Disparities in the age at osteoarthritis diagnosis: an indicator for equity-focussed prevention.

PEAT, George <http://orcid.org/0000-0002-9008-0184>, KIADALIRI, Ali and YU, Dahai

Disparities in the age at osteoarthritis diagnosis: an indicator for equity-focussed prevention

George Peat G[1] ✉, Ali Kiadaliri[2,3], Dahai Yu[4]

[1] Centre for Applied Health & Social Care Research (CARe), Sheffield Hallam University, Sheffield, UK

[2] Clinical Epidemiology Unit, Faculty of Medicine, Lund University, Lund, Skåne, Sweden

[3] Centre for Economic Demography, School of Economics and Management, Lund University, Lund, Skåne, Sweden

[4] Primary Care Centre Versus Arthritis, School of Medicine, Keele University, Keele, Staffordshire, UK

Corresponding author: Professor George Peat, Centre for Applied Health & Social Care, Sheffield Hallam University, Robert Winston Building, Broomsgrove Road, Sheffield S10 2BP, UK g.peat@shu.ac.uk ORCID: https://orcid.org/0000-0002-9008-0184

Key message

Examining disparities in the age distribution of newly diagnosed cases could help inform osteoarthritis prevention

Dear Editor,

Primary prevention of osteoarthritis (OA) aims to extend OA-free life expectancy for joints. Calls for more coherent and concerted preventive action highlight a number of challenges: they include appropriate methods and metrics to monitor and evaluate action.[1,2] We propose a visual population health metric, obtainable from routinely available data, that may be useful for equity-focussed monitoring of OA prevention in populations. It draws on classic work by van Saase and colleagues[3] who noted a strong tendency towards ‘parallelism’ (populations differ in their level of OA but not in their age-related slopes), by Brenner et al[4] on prevention as rate postponement, and a recent comprehensive analysis of the age at disease onset using national primary care EHR data.[5]

We used data from the Clinical Practice Research Datalink (CPRD) Aurum database linked to the Index of Multiple Deprivation (IMD) 2015, an area-based measure of deprivation based on patient residential postcode. Using previously established methods of a standard codelist of OA diagnostic codes, a three-year look-back period to exclude prevalent consulters, and exact person-time for denominator, we identified cases of incident (first) recorded diagnosis of OA in 2019 in England, in adults aged 45 years and over, stratified by IMD deciles (national ranking).[6] We used kernal density plots to display the age distribution of incident OA cases in the least and the most deprived deciles weighted to the mid-2019 English population.

The weighted kernal density plots overall and separately for men and women are presented in **Figure 1**. They are based on a total of 13,311 cases and 563,595 person-years of observation. The plots show the extent to which the age distribution of incident OA cases in England in the most deprived communities is ‘left-shifted’ compared to those in the least deprived communities, i.e. a greater proportion of cases occur earlier in the lifecourse. These analyses suggest a 4 to 5 years difference in weighted median age at diagnosis between cases living in the most and least deprived parts of the country, with the disparity slightly greater among women than among men (women: 61 (IQR 54, 69) vs 66 (58, 73) years; men: 61 (55, 69) vs 65 (57, 72) years; overall: 61 (54, 69) vs 66 (57, 73) years of age). The difference in peak density of weighted cases is greater still (56 vs 71 years of age overall). There is a 60% probability that a randomly selected case from the most deprived communities will be younger than a randomly selected case from least deprived communities (probabilistic index = 0.598 (95%CI: 0.588, 0.601) overall). A value of 0.50 (or 50%) would imply no overall difference in age distribution between cases from the least and most deprived communities.

These figures should encourage attention towards vulnerabilities and exposures prior to middle age in our most socioeconomically deprived communities. The figures also make clear that these communities are likely to suffer a greater proportion of the burden of osteoarthritis during working-age, and the financial and emotional consequences that can result.

Preventive action is essentially an exposure-focussed, outcome-wide endeavour: many important causes of osteoarthritis are shared with other disease outcomes. The proposed indicator permits the monitoring of the net effect of exposures, actions and policies, whether or not they are intended or targeted towards OA prevention. It exploits the advantages of cost, feasibility, scale, and population coverage of routine primary care electronic healthcare record (EHR) data compared to more conventional measures of OA incidence requiring repeated bespoke self-report, clinical or imaging assessments in sufficiently large, representative samples of the target population. The approach could be adapted to specific phenotypes (e.g. OA knee) where recording is valid, and to subpopulations and strata where sufficient data exist.

This indicator also has the potential to mislead, so requires cautious interpretation and ideally corroboration. Estimates will be sensitive to the population structure used for weighting. We previously found that a three-year look-back period was optimal for excluding prior OA-coded consultation but this may differ in other datasets. More importantly, estimates obtained from dynamic EHR data are sensitive to case definition and analytic approach, the scope of the data sources, coding behaviours, and access to healthcare.[6] Delayed diagnosis for the poor, and earlier diagnosis in the rich will have the spurious effect of reducing observed disparities. A key assumption is therefore the absence of systematic differences (or changes in differences over time when used for monitoring trend) between the most and least deprived populations in their access to primary healthcare, their propensity to consult, and the propensity of healthcare professionals to code their problem as 'osteoarthritis', for a given level of severity. It seems possible that the figures presented here under-estimate current disparities.

With such considerations in mind, this indicator nevertheless adds new insights to existing national and subnational chronic disease surveillance/population health intelligence systems and reports, e.g.[7,8]. We welcome critical comment and application in other national/subnational populations with suitable data sources.

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Data Availability Statement
Data may be obtained from a third party and are not publicly available. The data were obtained from the Clinical Practice Research Datalink (CPRD). CPRD data governance does not allow us to distribute patient data to other parties. Researchers may apply for data access at http://www.CPRD.com/research-applications. Our approved study protocol is available on request, and codelists are freely available at https://www.keele.ac.uk/mrr/codelists/.

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The authors declare no conflicts of interest.

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FIGURE LEGENDS

Figure 1. Age distribution of newly diagnosed cases of osteoarthritis living in the most deprived versus the least deprived areas in England, 2019