



# The burden of skin diseases in India: Global Burden of Disease Study 2017

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## Abstract

**Background:** The prevalence of skin diseases has increased over the last few decades, and they contribute to a significant burden on health-care systems across the world.

**Aims/Objective:** This report looks at the burden of skin and subcutaneous diseases in terms of years lived with disability and age-standardised years lived with disability in India using the Global Burden of Disease Study results from 2017.

**Methods:** Data were obtained from the Global Burden of Disease online interactive tool. Updated estimates of the world's health for 359 diseases and injuries and 84 risk factors from 1990 to 2017 are available in this interactive tool.

**Results:** Years lived with disability due to skin and subcutaneous diseases accounted for 4.02% of the total years lived with disability in India in 2017. There was an increase of 53.7% in all age standardised years lived with disability for all the skin and subcutaneous diseases from 1990 to 2017. Among skin and subcutaneous diseases, dermatitis contributed maximum years lived with disability (1.40 million; 95% uncertainty interval, 0.82–2.21) in 2017, followed by urticaria (1.02 million; 95% uncertainty interval, 0.06–1.44) with percentage increases of 48.9% and 45.7% respectively.

**Conclusion:** The burden due to infectious skin diseases (e.g., scabies, fungal skin disease and bacterial skin disease) and non-infectious diseases (e.g., dermatitis, urticaria and psoriasis) has increased over the past three decades, however the age-standardised years lived with disability for leprosy, scabies, fungal infections, sexually transmitted infections and non-melanoma skin cancer (basal cell carcinoma) has decreased. The high burden of skin and subcutaneous diseases demand that they be given due importance in the national programmes and health policy of India.

**Keywords:** Global Burden of Disease, skin and subcutaneous diseases, years lived with disability, prevalence and incidence of skin diseases

## Plain Language Summary

The prevalence of skin diseases has increased over the last few decades and they contribute to a significant burden on the healthcare systems all across the world. This study aims to measure the burden of skin and subcutaneous diseases in terms of years lived with disability (YLDs) in individuals with skin diseases. The data for the study was obtained from a Global Burden of Disease online interactive tool. YLDs due to skin and subcutaneous diseases accounted for 4.02% of the total YLDs in India in 2017; dermatitis, urticaria and acne contributed significantly to the burden of skin diseases in India. However, infections and infestations also contribute to nearly 30% of the total YLDs due to skin and subcutaneous diseases. (fungal skin diseases- 12.6%, viral skin diseases-10.0% and scabies- 10.3%). The burden due to both infectious skin diseases (e.g. scabies, fungal skin disease, bacterial skin disease) and non infectious diseases (e.g. dermatitis, urticaria, Psoriasis) has increased over the last 3 decades; however, there is a substantial improvement in the age standardized YLDs (-39.8%) for Leprosy which can be attributed to the intensive efforts of Government of India and successful national programme strategies. The high burden and socioeconomic impact of skin and subcutaneous diseases demand that they should be given due importance in national programmes and health policy of India.

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## Introduction

Skin and subcutaneous diseases are responsible for significant morbidity worldwide, but they do not get due importance in national health planning and policies in several countries.<sup>1</sup> Although mortality due to skin diseases is low, they contribute to significant disability, and the non-fatal burden of skin and subcutaneous diseases is more than that of cardiovascular diseases in India. In 2017, age-standardised years lived with disability for cardiovascular diseases in India were 332.96 as compared to 455.06 per 100,000 for skin and subcutaneous diseases. In the global burden of disease study 2017, skin diseases ranked 10<sup>th</sup> whereas cardiovascular diseases ranked 12<sup>th</sup> according to age-standardised years lived with disability.<sup>2</sup>

The Global Burden of Disease study is a comprehensive regional and global research study of disease burden that assesses mortality and disability due to major diseases, injuries and risk factors using disability-adjusted life years; the data was analysed using the Global Burden of Disease 2017 data set. The disability-adjusted life-year measures health loss due to fatal and non-fatal diseases. Disability-adjusted life years are the sum of the years of life lost due to premature mortality and years of life lived with disability. The years of life lost are based on remaining life expectancy when compared with a reference standard life table of age at death, and the years lived with disability are calculated by multiplying the prevalence of a disease or injury and its main disabling outcomes by its weighted level of severity. One disability-adjusted life year represents one year of healthy life lost.<sup>3</sup>

