 14485.14)	0.06(0.05 to 0.07)	43(26 to 65)	1353.93(836.10 to 2029.67)	51(31 to 78)	1234.73(759.16 to 1861.23)
Nepal	9483.44(6744.05 to 12825.41)	−0.34(−0.37 to −0.31)	142240(89176 to 212641)	1061.05(640.39 to 1609.25)	257106(158272 to 386061)	1075.66(658.02 to 1622.37)
Netherlands	9912.89(7112.41 to 13332.54)	−0.16(−0.18 to −0.14)	122096(74529 to 183697)	1129.83(688.45 to 1707.62)	137612(84940 to 208205)	1123.25(686.43 to 1685.17)
New Zealand	7056.35(4991.57 to 9635.58)	−0.21(−0.24 to −0.18)	39454(24639 to 58779)	878.69(534.12 to 1328.46)	60170(37401 to 90047)	807.80(492.00 to 1228.38)
Nicaragua	7307.13(5180.78 to 9959.99)	−0.04(−0.04 to −0.03)	18467(11230 to 27664)	796.10(488.73 to 1190.63)	44200(26868 to 66536)	829.28(502.44 to 1256.97)
Niger	7287.46(5162.15 to 9943.43)	0.09(0.08 to 0.09)	28530(17298 to 42995)	815.42(490.63 to 1232.75)	87279(52846 to 132803)	822.24(502.69 to 1237.68)
Nigeria	10787.03(7773.15 to 14496.93)	−0.01(−0.02 to 0.01)	374133(229056 to 561346)	1356.55(839.97 to 2023.12)	947466(576925 to 1421940)	1218.32(752.80 to 1832.46)
Niue	7048.23(4998.34 to 9652.07)	−0.04(−0.05 to −0.03)	11(7 to 16)	81388(493.35 to 1236.83)	106 to 15)	799.55(486.94 to 1214.57)
North Macedonia	10069.80(7205.51 to 13587.10)	−0.02(−0.03 to −0.01)	21013(12929 to 31685)	1150.11(702.07 to 1739.16)	27005(16649 to 40313)	1135.85(692.65 to 1706.61)
Northern Mariana Islands	9671.50(6932.78 to 13053.22)	−0.02(−0.05 to 0.01)	241(146 to 369)	1116.17(680.85 to 1661.62)	316(192 to 480)	1103.25(682.60 to 1655.53)
Norway	7695.00(5472.27 to 10433.39)	−0.21(−0.25 to −0.16)	35364(21743 to 53141)	848.88(513.33 to 1283.48)	45991(28288 to 68933)	873.93(531.71 to 1321.25)
Oman	10525.44(7547.11 to 14154.58)	−0.06(−0.08 to −0.05)	10569(6426 to 16040)	1183.97(725.34 to 1780.39)	33961(20612 to 51293)	1206.74(737.97 to 1805.41)
Pakistan	10027.54(7173.37 to 13538.64)	0.35(0.31 to 0.38)	461564(274380 to 711189)	1112.66(691.51 to 1660.52)	1310155(779797 to 2021569)	1132.86(692.65 to 1696.82)
Palau	7407.91(5274.42 to 10044.87)	−0.09(−0.10 to −0.08)	74(45 to 112)	849.63(514.13 to 1292.60)	12676 to 191)	845.25(511.49 to 1275.16)
Palestine	8161.97(5614.90 to 11405.41)	−0.11(−0.13 to −0.10)	10117(6198 to 15301)	716.56(453.44 to 1048.78)	31338(19013 to 47691)	934.48(553.96 to 1445.60)
Panama	13879.20(10018.89 to 18561.75)	0.02(0.01 to 0.03)	13618(8235 to 20690)	1728.80(1080.27 to 2566.47)	28610(17440 to 43175)	1576.48(978.57 to 2358.27)
Papua New Guinea	8009.93(5695.24 to 10837.90)	−0.01(−0.03 to 0)	16360(9931 to 24713)	908.99(561.79 to 1351.52)	46900(28251 to 70367)	913.46(559.21 to 1378.60)
Paraguay	11716.49(8459.70 to 15719.71)	0.11(0.09 to 0.13)	20599(12910 to 30628)	1354.32(838.54 to 2036.04)	48044(29222 to 72479)	1334.03(815.94 to 2012.47)
Peru	7176.98(5078.08 to 9809.86)	0.09(0.08 to 0.10)	83819(50606 to 127487)	826.92(503.23 to 1244.22)	183898(110329 to 278599)	817.41(498.88 to 1237.74)
Philippines	8884.49(6323.11 to 12045.54)	−0.15(−0.16 to −0.14)	253744(154694 to 381117)	966.05(589.40 to 1454.63)	549194(334080 to 826985)	1006.71(615.64 to 1513.70)
Poland	7664.08(5439.18 to 10443.20)	−0.10(−0.12 to −0.09)	455909(283734 to 676130)	861.10(523.69 to 1300.31)	494317(307600 to 734428)	870.63(529.38 to 1322.82)
Portugal	7546.36(5379.21 to 10194.57)	−0.07(−0.09 to −0.05)	95851(59005 to 143811)	979.65(603.11 to 1463.83)	106330(66092 to 159068)	848.26(519.97 to 1273.22)
Puerto Rico	12335.94(8902.04 to 16589.71)	−0.01(−0.01 to −0.01)	18262(11131 to 27731)	1538.64(968.35 to 2296.67)	19158(11589 to 28853)	1389.96(857.22 to 2085.06)
Qatar	6658.50(4719.21 to 9055.93)	0.07(0.04 to 0.10)	3041(1852 to 4599)	796.90(487.16 to 1194.14)	25511(15525 to 38765)	766.25(465.55 to 1159.86)
Republic of Korea	11816.64(8443.18 to 15918.58)	−0.22(−0.30 to −0.15)	39152(239250 to 589288)	1551.84(1026.89 to 2201.27)	527694(322568 to 789164)	1347.20(827.10 to 2033.13)
Republic of Moldova	7593.19(5392.26 to 10312.99)	−0.07(−0.08 to −0.06)	40335(24942 to 60471)	868.85(528.84 to 1322.00)	39312(24302 to 59080)	865.45(523.89 to 1303.28)
Romania	15789.62(11481.79 to 21013.24)	−0.20(−0.22 to −0.18)	29931(6186767 to 445673)	1852.94(1156.07 to 2750.96)	243746(150705 to 364082)	1802.63(1117.71 to 2694.57)
Russian Federation	8611.30(6140.12 to 11654.05)	−0.12(−0.14 to −0.10)	1538984(954261 to 2290316)	9652.3(5877.73 to 1456.41)	1519972(944747 to 2261716)	975.59(598.95 to 1476.04)
Rwanda	6309.67(4438.64 to 8636.37)	−0.10(−0.14 to −0.07)	31802(19434 to 48034)	751.32(474.86 to 1101.25)	70014(42558 to 105729)	725.03(435.43 to 1105.76)

