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Scottish Burden of Disease Study, 2015

Other musculoskeletal disorders 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 other musculoskeletal disorders (OMSKD) in SBoD. OMSKD contains all musculoskeletal disorders NOT coded as arthritis, gout or neck and lower back pain, and includes conditions such as ankylosing spondylitis, arthralgia, Behcet's disease and carpal tunnel syndrome.

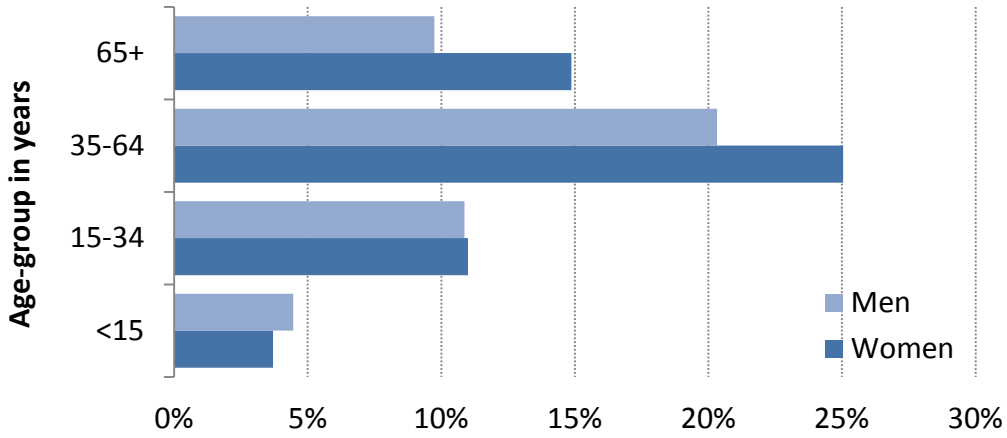
Burden of disease studies aim to estimate the difference between ideal and actual health in a country or region at a specific point in time. Individuals can suffer non-fatal health loss due to suffering disability attributable to a disease, condition or injury, or suffer fatal health loss which is early 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 other musculoskeletal disorders

OMSKD was the 21st most common cause of disease burden in Scotland in 2015, resulting in a total of approximately 19,700 DALYs. Of this total burden, 9% was due to premature mortality attributed to OMSKD and 91% was attributed to the health loss suffered due to living with OMSKD.

Figure 1 Percentage of total DALYs by gender and age group for other musculoskeletal disorders



A higher proportion of Scotland's OMSKD burden was contributed by women (55%) than men (45%). Overall, 45% of the total OMSKD burden was contributed by individuals aged 35 to 64 years, 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) due to other musculoskeletal disorders

YLL measures the years of life lost due to premature deaths i.e. the fatal component of burden of disease. YLLs are calculated by subtracting the age at each OMSKD death from the expected remaining life expectancy for a person at that age.

Estimating the number of deaths

There were approximately 140 deaths caused by OMSKD in 2015. These deaths were identified from the underlying cause of death on the National Records of Scotland (NRS) register of deaths [2]. To classify deaths the GBD 2015 cause list was used, which has been created using the International Statistical Classification of Diseases and Related Health Problems (ICD-10) [3, 4]. The NRS register of deaths has a Community Health Index (CHI) number attached to each death, which allows for demographic data such as gender, geographical area of residence and age at death to be established for each individual.

Included in the total OMSKD mortality count are deaths that have come from what are termed ill-defined causes of death in burden of disease studies. These ill-defined deaths are causes of death that have been coded with ICD-10 codes in vital registers but for the purposes of burden of disease studies, are not regarded as sufficiently specific causes of death. These ill-defined deaths are therefore redistributed amongst specific causes of death across the burden of disease cause list based on the redistribution of deaths method used in the GBD study [3]. For OMSKD, approximately 12% of the death count comes from ill-defined death categories such as A40 ‘streptococcal sepsis’ and other ICD-10 codes. Further explanation of this method is available in the SBoD technical paper [1]. For this reason, the number of deaths due to OMSKD which have been reported are different from that of officially reported sources.

Life expectancy and YLL

Each single death contributes to the total YLL through calculating the difference between the age at death and the life expectancy at that age. Life expectancy was defined using the 2013 gender-specific National Life Tables for Scotland [5]. There were approximately 1,700 YLL due to OMSKD in Scotland in 2015. Dividing the total YLL for OMSKD by the total mortality count indicates that, on average, individuals who die due to OMSKD die 12

years younger than would be otherwise expected on the basis of the life expectancy of the general population.

Years Lived with Disability (YLD) due to other musculoskeletal disorders

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 number of individuals suffering disability

To estimate prevalent cases of OMSKD in 2015, the Practice Team Information dataset (PTI) was used [6]. This dataset was collected and maintained 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 [7]. The number of individuals that had a Read code specific to OMSKD between 1 April 2003 and 31 September 2013 were used to estimate prevalence. The list of Read codes we used can be consulted on the ScotPHO website [1]. Individuals were counted once per year if they attended their GP and consulted for OMSKD. Individuals were only counted as prevalent cases for the year they consulted. In line with the GBD methodology we removed the burden of long-term outcomes of injuries [8]. We did that by discarding from our prevalent count individuals that had had an injury in the two years prior to the OMSKD consultation. We projected the annual count of individuals consulting for OMSKD for the time period covered by PTI (2003-2013) to estimate the number of prevalent cases in 2015.

Using this method of identifying prevalent cases of OMSKD, we estimated that there were approximately 185,000 individuals in the Scottish population living with OMSKD in 2015.