Although skin diseases do not contribute significantly to the years of life lost and disability-adjusted life years due to skin diseases are less, their impact on disability or years lived with disability is much more significant.<sup>3,4</sup>

In the Global Burden of Disease Study 2017, twelve dermatoses i.e., psoriasis, dermatitis (atopic, contact and seborrheic), scabies, bacterial skin infections (cellulitis and pyoderma), fungal skin diseases, pruritus, viral skin diseases, acne vulgaris, alopecia areata, urticaria, decubitus ulcer and other skin and subcutaneous diseases are included under the category of skin and subcutaneous diseases. Some other dermatoses or conditions which are generally managed by dermatologists such as leprosy and melanomas, are not included in the skin and subcutaneous diseases category but are classified under 'neglected tropical diseases' and 'neoplasms' respectively, hence disability due to these is not represented in the skin and subcutaneous disorders group. Similarly, years lived with disability due to sexually transmitted diseases excluding HIV are also calculated separately. Hence, the skin and subcutaneous disease category in the Global Burden of Disease Study 2017 may not represent the entire burden of all dermatoses.

The prevalence of skin diseases has increased over the past few decades and they contribute to a significant burden on

health-care systems across the world. Most of the data on the epidemiology of skin disease from India is in the form of small case series or surveys from hospitals or communities and it does not give us the true picture of disease burden in the country. We obtained data from the Global Burden of Disease Study 2017 on burden of skin and subcutaneous diseases in terms of years lived with disability and age-standardised years lived with disability in India. Years lived with disability can be described as years lived in less than ideal health and can be measured by multiplying the prevalence of the condition with the disability weight of that condition. Disability weight reflects the severity of that condition.<sup>5</sup> Since age composition varies across world populations, age-standardised years lived with disability are adjusted for differences in age distribution of the population and are expressed per 100,000 population. These rates are computed using the average world population age-structure constructed by the World Health Organisation for the period 2000-2025.<sup>6,7</sup>

## Methods

The data for the study were obtained from the Global Burden of Disease online interactive tool (<http://www.healthdata.org/data-visualization/gbd-india-compare>). Updated estimates of the world's health for 359 diseases and injuries and 84 risk factors from 1990 to 2017 were available in this interactive tool. Patterns and trends by country, age and sex can also be explored. This interactive tool allows the analysis of health levels and trends. This tool includes maps, arrow diagrams and other charts to compare and explore trends. Results at the sub-national level are also available for select countries. The map displays country or sub-national estimates. Detailed data can be seen by placing the cursor on a section of the map or a dot above the map legend. Using the advanced setting in the tool, age-standardised rates can also be retrieved.<sup>8</sup>

The Global Burden of Disease Study includes the most up-to-date data available and it is updated by addition of new studies that are continuously extracted from the literature for addition into the key data sources. The Global Burden of Disease Study acquires its data from multiple sources (scientific papers and hospital data sources). They also use extrapolation methodology, based on Bayesian techniques, to estimate missing data to fill the data gap for the many countries and regions with no relevant data sources. Global Burden of Disease study is fully compliant with the Guidelines for Accurate and Transparent Health Estimates Reporting (GATHER).<sup>9</sup> The selection of skin conditions studied and reported in the Global Burden of Disease dataset reflects the prevalence, the case definition and the availability of the data. Diseases-specific years lived with disability were obtained using this online interactive tool. Data were obtained for 12 skin conditions included under the category of skin and subcutaneous diseases, leprosy, sexually transmitted diseases (excluding HIV), malignant skin melanoma and non-melanoma skin cancer (squamous cell carcinoma and basal cell carcinoma). It was then summarised as prevalence

and incidence figures, years lived with disability in millions and age-standardised years lived with disability per 100,000 population.

## Results

Years lived with disability due to skin diseases accounted for 4.02% of the total years lived with disability in India in the year 2017. There were 4.07 million (95% uncertainty interval 2.65–6.19 million) years lived with disability due to skin and subcutaneous diseases in 1990, which increased to 6.26 million (95% uncertainty interval 4.12–9.35 million) in 2017. Although the number of years lived with disability has increased by 53.7% between 1990 and 2017, the increase in age-standardised years lived with disability rates was only 1.52%.

