The Global Campaign turns 18: a brief review of its activities and achievements

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Abstract
The Global Campaign against Headache, as a collaborative activity with the World Health Organization (WHO), was formally launched in Copenhagen in March 2004. In the month it turns 18, we review its activities and achievements, from initial determination of its strategic objectives, through partnerships and project management, knowledge acquisition and awareness generation, to evidence-based proposals for change justified by cost-effectiveness analysis.

Keywords: Headache, Burden, Health care, Structured headache services, Public health, Change management, Project management, Implementation, Global Campaign against headache

Background
In 1996, two of us (TJS and JO) commenced a dialogue with the World Health Organization (WHO) in Geneva. Our messages were straightforward: that headache disorders were ubiquitous, prevalent and disabling – and to a very large extent treatable. These were WHO's criteria for priority.

There was global persistence of substantial and largely unmitigated headache-attributed burden, with universal barriers to care maintaining wide gaps between need for treatment and its provision. The roots of these healthcare failures were established in educational failures. From poor understanding, headache was accorded little priority despite clear evidence that this was wrong. It was wrong from a public-health perspective, and it was wrong economically in view of the very high financial costs of headache disorders. Educational failures blocked awareness, so that this evidence was unseen, or ignored.

According to its mandate to promote health through universal health coverage [1], we argued, WHO should take action to reduce this burden.

Thus, more than 25 years ago, were sown the seeds of the Global Campaign against Headache. They did not instantly spring to life. WHO requested empirical evidence to support these arguments, which took time to muster but was in due course presented in WHO's own Global Burden of Disease study (GBD) 2000. The World Health Report 2001, portraying the estimates of GBD2000 and assimilating all evidence that we could then gather on migraine-attributed burden, ranked migraine among the top 20 causes of disability worldwide [2]. The Global Campaign was the outcome, formally launched in Copenhagen in March 2004 [3, 4].

The way forward was not clear: the evident scale of the problem mandated an effective response, but also stood in the way of any solution. Needs analysis revealed then, as it does now, the potentially daunting demands for headache-related health care of the very large numbers who might benefit from it [5–14]. The approach required was broad, its distant target ambitious. It called for strategic partners, of whom WHO would be the most important [3, 4, 15–26], along with the Institute for Health Metrics and Evaluation (IHME) at the University of...
Washington (see later). The path took time to construct [3, 4, 16].

*Lifting The Burden* (LTB), a non-governmental organisation registered in UK, was created in 2009 to formalise the strategic partnerships, particularly with WHO. In 2011, LTB was invited into Official Relations with WHO [18], a recognition of its track record of achievement already [16], and of the importance among WHO’s priorities accorded to the Campaign [22–25].

**The Global Campaign**

Strategy and tactics

The Global Campaign is an agent for change, not merely an advocate of change. Strategically, it was conceptualised in three stages, each of these aligned with one of three strategic objectives, themselves directionally determined by change-management theory (Table 1).

Tactically, in line with standard project-management methodology, the Campaign was implemented through reduction, breaking it into small component activities to be reassembled, ultimately, into a coherent whole [4]. At this level, the Campaign depended on academic collaborations established as a network throughout the world, and on tactical partnerships, most importantly with the Norwegian University of Science and Technology (NTNU), its academic base since 2009 [27], with the International Headache Society, European Headache Federation and European Brain Council, and with the *Journal of Headache and Pain*, its official journal.

**Knowledge for awareness**

Stage 1 of the Campaign recognised that the scope and scale of a problem must be clearly known before its remedy could be envisaged.

When, early on, all existing data on the burden of headache were collated, Western Europe and North America were far better represented than elsewhere, and migraine far better than other headache disorders [6]. What was then known of headache covered less than half the world’s population, among whom only half of the burden attributable to headache was estimated with any reliability.

Filling these large knowledge gaps was the first priority (Table 1), requiring a series of new population-based burden-of-headache studies. Most of these would be in low- and middle-income countries, and promised to be methodologically and financially challenging. Therefore, LTB brought together an international expert consensus group to establish standardised methodology and questionnaire [28–32]. Adult studies using these have now been conducted in all world regions: African (Ethiopia [33, 34] and Zambia [35, 36], Benin, Cameroon and Mali [not yet published], and Malawi in a HIV-positive population [37]); American (Brazil [38] and Peru [not yet published]); Eastern Mediterranean (Pakistan [39–41], Saudi Arabia [42, 43] and Morocco [not yet published]); European (Georgia [44–47], Lithuania [48], Russia [49–52] and, within the Eurolight project, eight countries of western Europe [53–59]); South East Asia (India south [Karnataka State] [60–64], Nepal [65–74] and India north [Delhi and National Capital Territory Region] [not yet published]); Western Pacific (China [75–81] and Mongolia [82, 83]). Schools-based child and adolescent studies began later, again with development and testing of new methodology [84, 85]. Studies have completed data collection in Austria [86], Ethiopia [87], Lithuania [88, 89] and Turkey [90], and in Benin, Iran, Mongolia, Serbia and Zambia [not yet published]. Others have commenced or are planned in Brazil, Cambodia, Cameroon, Estonia, Georgia, Nepal and Spain, but are interrupted by the SARS-CoV-2 pandemic.

