

Migraine is the most disabling neurological disease among children and adolescents, and second after stroke among adults: A call to action

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Abstract

The Global Burden of Disease (GBD) study is pivotal in shaping health policies by providing comprehensive data on mortality and disability. An updated GBD2021 analysis, published in *Lancet Neurology* on 14 March 2024, expands the scope of neurological disorders to include 37 conditions, revealing their significant impact on global health. Neurological disorders affect 3.4 billion people, or 43.1% of the global population, making them the leading cause of disability-adjusted life years (DALYs) in 2021, with an 18.2% increase since 1990. The top three causes of DALYs in this category are stroke, neonatal encephalopathy and migraine. Migraine, affecting 1.16 billion people, ranks first among children and adolescents and second among adults aged under 60 years. Despite its substantial impact, migraine often lacks proper attention because of its non-fatal nature, invisibility and historical neglect of neurological disorders. The International Headache Society calls for recognizing migraine as a serious medical condition, promoting research and integrating migraine management into public health strategies. Effective interventions include raising awareness, improving access to treatment, adding migraine to the epidemiological surveillance agenda and exploring new treatment strategies. A coordinated effort among stakeholders is essential to alleviate the burden of migraine on individuals and society.

Keywords

disability-adjusted life years (DALYs), global burden of disease (GBD), migraine, neurological disorders, public health strategies

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Introduction

The Global Burden of Disease (GBD) study has a pivotal role in shaping global, regional and national health policies, providing “a comprehensive picture of mortality and disability across countries, time, age, and sex” (<https://www.healthdata.org/research-analysis/gbd>). Presenting best estimates of prevalence, along with attributed mortality and lost health expressed as disability-adjusted life years (DALYs), for all diseases across all the world’s populations, this study highlights crucial trends in population health and challenges to health policy.

On 14 March 2024, *Lancet Neurology* published an updated analysis, from GBD2021, of the global, regional and national burdens of neurological disorders from 1990 to 2021 (Table 1) (1). The study expanded its scope to include 37 unique conditions, broadening the understanding of the health loss as a result of nervous system diseases. By doing so, it departed from the groupings used by GBD elsewhere (e.g. on-line GBD Compare includes eight unique neurological disorders (2)), embracing all conditions affecting the central and/or peripheral nervous system for which neurological consequences could be isolated (1). Among these conditions were neurodevelopmental disorders, stroke (normally categorised under cardiovascular disorders) and neurological consequences (e.g. intellectual disability, cognitive impairment, motor impairment, sensory deficits) of other congenital, neonatal, metabolic or infectious diseases (1).

Based on this much expanded definition, neurological disorders affect an estimated 3.4 billion people, or 43.1% of the global population, making them the leading cause of DALYs in 2021, with an 18.2% increase from 1990. Among them, the top three single causes of DALYs are stroke, neonatal encephalopathy and migraine, with the last estimated to affect 1.16 billion people (95% confidence interval = 1.00–1.33) or 14.7% of the global population. Migraine ranks first, however, among children and adolescents (age group 5–19 years) and second among adults

under 60 years (age group 20–59 years). Remarkably, the migraine-attributed proportion of the overall neurological disease burden is similar across these age groups, being 22.3% for the age group 5–19 years and 21.8% for the age group 20–59 years.

Regional disparities exist but are not great. Migraine ranks first for DALYs in Western Europe and Australasia, and second across a range of other regions: Central Europe, Eastern Europe, Central Asia, North America, North Africa and the Middle East, Latin America, Tropical and Andean America, and Southeast Asia. Migraine descends to third position in High-Income South Asia, Central Latin America, East Asia, Oceania and Southern Sub-Saharan Africa, fourth in the Caribbean and Western Sub-Saharan Africa, fifth in Central Sub-Saharan Africa, and sixth in Eastern Sub-Saharan Africa. The shifts in rank across these regions are less the result of variations in migraine-attributed burden and more the result of the increasing prominence of other diseases such as meningitis and neonatal encephalopathy in less developed regions, as well as dementia in high-income territories.

Why is it then that, despite this clear evidence of its very great impact on population health everywhere in the world, migraine does not receive, anywhere, the attention it deserves from society, governments and healthcare systems?