Table 2 (continued)

Location	Prevalence		DALYs			
	ASPR(2021)	AAPC 1990–2021	DALYs cases (1990)	ASDR (1990)	DALYs cases(2021)	AAPC 1990–2021
Saint Kitts and Nevis	7044.51(4983.45 to 9591.32)	−0.09(−0.10 to −0.08)	171(103 to 259)	823.36(500.58 to 1239.48)	373(228 to 567)	798.61(487.45 to 1203.53)
Saint Lucia	8070.78(5706.45 to 10925.44)	−0.15(−0.16 to −0.14)	587(356 to 896)	932.65(580.25 to 1389.72)	1132(695 to 1721)	921.62(562.24 to 1400.87)
Saint Vincent and the Grenadines	7181.76(5071.08 to 9770.13)	−0.05(−0.05 to −0.04)	438(264 to 666)	858.91(521.75 to 1297.74)	647(395 to 981)	817.90(493.56 to 1239.18)
Samoa	11162.69(8038.27 to 14951.00)	−0.19(−0.21 to −0.16)	699(421 to 1066)	1330.51(826.03 to 1979.54)	986(600 to 1495)	1268.70(783.06 to 1894.86)
San Marino	8492.10(6057.63 to 11526.98)	−0.11(−0.14 to −0.08)	215(132 to 325)	1023.25(624.09 to 1546.76)	304(188 to 457)	964.84(584.76 to 1460.34)
Sao Tome and Principe	10524.25(7535.22 to 14230.13)	−0.10(−0.11 to −0.09)	412(247 to 622)	1212.11(748.16 to 1805.33)	921(553 to 1400)	1199.96(735.76 to 1804.19)
Saudi Arabia	11934.97(8588.99 to 16087.52)	0.09(0.09 to 0.10)	83917(51327 to 126689)	1389.01(859.27 to 2084.52)	310780(189396 to 472250)	1361.73(838.47 to 2046.83)
Senegal	11317.16(8150.31 to 15273.95)	−0.12(−0.14 to −0.10)	26168(16146 to 39256)	1380.29(849.37 to 2078.98)	62528(37758 to 94562)	1295.96(795.93 to 1954.30)
Serbia	7302.71(5165.09 to 9940.24)	0.01(0.01 to 0.01)	121317(75184 to 180871)	828.49(517.09 to 1245.34)	114799(70953 to 172178)	834.05(507.59 to 1254.89)
Seychelles	8298.01(5910.04 to 11286.20)	−0.17(−0.18 to −0.16)	290(173 to 442)	991.66(605.45 to 1503.96)	554(335 to 836)	942.87(572.84 to 1426.33)
Sierra Leone	10456.54(7473.52 to 14127.78)	−0.20(−0.21 to −0.19)	17383(10465 to 26385)	1231.85(757.13 to 1852.02)	37033(22499 to 55786)	1196.91(739.24 to 1808.93)
Singapore	10785.82(7721.10 to 14562.07)	−0.27(−0.40 to −0.15)	24112(14695 to 36275)	1277.91(782.87 to 1940.87)	48024(29426 to 72719)	1230.83(750.14 to 1858.08)
Slovakia	14201.38(10264.79 to 18873.00)	−0.13(−0.15 to −0.12)	61848(38841 to 91293)	1678.12(1050.03 to 2466.29)	70547(43612 to 105388)	1626.51(1003.68 to 2434.57)
Slovenia	14744.14(10705.38 to 19477.20)	−0.06(−0.07 to −0.05)	22545(14040 to 33273)	1770.09(1100.98 to 2636.75)	24404(15174 to 36385)	1672.74(1038.69 to 2502.92)
Solomon Islands	7541.38(5348.68 to 10224.50)	0.20(0.18 to 0.21)	1222(733 to 1858)	912.46(554.47 to 1373.01)	3203(1948 to 4839)	862.48(524.26 to 1303.69)
Somalia	7235.00(5165.06 to 9864.55)	0.03(0.02 to 0.05)	31318(18920 to 47371)	831.14(503.91 to 1256.90)	83807(51222 to 127270)	818.32(500.27 to 1234.45)
South Africa	8327.29(5949.07 to 11288.78)	−0.25(−0.27 to −0.22)	158507(97135 to 237978)	941.36(573.86 to 1414.53)	289791(177377 to 433550)	939.05(571.97 to 1427.73)
South Sudan	8462.07(5991.45 to 11528.12)	−0.01(−0.02 to 0.00)	23333(14123 to 35070)	983.24(597.15 to 1488.46)	41350(25116 to 62816)	961.22(591.19 to 1449.28)
Spain	7342.35(5217.66 to 9997.00)	−0.31(−0.34 to −0.27)	289640(187931 to 415382)	832.30(503.56 to 1257.14)	339557(207241 to 516901)	835.28(506.72 to 1276.34)
Sri Lanka	7569.86(5369.74 to 10263.62)	−0.03(−0.03 to −0.02)	73078(44731 to 110416)	846.10(515.39 to 127936)	114630(69395 to 174218)	856.69(52065 to 1294.80)
Sudan	13761.43(9955.43 to 18372.84)	−0.01(−0.02 to −0.01)	105829(64197 to 160099)	1585.24(975.45 to 2391.14)	260796(158987 to 391168)	1571.32(965.73 to 2347.74)
Suriname	8195.96(5836.33 to 11183.75)	0.06(0.05 to 0.06)	1773(1063 to 2686)	905.18(551.36 to 1361.97)	3293(2015 to 4958)	934.72(570.30 to 1422.46)
Sweden	11966.64(8610.21 to 16093.56)	0.86(0.80 to 0.93)	41443(26330 to 60660)	1394.85(863.64 to 2098.44)	66053(39221 to 102227)	1359.75(840.90 to 2035.42)
Switzerland	7314.16(5189.94 to 9969.03)	−0.46(−0.50 to −0.42)	75678(50155 to 107279)	847.37(514.85 to 1290.62)	89018(54826 to 134139)	839.46(508.02 to 1277.10)
Syrian Arab Republic	11395.20(8174.79 to 15344.77)	0(−0.03 to 0.02)	65761(40107 to 99539)	1376.41(856.81 to 2046.32)	106952(65523 to 160392)	1305.45(799.37 to 1971.93)
Taiwan (Province of China)	6743.74(5120.55 to 8785.87)	0.45(0.43 to 0.47)	12142(81821 to 169022)	835.85(508.60 to 1270.69)	211457(149397 to 284655)	770.18(486.37 to 1124.72)
Tajikistan	8096.90(5786.13 to 10936.03)	−0.10(−0.11 to −0.09)	28124(17300 to 42401)	916.75(563.28 to 1373.91)	65182(39677 to 97732)	919.03(562.10 to 1377.14)
Thailand	8683.10(6177.26 to 11765.42)	0.19(0.17 to 0.21)	216020(132217 to 325846)	1010.85(620.83 to 1518.91)	375372(226437 to 572079)	984.60(601.85 to 1481.75)
Timor-Leste	5704.79(4011.05 to 7825.33)	−0.17(−0.18 to −0.15)	2744(1650 to 4178)	711.03(428.74 to 1082.82)	4894(2949 to 7439)	656.95(396.11 to 993.04)
Togo	6939.74(4915.86 to 9510.01)	−0.21(−0.22 to −0.19)	13793(8335 to 20918)	819.61(493.75 to 1237.85)	37950(23025 to 57291)	794.04(479.33 to 1206.87)
Tokelau	9628.76(6895.58 to 13026.00)	−0.06(−0.09 to −0.04)	7(4 to 11)	1106.65(676.19 to 1664.50)	7(4 to 11)	1080.80(662.21 to 1624.70)
Tonga	7779.46(519.55 to 10591.92)	−0.12(−0.13 to −0.10)	416(252 to 628)	800.04(493.43 to 1197.62)	497(302 to 754)	877.84(535.39 to 1328.28)
Trinidad and Tobago	10272.90(7348.20 to 13866.80)	−0.03(−0.03 to −0.03)	5569(3364 to 8419)	1190.11(766.06 to 1727.88)	8354(5125 to 12580)	1169.50(717.01 to 1775.03)