These studies inform local policy as well as global knowledge. To the extent that they have been conducted in low- and middle-income countries, they have enhanced research capacity in these countries [21] as a collateral benefit. Among other such benefits are a broader understanding of the full spectrum of headache-attributed burden, which goes far beyond symptom burden and disability [10–12, 14, 22, 29, 30, 32, 51, 54, 58, 84, 85, 90–94].

| Strategic objective | Purpose | Action |
|---------------------|---------|--------|
| 1 Knowledge for awareness | Establish what it is that requires change | Adduce and collate evidence of the scope and scale of the global burden of headache |
| 2 Awareness for action | Agitate to create desire for change | Promote awareness, among politicians, health-care providers, employers, schools and the general public, of headache disorders as remediable causes of public ill health and disability, and high financial cost |
| 3 Action for change | Propose and justify the change to be instigated | Develop evidence-based, adaptable recommendations for intervention, justified by cost-effectiveness analysis |
Two databases under construction at NTNU are capturing the individual-participant data (ie, primary data) from all LTB population-based studies, with sub-datasets describing sampling and other methodology as attributes of the main datasets. Ultimately, following development and imposition of quality controls, these will be available as free goods for academic purposes, as are all Global Campaign products.

**Awareness for action**

In its second stage, conducted almost in parallel with the first, the Campaign has used the knowledge it gathered to raise awareness – among people with headache, health-care providers and health-policy makers in particular. Making the case for change through evidence-based argument was the second priority (Table 1), with the key message that headache was not a health problem only of industrialised high-income countries – an historical misperception.

The Global Campaign could not have achieved this objective without its strategic partners.

On the one hand, the Atlas of headache disorders and resources in the world, 2011 was published jointly by WHO and LTB, collating data from more than 100 countries [22]. On the other, LTB has collaborated with IHME [95] since 2005, providing expert advice, health-state descriptions (on which disability weights are based [96]) and epidemiological data to inform all iterations of GBD from GBD2010 onwards [97–106]. GBD incorporates the findings of all population-based studies contributing to global knowledge, including LTB’s (all of these recently reviewed [107]). Migraine and tension-type headache (TTH) were included in GBD2010. Medication-overuse headache (MOH) entered GBD2013 (as 18th highest cause of disability), but, from GBD2016 onwards, has been included as a sequela of migraine (73%) or TTH (27%), and its consequences attributed accordingly [103]. Increasingly better informed, GBD has advanced the ranking of headache disorders generally and of migraine in particular among the global causes of disability: the latter from 19th in GBD2000 [2] to second (first among young women) in GBD2019 [108–115].

There has been no better means of fostering awareness of headache as a public-health priority. The Atlas, along with its political messages of “worldwide neglect of a major cause of public ill-health and ... the inadequacies of responses to it in countries throughout the world” [22], was distributed directly by WHO to the world’s Ministries of Health. The highly respected GBD data are a public good, directly shared with WHO and all governments, and available to health-policy makers everywhere [95].

**Action for change**

In its third stage, the Campaign has proposed the health-care solution to headache, a template for structured headache services adaptable to local needs and resources (Fig. 1), and supported it with evidence-based scientific, political and economic arguments [22, 116–128].

Many issues came up for consideration. How and where should headache services be organised? How and by whom, and with what level of resource allocation, should they be delivered? And what were the reasons for whatever were the answers to these? What features of a headache service contributed to quality? These might include technical success (would it function well at a practical level?), uptake (would it be used?), clinical outcomes (would it make patients better?), user satisfaction (would patients, and health-care providers, be happy with it?), cost-effectiveness (would it be affordable within the health-care or wider societal economies?) and equity (would there be equal access for all with equal need?). Which of these were most important, and from whose perspective? How were they measured?

The first and foremost requirement of a putative solution is to dismantle the barriers to care [129–133]. Structured headache services achieve this to a large extent through their base in accessible primary care (Fig. 1), where patients generally prefer to receive care [128]. They do not deny the role of specialist care, but this cannot be the focus or principal provider of ubiquitous, efficient, cost-effective and equitable care [134]. Placing the burden of care largely into the hands of non-specialists calls for some additional education [135–137], and a range of clinical management supports [138, 139]: diagnostic aids based on the International Classification of Headache Disorders [139], management principles [139, 140], and outcome measures to aid initial assessment and follow-up [141–146]. Public education is required to dismantle other barriers: banishing stigma, and promoting self-efficacy, in which people understand their headache disorders and seek and utilise care appropriately [139, 147–151].

All of these materials must be translated if they are to succeed transnationally and transculturally, following protocols to ensure conceptual equivalence [139, 152–154]. The outcome measures created by LTB [144, 145] are already freely available in 13 languages [155].

Quality evaluation of headache services first required an understanding of how “quality” should be defined in this context [156, 157]. Subsequently, field-tested indicators of quality were needed, with methods and instruments to measure quality as defined [158–162]. This remains work in progress, with bench-marking the next step.
Paying for change

Finally, in a world of competing demands and scarce resources, health-policy makers require evidence of the economic value of intervention if they are to be persuaded to invest accordingly. Empirical evidence of this for headache was limited outside the very restricted context of clinical trials, in which gains from use of specific drugs had been small and unconvincing. Efficiency is one key to economic value: poor knowledge and understanding of headache lead to misdiagnosis, mismanagement and poor outcomes, wasting health-care resources while often making the initial problem worse. Through avoidance of this wastage, by education, presently allocated resources can achieve much more than they do [22].

But the major economic opportunity is through reduction, by better care delivered more widely, in the very heavy consequential (lost-productivity) costs of headache [163–166]. Economic evaluation of structured headache services has used LTB’s empirical burden-of-headache data from population-based studies around the world [33–83], but first required development of a new metric (hours lived with disability [HLDs]), applicable to all forms of treatment, care and care-delivery systems as

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**Fig. 1** Adaptable template for structured headache services based in primary care and supported by educational initiatives and management aids, with expected patient flows (from [128]).
opposed to comparisons of single-modality treatments [167, 168]. By this measure, structured headache services as proposed [128], properly implemented with educational supports in place, are not merely cost-effective in a range of economies, in terms of health gained per dollar spent [169], but cost saving at societal level in many [170, 171].