First, unlike other non-communicable diseases (NCDs) such as stroke, myocardial infarction, cancer, diabetes and hypertension, migraine does not result in mortality. Second, migraine belongs to the category of “invisible” conditions that are not readily identifiable through biomarkers or diagnostic imaging. During attacks, patients seek solitude and, when resolved, attacks do not result in physically perceived sequelae. Third, the complexity of the nervous system has delayed, until relatively recently, the availability of sophisticated techniques to assess its function, leading to historical neglect in medicine of disorders of the nervous system.

These are misperceptions that must be reversed.

Table 1. Highlights regarding migraine from the global burden of disease study 2021.

Migraine affects 1.16 billion individuals worldwide, or 14.7% of the global population
Migraine is the top disabler of all neurological conditions among the ages 5–19 years
Migraine is the second disabler of all neurological conditions among adults aged 20–59 years
Migraine is the top disabler of all neurological conditions among all ages in Western Europe and Australasia
Migraine is the second disabler of all neurological conditions among all ages in Central Europe, Eastern Europe, Central Asia, North America, North Africa and Middle East, Latin America, Tropical and Andean America, Southeast Asia

Call to action

The International Headache Society (IHS) calls for recognition that change is overdue: migraine must be acknowledged as a serious but largely remediable medical condition and incorporated, with the priority it deserves, into the public health strategies of all countries. Alongside this recognition, IHS calls for acknowledgment by health-policy makers of the need both to promote research into the causes and consequences of migraine and to translate research findings into actionable public policy. Accordingly, we extend an invitation to all our affiliates, to all national headache societies, as well as to every neurological and pain association, to join us in

championing migraine awareness and advocating for the legitimacy and urgency of these objectives.

To begin, we address the misperceptions, identified above, that are barriers to change.

First, the GBD study emphatically illustrates how some conditions severely diminish health without necessarily leading to increased mortality rates, with headache disorders, including migraine at the forefront, serving as a notable example. It is evident from the study that lost healthy life years as a result of non-fatal causes are as important as those lost as a result of premature mortality. Indeed, the disabling nature of migraine can – and often does – substantially limit work productivity and social interactions and impair overall quality of life among those affected. The impacts of migraine extend beyond those with the disorder, imposing similarly substantial societal costs, including those incurred in health care and, far greater, those resulting from lost workdays and reduced productivity. Thus, the recognition of migraine as a debilitating as well as highly prevalent condition – as a leading cause of reduced population health despite being non-fatal – is the essential first step in developing effective management strategies. At the same time, recognizing the societal costs of migraine is crucial because such costs – and the potential for their recovery – mandates allocation of the necessary resources to these strategies.

Second, migraine should not be allowed to remain invisible. It is true that diagnosis predominantly depends on the subjective accounts of patients, elicited by the appropriate enquiries of healthcare practitioners. Nonetheless, migraine has a distinctive clinical profile. Standardized diagnostic criteria enable, in the vast majority of cases, its reliable diagnosis with only a limited amount of training and no need for investigation.

Third, neurological disorders are emerging from the shadows. The World Health Assembly's ratification of WHO's Intersectoral Global Action Plan on Epilepsy and

Other Neurological Disorders for the 2022–2031 timeframe presents a new and huge opportunity to rebalance the scales towards neurological health. The focus on epilepsy is somewhat irrational because idiopathic epilepsy accounts for fewer than one-third as many DALYs (0.48% of the global total) as headache disorders (1.65%), but headache is specifically mentioned in an aspirational plan advocating for comprehensive neurological care from prevention to rehabilitation.

The advancement of strategies to mitigate the impacts of migraine necessitates further research, adopting successful models from other medical benchmarks like hypertension (3). A critical initiative involves developing a treatment cascade for migraine – and for other common headache disorders – akin to established protocols in managing this condition across their spectra and delineating prevalence awareness, diagnosis, treatment gap analysis and means of control (precise and effective management strategies) (Figure 1). Perspective is important: targeted interventions should be tailored to the needs of those affected by the disease at different points in the migraine continuum, but a high proportion can manage themselves adequately if given minimal support and with public education.

Awareness, access to treatment, surveillance and research dedicated to new treatments are the four main pillars of effective intervention (Figure 1).

