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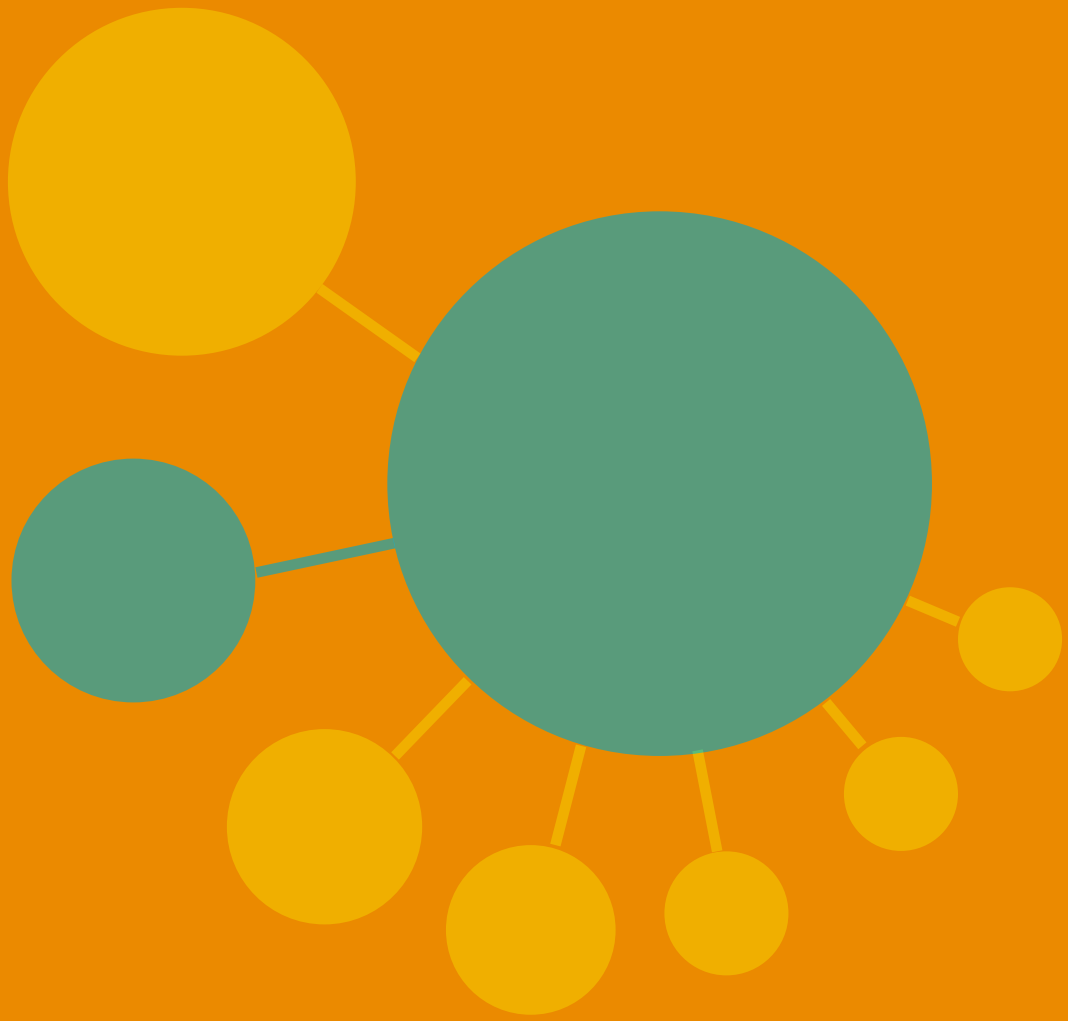
Public Health Information for Scotland

Scottish Burden of Disease Study, 2015

Migraine technical overview



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Background

The Scottish Burden of Disease (SBoD) study team have published comprehensive estimates of the burden of disease and injury in Scotland for 2015 [1]. The purpose of this technical overview is to provide background information on the data and methodology used, noting any caveats associated with estimating the burden of migraine in SBoD.