Conclusion
The Global Campaign against Headache is a coherent programme of multiple constituent parts, its path determined by its strategic objectives, its activities guided by its values [4] and its progress towards its objectives dependent on a global network of partners. After 18 years, the once-distant target is now visible on the near horizon, but there is a lot more to be done [172, 173]. The Campaign’s aspirational vision, from outset, has been of “a future world in which headache disorders are recognised everywhere as real, disabling, and deserving of medical care. In this world, all who need headache care have access to it, without artificial barriers” [174]. The Global Campaign can inform, motivate and offer the means, but only governments can realise this vision.

Abbreviations
GBD: Global Burden of Disease (study); HLDs: Hours lived with disability; IHME: Institute for Health Metrics and Evaluation; LTB: Lifting The Burden; MOH: Medication-overuse headache; NTNU: Norwegian University of Science and Technology; TTH: Tension-type headache; WHO: World Health Organization.

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References
1. World Health Organization. What we do. At: https://www.who.int/about/what-we-do (last accessed 1.3.2022).
2. World Health Organization (2001) World Health Report 2001. Geneva: WHO.
3. Steiner TJ (2004) Lifting the burden: the global campaign against headache. Lancet Neurol; 3: 204–205.
4. Steiner TJ (2005) Lifting The Burden: The global campaign to reduce the burden of headache worldwide. J Headache Pain; 6: 373–377.
5. Leonardi M, Steiner M, Scher AT, Lipton RB (2005) The global burden of migraine: measuring disability in headache disorders with WHO’s Classification of Functioning, Disability and Health (ICF). J Headache Pain; 6: 429–440.
6. Stovner LJ, Hagen K, Jensen R, Katsarava Z, Lipton RB, Scher AI, Steiner TJ, Zwart J-A (2007) The global burden of headache: a documentation of headache prevalence and disability worldwide. Cephalalgia; 27: 193–210.
7. Antonaci F, Valade D, Lanteri-Minet M, Lainez JM, Jensen R, Steiner TJ on behalf of the European Headache Federation and Lifting The Burden: the Global Campaign to Reduce the Burden of Headache Worldwide (2008) Proposals for the organisation of headache services in Europe. Intern Emerg Med. 3(suppl 1):S25–S28.
8. Steiner TJ, Antonaci F, Jensen R, Lainez JMA, Lantéri-Minet M, Valade D on behalf of the European Headache Federation and Lifting The Burden: the Global Campaign against Headache (2011) Recommendations for headache service organisation and delivery in Europe. J Headache Pain 12:419–426.
9. Saylor D, Steiner TJ (2018) The global burden of headache. Sem Neurol; 38: 182–190.
10. Steiner TJ, Stovner LJ (eds) (2019) Societal impact of headache. Burden, costs and response. Cham, Switzerland: Springer Nature, 2019.
11. Steiner TJ (2019) The meaning of “headache” in the context of society. Ch 2 in: Steiner TJ, Stovner LJ (eds) Societal impact of headache. Burden, costs and response. Cham, Switzerland: Springer Nature, pp 7–18.
12. Steiner TJ, Stovner LJ (2019) Headache-attributed burden: its qualitative components. Ch 4 in: Steiner TJ, Stovner LJ (eds) Societal impact of headache. Burden, costs and response. Cham, Switzerland: Springer Nature, pp 29–36.
13. Stovner LJ, Steiner TJ (2019) The global burden of headache in published studies. Ch 8 in: Steiner TJ, Stovner LJ (eds) Societal impact of headache. Burden, costs and response. Cham, Switzerland: Springer Nature, pp 83–104.
14. Steiner TJ, Stovner LJ (2019) Headache, functional impact and environment. Ch 11 in: Steiner TJ, Stovner LJ (eds) Societal impact of headache. Burden, costs and response. Cham, Switzerland: Springer Nature, pp 143–156.
15. Steiner TJ (2010) Lifting The Burden: WHO’s global campaign to reduce the burden of headache worldwide. In: Headache Care, Research, and Education Worldwide, ed Olsen J, Ramadan N. Oxford: Oxford University Press, pp 1–9.
16. Steiner TJ, Birbeck GL, Jensen R, Katsarava Z, Martelletti P, Stovner LJ (2010) Lifting The Burden: the first 7 years. J Headache Pain; 11: 451–455.
17. Steiner TJ, Stovner LJ, Katsarava Z, Jensen R, Birbeck GL, Martelletti P (2011) The Global Campaign against Headache. Ch 58 in: Handbook of Headache, ed Martelletti P, Steiner TJ. Milan: Springer, pp 737–744.

18. Steiner TJ, Birbeck GL, Jensen R, Katsarava Z, Martelletti P. Stovner LJ (2011) The Global Campaign of World Health Organization and Lifting The Burden: collaboration in action. J Headache Pain; 12: 273–274.

19. Steiner TJ (2006) WHO cares about headache (13th Marcia Wilkinson Lecture). Ch 20 in: Headache and Migraine 9, ed Sorbi MJ, Couturier EGM, Méréle SYM. Utrecht: Anglo-Dutch Migraine Association, pp 219–230.

20. Martelletti P, Steiner TJ, Bertolote JM, Dua T, Saraceno B (2007) The definitive position of headache among the major public health challenges. An end to the slippery slope of disregard. J Headache Pain; 8: 149–151.

21. Mateen FJ, Dua T, Steiner T, Saxena S (2008) Headache disorders in developing countries: research over the past decade. Cephalalgia 28(1):107–114.

22. Saxena S, Steiner TJ (eds) on behalf of World Health Organization and Lifting The Burden. Atlas of headache disorders and resources in the world, 2011. Geneva: World Health Organization, 2011.

23. Steiner TJ, Stovner LJ, Dua T, Birbeck GL, Jensen R, Katsarava Z, Martelletti P, Saxena S (2011) Time to act on headache disorders (editorial). J Headache Pain; 12: 501–503.

