ORIGINAL ARTICLE

The global, regional, and national burden of psoriasis in 195 countries and territories, 1990 to 2017: A systematic analysis from the Global Burden of Disease Study 2017

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Background: Few existing studies on the global incidence, prevalence, and burden of disease from psoriasis are of high quality, making reliable data and comparisons difficult to find.

Methods: We analyzed global psoriasis trends from 1990 to 2017 in 195 countries worldwide through the Global Burden of Disease Study database, including age-standardized prevalence rates, percent change in age-standardized prevalence rates, age and sex patterns, and psoriasis burden using disability-adjusted life years.

Results: The age-specific prevalence rate in 2017 showed a left-skewed distribution with a peak between 60 and 70 years of age and a roughly equal male-to-female ratio across all ages. Psoriasis burden was greatest in countries with high income and high sociodemographic index. A positive linear relationship between psoriasis prevalence and comorbidities is seen with cardiovascular disease (R = .67), mental health (R = .63), type 2 diabetes mellitus (R = .55), stroke (R = .51), non-Hodgkin lymphoma (R = .84), Hodgkin lymphoma (R = .77), nonmelanoma skin cancer (R = .68), and inflammatory bowel disease (R = .55) across all countries in 2017.

Conclusion: There is increasing prevalence, burden, and associated comorbidities of psoriasis on a global scale and the need for support to reduce this important global health disparity. (J Am Acad Dermatol https://doi.org/10.1016/j.jaad.2020.04.139.)

Key words: age-standardized prevalence rates; cardiovascular disease; diabetes; disability-adjusted life years (DALYs); global medicine; Global Burden of Disease Study (GBD) database; gross domestic product (GDP) per capita; health care disparities; Hodgkin lymphoma; inflammatory bowel disease; mental health; non-Hodgkin lymphoma; nonmelanoma skin cancer; psoriasis; stroke.

Psoriasis is a chronic, noncommunicable inflammatory disease increasing in prevalence and morbidity in both adults and children of all ages across the globe; it affects approximately 100 million people worldwide.[1,2] The prevalence of psoriasis on a global scale across countries from published studies varies between 0.09% and 11.4%, but in most developed countries, the prevalence ranges from 1.5% to 5%.[1,2]

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Recently, multiple comorbidities with psoriasis have been found, including psoriatic arthritis, cardiovascular disease (CVD), metabolic syndrome, mental health conditions such as depression and anxiety, inflammatory bowel disease (IBD), and malignancies such as lymphoma.[3] The skin manifestations are commonly the only recognized symptom of psoriasis. Regardless, the chronic disease burden from psoriasis and its comorbidities may be a source of significant physical, emotional, and social stress due to disfigurement and disability. Disability (including loss of productivity) can lead to higher rates of depression in individuals affected by psoriasis and can significantly affect quality of life even with limited body surface area (BSA) involvement.[1] Low socioeconomic status can further worsen disease burden for patients with psoriasis because of a lack of access to health care.

CAPSULE SUMMARY

- The prevalence of psoriasis continues to increase, and it is the second largest contributor to skin-related disability. This article describes these trends on a global scale.
- Dermatologists can reduce the global burden of psoriasis through adequate treatment, screening for comorbidities, and providing appropriate specialist referrals.

One measurement of skin disease morbidity is disability-adjusted life years (DALYs), measured as years of life lost due to premature mortality in the population plus the years lost due to disability for people living with a health condition or its consequences.[4] One DALY can be thought of as 1 year of healthy life lost, and the sum of DALYs across a population is the burden of disease, which can be thought of as a measurement of the gap between health status at a given point in time and a disease- and disability-free state.[4] Furthermore, the sociodemographic index (SDI) was developed in 2016 to help track key measures of socioeconomic development, predict health outcomes, monitor inequalities, and monitor the impact of interventions on health outcomes such as DALYs.[5,6] The SDI is a composite average of income per capita, years of schooling, and total fertility rate (TFR) used to identify where countries sit on a spectrum of development on a scale of 0 to 1.[5] The TFR is a summary measure of the average number of children a woman would deliver over her lifetime.[5] One represents the highest possible income per capita, greatest average number of years of schooling, and lowest TFR.[5] Metrics such as DALYs and SDI may help dermatologists and key policy and decision makers interested in reducing global health disparities from psoriasis and its related comorbidities to focus their time and resources on interventions to help maximize public health impact.

