Global burden of anorexia nervosa from 1990 to 2021 and future trends: pronounced disparities by sex, age, and socioeconomic development

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Abstract

Anorexia nervosa is a severe eating disorder with one of the highest mortality rates among psychiatric conditions and disproportionately affects adolescents and young women. However, comprehensive assessments of its long-term global burden and future trajectory remain limited.

Methods

Data on anorexia nervosa from the Global Burden of Disease (GBD) 2021 study were analyzed from 1990 to 2021. Age-standardized prevalence (ASPR), incidence (ASIR), death rates (ASDR), and disability-adjusted life years (DALYs) were estimated at global, regional, and national levels. Temporal trends were assessed using estimated annual percentage change (EAPC). Analyses were stratified by sex, age group, and Socio-demographic Index (SDI). Future trends from 2022 to 2041 were projected using autoregressive integrated moving average (ARIMA) models.

Results

Globally, ASPR and ASIR increased modestly from 1990 to 2021, whereas ASDR remained low and showed a slight decline. The burden of anorexia nervosa was substantially higher in high-SDI regions than in low-SDI regions. Females consistently exhibited a markedly higher burden than males, particularly among adolescents and young adults aged 15–24 years. Considerable regional and national heterogeneity was observed. Projections suggest a slight global decline in prevalence over the next two decades; however, the burden among females is expected to remain persistently high.

Conclusions

Anorexia nervosa continues to pose a significant global health challenge with pronounced disparities by sex, age, and socioeconomic development. These findings underscore the need for disorder-specific prevention strategies and improved surveillance of anorexia nervosa, particularly among adolescent girls and young women.

INTRODUCTION

Anorexia nervosa is a core eating disorder characterized by persistent restriction of energy intake, an intense fear of weight gain, and a disturbance in body image, as defined by contemporary diagnostic frameworks and clinical consensus[1, 2]. Despite its relatively low prevalence compared with other psychiatric disorders, anorexia nervosa is associated with disproportionately high morbidity and mortality[3], resulting in one of the highest case-fatality rates among mental disorders and constituting a major public health concern worldwide[4]. The disorder most commonly emerges during adolescence and young adulthood and shows a pronounced female predominance[5], with substantially higher prevalence and incidence observed among girls and young women than among males[6, 8] .

Accumulating evidence indicates that sociocultural factors play a central role in the development and maintenance of anorexia nervosa[9]. These factors include thin-ideal internalization, body dissatisfaction, and exposure to appearance-focused and weight-related media, all of which have been consistently associated with elevated risk of disordered eating behaviors and restrictive eating patterns[10]. Importantly, sociocultural influences are not uniformly distributed across populations. Variations in socioeconomic development, cultural norms, and media environments may contribute to substantial geographic and contextual differences in the observed burden of anorexia nervosa across regions and countries[11].

In recent years, several studies have assessed the global burden of eating disorders using large-scale epidemiological data[12, 13, 31]. However, many of these analyses have aggregated anorexia nervosa with other eating disorder diagnoses or have focused on specific countries or regions, limiting disorder-specific interpretation at the global level[29]. Given the distinct clinical characteristics, risk profile, and particularly high mortality associated with anorexia nervosa, a dedicated global assessment focusing exclusively on this disorder is warranted[15, 16]. Moreover, evidence regarding long-term temporal trends and future trajectories of anorexia nervosa burden remains limited, constraining the capacity of health systems to anticipate future needs and to design targeted prevention and intervention strategies[3, 17].

Using data from the Global Burden of Disease (GBD) 2021 study, the present analysis aims to provide a comprehensive assessment of the global burden of anorexia nervosa from 1990 to 2021, stratified by sex, age, and Socio-demographic Index (SDI)[14]. In addition, this study projects future trends to inform eating disorder–specific public health planning and resource allocation in the coming decades.

METHODS

Data sources

Data were obtained from the Global Burden of Disease (GBD) 2021 study, which provides systematic and comparable estimates of disease burden for 204 countries and territories from 1990 onward [24]. The GBD framework synthesizes data from multiple sources, including epidemiological surveys, administrative health records, and disease registries, and applies standardized analytical methods to ensure comparability across locations and over time. All estimates are reported with corresponding 95% uncertainty intervals to reflect data availability and modeling uncertainty.

Case definition

Anorexia nervosa was defined according to the International Classification of Diseases (ICD) criteria as implemented within the GBD 2021 analytical framework. Case definitions and disease modeling followed standardized GBD protocols to ensure consistency across countries, regions, and time periods.

Measures

We assessed the burden of anorexia nervosa using four core epidemiological indicators: age-standardized prevalence rate (ASPR), incidence rate (ASIR), death rate (ASDR), and disability-adjusted life years (DALYs). All rates were reported per 100,000 population with corresponding 95% uncertainty intervals. Age standardization was performed using the GBD standard population to allow valid comparisons across populations with differing age structures. DALYs were calculated as the sum of years lived with disability and years of life lost due to premature mortality, providing an integrated measure of both fatal and non-fatal disease burden.

Socio-demographic Index

Socio-demographic Index (SDI) is a composite indicator reflecting income per capita, average educational attainment, and fertility rate among individuals younger than 25 years, scaled from 0 to 1 [25]. Countries and regions were categorized into five SDI quintiles (low, low-middle, middle, high-middle, and high) to examine socioeconomic gradients in the burden of anorexia nervosa and to facilitate comparisons across different levels of development.