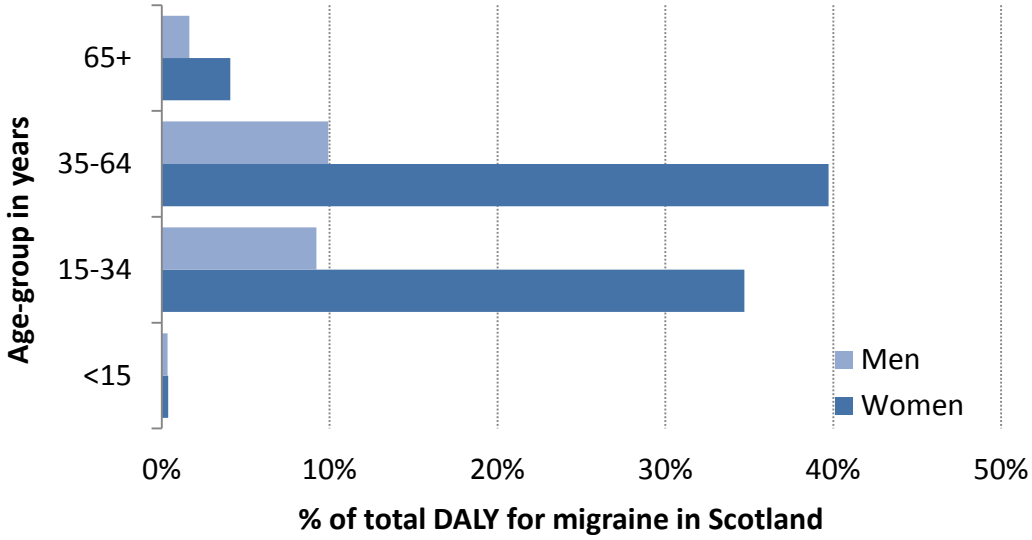
Burden of disease studies aim to estimate the difference between ideal and actual health in a country or region at a specific point in time. Individuals can suffer non-fatal health loss due to suffering disability attributable to a disease, condition or injury, or suffer fatal health loss which is early death due to a disease, condition or injury. To quantify the total burden, non-fatal and fatal health loss are combined to produce a single metric called the Disability-Adjusted Life Year (DALY).

Further information about the SBoD study, including a more thorough explanation of the methodology used, overview reports, detailed results and other specific disease briefings, can be found on the website of the Scottish Public Health Observatory (ScotPHO) [1].

Estimated burden due to migraine

Migraine was the 13th most common cause of disease burden in Scotland in 2015, resulting in approximately 27,800 DALYs. Migraine was the second largest contributor to the overall neurological disorders disease burden.

Figure 1 Percentage of total DALYs by age-group and gender for migraine



Overall, women accounted for over three-quarters (79%) of the total migraine DALY in Scotland in 2015. Women aged between 35-64 years accounted for the largest proportion (40%) of this burden, followed by women aged 15-34 years (35%). Men aged 35-64 years contributed the third highest proportion (10%) to the migraine burden in Scotland. In both age groups (15-34 and 35-64 years) the burden in women was over four times higher than that in men of similar age, as outlined in Figure 1. Note that the burden we are describing is the absolute burden and has not been adjusted for the age/gender case-mix.

How did we produce these estimates?

DALYs attributed to a disease, condition or injury are calculated by combining estimates from two individual metrics: Years of Life Lost (YLL) due to premature mortality and Years Lived with Disability (YLD).

Years of life lost (YLL) to migraine

Each single death contributes to the total YLL through calculating the difference between the age at death and the life expectancy at that age. Migraine is not regarded, in itself, as a valid cause of death in burden of disease studies [2]. There is, therefore, no YLL component in the DALY for

this condition; the entire burden estimated comes from non-fatal consequences of health loss due to migraine.