Severity distribution and disability weights

The levels of severity and disability due to OMSKD in Scotland were based on the specifications of the GBD 2015 study [9]. This allowed prevalent cases to be disaggregated by levels of severity and the associated disability at each level of severity. The disability weights were developed by the GBD study through surveys of the general public and take into account the consequences of each disease, condition and injury [10]. The severity distributions and disability weights for OMSKD are outlined in Table 1.

Once the severity of OMSKD and associated disability were taken into account, individuals were estimated to be suffering approximately 18,000 YLDs due to OMSKD in Scotland.

Table 1 Description and allocation to severity levels for other musculoskeletal disorders with corresponding disability weight

Severity level	Description	% of individuals	Disability weight
1	Has disease or infection but experiences no symptoms by virtue of, for instance being on treatment or because of the natural course of the condition.	25	0.000
2	Has pain in the leg, which causes some difficulty running, walking long distances, and getting up and down.	22	0.023
3	Has mild pain and stiffness in the arms and hands. The person has some difficulty lifting, carrying and holding things.	21	0.028
4	Has moderate pain and stiffness in the arms and hands, which causes difficulty lifting, carrying, and holding things, and trouble sleeping because of the pain.	11	0.117

Severity level	Description	% of individuals	Disability weight
5	Has severe pain in the leg, which makes the person limp and causes a lot of difficulty walking, standing, lifting and carrying heavy things, getting up and down, and sleeping.	6	0.165
6	Has pain and deformity in most joints, causing difficulty moving around, getting up and down, and using the hands for lifting and carrying. The person often feels fatigue.	8	0.317
7	Has severe, constant pain and deformity in most joints, causing difficulty moving around, getting up and down, eating, dressing, lifting, carrying and using the hands. The person often feels sadness, anxiety and extreme fatigue.	7	0.581

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.

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

 **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.

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 these criteria, the estimates of burden of OMSKD have **uncertainties over the accuracy and relevance**, and have a red  rating.

The burden of OMSKD is mostly driven by our prevalence estimates. There are no national registries available for OMSKD, hence we used primary care data. The OMSKD category within the GBD is a collection of diseases (such as ankylosing spondylitis, arthralgia, Behcet's disease, carpal tunnel syndrome and others) with different outcomes, some of them may be chronic, while others are not. However, because the PTI dataset did not contain

enough information to differentiate all the diseases making up the OMSKD group we decided not to use an average duration for how long an individual is a prevalent case of the disease. Instead our YLD estimates assume that an individual is a prevalent case only for the year when s/he consults the GP for OMSKD.

The Global Burden of Disease (GBD) 2015 study estimated that there were approximately 247,700 individuals with prevalent OMSKD in Scotland in 2015 [11], which is substantially higher than our estimate of approximately 185,000 individuals.

What next to improve estimates for other musculoskeletal disorders?

Future work on the SBoD study will attempt to refine the estimates of prevalence. This work will include reviewing the coding and recording of OMSKD in alternative national and explore local area datasets for information. The development of the Scottish Primary Care Information Resource (SPIRE) will help us to improve our estimates of the burden of disease in Scotland [12]. 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.

References

[1] Scottish Burden of Disease study. Scottish Public Health Observatory, Available from: URL: http://www.scotpho.org.uk/comparative-health/burden-of-disease/overview (Accessed 03 July 2017)

[2] National Records of Scotland (NRS). Vital Events - Deaths. Scottish Government, Available from: URL: https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/vital-events/deaths (Accessed 03 July 2017)

[3] GBD 2015 Mortality and Causes of Death Collaborators. Global, regional, and national life expectancy, all-cause mortality, and cause-specific mortality for 249 causes of death, 1980–2015: a systematic analysis for the Global Burden of Disease Study 2015. The Lancet 2016 Oct 8;388(10053):1459-544.

[4] World Health Organization. International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10) Version for 2010, Geneva. World Health Organization, Available from: URL: http://apps.who.int/classifications/icd10/browse/2010/en (Accessed 03 July 2017)

[5] Office for National Statistics. National Life Tables: Scotland. Open Government Licence, Available from: URL: https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/lifeexpectancies/datasets/nationallifetablesscotlandreferencetables (Accessed 03 July 2017)

[6] ISD Scotland. Practice Team Information. NHS National Services Scotland, Available from: URL: http://www.isdscotland.org/Health-Topics/General-Practice/PTI-Support/ (Accessed 03 July 2017)

[7] NHS Digital. Read Codes. NHS Digital, Available from: URL: https://digital.nhs.uk/article/1104/Read-Codes (Accessed 03 July 2017)

[8] Smith E, Hoy DG, Cross M, Vos T, Naghavi M, Buchbinder R, et al. The global burden of other musculoskeletal disorders: estimates from the Global Burden of Disease 2010 study. Ann Rheum Dis 2014 Oct;73(8): 1462-1469.

[9] Vos T, Allen C, Arora M, Barber RM, Bhutta ZA, Brown A, et al. 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. The Lancet 2016;388(10053):1545-602.

[10] Salomon JA, Haagsma JA, Davis A, de Noordhout CM, Polinder S, Havelaar AH, et al. Disability weights for the Global Burden of Disease 2013 study. The Lancet Global Health 2015 Nov;3(11):e712-e723.

[11] Institute for Health Metrics and Evaluation (IHME). GBD Results Tool. Seattle, WA: IHME, University of Washington. Available from: URL: http://ghdx.healthdata.org/gbd-results-tool (Accessed 03 July 2017)

[12] Scottish Primary Care Information Resource (SPIRE). NHS National Services Scotland, Available from: URL: http://spire.scot/ (Accessed 03 July 2017)

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