Table 2 (continued)

Location	Prevalence		DALYs			
	ASPR(2021)	AAPC 1990–2021	DALYs cases (1990)	ASDR (1990)	DALYs cases(2021)	ASDR(2021)
Tunisia	9215.20(6326.90 to 1281.085)	0.09(0.08 to 0.10)	49681(30807 to 74235)	935.49(559.31 to 1440.61)	94048(57586 to 140744)	1040.01(621.89 to 1604.27)
Turkey	11776.96(8461.38 to 15815.73)	−0.04(−0.06 to −0.02)	384730(247081 to 558617)	1360.23(833.18 to 2040.24)	685489(420276 to 1040429)	1340.03(821.04 to 2016.82)
Turkmenistan	7341.99(5208.45 to 10024.20)	−0.10(−0.10 to −0.09)	21037(12867 to 31836)	907.91(553.52 to 1376.25)	382152(2382 to 57662)	838.14(512.79 to 1267.65)
Tuvalu	10777.02(7733.38 to 14532.74)	−0.10(−0.11 to −0.09)	46(28 to 70)	1201.39(738.74 to 1788.35)	63(38 to 96)	1227.90(752.99 to 1843.62)
Uganda	9447.18(6788.06 to 12819.14)	−0.11(−0.12 to −0.11)	68349(41787 to 103129)	1087.19(664.03 to 1629.70)	177001(107668 to 266818)	1072.58(653.40 to 1613.28)
Ukraine	7313.22(5180.39 to 9966.26)	−0.11(−0.12 to −0.10)	62737(388771 to 933073)	850.40(517.50 to 1289.30)	539788(337745 to 805888)	833.08(505.73 to 1254.67)
United Arab Emirates	7242.36(5128.82 to 9887.06)	0.17(0.16 to 0.18)	109296628 to 16562)	816.93(494.74 to 1240.83)	84942(51485 to 128424)	822.42(499.31 to 1252.21)
United Kingdom	8389.99(5991.87 to 11332.65)	−0.14(−0.20 to −0.09)	515216(320206 to 766431)	1028.32(631.11 to 1538.82)	608929(376886 to 908851)	952.96(583.06 to 1426.53)
United Republic of Tanzania	8894.23(6343.37 to 12121.74)	−0.11(−0.12 to −0.10)	105228(63485 to 159626)	1112.18(690.51 to 1653.82)	262598(160438 to 396364)	1008.95(614.30 to 1516.63)
United States of America	9110.26(6494.67 to 12409.60)	−0.01(−0.02 to 0.00)	557(335 to 850)	1036.77(628.30 to 1574.24)	513(313 to 775)	1039.10(633.55 to 1567.38)
United States Virgin Islands	11557.45(8423.17 to 15468.11)	−0.32(−0.34 to −0.31)	2758928(1737010 to 4054092)	1322.14(816.77 to 2001.05)	3402390(2289772 to 4729577)	1317.46(809.58 to 1967.67)
Uruguay	8512.95(6043.89 to 11497.75)	0.26(0.13 to 0.39)	25214(15735 to 37761)	922.46(562.86 to 1397.54)	31836(19588 to 47891)	969.30(588.25 to 1464.75)
Uzbekistan	7178.18(5089.70 to 9755.90)	−0.03(−0.04 to −0.02)	119890(72914 to 181603)	844.29(517.96 to 1280.14)	266823(163590 to 400151)	817.45(494.75 to 1244.22)
Vanuatu	16704.85(12202.96 to 22041.11)	0.05(0.04 to 0.05)	627(382 to 950)	1937.43(1208.16 to 2886.55)	1560(955 to 2363)	1910.13(1191.92 to 2844.71)
Venezuela (Bolivarian Republic of)	7234.97(5124.60 to 9874.52)	−0.13(−0.16 to −0.10)	99606(60137 to 150230)	850.16(528.04 to 1273.76)	176465(107302 to 268704)	822.09(499.75 to 1241.68)
Viet Nam	9754.94(6960.32 to 13182.04)	−0.01(−0.02 to 0.00)	254497(154137 to 379906)	1127.64(683.60 to 1707.33)	558705(334856 to 844039)	1106.48(680.93 to 1670.16)
Yemen	8703.00(6197.89 to 11770.69)	−0.12(−0.13 to −0.11)	64446(39112 to 97404)	1026.69(621.93 to 1553.09)	190765(116382 to 286467)	981.25(603.04 to 1477.94)
Zambia	7222.22(5131.12 to 9863.12)	0.31(0.29 to 0.32)	25439(15616 to 38167)	826.03(501.91 to 1243.91)	77792(47111 to 118000)	808.49(491.13 to 1220.78)
Zimbabwe	9100.30(6535.68 to 12237.35)	0.26(0.25 to 0.27)	35905(22020 to 53572)	1059.78(653.71 to 1587.16)	69064(42175 to 105038)	1032.27(634.70 to 1547.83)