Statistical analysis

Temporal trends in age-standardized rates were quantified using estimated annual percentage change (EAPC), calculated through log-linear regression models[19]. An increasing or decreasing trend was defined when the 95% confidence interval of the EAPC did not include zero. Analyses were conducted at the global, regional, and national levels, as well as stratified by sex, age group, and SDI category.

Forecasting analysis

Future trends in the burden of anorexia nervosa from 2022 to 2041 were projected using autoregressive integrated moving average (ARIMA) models based on historical trends observed during the study period. Model selection was guided by standard time-series diagnostics to ensure appropriate fit. Projections were intended to provide scenario-based estimates to support long-term public health planning rather than precise point predictions, and should be interpreted in light of inherent uncertainty and potential future sociocultural or policy changes.

RESULTS

Global temporal trends of anorexia nervosa burden

Globally, the burden of anorexia nervosa increased from 1990 to 2021, with rising age-standardized prevalence and incidence rates, whereas age-standardized mortality remained very low (Table 1; Fig. 1). For both sexes combined, the global age-standardized prevalence rate increased from 45.32 per 100,000 in 1990 to 47.75 per 100,000 in 2021, with a positive temporal trend (EAPC 0.239, 95% CI 0.211 to 0.267) (Table 1). Similarly, the global age-standardized incidence rate increased from 15.20 per 100,000 in 1990 to 16.98 per 100,000 in 2021 (EAPC 0.423, 95% CI 0.394 to 0.453) (Table 1).

In contrast, the global age-standardized death rate was extremely low and slightly decreased over time for both sexes combined, remaining at approximately 0.0029 per 100,000 in both 1990 and 2021, with a negative temporal trend (EAPC − 0.321, 95% CI − 0.546 to − 0.095) (Table 1). The global age-standardized DALY rate increased from 9.80 per 100,000 in 1990 to 10.31 per 100,000 in 2021 (EAPC 0.234, 95% CI 0.209 to 0.258), indicating a gradually increasing non-fatal health loss attributable to anorexia nervosa worldwide (Table 1).

Sex-stratified results showed consistently higher age-standardized prevalence, incidence, deaths, and DALYs in females than males in both 1990 and 2021 (Table 1). Notably, the rates of increase were generally larger in males than females for prevalence (male EAPC 0.337 vs female EAPC 0.211) and incidence (male EAPC 0.441 vs female EAPC 0.426), while the decline in deaths was more pronounced in males (Table 1).

Figure interpretation (Fig. 1). Figure 1 summarizes the global temporal patterns from 1990 to 2021, showing upward trends in ASPR/ASIR and a modest increase in DALYs, contrasted with persistently low and slightly declining ASDR.

Table 1
Global age-standardized prevalence rate (ASPR), incidence rate (ASIR), death rate (ASDR), and disability-adjusted life years (DALYs) of anorexia nervosa in 19 and 2021, with corresponding estimated annual percentage changes (EAPCs).

Measure	Sex	1990 Number(95% UI)	1990 ASR(95% UI)	2021 Number(95% UI)	2021 ASR(95% UI)	EAPC(95% CI)
Prevalence	Male	710571.2473(487432.8799 to 1005894.4301)	23.7135(16.4932 to 33.4232)	1017417.2085(708324.5754 to 1428116.2002)	25.8905(17.9705 to 36.2884)	0.3366(0.3073 to 0.3658)
Prevalence	Female	1953858.5461(1341114.007 to 2730850.4774)	67.4632(46.5735 to 94.5881)	2680561.729(1859698.0126 to 3698457.2366)	70.3752(48.703 to 97.1044)	0.2107(0.1798 to 0.2416)
Prevalence	Both	2664429.7934(1833177.2824 to 3729143.0718)	45.3163(31.5556 to 63.4288)	3697978.9375(2590427.8229 to 5130222.108)	47.753(33.2272 to 66.3324)	0.239(0.2107 to 0.2672)
Incidence	Male	295133.5257(203785.2488 to 403326.8324)	9.7376(6.7324 to 13.1731)	427264.3991(297637.5571 to 581898.9327)	10.9483(7.6239 to 14.9562)	0.4414(0.4103 to 0.4725)
Incidence	Female	592761.1167(414758.0572 to 823633.1828)	20.0891(14.0682 to 27.768)	840038.0707(590103.5001 to 1154927.5519)	22.48(15.8151 to 31.1044)	0.4258(0.3962 to 0.4553)
Incidence	Both	887894.6424(617530.953 to 1224529.7232)	14.8352(10.339 to 20.3062)	1267302.4697(890139.1343 to 1736633.5518)	16.5886(11.6567 to 22.8009)	0.4234(0.3937 to 0.453)
Deaths	Male	13.5773(3.7524 to 16.6004)	5e-04(1e-04 to 6e-04)	15.2738(3.6379 to 21.9405)	4e-04(1e-04 to 5e-04)	-1.3334(-1.553 to -1.113)
Deaths	Female	140.3799(122.6548 to 154.6513)	0.0054(0.0047 to 0.0059)	216.216(186.3462 to 242.2301)	0.0054(0.0047 to 0.0061)	-0.2544(-0.484 to -0.0234)
Deaths	Both	153.9572(131.0063 to 168.7632)	0.0029(0.0025 to 0.0032)	231.4898(195.1439 to 261.7377)	0.0029(0.0024 to 0.0032)	-0.3207(-0.545 to -0.095)
DALYs (Disability-Adjusted Life Years)	Male	153805.2192(93216.5182 to 245666.9714)	5.1344(3.1317 to 8.2049)	219973.164(132243.8179 to 354219.7167)	5.598(3.3591 to 9.0158)	0.3357(0.3073 to 0.3641)
DALYs (Disability-Adjusted Life Years)	Female	421984.5789(262375.8459 to 669007.5825)	14.5849(9.1225 to 23.0905)	578470.159(363035.9106 to 911861.92)	15.1832(9.5297 to 23.9004)	0.2032(0.1774 to 0.2291)
DALYs (Disability-Adjusted Life Years)	Both	575789.7982(356711.144 to 913196.3305)	9.8006(6.1137 to 15.5294)	798443.323(496896.9784 to 1259377.2006)	10.3089(6.4168 to 16.2483)	0.2335(0.2092 to 0.2579)