Years lived with disability (YLD) due to migraine

Years lived with disability (YLD) are estimated using

- disease and injury prevalence estimates
- levels of severity
- disability weights

Our sources of information for these three components were as follows:

Estimating the prevalence

To estimate prevalent cases of migraine in Scotland in 2015, data from the Eurolight study was used, as this was one of the few studies to report on all three headache disorders included in the SBoD disease classification; migraine, tension-type headache and medication overuse headache [3].

The Eurolight study was a collaborative data-collection exercise in ten countries of Europe: Austria, France, Germany, Ireland, Italy, Lithuania, Luxembourg, Netherlands, Spain and UK. Its purpose was to estimate the prevalence and impact of headache disorders. The project took the form of population surveys by structured questionnaire conducted from November 2008 to August 2009. The targeted population in the UK were patients of 12 general practices in 11 towns or cities: Aberdeen, Brighton, Cambridge, Cuddlington, Eastbourne, Exeter, Grantham, Guildford, Norwich, Tenterden and Weymouth. The structured questionnaire included diagnostic questions based on the International Classification of Headache Disorders classification (ICHD-II) [4].

Of a total sample of 8,271 individuals, aged 18-65 years, the estimated prevalence of definite migraine across Europe was 22.2% (27.7% for woman and 14.8% for men) [3]. Based on this, we estimated that there were approximately 759,400 individuals suffering from migraine in Scotland in 2015. This estimate was arrived at by taking the Eurolight survey prevalence

and using it in conjunction with NRS age specific population estimates to make an inference nationally on the number of individuals in Scotland that suffer from migraine. The total prevalent estimate was later redistributed to different age groups and gender based on the proportions we obtained from the Practice Team Information dataset (PTI) [5]. This dataset was collected by ISD Scotland from April 2003 to September 2013. It includes information from a nationally representative 5% sample of Scottish General Practices regarding face-to-face consultations between individuals and a member of the practice team (GPs, nurses and clinical assistants). The presence of a unique patient-identifier on the dataset allows for the grouping of consultations for each individual. The reason for each consultation was coded using Read codes. The number of individuals that had a Read code specific to migraine between 1 April 2003 and 31 September 2013 were used to estimate the age groups and gender proportions. The list of Read codes we used to identify migraine consultations can be found on the ScotPHO website [1].

Severity distribution and disability weights

The levels of severity and disability due to migraine in Scotland are based on the specifications of the Global Burden of Disease (GBD) 2015 study [6]. This allowed prevalent cases to be disaggregated by levels of severity and the associated disability at each level of severity. The disability weights have been developed by the global burden of disease study through surveys of the general public and take into account the consequences of each disease and injury [7]. The severity distributions and disability weights for migraine are shown Table 1. Only 8% of people who suffer from migraine (i.e. the total number of prevalent cases) had symptoms at any one time, reflecting the episodic nature of the condition. The remaining 92% of people do not therefore have an associated disability weight and do not count towards the overall DALY total.

These severity distributions and disability weights were applied to the estimated number of people suffering from migraine (n= 759,400), resulting in around 27,800 YLD due to migraine in Scotland in 2015.

Table 1 Migraine severity levels and disability weights

Severity level	Description	% of individuals	Disability weight
Asymptomatic	Experiences no symptoms by virtue of, for instance being on treatment or because of the natural course of the condition.	92	Nil
Symptomatic	Has severe, throbbing head pain and nausea that cause great difficulty in daily activities and sometimes confine the person to bed. Moving around, light, and noise make it worse.	8	0.441

Data quality

In order to provide a measure of the degree of accuracy[1] and relevance[2] of the estimated disease DALYs to users, a measure of data quality has been developed for the SBoD study. This measure assigns a RAG (Red; Amber; Green) status to each disease or injury indicative of the accuracy and relevance of the estimates. Interpretation of the RAG status can be defined as follows:

 **Highly accurate and relevant**

Estimates have been derived using relevant and robust data sources with only a small degree of adjustments performed to the input data. These estimates can be considered a highly accurate depiction of the burden incurred from the disease, condition or injury.