In 2014, the member states of the World Health Organization (WHO) adopted resolution WHA67.9, recognizing psoriasis as a serious noncommunicable disease.[1] The resolution recognized needless global suffering from the disease due to incorrect or delayed diagnosis, inadequate treatment, insufficient access to care, and social stigmatization.[1] In 2016, the WHO released its global report on psoriasis to help raise awareness and empower policy makers to improve health care for and the social inclusion of people with psoriasis.[1] With increasing prevalence and burden of disease from psoriasis, it is important to provide a timely diagnosis to initiate adequate treatment, provide adequate screening for comorbidities, and provide appropriate specialist referrals to help manage comorbidities and improve quality of life.

In this observational study, we show multiple global trends in psoriasis from 1990 to 2017 in 195 countries worldwide through the Global Burden of Disease Study (GBD) database. We include age and sex patterns and psoriasis burden through DALYs, and we provide comparisons to SDI and multiple well-known associated comorbidities. To our knowledge, our study comparisons have not yet been made with the GBD study database.

This study aims to contribute to the growing body of research addressing global trends in and the global prevalence of psoriasis and its relationship with multiple comorbidities through GBD data; the database is one of the largest scientific collaborations in the world and the most comprehensive present-day effort of measuring global epidemiologic levels and trends.[5] This study is important because, as recognized by the WHO, few of the existing studies on the global incidence, prevalence, and burden of disease from psoriasis are of high quality, making reliable data difficult to find.[1] In addition, many existing studies are very difficult to compare because of different study methodologies, limitations, definitions of prevalence, case definitions of psoriasis, populations, ages studied, and sampling techniques.[1]

METHODS

Our data were derived from publicly available GBD data sets from 2017. The GBD data sets provide

Abbreviations used:

BSA: body surface area
CVD: cardiovascular disease
DALY: disability-adjusted life years
GBD: Global Burden of Disease Study
HL: Hodgkin's lymphoma
IBD: Inflammatory bowel disease
IHME: Institute for Health Metrics and Evaluation
NHL: non-Hodgkin's lymphoma
NMSC: nonmelanoma skin cancer
SDI: sociodemographic index
TFR: total fertility rate
T2DM: type 2 diabetes mellitus
WHO: World Health Organization

data to compare the magnitude of diseases, injuries, and risk factors across age groups, sexes, countries, regions, and time from 1990 to the present day for over 350 diseases in 195 countries.[5] The GBD project is led by the Institute for Health Metrics and Evaluation (IHME) at the University of Washington in collaboration with more than 3,600 researchers and more than 145 countries worldwide.[5] An in-depth protocol is available from the IHME on how data are obtained, incorporated, calculated, and published in the GBD study.[7]

We provided age patterns by sex and the total number of prevalent cases and age-specific prevalence rates of psoriasis on a global level and by region in 2017 (Figs 1 and 2). Age-standardized psoriasis DALYs per 100,000 were then compared to the absolute SDI values of all 195 GBD countries globally in 2017 (Fig 3). When looking at the relationship between the prevalence of psoriasis cases per 100,000 and the prevalence of cases of psoriasis comorbidities per 100,000, the comorbidities were separated based on high total comorbidity prevalence or low total comorbidity prevalence. Highly prevalent psoriasis comorbidities include CVD, type 2 diabetes mellitus (T2DM), mental health (eg, depression and anxiety), and stroke. Psoriasis comorbidities with lower prevalence include nonmelanoma skin cancer (NMSC), IBD, non-Hodgkin lymphoma (NHL), and Hodgkin lymphoma (HL). Statistical analyses were performed using a 2-tailed linear regression using SPSS Statistics, version 25.0 (IBM, Armonk, NY). Significance was set to a P value of less than .05.