Disparities across Socio-demographic Index (SDI) levels

Marked gradients were observed across SDI quintiles (Fig. 2; Table 2). In 2021, high-SDI settings exhibited substantially higher age-standardized prevalence (125.74 per 100,000) and DALY rates (27.45 per 100,000) than low-SDI settings (prevalence 27.38 per 100,000; DALYs 5.82 per 100,000) (Table 2). Temporal trends also varied by SDI, with the largest increases for prevalence and DALYs occurring in middle SDI populations (prevalence EAPC 0.948; DALYs EAPC 0.960) (Table 2).

At the GBD-region level, the highest 2021 age-standardized prevalence and DALY rates were observed in Australasia, with prevalence 184.36 per 100,000 and DALYs 39.46 per 100,000 (Table 2). By contrast, East Asia showed the most pronounced increases over time, with the largest EAPCs for prevalence (1.388), incidence (1.357), and DALYs (1.447) from 1990 to 2021 (Table 2).

Figure interpretation (Fig. 2). Figure 2 displays SDI-stratified trajectories, highlighting consistently higher burdens in higher SDI quintiles and heterogeneous temporal patterns across SDI levels.

Table 2
Age-standardized prevalence, incidence, death rate, and DALYs of anorexia nervosa by Socio-demographic Index (SDI) quintile and GBD region in 1990 and corresponding estimated annual percentage changes (EAPCs).

Measure	Location	1990 Number(95% UI)	1990 ASR(95% UI)	2021 Number(95% UI)	2021 ASR(95% UI)	EAPC(95% CI)
Prevalence	High-income Asia Pacific	207206.6185(143470.976 to 287972.2201)	117.3178(81.107 to 163.0996)	195433.0314(137501.0648 to 268419.8469)	150.2192(103.3221 to 204.4003)	0.7548(0.6628 to 0.8469)
Prevalence	Eastern Sub-Saharan Africa	53076.7831(35857.0309 to 76701.276)	24.9864(17.3629 to 35.3405)	137321.0686(92556.5318 to 198278.7951)	26.9226(18.6473 to 37.6173)	0.3251(0.2522 to 0.3981)
Prevalence	High-income North America	385422.2828(261864.1755 to 536360.5218)	134.4064(91.1883 to 187.7051)	437122.917(299952.5054 to 604161.6033)	137.6889(94.0125 to 189.8616)	0.1056(0.0807 to 0.1305)
Prevalence	High-middle SDI	525554.5033(364288.5371 to 737264.7508)	45.0229(31.4383 to 62.8324)	561543.2516(393744.8127 to 785150.5533)	52.9087(36.4703 to 73.8849)	0.6205(0.5603 to 0.6808)
Prevalence	Central Asia	30116.7407(20581.7531 to 43173.6635)	39.5019(27.345 to 56.0583)	41696.376(29252.721 to 58996.7531)	43.9474(30.6265 to 62.2552)	0.6274(0.4021 to 0.8531)
Prevalence	Southeast Asia	143703.739(98323.4075 to 203866.2291)	26.2623(18.3926 to 37.0224)	234681.4464(162700.9431 to 326522.2104)	32.8712(22.6536 to 45.9017)	0.6833(0.6454 to 0.7212)
Prevalence	Middle SDI	621738.2296(421004.7805 to 892099.8071)	30.1127(20.7112 to 42.7032)	922184.8956(641795.2057 to 1296621.6155)	39.3246(27.1957 to 55.4333)	0.9483(0.9277 to 0.9689)
Prevalence	Tropical Latin America	99079.0684(67610.3991 to 140073.9967)	55.7845(38.5066 to 78.5149)	137858.6678(97108.5776 to 194481.4102)	62.395(43.141 to 88.4828)	0.4596(0.427 to 0.4921)
Prevalence	Central Sub-Saharan Africa	17398.5242(11750.337 to 25171.4212)	28.705(19.9586 to 41.0197)	42267.5433(28972.4002 to 60616.5144)	26.839(18.8339 to 37.6062)	-0.0432(-0.2051 to 0.119)
Prevalence	Western Sub-Saharan Africa	62988.8395(42272.5871 to 89728.3964)	29.9675(20.5985 to 42.308)	177709.7827(119810.1527 to 257848.6119)	31.6918(22.0078 to 44.8036)	0.3251(0.2407 to 0.4096)
Prevalence	Central Latin America	85339.5855(56777.8419 to 122841.0154)	43.8871(30.1199 to 61.7772)	122953.7405(84303.3661 to 173804.6864)	46.4792(31.985 to 65.7309)	0.2218(0.2032 to 0.2405)
Prevalence	Southern Sub-Saharan Africa	24052.4176(16411.0014 to 34218.0323)	39.2344(27.221 to 55.0707)	34783.7016(24118.4339 to 49294.4241)	39.4195(27.3 to 55.8983)	0.0649(0.0522 to 0.0776)
Prevalence	East Asia	343649.7129(232840.9371 to 492730.1043)	23.2572(16.0665 to 32.9361)	381440.8195(269310.2718 to 531587.3222)	33.6851(23.3162 to 47.7041)	1.3875(1.3374 to 1.4376)
Prevalence	Andean Latin America	16812.6795(11344.377 to 23787.1656)	38.2083(26.2711 to 53.3858)	31309.4749(21718.2287 to 43854.9093)	44.2949(30.8633 to 61.9257)	0.6359(0.5656 to 0.7063)
Prevalence	Central Europe	50618.1593(35308.3536 to 71190.8925)	42.2009(29.3124 to 59.6706)	49691.2219(35276.4115 to 69037.1262)	57.2315(39.8609 to 80.3426)	1.2425(1.1514 to 1.3337)
Prevalence	Australasia	33487.2413(22935.1117 to 48384.5596)	159.7184(108.9776 to 231.0642)	49046.3248(33281.9099 to 68502.5196)	184.3648(124.9619 to 257.2285)	1.0335(0.7744 to 1.2932)
Prevalence	Oceania	1907.9003(1308.419 to 2733.9025)	25.1543(17.5154 to 35.5027)	3947.981(2714.7773 to 5574.2572)	25.6042(17.7847 to 36.1745)	-0.0533(-0.1079 to 0.0013)
Prevalence	Southern Latin America	38048.6671(25710.3618 to 54923.4214)	74.3534(50.5312 to 106.8612)	55061.8639(37799.6259 to 78014.0592)	82.9906(57.0749 to 117.07)	0.329(0.2885 to 0.3695)
Prevalence	Caribbean	16491.1183(11186.0403 to 23806.6394)	40.4964(27.8424 to 57.5599)	19297.8752(13394.87 to 27073.7989)	41.0881(28.4224 to 57.7891)	0.137(0.096 to 0.1781)
Prevalence	Eastern Europe	113386.7804(78888.7604 to 159422.9466)	53.635(37.0646 to 76.0308)	89599.5449(63158.6312 to 125473.1812)	57.0748(39.4966 to 80.0492)	0.4597(0.2521 to 0.6678)
Prevalence	South Asia	319531.229(216664.1485 to 451752.0666)	26.1093(17.9278 to 36.6466)	705175.4699(481624.4853 to 998701.8561)	33.7709(23.1544 to 47.6333)	0.8778(0.8393 to 0.9163)
Prevalence	North Africa and	147553.8422(98004.1835 to 214639.1674)	38.126(26.3171 to 54.2143)	274763.7112(189737.5794 to 390416.6241)	41.7733(28.7174 to 59.8047)	0.4131(0.3698 to 0.4566)

