Knee joint replacement and individual susceptibility for progression of knee osteoarthritis and tibial cartilage volume loss: not only genes run in the family

Dear Editor

The study of interactions between genetic and non-genetic factors can be quite complex. Also the identification of risk factors for the worsening of knee osteoarthritis (OA) is difficult but knowing these risk factors is essential for the selection of effective individual, community level and workplace interventions for this rapidly growing disabling disease. Khan et al. used in their longitudinal study with an impressive follow-up period of 10 years an innovative proxy for the genetic factor namely adults (offspring) of parents of whom at least one was operated for knee replacement due to severe primary knee OA. All participating adults were of working age at baseline: mean 45 years, standard deviation 7. The radiographic changes and cartilage loss in the knee in the offspring group (n = 115) were compared with 105 sex and age matched healthy population controls. In the analysis, Body Mass Index (BMI), knee pain, cartilage defects, tibial bone area and leg strength were taken into account.

Khan et al. concluded that this is the first study to confirm that offspring of those with a knee replacement for OA have a higher risk of worsening knee OA. This suggests that the genes responsible may express themselves later in life, possibly through interaction with factors such as BMI and muscle strength, as pointed out by reduction in estimates after adjustment for baseline differences. We think that an important non-genetic factor should have been discussed in their interesting study, namely knee-demanding work. First of all, it has been established that persons with lower socio-economic position (SEP) have a substantial increased risk for knee joint replacement: in 2010 an estimated rate per 1,000 male person years of 8.32 (95% CI 7.97–8.68) vs 6.28 (95% CI 6.00–6.58). Moreover, the percentage patients in working age operated for knee replacement surgery perform more often physically demanding work compared to the distribution of physically demanding work among the general working population: an estimated ratio of about 5:3 in the Netherlands. There is ample evidence that SEP is partly determined by intergenerational transmission and, thus, this also implies that their offspring has a lower SEP and are more exposed to established occupational risk factors for knee OA like lifting. Adjusting for BMI as is done by Khan et al. seems not sufficient given for instance the finding of an multiplicative interaction between BMI and lifting. Therefore, discussing possible confounding due to knee-demanding work and SEP might have shed more light on the complex interaction between genetic and non-genetic factors in their paper.

We like to share our thoughts on this topic in order to overcome that future health impact assessments on prevention for knee OA underestimate the true contribution of non-genetic factors like occupational risk factors for prevention.

Author contribution

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Conflict of interest

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References


P.P.F.M. Kuijer*
Netherlands Center for Occupational Diseases, Coronel Institute of Occupational Health, Academic Medical Center, University of Amsterdam, Amsterdam, The Netherlands

* Address correspondence and reprint requests to: P.P.F.M. Kuijer, Netherlands Center for Occupational Disease, Coronel Institute of Occupational Health, Academic Medical Center, University of Amsterdam, PO Box 22660, 1100 DD Amsterdam, The Netherlands. Tel.: 31-20-566-5339; fax: 31-20-697-7161. E-mail address: p.p.kuijer@amc.uva.nl (P.P.F.M. Kuijer).

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