Rates are reported per 100,000 person-years. Data in parentheses are 95% uncertainty intervals for cases and age-standardized rates of incident, prevalence and DALYs, and 95% confidence intervals for AAPCs

Abbreviations: WAP working-age population, DALYs disability-adjusted life-years, ASIR age-standardized incidence rate, ASPR age-standardized prevalence rate, ASDR age-standardized DALYs rate, AAPC average annual percent change, SDI socio-demographic index, UI uncertainty interval, CI confidence interval

in the US, frequently accompanied by the serious issue of prescription opioid misuse [26]. In 2018, opioid overdoses claimed approximately 47,000 lives in the United States alone [27]. Improving low back pain through non-pharmacological treatments may help mitigate some of the impacts of opioid abuse.

Due to the specificity of the population we analyzed, the WAP population is closely linked to various types of work. High workloads are likely to contribute to low back pain, which may further affect work efficiency, increase work burdens, and create a vicious cycle. Occupations involving heavy physical labour were linked to low back pain [28]. Warehouse workers frequently reported experiencing low back pain [29]. Incorrect work posture and job content could also cause lower back pain. Tailors who worked in static forward-bent postures for long hours faced an increased risk of low back pain, a condition that similarly remained prevalent among drivers [30–32]. Furthermore, healthcare workers were notably susceptible to high rates of low back pain because of their jobs [33].

The results of the gender analysis are consistent with those of existing studies, showing a notably higher prevalence of low back pain among female hospital staff, particularly nurses, compared to their male counterparts [34]. Women may have taken on more important roles in the nursing and education industries, as well as in office work. Apart from the gap in occupational factors compared to men, females exhibited increased susceptibility to chronic low back pain [35] due to ergonomic factors [15], pregnancy [36], physiological structure [37], and family responsibilities [38]. Additionally, gender bias in medical practice by healthcare professionals could lead to misdiagnosis and undertreatment [39]. Occupational factors seemed to exert a stronger influence on low back pain in females [40]. For women, low back pain was associated with occupational activity involving frequent heavy lifting, standing position leaning forward, sitting position leaning forward, and sitting at the computer three or more days a week. Similarly, another study on low back pain in New Zealand found that women experienced higher rates of working in awkward or tiring positions, dissatisfaction with contact and cooperation with management, and perceiving their job as very or extremely stressful [41]. A study conducted in the Paris region indicated that although women appeared to have less exposure to known risk factors, these risk factors were predominant among female workers, leading to a higher incidence and severity of low back pain in women [42].

The analysis of SDI revealed that in high SDI regions such as Australia, Canada, and France, these indicators were the highest, potentially due to work practices, job types, and industrial distribution. In middle SDI regions

such as China, Albania, and Brazil, the indicators were the lowest, possibly related to shifts in industrial structure and developments in healthcare systems. At the regional level, East Asia had the largest average decline in age standardization indicators. This may have been attributed to the changes in industrial structure and the improvement of medical service capabilities in East Asia in recent years. Central Latin America and Tropical Latin America exhibited increasing trends, which may have been attributed to inadequate local healthcare conditions [43, 44], work practices, and job types [45]. At the national level, Sweden exhibited the highest of these indicators, whereas China had the lowest. However, due to their large population bases, China and India had high numbers of individuals in the WAP affected by low back pain. Recent studies in India have also confirmed this [46]. Different races may have differences in their perception of lower back pain due to cultural differences [47]. Existing studies have shown that after adjusting for potential confounding factors, the cultural dimensions of power distance and collectivism are negatively correlated with the prevalence of chronic low back pain [48]. When analyzing regional differences, cultural and lifestyle variations may have contributed significantly. For example, in regions characterized by heavy lifting or manual labor, particularly among females, the incidence, prevalence, and DALYs of low back pain may have been elevated. In contrast, in high and high-middle-income countries, higher incidence, prevalence, and DALYs may have been due to the increased use of computers and smartphones, as well as more comprehensive healthcare services. Additionally, due to COVID-19, sedentary behaviour, decreased activity, and extended periods of working from home may have exacerbated low back pain [49]. During the COVID-19 pandemic, working from home and remote work increased the incidence of low back pain among workers [50, 51]. Additionally, studies have confirmed that remote work is associated with the worsening of low back pain [52]. Other research has pointed out that during COVID-19, activity limitations and pain intensity due to low back pain were higher [53]. However, our data did not reflect this trend. This may be due to the impact of healthcare policies or a reduction in demand for medical care due to safety concerns. Previous studies have confirmed this, showing a decrease in patients visiting the emergency department due to low back pain [54]. Nonetheless, the living and working environments, content, and methods, as well as access to healthcare services and awareness of diseases, differ for the WAP across various SDI regions and countries.

According to our analysis and previous research, there were three risk factors for low back pain patients in WAP [1]. Among these, occupational ergonomics appeared to