Measure	Location	1990 Number(95% UI)	1990 ASR(95% UI)	2021 Number(95% UI)	2021 ASR(95% UI)	EAPC(95% CI)
	Middle East					
Prevalence	Western Europe	474557.8638(334742.8439 to 652906.1905)	127.2713(90.1824 to 173.1628)	476816.375(330991.4736 to 651705.4706)	143.105(98.643 to 195.2813)	0.405(0.3566 to 0.4534)
Prevalence	Low SDI	139756.6002(95175.3337 to 200234.101)	25.7187(17.9391 to 36.2614)	357078.6179(241502.3846 to 515464.1203)	27.3827(19.1083 to 38.6054)	0.2872(0.2084 to 0.366)
Prevalence	High SDI	1007179.3754(695894.0399 to 1399251.4376)	113.5332(78.4047 to 155.7464)	1118993.9118(776067.358 to 1532238.9951)	125.7428(85.967 to 171.2739)	0.3192(0.2944 to 0.3439)
Prevalence	Low-middle SDI	367982.1975(248795.1182 to 526408.0371)	28.2679(19.5033 to 39.6622)	735489.7338(503587.9038 to 1051944.7419)	34.1769(23.5815 to 48.5242)	0.672(0.6363 to 0.7077)

Regional and national heterogeneity

Substantial heterogeneity in anorexia nervosa burden was evident across countries and territories (Fig. 3). Geographic distributions of 2021 age-standardized prevalence, incidence, deaths, and DALYs demonstrated clustering of higher burdens in high-income settings, while changes between 1990 and 2021 varied considerably across locations, indicating that the pace of increase (or decrease) differed markedly by country (Fig. 3; Table 2).

Figure interpretation (Fig. 3). Figure 3 presents country-level maps of 2021 burden and the percentage change from 1990 to 2021, illustrating pronounced between-country variability and regionally patterned changes over time.

Age- and sex-specific patterns

Age- and sex-specific analyses showed a consistent epidemiological profile characterized by a pronounced female predominance and concentration in adolescence and early adulthood (Figs. 4–5). Incidence peaked in adolescent and young adult age groups, with substantially higher rates in females than males across SDI categories (Fig. 4). Prevalence displayed a similar age distribution in both 1990 and 2021, with the highest levels concentrated in adolescent and young adult females and a clear decline with increasing age (Fig. 5).

Figure interpretation (Figs. 4–5). Figure 4 summarizes incidence patterns by age and sex in 2021 across SDI settings. Figure 5 compares prevalence distributions in 1990 versus 2021, demonstrating persistent age concentration and female predominance over time.