Dermatitis (atopic, seborrheic and contact) contributed maximum to years lived with disability (1.40 million, 95% uncertainty interval:0.82–2.21) in 2017 followed by urticaria (1.02 million, 95% uncertainty interval 0.06–1.44) with percentage increases of 48.9% and 45.7%, respectively. Infections and infestations contributed to nearly 30% of the total years lived with disability due to skin and

subcutaneous diseases (fungal skin diseases- 12.6%, viral skin diseases-10.0% and scabies- 10.3%) [Table 1].

Over the past three decades, the number of years lived with disability from acne vulgaris increased by 153.8%, decubitus ulcer by 137.5% and other skin diseases by 115.7%. There were also significant percentage increases in years lived with disability due to psoriasis (89.7%), pruritus (85.7%) and alopecia areata (75%). During the same interval, age-standardised years lived with disability rates per 100,000 due to leprosy decreased from 1.58 (95% uncertainty interval 1.05–2.24) in 1990 to 0.95 (95% uncertainty interval 0.63–1.36) in 2017, a percentage decrease of 39.8%. There was an increase in the years lived with disability due to sexually transmitted diseases (excluding HIV) between 1990 (0.13; 95% uncertainty interval 0.07–0.24) and 2017 (0.24[0.13–0.42]) with a negligible decrease (0.94%) in the age-standardised years lived with disability rates. The percentage increase in the number of years lived with disability due to malignant melanoma during the same interval was 215.7% with a significant increase in age-standardised years lived with disability (59.4%). Similarly, the years lived with disability due to non-melanoma skin cancers like squamous

**Table 1: Prevalence, incidence, number of years lived with disability and age-standardised years lived with disability rate from skin and subcutaneous diseases in India, 1990 to 2017 (Source: The Global Burden of Disease Study 2017)**

Cause	Prevalence counts (thousands) 2017	Incidence counts (thousands) 2017	Number of years lived with disability (millions)			Age-standardised years lived with disability rates (per 100,000)		
			1990 (95% uncertainty interval)	2017 (95% uncertainty interval)	Change %	1990 (95% uncertainty interval)	2017 (95% uncertainty interval)	Change %
Skin and subcutaneous diseases	319993.3 (308027.7–333594.6)	680819.6 (643700.9–720884.5)	4.07 (2.65–6.19)	6.26 (4.12–9.35)	53.7	448.24 (294.05–684.5)	455.06 (300.66–681.52)	1.52
Scabies	25207.6 (21851.9–29094.1)	75735.3 (65480.4–87555.8)	0.45 (0.25–0.74)	0.65 (0.36–1.06)	44.4	48.06 (26.71–78.44)	45.5 (25.32–74.35)	-5.32
Dermatitis	36741.9 (34699.4–38755.5)	38605.7 (34043.7–43539.0)	0.94 (0.55–1.50)	1.40 (0.82–2.21)	48.9	100.07 (59.61–156.98)	100.29 (59.29–158.06)	0.22
Psoriasis	8671.4 (8389.2–8973.2)	1285.3 (1240.2–1336.8)	0.39 (0.28–0.52)	0.74 (0.53–0.98)	89.7	51.53 (36.82–67.95)	55.37 (39.3–73.17)	7.45
Bacterial skin disease	1769.6 (1713.9–1824.1)	44262.1 (43208.9–45271.8)	0.02 (0.01–0.03)	0.03 (0.02–0.04)	50	1.92 (1.2–2.98)	2.04 (1.27–3.21)	6.25
Fungal skin disease	141671.6 (128430.2–156814.1)	367710.4 (331704.0–405204.6)	0.62 (0.22–1.32)	0.79 (0.32–1.65)	27.4	70.43 (28.05–148.73)	61.18 (24.27–127.72)	-13.1
Viral skin disease	20745.7 (19674.7–21813.1)	21358.8 (20170.8–22461.0)	0.48 (0.30–0.71)	0.63 (0.40–0.94)	31.3	45.37 (28.96–67)	45.52 (29.04–67.25)	0.33
Urticaria	17053.1 (14838.3–19589.2)	29942.0 (26145.6–34169.6)	0.7 (0.4–0.9)	1.02 (0.06–1.44)	45.7	72.86 (48.18–102.37)	73.44 (48.63–103.02)	0.79
Alopecia Areata	2373.3 (2279.3–2477.2)	4205.5 (4035.8–4390.8)	0.04 (0.02–0.06)	0.07 (0.05–0.11)	75	5.46 (3.52–8.09)	5.48 (3.54–8.15)	0.37
Pruritus	13090.3 (11698.9–14835.8)	10213.9 (8988.4–11558)	0.07 (0.03–0.14)	0.13 (0.06–0.26)	85.7	9.99 (4.71–18.79)	10.44 (4.91–19.72)	4.5
Decubitus ulcer	118.2 (105.1–132.1)	432.9 (387.9–484.9)	0.008 (0.006–0.012)	0.019 (0.013–0.026)	137.5	1.551.07–2.11)	1.76 (1.22–2.4)	13.5
Acne vulgaris	15541.01 (13707.3–17748.7)	8158.3 (7131.6–9347.4)	0.13 (0.07–0.20)	0.33 (0.19–0.53)	153.8	13.45 (8.01–21.54)	21.59 (12.76–34.55)	60.5
Other skin diseases	76102.7 (74287.2–77945.0)	78908.7 (77042.8–80809.8)	0.19 (0.09–0.36)	0.41 (0.20–0.76)	115.7	27.54 (13.26–50.7)	32.44 (15.64–59.76)	17.8