24. Thakur KT, Albanese H, Giannakopoulou P, Jette N, Linde M, Prince MI, Steiner TJ, Dua T (2015) Neurological disorders. Ch 5 in: Mental, neurological, and substance use disorders, ed Patel V, Chisholm D, Dua T, Laxminarayan R, Medina-Mora ME (vol 4 of: Disease control priorities, 3rd edition, series ed Jamison DT, Nugent R, Gelbard H, H Laxminarayan R, Mock CN). Washington DC: World Bank, pp 87–108.

25. World Health Organization. Headache disorders. At: https://www.who.int/news-room/fact-sheets/detail/headache-disorders (last accessed 1.3.2022).

26. Steiner TJ, Huynh N, Stovner LJ (2019) Headache disorders and the World Health Organization. Ch 5 in: Steiner TJ, Stovner LJ (eds) Societal impact of headache: Burden, costs and response. Springer Nature, Cham, Switzerland, pp 37–43.

27. Norwegian University of Science and Technology. Global Campaign against Headache. At: https://www.ntnu.edu/headache (last accessed 1.3.2022).

28. Steiner TJ, Stovner LJ, Al Jumah M, Birbeck GL, Jensen R, Katsarava Z, Queiroz LP, Scher AI, Tekle-Haimanot R, Wang SJ, Martelletti P, Dua T, Chatterjee S (2013) Improving quality in population surveys of headache prevalence, burden and cost: key methodological considerations. J Headache Pain; 14: 87.

29. Steiner TJ, Gururaj G, Andrié C, Katsarava Z, Ayzenberg I, Yu SY, Al Jumah M, Tekle-Haimanot R, Birbeck GL, Herekar A, Linde M, Mbewe E, Mandanhar K, Risal A, Jensen R, Queiroz LP, Scher AI, Wang SJ, Stovner LJ (2014) Diagnosis, prevalence estimation and burden measurement in population surveys of headache: presenting the HARDSHIP questionnaire: J Headache Pain; 15: 3.

30. Stovner LJ, Al Jumah M, Birbeck GL, Gururaj G, Jensen R, Katsarava Z, Queiroz LP, Scher AI, Tekle-Haimanot R, Wang SJ, Steiner TJ (2014) The methodology of population surveys of headache prevalence, burden and cost: Principles and recommendations from the Global Campaign against Headache. J Headache Pain; 15: 5.

31. Stovner TJ, Steiner TJ (2019) Epidemiological methods for headache studies. Ch 6 in: Steiner TJ, Stovner LJ (eds). Societal impact of headache. Burden, costs and response. Cham, Switzerland: Springer Nature, pp 47–68.

32. Steiner TJ, Stovner LJ (2019) Methodology of headache measurement. Ch 7 in: Steiner TJ, Stovner LJ (eds). Societal impact of headache. Burden, costs and response. Cham, Switzerland: Springer Nature, pp 69–82.

33. Zebenigus M, Tekle-Haimanot R, Worku DK, Thomas H, Steiner TJ (2016) The prevalence of primary headache disorders in Ethiopia. J Headache Pain; 17: 110.

34. Zebenigus M, Tekle-Haimanot R, Worku DK, Thomas H, Steiner TJ (2017) The burden of headache disorders in Ethiopia: national estimates from a population-based door-to-door survey. J Headache Pain; 18: 58.

35. Mbewe E, Zairemthima P, Yeh HH, Paul R, Birbeck GL, Steiner TJ (2015) The epidemiology of primary headache disorders in Zambia: a population-based door-to-door survey. J Headache Pain; 16: 30.

36. Mbewe E, Zairemthima P, Paul R, Birbeck GL, Steiner TJ (2015) The burden of primary headache disorders in Zambia: national estimates from a population-based door-to-door survey. J Headache Pain; 16: 36.

37. Leone M, Giani L, Phaka M, Uluduz D, Tayyar S, Kamponda M, Tambi Tolvo V, Guidotti G, Marazzi MC, Steiner TJ (2022) Burden of headache in a HIV-positive population of sub-Saharan Africa. Cephalalgia; 42 (in press).

38. Peres MFP, Queiroz LP, Rocha-Filho PS, Sarmento EM, Katsarava Z, Steiner TJ (2019) Migraine: a major debilitating chronic non-communi- cable disease in Brazil, evidence from two national surveys. J Headache Pain; 20: 85.

39. Herekar AD, Herekar AA, Ahmad A, Uqaili UL, Ahmed B, Effendi J, Alvi SZ, Steiner TJ (2013) The burden of headache disorders in Pakistan: methodology of a population-based nationwide study, and questionnaire validation. J Headache Pain; 14: 73.

40. Ahmed B, Ahmad A, Herekar AA, Uqaili UL, Effendi J, Alvi SZ, Herekar AD, Steiner TJ (2014) Fraud in a population-based study of headache: prevention, detection and correction. J Headache Pain; 15: 37.

41. Herekar AA, Ahmad A, Uqaili UL, Ahmed B, Effendi J, Alvi SZ, Shahab MA, Javed U, Herekar AD, Khanani R, Steiner TJ (2017) Primary headache disorders in the adult general population of Pakistan – a cross-sectional nationwide prevalence survey. J Headache Pain; 18: 28.

42. Al Jumah M, Al Khathaami A, Tamir H, Al Owayed A, Kojan S, Jawhary A, Lipton R, Buse D, Jenssen H, Lipton R, Steiner TJ (2013) HURT (Headache Under-Response to Treatment) questionnaire in the management of primary headache disorders: reliability, validity and clinical utility of the Arabic version. J Headache Pain; 14: 6.

43. Al Jumah M, Al Khathaami AM, Kojan S, Hussain M, Thomas H, Steiner TJ (2020) The prevalence of primary headache disorders in Saudi Arabia: a cross-sectional population-based study. J Headache Pain; 21: 11.