Projected future trends

Forecasting analyses based on ARIMA models suggested a modest decline in global age-standardized prevalence over the projection period, while sex differences persisted, with females maintaining substantially higher levels of burden than males (Fig. 6). Projected mortality remained extremely low, whereas the projected non-fatal burden (prevalence and DALYs) continued to represent the major component of total health loss attributable to anorexia nervosa (Fig. 6).

Figure interpretation (Fig. 6). Figure 6 displays projected trends for age-standardized prevalence, incidence, deaths, and DALYs from 2022 to 2041 with corresponding uncertainty intervals.

DISCUSSION

This study provides a comprehensive global assessment of the burden and temporal trends of anorexia nervosa from 1990 to 2021 using data from the Global Burden of Disease 2021 study. The findings reveal a persistently increasing non-fatal burden worldwide, accompanied by pronounced disparities across sex, age groups, and levels of socioeconomic development[5, 6, 25]. Together, these results highlight the distinct epidemiological profile of anorexia nervosa and its sustained contribution to global health loss.

The pronounced female predominance and concentration of disease burden during adolescence and early adulthood observed in this study are consistent with previous epidemiological evidence[21]. Prior research has consistently shown that girls and young women experience substantially higher prevalence and incidence of anorexia nervosa than males, particularly during critical developmental periods characterized by heightened vulnerability to body image concerns and sociocultural pressures. The persistence of this pattern across all SDI categories in our analysis suggests that sex- and age-related disparities are robust global features of anorexia nervosa epidemiology rather than phenomena confined to specific regions or stages of development[7, 26].

Socioeconomic gradients in disease burden were also evident, with high-SDI regions consistently exhibiting the highest prevalence, incidence, and DALY rates[12, 14]. These patterns likely reflect a combination of factors, including greater exposure to sociocultural risk factors such as thin-ideal internalization and appearance-focused media, as well as higher diagnostic awareness and access to mental health services in more developed settings. Conversely, the comparatively low burden observed in low-SDI regions may partially result from underdiagnosis and limited availability of specialized mental health care rather than a true absence of disease, underscoring the potential for substantial hidden burden in resource-limited contexts[18, 22].

From a public health perspective, these findings underscore the need for eating disorder–specific prevention and intervention strategies tailored to different socioeconomic settings. In high-SDI regions, population-level interventions addressing body dissatisfaction, media literacy, and early identification among adolescents may help mitigate the sustained burden observed in young women[22, 28]. In contrast, strengthening diagnostic capacity, improving

surveillance, and expanding access to mental health services remain critical priorities in low- and middle-SDI regions, where under-recognition of eating disorders may delay diagnosis and treatment.

Several limitations should be considered when interpreting these findings. Estimates from the GBD study rely on the availability and quality of underlying data and on modeling assumptions that may vary across regions, potentially leading to underestimation of burden in settings with sparse data[27]. In addition, projections of future trends assume continuity of past patterns and do not account for potential shifts in sociocultural norms, healthcare access, or policy interventions that could influence the future trajectory of anorexia nervosa burden[23]. Despite these limitations, the present study provides robust and comparable estimates that offer valuable insights into the global epidemiology of anorexia nervosa and its evolving public health impact[20].

CONCLUSIONS

Anorexia nervosa remains a substantial global public health challenge, characterized by a persistently increasing non-fatal burden and pronounced disparities across sex, age groups, and levels of socioeconomic development[12]. The disease burden is disproportionately concentrated among adolescents and young women, with these patterns remaining consistent across regions and SDI categories.

These findings underscore the need for sustained, eating disorder–specific prevention and intervention strategies that are responsive to both developmental stage and socioeconomic context. Strengthening early identification, improving access to appropriate care, and addressing sociocultural risk factors are essential to mitigating the long-term health impact of anorexia nervosa[26, 32]. Continued global surveillance and high-quality epidemiological data will be critical for informing targeted policies and resource allocation aimed at reducing the worldwide burden of this disorder.

Declarations

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Authors' contributions

W.X.K. contributed to the study design, data analysis, project administration, and drafting and editing of the manuscript. H.K.Y. and L.M.contributed to the study design, project administration, and review and editing of the manuscript. L.X. , W.Y. and X.L.S. contributed to the investigation, data curation, and revision of the manuscript. W.F.Y. contributed to the study design, funding acquisition, and revision of the manuscript. All authors read and approved the final manuscript.

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Availability of data and materials

Data will be made available on request.

Ethics approval and consent to participate

The data for this study were obtained from the Global Health Data Exchange GBD 2021 results website (https://vizhub.healthdata.org/gbd-results/), which are publicly available for free download and ethically approved in the original studies. Therefore, additional ethical approval was not required for our study.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Figures