 **Moderately accurate and relevant**

Estimates have been derived using reasonably relevant and robust data sources with only a moderate degree of adjustments performed to the input data. These estimates can be considered a moderately accurate depiction of the burden incurred from the disease, condition or injury.

 **Uncertainties over accuracy and relevance**

Estimates have been derived using less comprehensive or relevant data sources with a high degree of adjustments performed to the input data. These estimates contain substantial uncertainties and should be used with some caution.

The data quality has been assessed using three main criteria:

- Relevance and accuracy of the data source used to measuring the population of interest
- Likelihood that the implemented disease model captured the overall burden of disease or injury
- The relative contribution of ill-defined deaths to YLL, and YLL to DALY.

[1] How precise, unbiased or certain the estimate is.
[2] Do we measure the thing we want to measure?

These criteria are subjectively assessed and each criterion is scored on a scale of 1 to 5. Further details on these data quality measures are available on the ScotPHO website [1].

Based on above criteria, the estimated of the burden of migraine in Scotland should be regarded as having **uncertainties over accuracy and relevance**  .

Our prevalence estimate of 759,400 is substantially lower than the GBD 2015 estimate of 1,252,000 individuals in Scotland suffering from migraine. We have used data from a cross sectional survey (Eurolight) conducted across ten countries (including the United Kingdom) in Europe to estimate migraine prevalence, as primary and secondary care electronic health records do not adequately capture the overall prevalence of migraine in Scotland.

Although EUROLIGHT was not intended or designed to be used as a primary source of prevalence on headache types [3], it is one of the few headache studies to report on prevalence of the three major headache types (MOH, migraine, tension type headache) included in the SBoD disease classification, and to adopt the same diagnostic criteria for headache (based on ICDH-II) used in GBD 2015. Study authors, however, noted some methodological limitations of the study itself including a low response rate (20.7%), interest bias and concerns about diagnostic accuracy [3, 8], all of which impact on the accuracy of the estimated prevalence of migraine used in SBoD. Of these, interest bias (that is people affected by headache and, particularly, people who perceived themselves to be badly affected, had more interest in participating in the study and were therefore over-represented) will impact the most on the reported prevalence of migraine in Eurolight. The study authors carried out a non-responder study, which suggested that interest bias may have led to over-estimation of migraine prevalence by between two and three per cent [3]. Adjusting the SBoD migraine YLD to take this over-estimation into account, would lead to migraine falling from the13th to the 16th leading cause of disease burden in Scotland.

The Eurolight study reported the prevalence of both ‘definite’ and ‘probable’ migraine on the basis of the ICDHD guidelines. We used the prevalence figure for ‘definite’ migraine only because of concerns about the diagnostic accuracy of the ‘probable’ figure. Applying the combined ‘definite’ and ‘probable’ migraine prevalence would have resulted in an estimated 1,252,000 individuals in Scotland suffering from migraine, which is higher than the GBD 2015 Scottish prevalence estimate of 1,135,600 [9]. Using prevalence estimates for both definite and probable migraine would make migraine the ninth leading contributor to disease burden in Scotland.

Despite the above limitations, the reported ‘definite’ migraine prevalence of 22% in Eurolight is similar to that reported in a survey of over 4,000 individuals in England which showed that 7.6% of men and 18.3% of women experienced migraine with or without aura within the last year, meeting diagnostic criteria established by GBD 2015 [10].

What next to improve estimates for migraine?

Future work on the SBoD study will attempt to refine the estimates of migraine prevalence. This work will include reviewing the coding and recording of migraine in national datasets and exploring local area datasets for information. The development of the Scottish Primary Care Information Resource (SPIRE) may help us to improve our estimates of the burden of disease in Scotland [11]. Further to this, work will be carried out to attempt to derive estimates of severity levels that are dependent on age and that are specific to the Scottish population.

These improvements are partly dependant on exploring other data sources and reviewing evidence from high quality research that it is relevant to Scotland. Please contact the SBoD project team (nhs.healthscotland-sbod-team@nhs.net) for enquiries and suggestions on how to improve our estimates.

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