44. Kukava M, Dzagnidze A, Mirvelashvili E, Dzijibut M, Fritsche G, Jensen R, Stovner LJ, Steiner TJ, Katsarava Z (2007) Validation of a Georgian language headache questionnaire in a population-based sample. J Headache Pain; 8: 321–324.

45. Katsarava Z, Kukava M, Mirvelashvili E, Tavadez A, Dzagnidze A, Dzijibut M, Steiner TJ (2007) A pilot methodological validation study for a population-based survey of the prevalences of migraine, tension-type headache and chronic daily headache in the country of Georgia. J Headache Pain; 8L 77–82.

46. Katsarava Z, Dzagnidze A, Kukava M, Mirvelashvili E, Dzijibut M, Janelidze M, Jensen R, Stovner LJ, Steiner TJ on behalf of the Global Campaign to Reduce the Burden of Headache Worldwide and The Russian Linguistic Subcommittee of the International Headache Society (2010) Prevalence of cluster headache in the Republic of Georgia: results of a population-based study and methodological considerations. Cephalalgia; 29: 949–952.

47. Katsarava Z, Dzagnidze A, Kukava M, Mirvelashvili E, Dzijibut M, Janelidze M, Jensen R, Stovner LJ, Steiner TJ on behalf of Lifting The Burden: the Global Campaign to Reduce the Burden of Headache Worldwide and the Russian Linguistic Subcommittee of the International Headache Society (2009) Primary headache disorders in the Republic of Georgia: prevalence and risk factors. Neurology 73:1796–1803.

48. Rastenytė D, Miekeviciene D, Stovner LJ, Thomas H, Andrié C, Steiner TJ (2017) Prevalence and burden of headache disorders in Lithuania and their public-health and policy implications: a population-based study within the Eurolight Project. J Headache Pain; 18: 53.

49. Ayzenberg I, Katsarava Z, Mathalkov R, Chernysh M, Osipova V, Tabeeva G, Steiner TJ on behalf of Lifting The Burden: the Global Campaign to Reduce Burden of Headache Worldwide and the Russian Linguistic Subcommittee of the International Headache Society (2011) The burden of headache in Russia: validation of the diagnostic questionnaire in a population-based sample. Eur J Neurol 18:454–459.

50. Ayzenberg I, Katsarava Z, Sborowski A, Chernysh M, Osipova V, Tabeeva G, Steiner TJ (2014) The prevalence of primary headache disorders in Russia: a countrywide survey. Cephalalgia; 32: 373–381.

51. Ayzenberg I, Katsarava Z, Sborowski A, Chernysh M, Osipova V, Tabeeva G, Steiner TJ (2014) Headache-attributed burden and its impact on productivity and quality of life in Russia: structured health care for headache is urgently needed. Eur J Neurol; 21: 758–765.

52. Ayzenberg I, Katsarava Z, Sborowski A, Obermann M, Chernysh M, Osipova V, Tabeeva G, Steiner TJ (2015) Headache yesterday in Russia:...
its prevalence and impact, and their application in estimating the national burden attributable to headache disorders. J Headache Pain; 16: 7.

53. André C, Stovner LJ, Steiner TJ, Barre J, Katsarava Z, Lainez JM, Lair ML, Lantéri-Minet M, Mick G, Rasteney D, Ruiz de la Torre E, Tassorelli C, Vriezen P, Lampi C (2011) The Eurolight project: the impact of primary headache disorders in Europe. Description of methods. J Headache Pain; 14: 541–549.

54. Linde M, Gustavsson A, Stovner LJ, Steiner TJ, Barré J, Katsarava Z, Lainez JM, Lampi C, Lantéri-Minet M, Rasteney D, Ruiz de la Torre E, Tassorelli C, André C (2012) The cost of headache disorders in Europe: the Eurolight project. Eur J Neurol; 19: 703–711.

55. Steiner TJ, Stovner LJ, Katsarava Z, Lainez JM, Lampi C, Lantéri-Minet M, Rasteney D, Ruiz de la Torre E, Tassorelli C, André C (2014) The impact of headache in Europe: principal results of the Eurolight project. J Headache Pain; 15: 31.

56. André C, Steiner TJ, Barré J, Katsarava Z, Lainez JM, Lampi C, Lantéri-Minet M, Rasteney D, Ruiz de la Torre E, Tassorelli C, Stovner LJ (2014) Headache yesterday in Europe. J Headache Pain; 15: 33.

57. Allena M, Steiner TJ, Sances G, Carugno B, Balsamo F, Nappi G, André C, Tassorelli C (2015) Impact of headache disorders in Italy and the public-health and policy implications: a population-based study within the Eurolight Project. J Headache Pain; 16: 100.

58. Lampi C, Thomas H, Stovner LJ, Tassorelli C, Katsarava Z, Jlama, Lantéri-Minet M, Rasteney D, Ruiz de la Torre E, Andreé C, Steiner TJ (2016) Interictal burden attributable to episodic headache: findings from the Eurolight project. J Headache Pain; 17: 9.

59. Lampi C, Thomas H, Tassorelli C, Katsarava Z, Lainez JM, Lantéri-Minet M, Rasteney D, Ruiz de la Torre E, Stovner LJ, Andreé C (2016) Headache, depression and anxiety: associations in the Eurolight project. J Headache Pain; 17: 59.

60. Rao GN, Kulkarni GB, Gururaj G, Rajesh K, Subbakrishna DK, Steiner TJ, Stovner LJ (2016) Headache yesterday in Karnataka state, India: prevalence, impact and cost. J Headache Pain; 17: 3.

61. Risal A, Manandhar K, Holen A, Steiner TJ, Linde M (2016) Comorbidities of psychiatric and headache disorders in Nepal: implications from a nationwide population-based study. J Headache Pain; 17: 45.