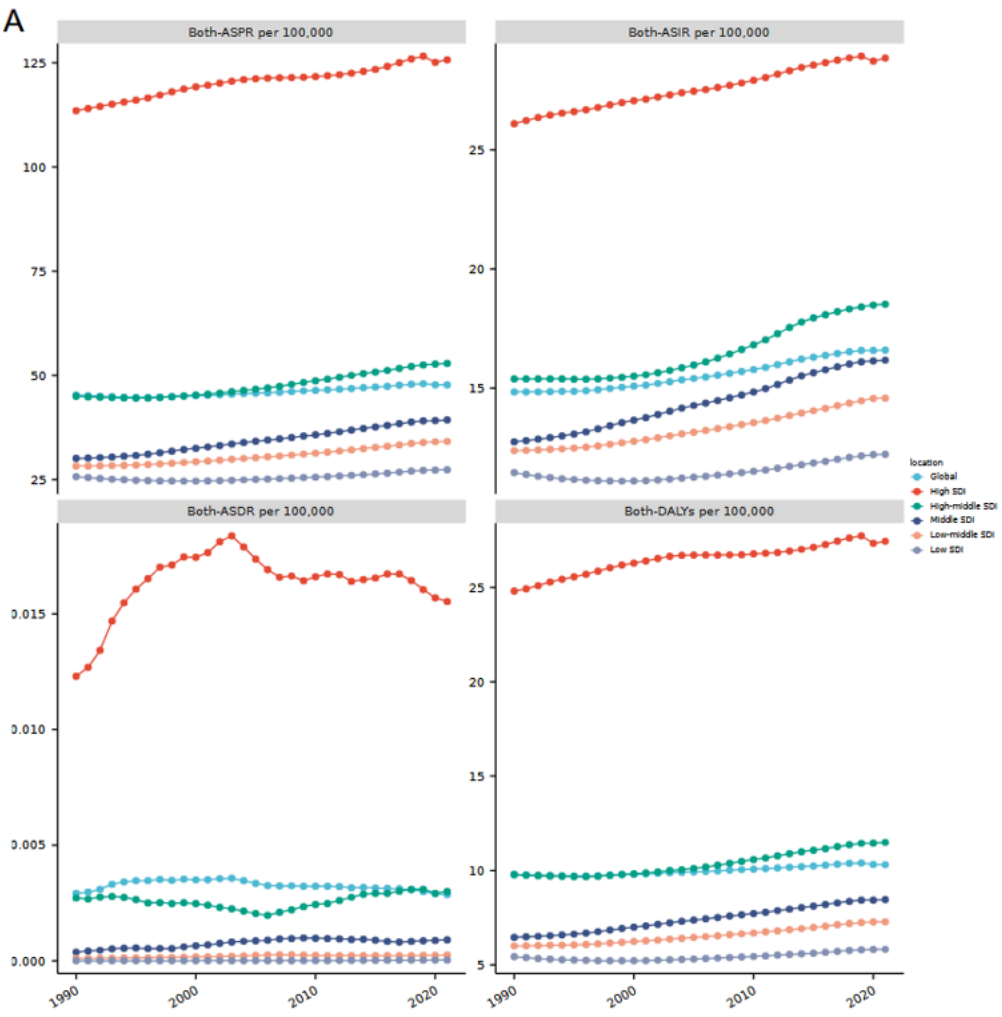

Figure 1

Global temporal trends in age-standardized prevalence rate (ASPR), incidence rate (ASIR), death rate (ASDR), and disability-adjusted life years (DALYs) of anorexia nervosa from 1990 to 2021. Solid lines represent point estimates, and shaded areas indicate 95% uncertainty intervals derived from the Global Burden of Disease (GBD) 2021 study.

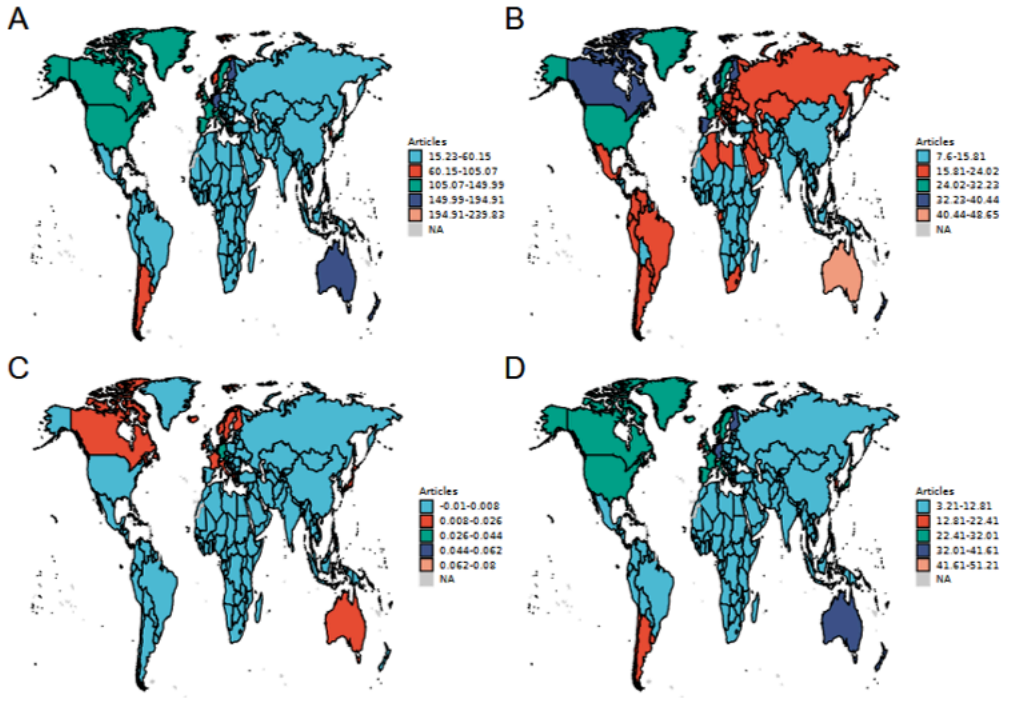

Figure 2

Age-standardized prevalence, incidence, death rate, and DALYs of anorexia nervosa stratified by Socio-demographic Index (SDI) quintile from 1990 to 2021. SDI quintiles reflect increasing levels of socioeconomic development, with high-SDI regions consistently exhibiting the highest burden across all indicators.