RESULTS

The age-specific prevalence rate in 2017 showed a left-skewed distribution with a peak between 60 and 70 years of age, with roughly an equivalent number of males and females affected across all age groups (Fig 1). In a regional comparison of psoriasis prevalence by sex, high-income North America ranked highest for both females (2738 cases per 100,000) and males (2554 cases per 100,000) (Fig 2). Western Europe ranked second and Australasia third. High-income Asia Pacific ranked lowest for females (364 cases per 100,000), and Oceania ranked lowest for males (367 cases per 100,000). Overall, there does not appear to be a significant difference in prevalence between males and females in any particular region. A clustering of countries and regions with both high psoriasis DALYs and high SDI scores could be seen when comparing age-standardized DALY rates and SDI scores across all the countries surveyed by the GBD database in 2017 (Fig 3). These countries and regions included the United States, Canada, Greenland, Scandinavia, Western Europe, Southern Europe, Israel, Australia, and New Zealand. The countries and regions with the lowest DALYs and lowest SDI scores included Afghanistan and all regions of Sub-Saharan Africa (South, West, Central, and East Africa).

When comparing the prevalence of psoriasis cases per 100,000 and the most highly prevalent psoriasis comorbidities per 100,000 across all 195 GBD countries in 2017, a positive linear relationship is seen with CVD (R = .67), mental health (R = .63), T2DM (R = .55), and stroke (R = .51). The comparison with psoriasis comorbidities of lower prevalence found a positive association with NHL (R = .84), HL (R = .77), NMSC (R = .68), and IBD (R = .55).

DISCUSSION

Both the global prevalence and associated DALYs of skin diseases and psoriasis have grown to the present day. The global prevalence of all skin disease was 26.8% in 2017, up from 26.2% in 1990, and the percentage of total DALYs due to skin and subcutaneous diseases was 1.8% in 2017, up from 1.2% in 1990.[8] The global prevalence of psoriasis also increased from 0.7% in 1990 to 0.9% in 2017, and the percentage of total DALYs due to psoriasis increased from 0.1% in 1990 to 0.2% in 2017.[8] Compared to all subcategories of the dermatoses measured by the GBD, psoriasis ranked as the tenth most prevalent skin disease (0.9%) and the second largest contributor to all combined skin DALYs (0.2%) in 2017.[8,9] Other dermatosis subcategories measured by the GBD include dermatitis (atopic, contact, and seborrheic), bacterial skin diseases (cellulitis and pyoderma), scabies, fungal skin diseases, viral skin disease, acne vulgaris, alopecia areata, pruritus, urticaria, decubitus ulcer, other skin and subcutaneous diseases, basal cell carcinoma, squamous cell carcinoma, and melanoma.[8]