**Table 2: Prevalence, incidence, number of years lived with disability and age-standardised years lived with disability rate from leprosy, sexually transmitted diseases and skin malignancies in India, 1990 to 2017 (Source: The Global Burden of Disease Study 2017)**

Cause	Prevalence counts (thousands) 2017	Incidence counts (thousands) 2017	Number of years lived with disability (millions)			Age-standardised years lived with disability rates (per 100,000)		
			1990 (95% uncertainty interval)	2017 (95% uncertainty interval)	Change %	1990 (95% uncertainty interval)	2017 (95% uncertainty interval)	Change %
Leprosy	186.6 (168.9–208.7)	25.8 (23.9–28.1)	0.01 (0.007–0.02)	0.009 (0.006–0.013)	–10	1.58 (1.05–2.24)	0.95 (0.63–1.36)	–39.8
Sexually transmitted diseases excluding HIV	157514.4 (143119.3–173992.9)	111729.9 (100087.5–125952.4)	0.13 (0.07–0.24)	0.24 (0.13–0.42)	84.6	16.87 (9.22–30.03)	16.71 (9.13–29.41)	–0.94
Malignant skin melanoma	14.3 (9.9–16.1)	3.2 (2.2–3.6)	0.00038 (0.00023–0.00058)	0.0012 (0.0007–0.0017)	215.7	0.069 (0.043–0.11)	0.11 (0.065–0.15)	59.4
Non-melanoma skin cancer (squamous cell carcinoma)	2.03 (1.01–3.49)	8.53 (4.68–13.3)	0.000032 (0.000015–0.000062)	0.000095 (0.000043–0.00017)	196.8	0.0074 (0.0035–0.013)	0.0094 (0.0043–0.017)	27.02
Non-melanoma skin cancer (basal cell carcinoma)	4.84 (2.53–8.49)	62.9 (35.1–103.3)	0.000011 (0.000004–0.000026)	0.000021 (0.000007–0.000048)	90.9	0.002 (0.00069–0.0045)	0.0017 (0.00062–0.0041)	–15

cell carcinoma and basal cell carcinoma also increased by 196.8% and 90.9%, respectively [Table 2].