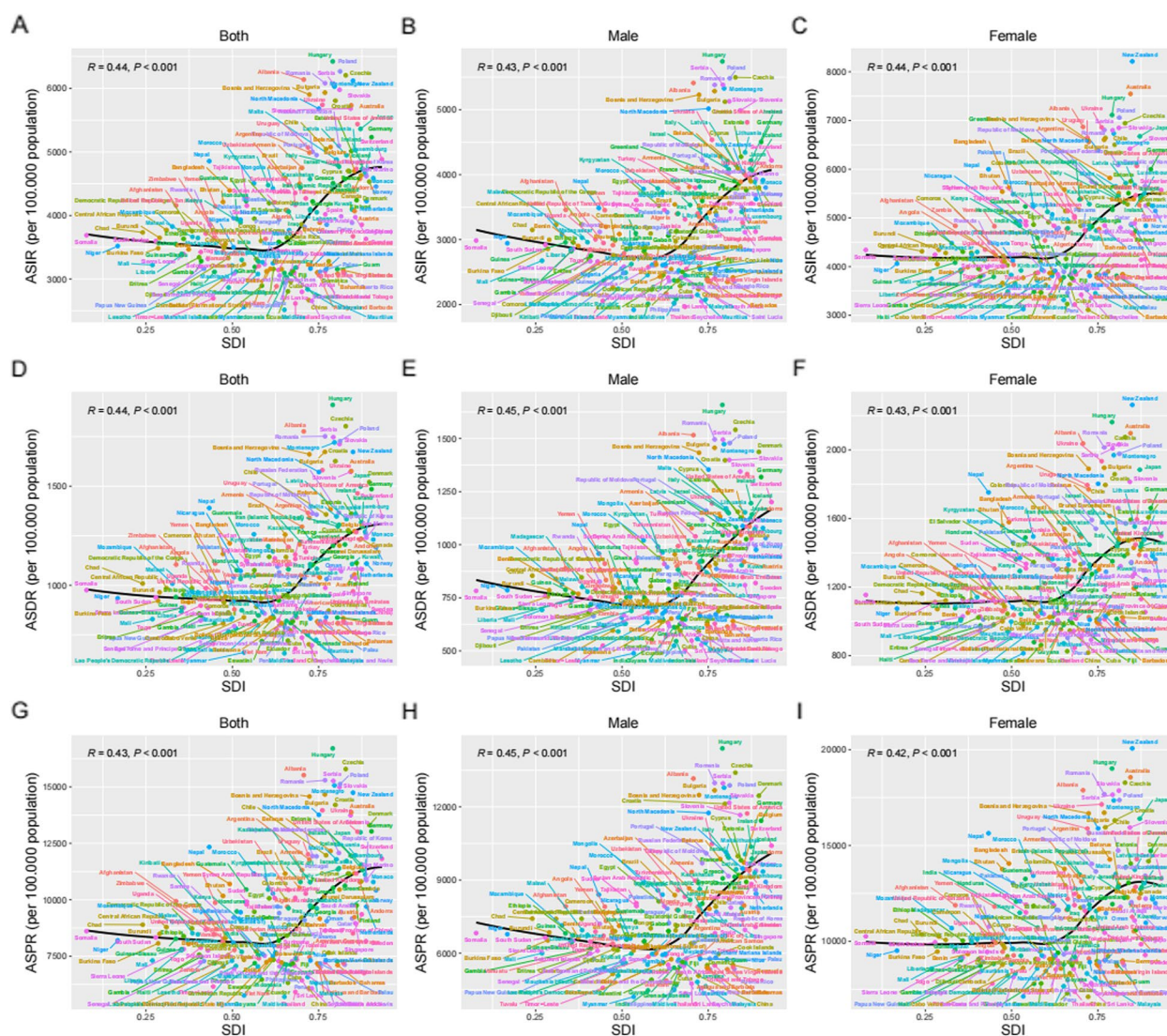


Fig. 4 Correlations between ASIR, ASPR, and ASDR of low back pain among WAP and SDI at the national level. Notes: In 2021, ASIR of low back pain among WAP in 204 countries, by SDI, the total population (A), males (B), and females (C). In 2021, ASDR of low back pain among WAP in 204 countries, by SDI, the total population (D), males (E), and females (F). In 2021, ASPR of low back pain among WAP in 204 countries, by SDI, the total population (G), males (H), and females (I). Abbreviations: SDI, socio-demographic index; DALYs, disability-adjusted life-years; ASIR, age-standardized incidence rate; ASPR, age-standardized prevalence rate; ASDR, age-standardized DALYs rate

be the most significant factor. A study conducted among healthcare workers in northeastern Poland demonstrated that a sedentary lifestyle significantly increased the recurrence of low back pain, while increased physical activity helped alleviate symptoms [55]. Interventions targeting occupational ergonomic factors, such as incorporating active rest breaks or changing postures, were shown to reduce low back pain symptoms in high-risk office workers [56]. Furthermore, research indicated that smoking and a high body mass index (BMI) were also risk factors for low back pain [1]. However, the causal mechanisms linking these factors to low back pain remain unclear.

Nevertheless, studies on these risk factors remain significant. Interventions targeting these factors may influence the condition of low back pain.

For the WAP, taking active rest breaks and changing postures positively affected low back pain, and rest did not negatively impact work efficiency [57]. Replacing one hour of sitting with one hour of vigorous activity per week alleviated low back pain [58]. Well-designed jobs, combined with a 'fitness for work' approach that aligned worker capabilities with job demands, had beneficial effects on low back pain and may have helped shorten the time to return to work and reduce short-term

