

ACCEPTED VERSION

This is the peer reviewed version of the following article: Gill, T.K.; Hill, C.L.
Socioeconomic factors and total joint replacement: comment on the article by Mnatzaganian et al,
Arthritis and Rheumatism, 2012; 64(4):1299-1300
which has been published in final form at DOI [10.1002/art.34325](https://doi.org/10.1002/art.34325)

Copyright © 2012 by the American College of Rheumatology.

This article may be used for non-commercial purposes in accordance with Wiley Terms and Conditions for self-archiving.

Wiley Terms and Conditions for self-archiving

<http://olabout.wiley.com/WileyCDA/Section/id-817011.html>

Under Wiley copyright, authors are permitted to self-archive the peer-reviewed (but not final) version of a contribution on the contributor's personal website, in the contributor's company/institutional repository or archive, and in certain not for profit subject-based repositories such as PubMed Central as listed at the following website (<http://olabout.wiley.com/WileyCDA/Section/id-820227.html>), subject to an embargo period of 12 months for scientific, technical, and medical (STM) journals and 24 months for social science and humanities (SSH) journals following publication of the final contribution.

12th March 2015

<http://hdl.handle.net/2440/86861>

Smoking, body weight, physical activity and risk of lower limb total joint replacement in a population-based cohort of men: comment on the article by Mnatzaganian et al

To the Editor:

We read with interest the article by Mnatzaganian et al (1), who reported that being overweight and reporting physical activity increased the risk of total joint replacements (TJR) but a strong inverse dose-response relationship of duration of smoking and TJR existed, although the mechanisms behind this were unclear. We acknowledge that the association between smoking and arthritis is unclear and the authors highlight that more research is needed to understand the pathways for selection of patients for TJR, however we believe that the authors have not discussed other relevant issues that may have impacted on the numbers of TJR.

Recently, Hui et al (2) demonstrated in a meta-analysis that the protective effect of smoking in osteoarthritis, which has been observed in epidemiological studies, is likely to be false, as a result of selection bias. Their results suggested that the use of a hospital setting was a source of study bias. Previous work has also demonstrated that the willingness to consider total joint arthroplasty (TJA) is a strong predictor of when a TJA is undertaken. Willingness has been shown to be associated with patient perceptions of the risks of TJA and the perception of the indications for a TJA (3). However when willingness is removed from the model, education level was the primary factor influencing undergoing a TJA (3). It has also been shown that those with lower education and/or income were less likely to have TJR and that there are racial and ethnic disparities in the receipt of a TJR (4,5). While these studies were undertaken in North America, it is also likely that similar conditions exist in Australia.

Variability in physicians relating to the indications for TJR has been shown to exist (6). While the authors highlighted a survey of orthopaedic surgeons, which demonstrated that smoking did not influence the decision to conduct a joint replacement, it has been shown by Singh et al (7) that smoking at the time of elective TJR was associated with an increased level of postoperative complications. Thus initial referral of patients to orthopaedic surgeons may not occur, particularly if patients are known to be smokers. There is also evidence to suggest that appropriate candidates for joint surgery do not have the procedure done. This may be due to health system restraints such as waiting lists and access to surgical resources, or a lack of postoperative assistance and support (8). Smokers may be impacted by long waiting lists which would then limit the number of smokers undertaking a TJR.

The authors indicate that the data include arthroplasties from both public and private hospitals in Australia. Data from the Australian Orthopaedic Association National Joint Replacement Registry demonstrate that, despite the presence of universal health care in Australia, the majority (over 60%) of TJR are performed in private hospitals (requiring patients to have access to private health insurance) (9). Generally, it is considered that those of higher socioeconomic status have access to private hospital care; these are also the patients with lower levels of co-morbidities and lower levels of smoking.

Smokers are more likely to be from lower socioeconomic groups (10) and these are also groups which have a lower level of health literacy (11). It may be that those who smoke are less willing to undertake a TJR and are impacted more strongly by factors highlighted by Hawker (12) such as sociodemographic factors, health beliefs, lack of community and family support, lack of resources and clinician characteristics.

Thus we would argue that there is not a direct dose-response relationship between smoking and TJR.

1. Mnatzaganian G, Ryan P, Norman PE, Davidson DC, Hiller JE. Smoking, body weight, physical exercise and risk of lower limb total joint replacement in a population-based cohort of men. *Arthritis Rheum* 2011;63:2523–2530.
2. Hui M, Doherty M, Zhang W. Does smoking protect against osteoarthritis? Meta-analysis of observational studies. *Ann Rheum Dis* 2011; 70:1231–1237.
3. Hawker GA, Guan J, Croxford R, Coyte PC, Glazier RH, Harvey BJ, et al. A prospective population-based study of the predictors of undergoing total joint arthroplasty. *Arthritis Rheum* 2006; 3212-3220.
4. Hawker GA, Wright JG, Glazier RH, Coyte PC, Harvey B, Williams JI, et al. The effect of education and income on need and willingness to undergo total joint arthroplasty. *Arthritis Rheum* 2002;63:3331–3339.
5. Skinner J, Weinstein JN, Sporer SM, Wennberg JE. Racial, ethnic, and geographic disparities in rates of knee arthroplasty among Medicare patients. *N Engl J Med* 2003;349:1350-59.
6. Toronto Arthroplasty Research Group Writing Committee. Variability in physician opinions about the indications for knee arthroplasty. *J Arthroplasty* 2011;26:569-575.
7. Singh JA, Houston TK, Ponce BA, Maddox G, Bishop MJ, Richman J, et al. Smoking as a risk factor for short-term outcomes following primary total hip and total knee replacement in veterans. *Arthritis Care Res* 2011;63:1365-1374.
8. Hudak PL, Grassau P, Glazier RH, Hawker G, Kreder H, Coyte P, et al. “Not everyone who needs one is going to get one”: The influence of medical brokering on patient candidacy for total joint arthroplasty. *Med Decis Making* 2008;28:773–780.
9. Australian Orthopaedic Association. Analysis of state and territory health data all arthroplasty. Supplementary report 2011. 2011. URL: http://www.dmac.adelaide.edu.au/aoanjrr/documents/AnnualReports2011/Analysis_of_State_and_Territory_Health_Data_All_Arthroplasty_2011.pdf
10. Scollo MM, Winstanley MH (eds.). *Tobacco in Australia: Facts and Issues*. 3rd ed. Cancer Council Victoria, Melbourne, Australia, 2008. Available from <http://www.tobaccoinaustralia.org.au>
11. Barber MN, Staples M, Osborne RH, Clerehan R, Elder C, Buchbinder, R. Up to a quarter of the Australian population may have suboptimal health literacy depending upon the measurement tool: Results from a population-based survey. *Health Promot Int* 2009;24:252-261.
12. Hawker GA. The quest for explanations for race/ethnic disparity in rates of use of total joint arthroplasty. *J Rheumatol* 2004;31;1683-1685.

Tiffany K Gill,

School of Medicine, The University of Adelaide, Adelaide, SA, Australia

Catherine L Hill,

Rheumatology Unit, The Queen Elizabeth Hospital,

Woodville, SA, Australia

The Health Observatory, The University of Adelaide, Adelaide, SA, Australia