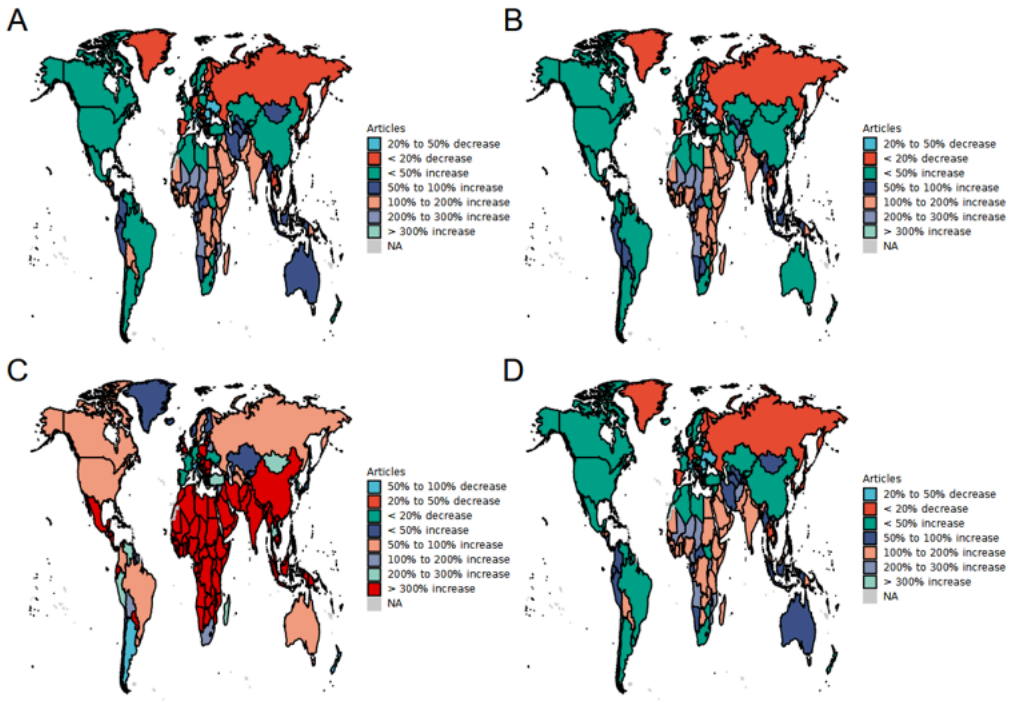

Figure 3

Geographic distribution and percentage change in age-standardized prevalence, incidence, death rate, and DALYs of anorexia nervosa at the national level between 1990 and 2021. Countries are colored according to the magnitude and direction of change over the study period.

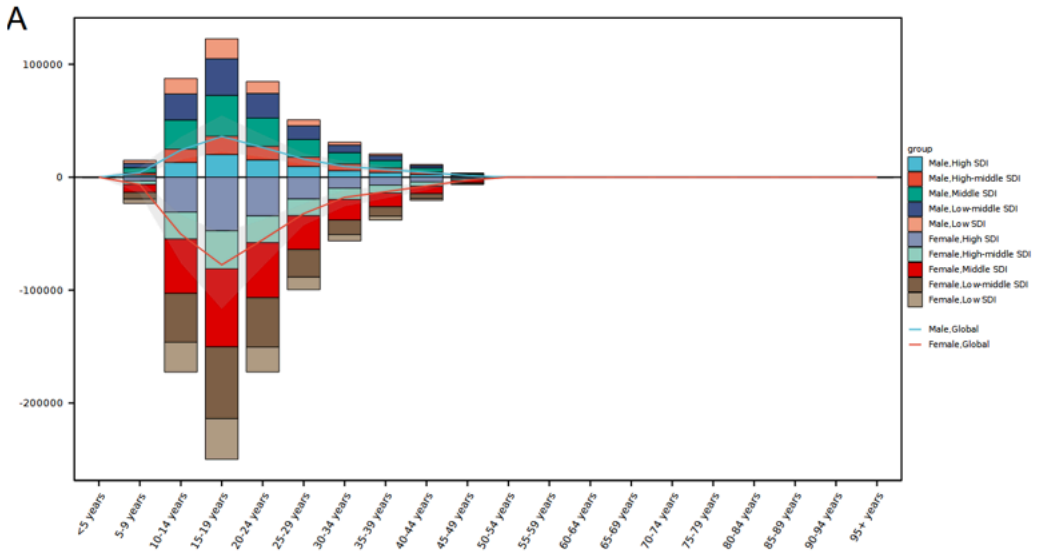

Figure 4

Age- and sex-specific incidence of anorexia nervosa across SDI regions in 2021. Incidence rates peak during adolescence and early adulthood, with substantially higher rates observed among females than males across all SDI categories.