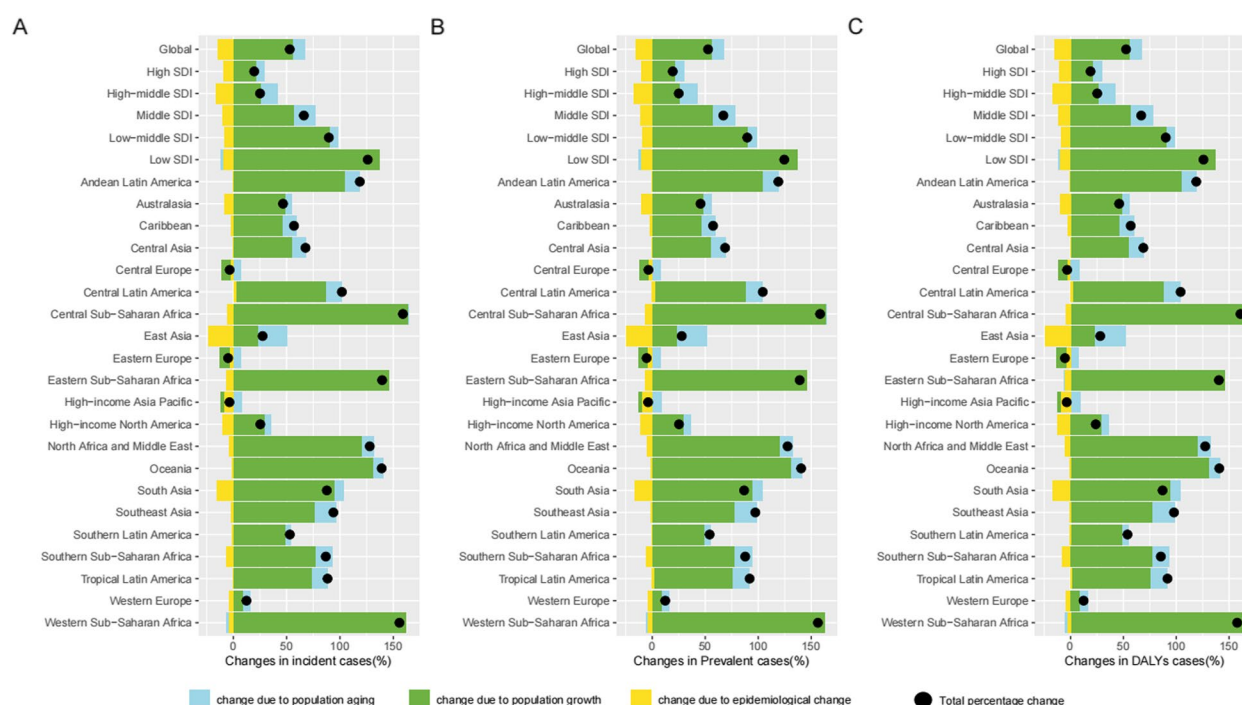


Fig. 5 Decomposition analysis of changes in low back pain among WAP incident cases (A), prevalent cases (B), and DALYs (C) at global level, SDI level, and regional level, 1990 to 2021. Notes: The black dots denote the sum of contribution to the changes in all 3 components. For each component, the magnitude of a positive value indicated a positive contribution; the magnitude of a negative value indicates a negative contribution. Abbreviations: WAP, working-age population; DALYs, disability-adjusted life-years; SDI, socio-demographic index

absenteeism [59]. Studies demonstrated that implementing participatory ergonomics methods to improve working conditions reduced low back pain by approximately 12% and increased productivity by an average of 42% [30]. Ergonomic structures, work formats, back care programs, and the use of assistive devices helped mitigate such occupational hazards [33]. Research conducted in Brazil linked work-related stress to a higher incidence of low back pain, along with more frequent episodes and increased severity of the condition [60].

In the past few decades, clinical guidelines for low back pain have undergone significant changes. In the past, medication and surgery were the primary treatments, but now there is more focus on self-management, physical therapy, psychological therapy, and other medical approaches. These changes reflect a shift in the understanding of low back pain treatment, emphasizing the improvement of patients' function and quality of life through non-pharmacological treatments such as exercise, massage, acupuncture, and others [61]. However, the implementation of specific policies has not been very effective. In this regard, individualized strategies [62] and the effective implementation of guidelines seem to be important [63]. For example, the United States and the United Kingdom have successfully reduced unnecessary

imaging tests by using specific imaging request forms and adding educational information in MRI reports [64, 65]. Denmark has improved the implementation of guidelines through multiple strategies, reducing secondary referrals and saving healthcare costs [66].

For high SDI regions and countries, optimization and improvement may be the main focus of various policies. Studies have shown that stratified care is more effective and cost-efficient than traditional best care methods [67, 68]. Reconfiguring the entire clinical pathway from initial contact to specialty care to improve low back pain is also one of the directions for future exploration. Another promising direction could be through integrated healthcare and occupational interventions, targeting both the healthcare system and, more broadly, public health. Combining healthcare and occupational health interventions for treating low back pain [61]. Early interventions in Sweden have shown that addressing workplace issues can help patients return to work earlier and reduce healthcare costs [69]. At the same time, high SDI regions also face issues of inappropriate and excessive use of medical examinations [70], medications [71], and surgeries [72]. Changing compensation and disability policies may bring potential benefits, especially in reducing work disability and welfare applications due to low back pain.

Table 3 Changes in incidence, prevalence, and DALYs number for low back pain among WAP according to population-level determinants and causes from 1990 to 2021

Location	Overall difference in incidence	Change due to Population-level determinants in incidence (% contribute to the total changes)	Overall difference in prevalence	Change due to Population-level determinants in prevalence (% contribute to the total changes)
Aging				
Change in age-specific incidence rate				
Population				
Aging				
Global	66624803.7(52.9%)	14279412.5(11.3%)	7026431.5(55.8%)	156203830.9(52.7%)
Sex				35850602.7(12.1%)
Female	42467165.1(55.9%)	8946356.0(11.8%)	43186414(56.9%)	22816031.4(12.6%)
Male	24157638.6(48.3%)	5414634.1(10.8%)	27231561(54.5%)	13269742.1(11.6%)
Sociodemographic Index				
High SDI	6267956.2(19.6%)	2446664.8(7.7%)	6873936(21.5%)	6495952.3(8.4%)
High-middle SDI	7370772.1(25.1%)	4618832.5(15.7%)	7609904(25.9%)	11493828.5(16.6%)
Middle SDI	22136448.9(66.1%)	6651040.9(19.9%)	19021849(56.8%)	16372971.5(21.1%)
Low-middle SDI	19975295.8(89.6%)	1833292.5(8.2%)	20091040(90.1%)	4544071.4(8.7%)
Low SDI	10841173.0(126.0%)	-157362.7(-1.8%)	11823242(137.4%)	-3950333.3(-2.0%)
Region				
Andean Latin America	676358.7(118.6%)	80276.2(14.1%)	595463(104.4%)	193130.5(14.9%)
Australasia	392756.7(46.6%)	56227.2(6.7%)	408309(48.5%)	154475.6(7.5%)
Caribbean	356988.6(56.9%)	78753.9(12.6%)	2901144(6.2%)	193754.0(13.4%)
Central Asia	1141892.9(67.7%)	22867.2(913.6%)	924822(54.8%)	553606.3(14.2%)
Central Europe	-186079.6(-3.5%)	407860.2(7.6%)	-487239(-9.0%)	1116590.9(8.3%)
Central Latin America	3282230.5(101.8%)	475152.5(14.7%)	2728934(84.6%)	1247765.0(16.4%)
Central Sub-Saharan Africa	1481933.9(159.0%)	12421.1(1.3%)	1524742(163.6%)	31204.0(1.5%)
East Asia	6735811.3(27.5%)	6770393.0(27.6%)	5620537(22.9%)	16343441.9(29.1%)
Eastern Europe	-428646.7(-4.9%)	662102.4(7.6%)	-814979(-9.3%)	1689042.7(8.0%)
Eastern Sub-Saharan Africa	4235631.3(139.5%)	-5466.0(-0.2%)	4430427(145.9%)	-13103.5(-0.2%)
High-income Asia Pacific	-248796.8(-3.6%)	560634.8(8.2%)	-222858(-3.3%)	1481074.7(8.9%)
High-income North America	2781686.2(25.3%)	685539.8(6.2%)	3213171(29.2%)	1951489.1(7.4%)
North Africa and Middle East	9432898.6(127.9%)	836679.5(11.3%)	8886072(120.5%)	2114068.3(11.9%)
Oceania	142781.5(139.1%)	9904.1(9.7%)	134255(130.8%)	24436.6(10.4%)
South Asia	18833890.4(87.7%)	187384.2(8.7%)	2032461(204.6%)	4605045.7(9.2%)
Southeast Asia	6783052.0(93.8%)	1420501.0(19.7%)	5523700(76.4%)	3572986.0(21.6%)
Southern Latin America	8044700(53.0%)	82579.8(5.4%)	737618(48.6%)	218204.8(6.1%)
Southern Sub-Saharan Africa	715026.9(86.7%)	128796.0(15.6%)	638445(77.4%)	304782.7(16.2%)
Tropical Latin America	3422770.2(88.3%)	584966.5(15.1%)	2823109(72.9%)	1515874.1(16.4%)
Western Europe	1609464.8(12.3%)	971914.8(7.4%)	1116022(8.6%)	2436353.0(7.8%)
Western Sub-Saharan Africa	4658682.4(155.7%)	-67264.7(-2.3%)	4853627(162.2%)	-159387.6(-2.3%)