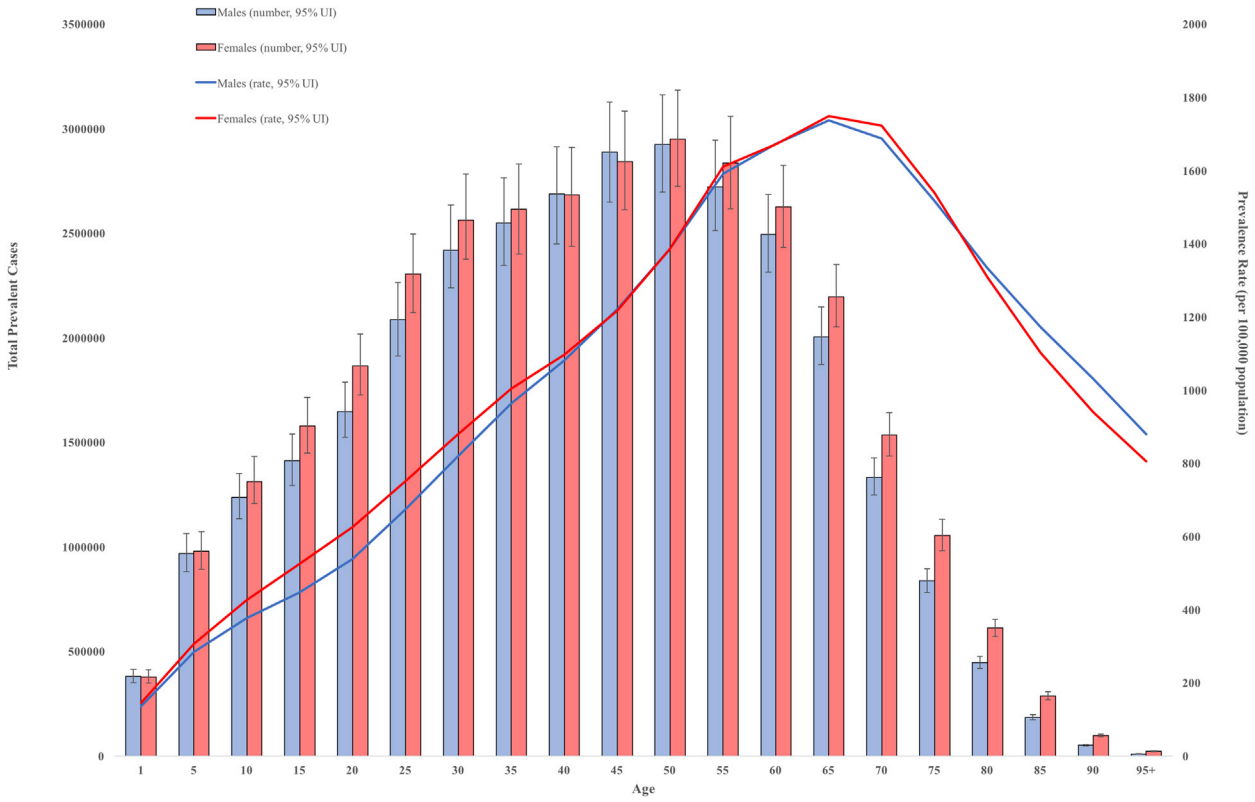

Fig 1. Age patterns by sex in 2017 of the total number of prevalent cases and age-specific prevalence rates of psoriasis at the global level. *UI*, uncertainty interval.

Our study results support existing data showing that psoriasis is a common dermatosis with wide geographic variance and multiple comorbidities. A systematic review of 54 studies found that there appeared to be some association in the prevalence of psoriasis and country distance from the equator.[2] Countries closer to the equator (eg, Egypt, Tanzania, Sri Lanka, and Taiwan) reported lower prevalence of psoriasis compared to countries farther from the equator (eg, Europe and Australia).[2] The geographic variation is not well understood and may be due to a combination of climate, genetics, and environmental factors such as antigen exposure, sunlight exposure, and vitamin D levels.[2,10]

Additionally, studies of age-specific trends in the global prevalence of psoriasis have shown a first peak around 20 to 29 or 30 to 39 years of age, with an increase to approximately 60 years before prevalence decreased.[2] Our data showed similar findings in age-specific trends in global prevalence but with a single peak around age 50 years (Fig 1). There are few data correlating psoriasis with the socioeconomic status of countries, but studies have shown a significant association between poor control of psoriasis and lower educational attainment.[11,12]