62. Risal A, Manandhar K, Linde M, Steiner TJ, Holen A (2016) Anxiety and depression in Nepal: prevalence, comorbidity and associations. BMC Psychiatry; 16: 102.

63. Manandhar K, Risal A, Linde M, Steiner TJ (2018) Health-care utilization for headache disorders in Nepal: a population-based door-to-door survey. J Headache Pain; 19: 116.

64. Linde M, Edvinsson L, Manandhar K, Risal A, Steiner TJ (2017) Migraine associated with atitude: results from a population-based study in Nepal. Eur J Neurol; 24: 1055–1061.

65. Yu S, Liu R, Zhao G, Yang X, Qiao X, Feng J, Fang Y, Cao X, He M, Steiner T (2012) The prevalence and burden of primary headaches in China: a population-based door-to-door survey. Headache; 52: 582–591.

66. Yu S, Liu R, Yang X, Zhao G, Qiao X, Feng J, Fang Y, Cao X, He M, Steiner T (2012) Body mass index and migraine: a survey of the Chinese adult population. J Headache Pain; 13: 531–536.

67. Yu S, He M, Liu R, Feng J, Qiao X, Yang X, Cao X, Zhao G, Fang Y, Steiner TJ (2013) Headache yesterday in China. A new approach to estimating the burden of headache, applied in a general-population survey in China. Cephalalgia 33:1211–1217.

68. Liu R, Yu S, He M, Zhao G, Yang X, Qiao X, Feng J, Fang Y, Cao X, Steiner TJ (2013) Health-care utilization for primary headache disorders in China: a population-based door-to-door survey. J Headache Pain; 14: 47.

69. Dong Z, Chen X, Steiner TJ, Hou L, Di H, He M, Dai W, Pan M, Zhang M, Liu R, Yu S (2015) Medication-overuse headache in China: Clinical profile, and an evaluation of the ICHD-3 beta diagnostic criteria. Cephalalgia; 35: 644–651.

70. He M, Yu S, Liu R, Yang X, Zhao G, Qiao X, Feng J, Fang Y, Cao X, Steiner TJ (2015) Elevated blood pressure and headache disorders in China – associations, under-treatment and implications for public health. J Headache Pain; 16: 86.

71. He M, Yu S, Liu R, Yang X, Zhao G, Qiao X, Feng J, Fang Y, Cao X, Steiner TJ (2016) Familial occurrence of headache disorders: A population-based study in mainland China. Clin Neurol Neurosurg; 149: 143–146.

72. Luvannorov O, Tsenddorj B, Baldojay B, Enkhbatsar J, Suyen T, Purev D, Thomas H, Steiner TJ (2019) Primary headache disorders among the adult population of Mongolia: prevalences and associations from a population-based survey. J Headache Pain; 20: 114.

73. Luvannorov O, Anisbayar T, Davasurum M, Baatar O, Batmagnai K, Tumurbabara K, Enkhetbasaar S, Uluduz D, Saymaz T, Solmaz ET, Steiner TJ (2020) The prevalence of headache disorders in children and adolescents in Mongolia: a nationwide schools-based study. J Headache Pain; 21: 107.

74. Wöber-Bingöl C, Wöber C, Uluduz D, Uyguroğlu U, Atlani TS, Kernmayer M, Ziesch H-E, Georges NTA, Wagner G, Siva A, Steiner TJ (2014) The global burden of headache in children and adolescents – developing a questionnaire and methodology for a global study. J Headache Pain; 15: 86.

75. Steiner TJ, Uluduz D (2019) Headache in children and adolescents: a broader approach is needed than in adults. Ch 3 in: Steiner TJ, Stovner LJ (eds). Societal impact of headache. Burden, costs and response. Cham, Switzerland: Springer Nature, pp 19–27.

76. Philipp J, Zeiler M, Wöber C, Wagner G, Karivazut AFK, Steiner T, Wöber-Bingöl C (2019) Prevalence and burden of headache in children and adolescents in Austria – a nationwide study in a representative sample of pupils aged 10–18 years. J Headache Pain; 20: 101.

77. Zenebe Zewde Y, Zebedinus M, Demissie H, Tekle-Haimanot R, Uluduz D, Šašmaz T, Bozdag F, Steiner TJ (2020) The prevalence of headache disorders in children and adolescents in Ethiopia: a schools-based study. J Headache Pain; 21: 108.

78. Genc D, Vaičienė-Magistris N, Zaboriskis A, Šašmaz T, Tunc AY, Uluduz D, Steiner TJ (2020) The prevalence of headache disorders in children and adolescents in Lithuania: a schools-based study. J Headache Pain; 21: 73.

79. Genc D, Vaičienė-Magistris N, Zaboriskis A, Šašmaz T, Tunc A, Uluduz D, Wöber C, Wöber-Bingöl C, Steiner TJ (2021) The burden attributable to headache disorders in children and adolescents in Lithuania: estimates from a national schools-based study. J Headache Pain; 22: 24.
90. Wöber C, Wöber-Bingöl C, Uluduz D, Aslan TS, Uygunoglu U, Tüfekçi A, Alp SI, Duman T, Surgun F, Emir GK, Demir CF, Balgetir F, Özdemir YB, Auer T, Siva A, Steiner TJ (2018) Undifferentiated headache: broadening the approach to headache in children and adolescents, with supporting evidence from a nationwide school-based cross-sectional survey in Turkey. J Headache Pain 19:18

91. Leonardi M, Raggi A (2019) A narrative review on the burden of migraine: when the burden is the impact on people’s life. J Headache Pain 20:41.

92. D’Amico D, Grazzi L, Usai S, Leonardi M, Raggi A (2013) Disability and quality of life in headache: where we are now and where we are heading. Neurosci Lett 34 Suppl 1: S1-S5.