Table 3 (continued)

Location	Change due to Population-level determinants in prevalence (% contribute to the total changes)	Overall difference in DALYs	Change due to Population-level determinants in DALYs (% contribute to the total changes)	Aging	Population	Change in age-specific DALYs rate
Global	1654631.41(55.8%)	-45109912.6(-15.2%)	17736120.2(52.5%)	4096137.7(12.1%)	18830502(55.8%)	-5190519.1(-15.4%)
Sex						
Female	103064347(56.7%)	-26224403.3(-14.4%)	11212677.0(54.5%)	2590214.6(12.6%)	11647543(56.7%)	-3025080.2(-14.7%)
Male	62789924(54.7%)	-19511810.6(-17.0%)	6523443.1(49.4%)	1531957.2(11.6%)	7225930(54.7%)	-2234444.2(-16.9%)
Sociodemographic Index						
High SDI	16592086(21.5%)	-8116403.7(-10.5%)	1668318.5(18.9%)	739670.0(8.4%)	1892067(21.4%)	-963418.2(-10.9%)
High-middle SDI	17934475(25.9%)	-12087952.7(-17.5%)	1996917.5(25.3%)	1315210.7(16.6%)	2049371(25.9%)	-1367664.4(-17.3%)
Middle SDI	4419781(8.57.0%)	-8585747.3(-11.1%)	5916391.3(66.8%)	18786740(21.2%)	5045662(57.0%)	-1007944.3(-11.4%)
Low-middle SDI	47068944(90.1%)	-4785675.6(-9.2%)	5308197.5(90.1%)	516436.7(8.8%)	5315992(90.2%)	-524231.2(-8.9%)
Low SDI	27493545(137.0%)	-2095408.9(-10.4%)	2837546.8(125.8%)	-43541.1(-1.9%)	3098024(137.4%)	-216936.2(-9.6%)
Region						
Andean Latin America	1358926(104.5%)	-5048.7(-0.4%)	176522.7(119.0%)	22349.6(15.1%)	155082(104.5%)	-909.1(-0.6%)
Australasia	997931(48.3%)	-210482.6(-10.2%)	107741.6(46.0%)	17775.5(7.6%)	113276(48.4%)	-23309.9(-10.0%)
Caribbean	669346(46.3%)	-33455.4(-2.3%)	93632.1(56.9%)	22201.5(13.5%)	76079(46.3%)	-4648.3(-2.8%)
Central Asia	2148383(55.0%)	-15560.8(-0.4%)	307564.6(68.9%)	63956.8(14.3%)	245576(55.0%)	-1967.8(-0.4%)
Central Europe	-1220963(-90.0%)	-371908.4(-2.8%)	-49995.9(-3.2%)	127020.5(8.2%)	-139237(-9.0%)	-37779.6(-2.5%)
Central Latin America	6475690(85.2%)	2062503.9(2.7%)	900120.4(104.2%)	142269.9(16.5%)	735981(85.2%)	21869.1(2.5%)
Central Sub-Saharan Africa	3514748(163.4%)	-138750.5(-6.5%)	386387.0(160.8%)	3644.0(1.5%)	394308(164.1%)	-11564.8(-4.8%)
East Asia	12907598(23.0%)	-13621676.2(-24.3%)	1817569.9(28.1%)	1889792.3(29.2%)	1490214(23.0%)	-1562436.9(-24.1%)
Eastern Europe	-1960512(-9.3%)	-836900.1(-4.0%)	189517.7(7.9%)	-221661(-9.3%)	-221661(-9.3%)	-94237.3(-4.0%)
Eastern Sub-Saharan Africa	10193259(145.8%)	-452861.7(-6.5%)	1106720.5(140.4%)	-955.9(-0.1%)	1152322(146.2%)	-44645.5(-5.7%)
High-income Asia Pacific	-540699(-3.2%)	-1581953.9(-9.5%)	-70393.1(-3.7%)	172534.2(9.0%)	-62351(-3.3%)	-180576.7(-9.4%)
High-income North America	7738561(29.2%)	-3003630.8(-11.3%)	718021.7(23.8%)	215403.0(7.2%)	875948(29.1%)	-373329.2(-12.4%)
North Africa and Middle East	21335162(120.4%)	-824747.7(-4.7%)	2561396.3(127.4%)	246260.5(12.3%)	2419449(120.4%)	-104313.1(-5.2%)
Oceania	307285(131.2%)	-2563.0(-1.1%)	37588.8(140.8%)	2814.1(10.5%)	35046(131.2%)	-271.4(-1.0%)
South Asia	47232299(94.4%)	-8459412.7(-16.9%)	4897697.1(87.1%)	518221.3(9.2%)	5315175(94.5%)	-935699.1(-16.6%)
Southeast Asia	12769286(77.1%)	-236989.7(-1.4%)	1858414.5(97.9%)	411992.4(21.7%)	1466548(77.3%)	-20126.1(-1.1%)
Southern Latin America	1743113(48.8%)	-26328.7(-0.7%)	21972.0(53.9%)	25117.3(6.2%)	198321(48.8%)	-4166.2(-1.0%)
Southern Sub-Saharan Africa	1458319(77.6%)	-115628.4(-6.2%)	181445.4(85.4%)	34313.5(16.2%)	163910(77.2%)	-16777.7(-7.9%)
Tropical Latin America	6813747(73.6%)	176012.7(1.9%)	956884.7(91.8%)	171006.1(16.4%)	767463(73.6%)	18415.9(1.8%)
Western Europe	2667401(8.6%)	-1264454.6(-4.1%)	438668.6(12.3%)	279693(17.9%)	304323(8.6%)	-145347.4(-4.1%)
Western Sub-Saharan Africa	11097412(162.4%)	-257203.9(-3.8%)	1217242.1(157.7%)	-17935.9(-2.3%)	1256775(162.9%)	-21597.0(-2.8%)

Abbreviations: WAP working-age population, DALYs Disability-adjusted life-years, SDI socio-demographic index

These policies should encourage workplace interventions and support early return to work through more flexible disability benefit policies.