The association between psoriasis and CVD due to atherosclerosis and increased prevalence of cardiovascular risk factors is well known and may be due to chronic vessel inflammation mediated by increased T helper type 1 and 17 cytokine expression.[13,14] However, there are no studies showing whether the treatment of coexisting cardiovascular risk factors or psoriasis itself will reduce the atherosclerotic burden.[15] The increased risk of T2DM and diabetic complications in psoriasis are independent of traditional risk factors such as age, sex, or body mass index and may contribute to 125,650 new comorbid diagnoses of T2DM worldwide annually.[16,17] Furthermore, more than 10% body surface involvement has been found to have greater association with new cases of T2DM, and 1 meta-analysis of 5 cohort studies found a relative risk for diabetes of 1.27 (95% confidence interval [CI], 1.16-1.40).[17,18] The implications of these findings from a population standpoint include measuring psoriasis BSA as part of routine care and more aggressive targeted prevention interventions for those with greater BSA involvement.[17] Collaboration with primary care providers can help reduce the overall burden of disease from these common comorbidities in patients with psoriasis.

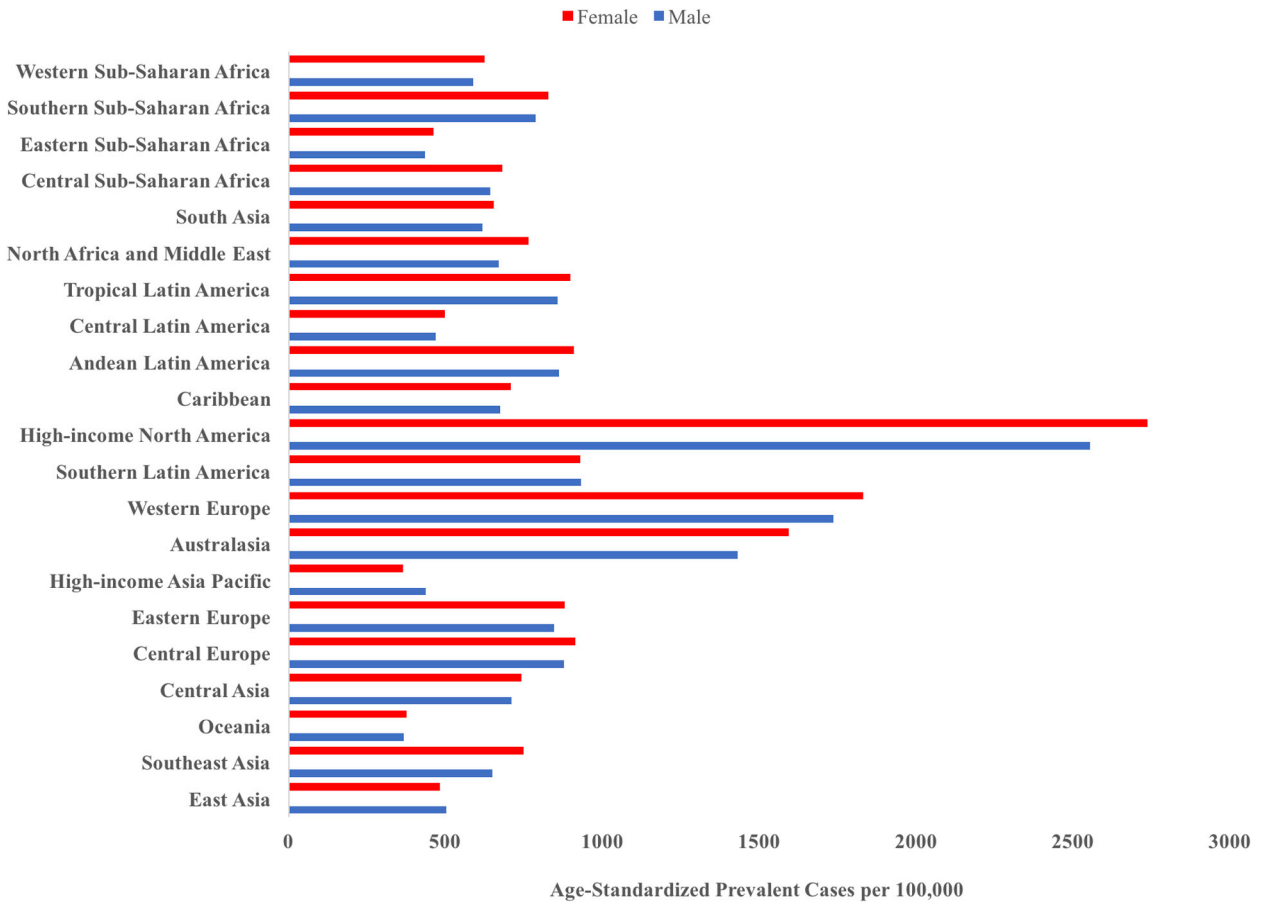

Fig 2. Age-standardized prevalence of psoriasis by sex and geographic region in 2017.

The increased risk of stroke in patients with psoriasis may have a similar pathogenesis as the chronic inflammation seen in CVD.[19] A population-based cohort study in the United Kingdom found that severe psoriasis was associated with a 44% increased risk of stroke.[19] A less positive association was seen with mild psoriasis as well, and these correlations persisted when controlling for major cardiovascular risk factors including age, diabetes, history of stroke or transient ischemic attack, hyperlipidemia, hypertension, male sex, and smoking status.[19] Addressing risk reduction of these common comorbidities in the prevention of stroke remains paramount in the dermatologic care plan of patients with psoriasis.

