Global mortality from conditions with skin manifestations

Lindsay N. Boyers, BA,[a] Chante Karimkhani, BA,[b] Mohsen Naghavi, MD, PhD, MPH,[c] David Sherwood, PhD,[d] David J. Margolis, MD, PhD,[e] Roderick J. Hay, DM, FRCP,[f] Hywel C. Williams, DSc, FRCP,[g] Luigi Naldi, MD,[h] Luc E. Coffeng, MD, PhD,[c] Martin A. Weinstock, MD, PhD,[i,j,k] Cory A. Dunnick, MD,[l,m] Hannah Pederson, BS,[n] Theo Vos, PhD,[c] and Robert P. Dellavalle, MD, PhD, MSPH[l,m,o]

Washington, District of Columbia; New York, New York; Seattle, Washington; Boulder, Aurora, and Denver, Colorado; Philadelphia, Pennsylvania; London and Nottingham, United Kingdom; Bergamo, Italy; and Providence, Rhode Island

Background: Global Burden of Disease Study is a research database containing systematically compiled information from vital statistics and epidemiologic literature to inform research, public policy, and resource allocation.

Objective: We sought to compare mortality among conditions with skin manifestations in 50 developed and 137 developing countries from 1990 to 2010.

Methods: This was a cross-sectional study to calculate mean age-standardized mortality (per 100,000 persons) across countries for 10 disease categories with skin manifestations. We compared differences in mortality from these disorders by time period (year 1990 vs year 2010) and by developing versus developed country status.

Results: Melanoma death rates were 5.6 and 4.7 times greater in developed compared with developing countries in 1990 and 2010, respectively. Measles death rates in 1990 and 2010 were 345 and 197 times greater in developing countries, and corresponding syphilis death rates were 33 and 45 times greater.

Limitations: Inability to adjust for patient-, provider-, and geographic-level confounders may limit the accuracy and generalizability of these results.

Conclusion: The mortality burden from skin-related conditions differs between developing and developed countries, with the greatest differences observed for melanoma, measles, and syphilis. These results may help prioritize and optimize efforts to prevent and treat these disorders. (J Am Acad Dermatol 2014;71:1137-43.)

From the Georgetown University School of Medicine, Washington, District of Columbia[a]; Columbia University College of Physicians and Surgeons, New York[b]; Institute for Health Metrics and Evaluation, University of Washington, Seattle[c]; Department of Integrative Physiology, University of Colorado, Boulder[d]; Department of Biostatistics and Epidemiology and Dermatology, University of Pennsylvania, Perelman School of Medicine[e]; Department of Dermatology, Kings College Hospital National Health Service Trust, London[f]; Center of Evidence-based Dermatology, University of Nottingham[g]; Department of Dermatology, Azienda Ospedaliera papa Giovanni XXIII, Bergamo[h]; Dermatoepidemiology Unit, US Department of Veterans Affairs Medical Center Providence[i]; Department of Dermatology, Rhode Island Hospital[j]; Departments of Dermatology and Epidemiology, Brown University, Providence[k]; Department of Dermatology, University of Colorado Anschutz Medical Campus, Aurora[l]; Dermatology Service, US Department of Veterans Affairs, Eastern Colorado Health Care System, Denver[m]; University of Colorado School of Medicine, Aurora[n]; and Department of Epidemiology, Colorado School of Public Health, University of Colorado Anschutz Medical Campus, Aurora.[o]

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Supplementary tables are available at http://www.jaad.org.

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Reprint requests: Robert P. Dellavalle, MD, PhD, MSPH, Dermatology Service, US Department of Veteran Affairs Medical Center, 1055 Clermont St, Box 165, Denver, CO 80220. E-mail: robert.dellavalle@ucdenver.edu.

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CAPSULE SUMMARY

- Population-based studies examining global differences in skin disease-related mortality between developing and developed countries have not been performed.
- Skin cancer causes greater mortality in developed countries than in developing countries.
- Our results indicate geographic variation in skin disease-related mortality that may inform health care resource allocation and prioritization.

The Global Burden of Disease Study 2010 (GBD) is a collaboration of 488 researchers from 303 institutions in 50 countries coordinated by the Institute of Health Metrics and Evaluation and funded by the Bill and Melinda Gates Foundation.[1,2] This study provides access to comprehensive, high-fidelity, country-level data regarding disease-specific mortality.[1,2] The GBD enables research aimed at understanding international patterns and temporal trends of mortality to inform global health and health policy.[2-5]

The GBD uses prevalence and disease severity adjustment measures to summarize data that enable patterns and trends to be detected over time and across geographic boundaries.[1,2,4,6] This database houses information from years 1990 through 2010 on 291 diseases and injuries, 1160 disease and injury sequelae, and 67 risk factors in 187 countries.[2,6] Mortality data are compiled from resources including but not limited to official vital registries, verbal autopsy reports, censuses, surveys, hospital data, police records, and mortuaries. Verbal autopsies ascertain probable cause of death using information about signs, symptoms, and circumstances surrounding a death, often in resource-poor settings without vital registration systems with medical certification of deaths.[7] Compared with traditional sources of mortality-related information, such as death certificate data, the GBD database offers greater accuracy of mortality estimates through integrated vital statistics information and improved analytic techniques, as previously described.[8-16]

To date, few studies have examined global geographic variation in mortality associated with skin disease, and these investigations have been limited by intrinsic limitations of conventional vital statistics data. The GBD offers an opportunity to narrow these knowledge gaps. We were motivated by the potential to assist in prioritization of efforts, resources, and research to decrease mortality secondary to conditions with skin manifestations (CSM) that may disproportionately affect certain countries of the world. Thus, this study was designed to assess mortality for CSM across time and geography. The mortality measurements for select CSM as measured by GBD were analyzed in developing and developed countries in 1990 and 2010. We hypothesized that: (1) mortality associated with skin diseases would differ significantly between developing versus developed countries; (2) infectious skin diseases would be associated with higher mortality in developing countries; and (3) cutaneous malignancies would be associated with higher mortality in developed countries.

METHODS

Of the 269 diseases included in the GBD database, we selected the following skin-related disorders for which mortality information was available: malignant melanoma of the skin, basal cell carcinoma (BCC) and squamous cell carcinoma (SCC), decubitus ulcer, bacterial skin diseases, cellulitis, varicella (including chickenpox, congenital varicella infection, and herpes zoster), syphilis, measles, dengue (including dengue fever and dengue hemorrhagic fever), and an "other skin and subcutaneous diseases" category (including but not limited to erythema multiforme, radiodermatitis, pemphigus, and pemphigoid). These GBD categories are defined by *International Classification of Diseases, Ninth Revision* and *International Statistical Classification of Diseases, 10th Revision* (*ICD-10*) codes (Supplementary Tables I and II). We excluded the following CSM, which lacked adequate mortality-related information: eczema, acne vulgaris, viral skin diseases, fungal skin diseases, urticaria, pruritus, scabies, alopecia areata, psoriasis, cutaneous leishmaniasis, and leprosy. Excess mortality caused by elevated risk of cardiovascular events in psoriasis was not considered, as these were attributed directly to cardiovascular disease in GBD. Additional skin-related diseases that were not included in the current analysis as a result of GBD data categorization limitations and inability to extract specific mortality estimates include: Kaposi sarcoma (included under HIV death), meningococcal sepsis (included under