

Diabetes is associated with elevated risks of osteoarthritis, osteoporosis and rheumatoid arthritis**S. Molsted**¹, A.-S.D. Bjørkman¹, M.B. Andersen¹, O. Ekholm²;¹Department of Clinical Research, Nordsjaellands University Hospital, Hillerød, ²National Institute of Public Health, University of Southern Denmark, København, Denmark.

Background and aims: Previous studies have reported elevated prevalence of musculoskeletal pain in patients with type 2 diabetes compared to age and gender matched general populations or non-diabetes populations. Musculoskeletal pain may be barriers to exercise training, which is important in the diabetes treatment. The question remains as to whether the pains are the results of an elevated prevalence of arthritis. The aim of this study was to investigate the association between diabetes (DM) and osteoarthritis (OA), osteoporosis (OP) and rheumatoid arthritis (RA).

Materials and methods: All data were self-reported and provided by the Danish National Health Survey 2013. The exposure variable was DM and the outcome variables included arthritis, back pain, shoulder/neck pain, and physical activity. Multiple logistic regression analyses adjusted for age, gender and BMI were performed.

Results: In total 109,218 individuals (≥ 40 years old) were included. Diabetes was reported by 9238 (8.5%), aged 65.6 ± 11.0 (mean \pm SD) years, males 55.6%, and the BMI was 28.9 ± 5.5 kg/m². In those without DM (n=99,980) the mean age was 59.2 ± 11.8 years, males 46.7%, and the BMI was 25.8 ± 4.4 kg/m². In individuals with DM vs those without DM, OA was reported by 43.5% vs 29.4%, $p < 0.0001$, OP by 6.4% vs 4.8%, $p < 0.0001$, and RA by 15.1% vs 7.6%, $p < 0.0001$, respectively. Back pain was reported by 60.6% vs 51.4%, $p < 0.0001$, and shoulder/neck pain was reported by 56.0% vs 51.5%, $p < 0.0001$, in individuals with and without DM, respectively. Diabetes was associated with OA (OR 1.33 (95% CI 1.25-1.41)), OP (1.29 (1.13-1.46)), and RA (1.71 (1.57-1.85)). Diabetes was associated with back pain 1.27 (1.21-1.34) and shoulder/neck pain 1.29 (1.22-1.36). In a sub analysis of those with DM, being physically active (n=6220 (71.6%)) was inversely associated with back pain 0.65 (0.57-0.73) and shoulder/neck pain 0.76 (0.68-0.86).

Conclusion: Diabetes was associated with significantly elevated odds of having arthritis and musculoskeletal pain. The most frequent arthritis in individuals with DM was OA. The most pronounced association was found between DM and RA. The association between DM and RA in this study may not be a link between the autoimmune diseases type 1 diabetes and RA as the majority of the individuals with DM may have had type 2 diabetes as result of the exclusion of individuals with an age below 40 years. The link between diabetes and RA may be a result of the chronic inflammation that is present in the two diseases. Another hypothesis of the association between DM and RA could be linked to medication. Whilst steroids are used in the treatment of RA, steroids also increases the risk of the development of type 2 diabetes. Furthermore, pains from RA may also increase the risk of physical inactivity, which is a type 2 diabetes risk factor. The reported pains may have negative impacts on the level of physical activity in individuals with diabetes. Health care professionals should remember to inform patients with DM, that musculoskeletal pain and arthritis not are contra-indications to exercise training. Thus, as exercise training is a recognized element in the treatment of DM and arthritis, it may have positive effects on glycemic control and musculoskeletal pain at the same time.

Disclosure: **S. Molsted:** None.