Psoriasis has also been associated with numerous malignancies including NMSC, NHL, and HL. Although it is difficult to assess the baseline risk of skin cancer because of confounding variables such as phototherapy and immunosuppressive treatments, an increased rate of NMSC has been found in patients with psoriasis, especially those receiving oral psoralen and ultraviolet A therapy.[20] A population-based cohort study also found a strong association between psoriasis and lymphoma (relative risk, 2.95; 95% CI, 1.83-4.79).[21] A follow-up cohort study showed that the overall risk of lymphohematopoietic cancers was increased in patients with psoriasis who did not receive treatment and had psoriasis for longer than 2 years.[22] A systematic review and meta-analysis of 112 studies and more than 2 million patients found an overall increase in the risk of keratinocyte cancers, lymphomas, lung cancer, and bladder cancer in patients with psoriasis but found no increase in cancer among patients with psoriasis treated with biologics (relative risk, 0.97; 95% CI, 0.85-1.10).[23] New or recurrent cancer rates are modest and should be compared to the benefits of actively treating psoriasis, especially with the consideration of other psoriasis comorbidities.[20]

There are important limitations to consider in the context of the global burden of psoriasis. As mentioned previously, studies measuring the prevalence and incidence of psoriasis often differ in focus based on the target populations, sex categories, and age groups, making data difficult to compare because of different study methodologies. Further limitations include descriptions of case definitions