For the first and second of these, campaigns directed at the general public and to healthcare professionals will improve disease recognition (blue box in Figure 1). Public policies facilitating access to treatment, both pharmacological and non-pharmacological, will mitigate undertreatment by designing specific and customized headache care pathways and guidelines, structuring headache care with appropriate provision at primary, secondary and tertiary levels (purple box in Figure 1) (4,5), as well as integrating it into national systems of health care.

For the third, migraine should be added to the epidemiological surveillance agenda of NCDs at national and global levels, such that the treatment cascade is monitored. GBD data should be explored in more detail by a network of collaborators, curating headache data, planning and delivering publications regarding not only migraine, but also other primary headaches such as tension-type headache and cluster headache, with country-level data. These should include the study of risk-outcomes pairs.

For the fourth, although current treatments are effective for many with migraine, their limitations must be acknowledged. An exploration of new treatment strategies, as well as the advent of novel technologies and innovative therapies, represents the pinnacle in efforts to mitigate the burden of migraine. Prioritizing population management alongside individual relief is paramount. This encompasses the validation of lifestyle modification programs, approaches tailored to cultural and work-related contexts, and examining whether promoting a healthy diet, regular exercise, mental relaxation,

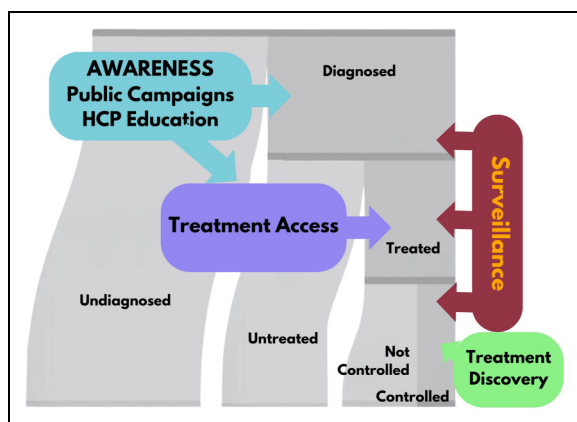


Figure 1. Actions on awareness, access to treatment, surveillance and treatment discovery according to the treatment cascade from hypertension (3). HCP: healthcare professional.

abstention from tobacco and alcohol, and ensuring adequate sleep – strategies beneficial against other NCDs – can also offer cost-effective improvements for people with migraine.

Conclusions

Implementing these actions requires a synergistic and coordinated effort among people affected by migraine, health-care providers, researchers, policy makers and society as a whole. Through united efforts, we can substantially alle-

viate the impacts of migraine on individuals and on society at large. It is imperative that the nervous system, migraine and other common headache disorders become, and remain, permanent focal points of global public health discussions.

Henceforth, let migraine receive the recognition it deserves: with increased funding for research and a shift in perception by both the scientific and medical communities. IHS commits to this charge and calls on its partners to do the same.

Clinical implications

- Neurological disorders affect 3.4 billion people, making them the leading cause of DALYs in 2021.
- Migraine impacts 1.16 billion people globally, ranking first in DALYs among children and adolescents, and second among adults under 60 years.
- Despite its prevalence, migraine remains underprioritized in public health because of its non-fatal nature and invisibility.
- The paper urges for recognition of migraine as a serious medical condition and its inclusion in national and global health strategies.
- Recommendations include raising awareness, improving treatment access, integrating migraine into epidemiological surveillance and advancing research on new treatments.

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References

1. GBD 2021 Nervous System Disorders Collaborators. Global, regional, and national burden of disorders affecting the nervous system, 1990–2021: a systematic analysis for the global burden of disease study 2021. *Lancet Neurol* 2024; 23: 344–381.
2. GBD Compare, <https://vizhub.healthdata.org/gbd-compare/> (accessed 13 May 2024).
3. NCD Risk Factor Collaboration (NCD-RisC). Worldwide trends in hypertension prevalence and progress in treatment and control from 1990 to 2019: a pooled analysis of 1201 population-representative studies with 104 million participants. *Lancet* 2021; 398: 957–980.
4. Steiner TJ, Terwindt GM, Katsarava Z, et al. Migraine-attributed burden, impact and disability, and migraine-impacted quality of life: expert consensus on definitions from a Delphi process. *Cephalalgia* 2022; 42: 1387–1396.
5. Steiner TJ, Jensen R, Katsarava Z, et al. Structured headache services as the solution to the ill-health burden of headache. 1. Rationale and description. *J Headache Pain* 2021; 22: 78.