In low SDI regions and countries, the primary issue to address is the allocation of basic healthcare resources and the integration of relevant information due to insufficient health resources. The lack of or inadequate monitoring of occupational musculoskeletal health policies [73] and the scarcity of high-quality low back pain data [74] are evident issues. The direct and indirect costs at the individual, social, and healthcare system levels in most low SDI regions remain unclear [22]. Additionally, more research and practice are needed to evaluate the actual effects of these public health interventions. Public health resources in low SDI regions and countries are typically focused on the prevention of infectious diseases, but low back pain should also be a key area of concern. Therefore, more targeted interventions need to be designed and implemented for low-income populations to reduce health disparities, eliminate barriers to returning to work, and help them escape poverty [61]. At the same time, it should be noted that spreading high-cost healthcare models to low- and middle-income countries will exacerbate, rather than alleviate, the burden [22]. Healthcare resource allocation and policy development should be tailored to the specific circumstances.

Due to their unique status, screening for related diseases in the working-age population helps improve overall well-being and productivity [75]. Treating individual low back pain patients may not be sufficient to address one of the most disabling global health issues [76, 77]. As mentioned, low back pain is very common and is strongly influenced by patients' beliefs and expectations, in addition to social events such as compensation and disability policies. Back pain is also often poorly managed [78]. Social-level interventions to improve low back pain health outcomes include mass media campaigns to increase public understanding of low back pain [79, 80], addressing people's fears and expectations about health—care providers [81, 82], eliminating compensation and disability policies that encourage disability, and implementing research to address the significant evidence-practice gap [59].

Several limitations were encountered in this study. First, heterogeneity in data sources was observed, primarily due to sparse and uneven data distribution, challenges in obtaining representative samples, and restrictions on data exchange across countries. Much of the data in the study relied on retrospective reports, with a broad definition of low back pain that lacked precise criteria. Although analytical methods could be adjusted to enhance comparability between different datasets, such adjustments introduced uncertainty and might

not have fully captured actual differences. Furthermore, much of the data relied on models rather than on observational data. Ideally, primary data from each country would have been available, and standardized methods would have been used for analysis; however, achieving this was challenging. Obtaining country-level raw data in the WAP remained challenging, particularly in low-income countries. These countries might not have reported low back pain, and their populations might have engaged in more physically demanding labour. Inequality in data could magnify the impact of data from high-income regions, distorting the accuracy of global assessments. The absence of primary data hindered the ability to draw accurate conclusions about regional and national differences. Second, the study did not account for the actual impact of COVID-19 on the burden of low back pain, particularly in regions most severely affected by the pandemic and in many LMICs. This included factors such as worsening occupational ergonomic conditions, reduced access to medical treatment, and increased mortality among older adults. Third, manual calculation of ASRs of low back pain was employed. Although this method helped alleviate the impact of age differences, it also affected the accuracy of the calculated UIs. This method might have influenced the original data quality, availability, and statistical uncertainty, potentially hindering full integration into the estimation results. Finally, the results of this study might have been disproportionately influenced by data from countries with large populations. This could have resulted in conclusions that might not have directly applied to or accurately reflected the unique circumstances of specific regions.

The results of this study will help promote countries and their relevant departments to adopt relevant policies to address back pain. Meanwhile, developing a more accurate definition for lower back pain can more accurately reflect the burden of lower back pain in different regions of WAP. In addition, further research is needed using more representative data. To alleviate this burden, collaboration among multiple departments and disciplines was essential, such as improving work-related factors, physical exercise, and treatment, etc. [76].

Conclusions

Over the past three decades, the global ASIR, ASPR, and ASDR for low back pain in the WAP showed a continuous downward trend. However, the absolute number of cases continued to rise, driven by population growth and aging, particularly in densely populated regions such as Asia. The burden of low back pain among females in the WAP remained higher than that among males, with significant regional heterogeneity. As a leading cause of global disability, low back pain in the WAP poses a

significant threat to healthy aging. National and organizational policies are needed to mitigate the burden of low back pain exacerbated by population growth and population aging. Considering gender-specific and regional heterogeneities, multifaceted measures should be implemented to strengthen international cooperation and prevent the further widening of disparities. Simultaneously, sharing healthcare information on low back pain could generate more accurate country-specific or estimated data, facilitating the statistical tracking of changes in incidence, prevalence, and DALYs over time, thereby providing a more precise picture. Our findings underscore the need for more high-quality data and research to enhance analysis and statistics. The objective is to implement patient-centered interventions that mitigate potential risk factors, identify and prevent the onset and progression of low back pain, and alleviate its disease burden.

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Authors' contributions

Yaokan Zhang (First Author): Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Data curation, Writing-original draft, Writing-review & editing, Visualization. Jia-xuan Wang: Software, Validation, Formal analysis, Investigation, Visualization, Writing-review & editing. Yi-zhou Ge: Software, Validation, Formal analysis, Data curation, Investigation, Visualization. Ze-bin Wang: Data curation, Validation, Formal analysis, Methodology, Investigation. Feng Chang (Corresponding Author): Conceptualization, Resources, Writing review & editing, Supervision, Project administration.

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Data availability

The data used in this study came from a public database that everyone can access through the link provided in this article (<https://www.healthdata.org/research-analysis/gbd>).

Declarations

Ethics approval and consent to participate

The GBD follows the Guidelines for Accurate and Transparent Health Estimates Reporting (GATHER). Since GBD information is entirely anonymized and does not include personal data, this analysis did not require approval from a research ethics committee.

Consent for publication

Not Applicable.

Competing interests

The authors declare no competing interests.

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