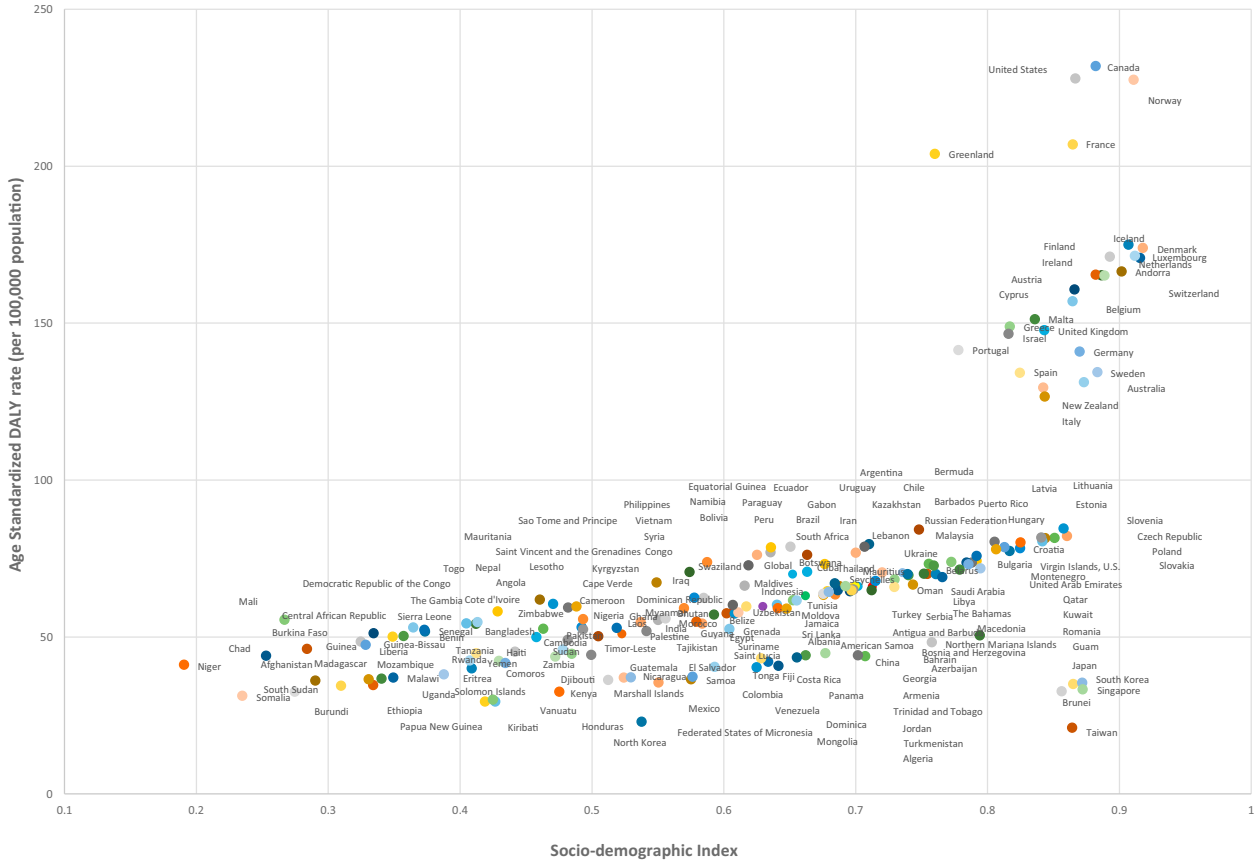

Fig 3. Age-standardized DALY rates from psoriasis by SDI for 195 countries and territories in 2017. *DALY,* Disability-adjusted life year; *SDI,* sociodemographic index.

(eg, self-reported, physician's, or dermatologist's diagnosis) or how prevalence is defined (eg, point prevalence, period prevalence, and lifetime prevalence).[1,2] Available studies for comparisons among the different GBD regions may also be limited by geographic coverage, where certain populations have a relative over- or underrepresentation of total studies in comparison to their total population. An example is the GBD estimates for skin and subcutaneous diseases in Sub-Saharan Africa, which includes 53 total studies for 46 countries, whereas estimates for the United States are based on 62 total studies with one third of the population.[1,24] The social stigmatization associated with psoriasis may also lead to an underestimation of global cases because of underreporting by patients.[1,24]

As recognized by the WHO, psoriasis continues to contribute to needless global suffering due to incorrect or delayed diagnosis, inadequate treatment, insufficient access to care, and social stigmatization.[1] Part of the problem may stem from individuals viewing psoriasis as something limited only to the skin, without realizing the associated increased risk of many other conditions. Dermatologists continue to face the challenge of raising global awareness and treating psoriasis to improve health care outcomes, quality of life, social inclusion, and the addressing of comorbidities as they strive to reduce the global burden of the disease. Increased outreach, funding, collaboration, and development of new therapies are promising steps to overcome this challenge and reduce the global burden of psoriasis and its comorbidities.

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