## Discussion

India has witnessed an epidemiological drift in the last few decades and the overall years of life lost from all diseases have decreased from 82.5% (1990) to 67.2% (2016) and the years lived with disability have increased from 17.5% to 32.8% of the total disability-adjusted life years.<sup>10</sup> Diseases such as lower back and neck pain, other musculoskeletal disorders, migraine, skin diseases, depressive disorders, diabetes and anxiety disorders are among the top ten causes of years lived with disability in India.<sup>10</sup> The epidemiology and burden of diseases in India is of global interest as nearly 18% of the world population lives in India and there are vast differences in the ethnicity and economic status of the inhabitants. In the past ten years, economic growth in India has been one of the fastest in the world, but the distribution of wealth is unequal. There are now divergent clusters of disease; the prevalence and incidence of diabetes, obesity and cardiovascular diseases have increased and these are considered to be associated with overnutrition and affluence, but we also have significant morbidity due to diarrhea and lower respiratory tract infections which are associated with malnutrition, poverty and poor hygiene.<sup>10</sup> A similar situation is seen with skin diseases where diseases such as psoriasis and urticaria appear to have increased alongside scabies, fungal and viral skin infections. Increased magnitude of the burden of skin and subcutaneous diseases with negligible improvement in the age-standardised years lived with disability is a matter of concern as a substantial portion of these years lived with disability are amenable to prevention and treatment.

Although the age-standardised years lived with disability figures are declining for scabies and fungal dermatoses, there is a relatively large increase for bacterial skin infections and modest increase for viral skin infections. The increase in the number of years lived with disability due to scabies (44.4%) and fungal skin diseases (27.4%) in close to three decades from 1990 to 2017 has been substantial, although diseases such as scabies and fungal skin diseases are considered easily treatable and can be significantly controlled by improvement in hygienic practices.

The data from India also show that all-age burden of acne has increased to about 153.8% with the maximum increase in the age-standardised years lived with disability (60.5%). Various reasons have been proposed for this increasing burden or increasing prevalence of acne globally, including earlier onset of puberty, genetic drift, environmental factors including the Western diet, socioeconomic status and changing societal perceptions.<sup>11</sup> Similar trends were also observed with increases in age-standardised years lived with disability for malignant melanoma (59.4%) and squamous cell carcinoma (27.02%). This could be attributed to increased life expectancy, more exposure to harmful chemicals, pollution, better awareness among people and better access to health-care facilities.

There was a significant decrease in years lived with disability with substantial improvement in the age-standardised years lived with disability (–39.8%) for leprosy which can be attributed to the intensive efforts of the Government of India and successful national program strategies.<sup>12</sup> However, similar trends were not seen in sexually transmitted infections where the total number of years lived with disability increased by 84.6% despite a national program for sexually

transmitted diseases. The increasing burden of sexually transmitted infections could be due to a variety of factors: sociocultural, economic, political and most importantly, sexual behaviour. Rising inequalities in income, increased globalisation, higher proportions of persons living outside of their cultures, increased numbers of unemployed people and widespread use of cellphones and the internet may all facilitate the formation of short-term sexual partnerships and contribute to an increasing incidence of sexually transmitted infections.

The Global Burden of Disease also gives us an indirect estimate of the socio-economic burden of the skin diseases in a country like India, where most of the health-care cost is paid out of pocket by patients themselves. In a study, it was observed that the median value of health-care cost was 73% of per capita monthly income; the increasing prevalence and incidence of skin diseases therefore imply a significant burden.<sup>13</sup>

#### Limitations

The estimates in the Global Burden of Disease Study 2017 may underestimate the true burden of skin and subcutaneous diseases because some skin conditions like benign skin tumours and dermatological manifestations of systemic illnesses are not individually categorised; cutaneous lupus erythematosus and systemic sclerosis are grouped under musculoskeletal diseases. Some dermatological conditions have been left out due to non-availability of data. The disability weight measures only the direct impact of diseases like itch or skin disfigurement and does not include the impact of complications of these disorders which can often be multifocal. Stigma associated with skin diseases may also lead to underreporting and thereby underestimation.

#### Conclusion

Skin disease particularly dermatitis and urticaria causes significant disease burden in India. The burden due to both infectious skin diseases (e.g., scabies, fungal and viral skin diseases) and non-infectious diseases (e.g., dermatitis, urticaria and psoriasis) has increased from 1990 to 2017 in India. The high burden of skin and subcutaneous diseases demand that they be given due importance in national programmes so as to meet the skin care needs of the population.

#### Declaration of patient consent

Patient consent not required as there were no patients in this study.

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Nil.

#### Conflicts of interest

There are no conflicts of interest.

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