93. Leonardi M, Grazzi L, D’Amico D, Martelletti P, Guastafierro E, Toppo C, Raggi A (2020) Global burden of headache disorders in children and adolescents 2007–2017. Int J Environ Res Public Health 18:250.

94. Raggi A, Giovannetti AM, Quinata R, D’Amico D, Cieza A, Sabaregro C, Bickenbach JE, Leonardi M (2012) A systematic review of the psychosocial difficulties relevant to patients with migraine. J Headache Pain 13: 595–606.

95. Institute for Health Metrics and Evaluation. Global burden of disease (GBD). At: https://www.healthdata.org/gbd/2019 (last accessed 1.3.2022).

96. Salomon JA, Vos T, Hogan DR, Gagnon M et al (2012) Common values in assessing health outcomes from disease and injury: disability weights measurement study for the Global Burden of Disease Study 2010. Lancet 380:2129–2143.

97. Vos T, Flaxman AD, Naghavi M et al (2012) Years lived with disability (YLDs) for 1160 sequelae of 289 diseases and injuries 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet 380:2138–2166.

98. Vos T, Barber RM, Bell B et al (2015) Global, regional, and national incidence, prevalence, and years lived with disability for 301 acute and chronic diseases and injuries in 188 countries, 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013. Lancet 386:743–800.

99. GBD (2013) Disease and Injury Incidence and Prevalence Collaborators (2016) Global, regional, and national incidence, prevalence, and years lived with disability for 310 diseases and injuries, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. Lancet 388:1545–1602.

100. Feigin VL, Abajobir AA, Abate KH et al (2017) Global, regional, and national burden of neurological disorders during 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. Lancet Neurol 16:877–896.

101. Vos T, Abajobir AA, Abate KH et al (2017) Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. Lancet 390:1211–1259.

102. Steiner TJ, Stovner LJ, Birbeck GL, Jensen RH, Katsarava Z, Uluduz D, Tinelli M, Thomas H, Stovner LJ (2019) Headache in the Global Campaign against Headache (2020) Migraine remains second among the world’s causes of disability, and first among young women: findings from GBD2019. J Headache Pain 21:137.

103. Steiner TJ (2003) Health-care systems for headache: patching the seam between primary and specialist care. J Headache Pain; 4 suppl 1: S70–74.

104. Steiner TJ (2014) National and international action plans for improving headache diagnosis. In: Classification and Diagnosis of Headache Disorders, ed Olesen J. Oxford: Oxford University Press, pp 347–360.

105. Steiner TJ (2013) Migraine remains second among the world’s causes of disability, and first among young women: findings from GBD2019. J Headache Pain 21:137.

106. Steiner TJ, Tinelli M (2021) Valuing headache’s solution (editorial). J Headache Pain; 22: 54.

107. Stovner LJ, Hagen H, Linde M, Steiner TJ (2022) The global prevalence of headache: An update, with analysis of the influences of methodological factors on prevalence estimates. J Headache Pain; 23 (in press).

108. Steiner TJ, Stovner LJ, Birbeck GL (2013) Migraine: the seventh disabler (editorial). Headache 53:227–229.

109. Steiner TJ, Stovner LJ, Birbeck GL (2013) Migraine: the seventh disabler (editorial). Cephalalgia 33:289–290.

110. Steiner TJ, Stovner LJ, Birbeck GL (2013) Migraine: the seventh disabler (editorial). J Headache Pain; 14: 1.

111. Martelletti P, Birbeck GL, Katsarava Z, Jensen RH, Stovner LJ, Steiner TJ (2013) The Global Burden of Disease survey 2010, Lifting The Burden and thinking outside-the-box on Headache disorders. J Headache Pain; 14: 13.

112. Steiner TJ, Birbeck GL, Jensen RH, Katsarava Z, Stovner LJ, Martelletti P (2015) Headache disorders are third cause of disability worldwide. J Headache Pain; 16: 58.

113. Steiner TJ, Stovner LJ, Vos T (2016) GBD 2015: migraine is the third cause of disability in under 50s. J Headache Pain; 17: 104.

114. Steiner TJ, Stovner LJ, Vos T, Jensen R, Katsarava Z (2018) Migraine is first cause of disability in under 50s: will health politicians now take notice? (editorial). J Headache Pain; 19: 17.

115. Steiner TJ, Stovner LJ, Jensen R, Uluduz D, Katsarava Z, on behalf of Lifting The Burden: the Global Campaign against Headache (2020) Migraine remains second among the world’s causes of disability, and first among young women: findings from GBD2019. J Headache Pain 21:137.

116. Steiner TJ (2003) Integrating headache services across the primary/secondary-care interface. Ch 58 in: Reducing the Burden of Headache, ed Olesen J, Steiner TJ, Lipton RB. Oxford: Oxford University Press, pp 347–360.

117. Stovner TJ (2003) Health-care systems for headache: patching the seam between primary and specialist care. J Headache Pain; 4 suppl 1: S70–74.
131. Steiner TJ, Katsarava Z, Olesen J (2019) Barriers to care. Ch 13 in: Steiner TJ, Martelletti P (eds). Handbook of headache. Milan: Springer, pp 173–183.

132. Braschinsky M, Haldre S, Kals M, Arge M, Saar B, Niibek M, Katsarava Z, Steiner TJ (2016) Structured education can improve primary-care management of headache: the first empirical evidence, from a controlled interventional study. J Headache Pain; 17: 24.

133. Braschinsky M, Haldre S, Kals M, Arge M, Saar B, Niibek M, Katsarava Z, Steiner TJ (2018) Structured education to improve primary-care management of headache: how long do the benefits last? A follow-up observational study. Eur J Neurol; 25: 497–502.

134. Steiner TJ, Martelletti P (2007) Aids for management of common headache disorders in primary care. J Headache Pain 8(suppl 1):S1–S47.