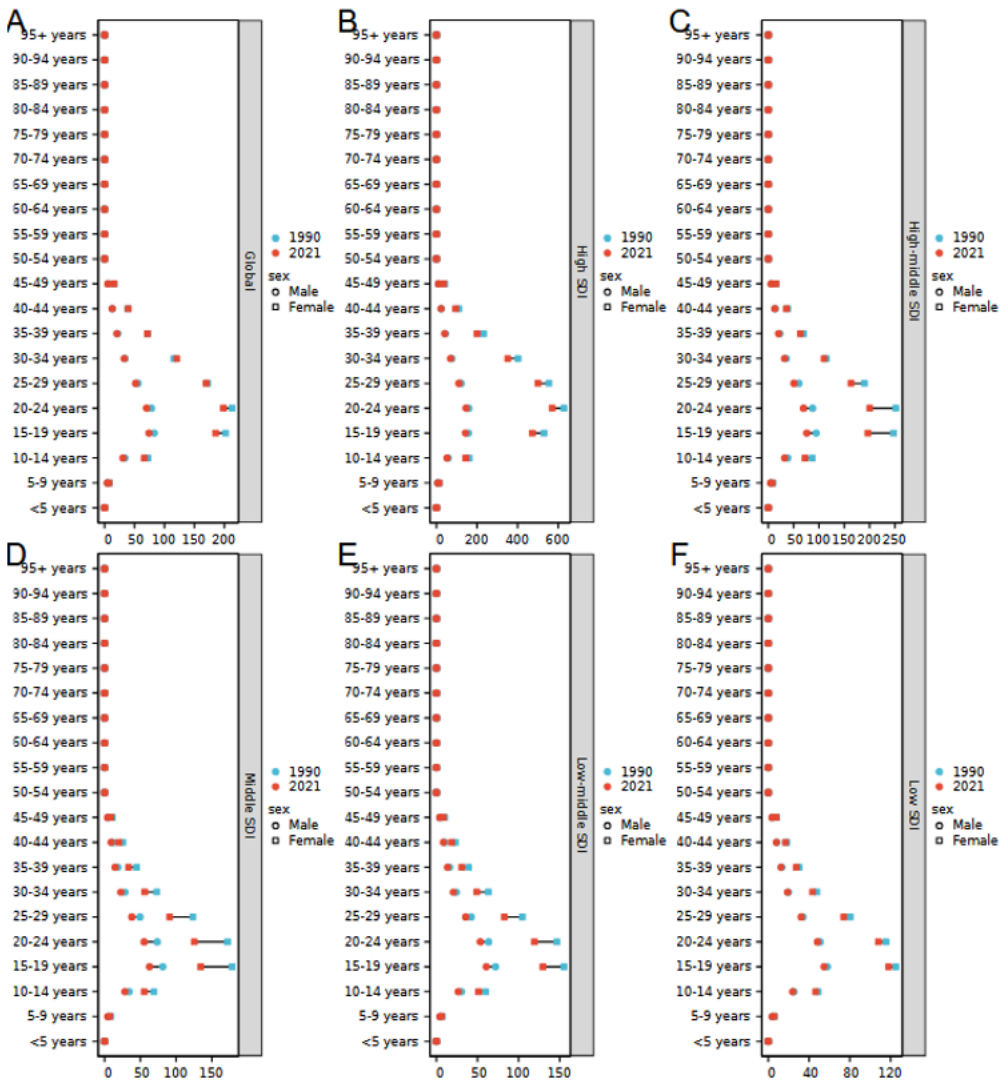

Figure 5

Age- and sex-specific prevalence of anorexia nervosa in 1990 and 2021 across SDI regions, illustrating persistent female predominance and concentration of disease burden in adolescent and young adult age groups.

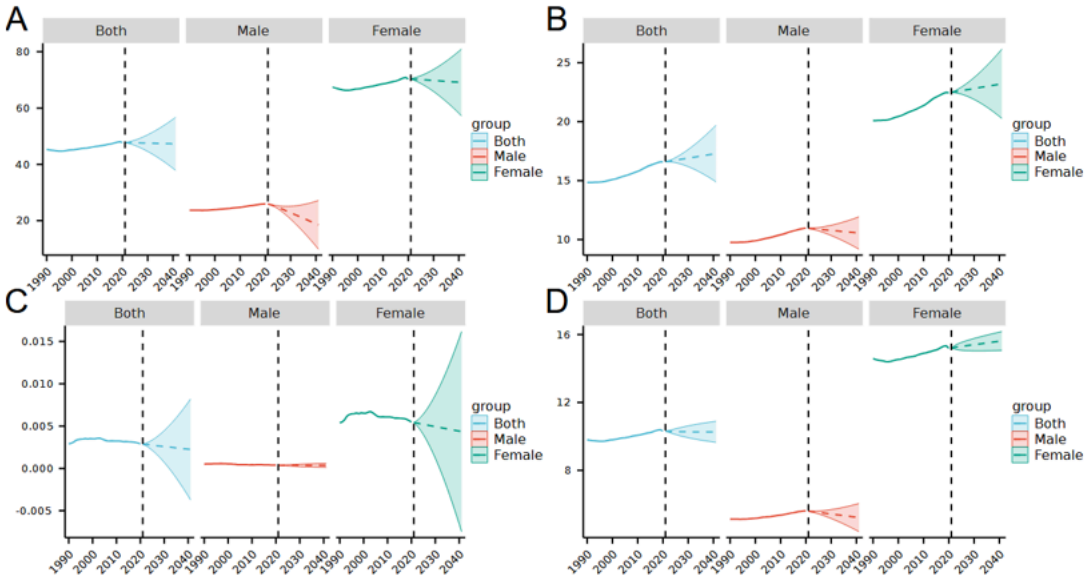

Figure 6

Projected global trends in age-standardized prevalence, incidence, death rate, and DALYs of anorexia nervosa from 2022 to 2041 based on autoregressive integrated moving average (ARIMA) models. Projections are presented with corresponding uncertainty intervals.