135. Peters M, Jenkinson C, Perera S, Loder E, Jensen R, Katsarava Z, Steiner TJ (2019) Evaluation: quality in the provision of headache care: 2. defining quality and its indicators. J Headache Pain; 13: 449–457.

136. Selekler HM, Gökmen G, Alvur TM, Steiner TJ (2015) Productivity losses occurring on more days than not. J Headache Pain; 16: 96.

137. Selekler MH, Gökmek G, Kökmen G, Kaynakayba B, Meksa L, Oliveira E, Palavra F, Rosendo I, Sahin M, Silva B, Uluduz D, Ural YZ, Varsberg-Apote I, Zengin ST, Zvaune L, Steiner TJ, on behalf of the European Headache Federation and Lifting The Burden: the Global Campaign against Headache (2021) Structured headache services: measures of burden in headache service quality indicators in primary care centres. J Headache Pain; 17: 111.

138. Peters M, Perera S, Loder E, Jensen R, Katsarava Z, Gil Gouveia R, Broner S, Steiner TJ (2012) Quality in the provision of headache care: 2. defining quality and its indicators. J Headache Pain; 13: 449–457.

139. Peters M, Jenkinson C, Perera S, Loder E, Jensen R, Katsarava Z, Gil Gouveia R, Broner S, Steiner TJ (2012) Quality in the provision of headache care: 2. defining quality and its indicators. J Headache Pain; 13: 449–457.

140. Peters M, Bertolote JM, Houchin C, Kandoura T, Steiner TJ (2007) Translation protocol for technical documents. J Headache Pain; 8 suppl 1: S41–S42.

141. Peters M, Bertolote JM, Houchin C, Kandoura T, Steiner TJ (2007) Translation protocol for hybrid documents. J Headache Pain; 8 suppl 1: S45–S47.

142. Peters M, Bertolote JM, Houchin C, Kandoura T, Steiner TJ (2007) Translation protocol for lay documents. J Headache Pain; 8 suppl 1: S43–S44.

143. Springer Healthcare IME. Knowledge: Advances in the acute treatment of migraine. At: https://migraine-acute-treatment.ime.springerhealthcare.com/knowledge/ (last accessed 3.2.2022).

144. Peters M, Perera S, Loder E, Jenkinson C, Gil Gouveia R, Jensen R, Katsarava Z, Steiner TJ (2012) Quality in the provision of headache care: 1. systematic review of the literature and commentary. J Headache Pain; 13: 437–447.

145. Peters M, Jenkinson C, Perera S, Loder E, Jensen R, Katsarava Z, Gil Gouveia R, Broner S, Steiner TJ (2012) Quality in the provision of headache care: 2. defining quality and its indicators. J Headache Pain; 13: 449–457.

146. Selekler HM, Gökmen G, Alvur TM, Steiner TJ (2015) Productivity losses occurring on more days than not. J Headache Pain; 16: 96.

147. Steiner TJ (2007) Information for patients. J Headache Pain 8 suppl 1: 1–5.

148. Steiner TJ, Martelletti P (2011) What to tell patients about tension-type headache. Ch 27 in: Handbook of Headache, ed Martelletti P, Steiner TJ. Milan: Springer, pp 307–310.

149. Steiner TJ, Martelletti P (2011) What to tell patients about headache occurring on more days than not. J Headache Pain; 13: 449–457.
166. Thomas H, Kothari SF, Husøy A, Jensen RH, Katsarava Z, Tinelli M, Steiner TJ (2021) The relationship between headache-attributed disability and lost productivity: 2. Empirical evidence from population-based studies in nine disparate countries. J Headache Pain, 22: 153.

167. Steiner TJ, Linde M, Schnell-Inderst P (2021) A universal outcome measure for headache treatments, care-delivery systems and economic analysis. J Headache Pain, 22: 63.

168. Steiner TJ (2022) Time is of the essence in headache measurement. J Headache Pain 23. 33.

169. Linde M, Steiner TJ, Chisholm D (2015) Cost-effectiveness analysis of interventions for migraine in four low- and middle-income countries. J Headache Pain; 16: 15.

170. Tinelli M, Leonardi M, Paemeleire K, Mitsikostas D, Ruiz de la Torre E, Steiner TJ, on behalf of the European Brain Council Value of Treatment Headache Working Group, the European Headache Federation, the European Federation of Neurological Associations and Lifting The Burden: the Global Campaign against Headache (2021) Structured headache services as the solution to the ill-health burden of headache. 2. Modelling effectiveness and cost-effectiveness of implementation in Europe: Methodology. J Headache Pain 22:99

171. Tinelli M, Leonardi M, Paemeleire K, Raggi A, Mitsikostas D, Ruiz de la Torre E, Steiner TJ, on behalf of the European Brain Council Value of Treatment Headache Working Group, the European Headache Federation, the European Federation of Neurological Associations and Lifting The Burden: the Global Campaign against Headache (2021) Structured headache services as the solution to the ill-health burden of headache. 3. Modelling effectiveness and cost-effectiveness of implementation in Europe: Findings and conclusions. J Headache Pain 22:90

172. Steiner TJ, Stovner LJ (2019) The way forward. Ch 17 in: Steiner TJ, Stovner LJ (eds). Societal impact of headache. Burden, costs and response. Cham, Switzerland: Springer Nature, pp 239–244.

173. Ashina M, Katsarava Z, Do TP, Buse DC, Pozo-Rosich P, Özge A, Krymchantowski AV, Lebedeva ER, Ravishankar K, Yu S, Sacco S, Ashina S, Younis S, Steiner TJ, Lipton RB (2021) Migraine: epidemiology and systems of care. Lancet; 397: 1485–1495.

174. Lifting The Burden. The Global Campaign against Headache. At: http://www.l-t-b.org (last accessed 4.3.2022).

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