physical therapists reported that they would use other interventions in addition to advice and exercise (manual therapy 27%, acupuncture 5%, electrotherapy 2%) and there was an increased focus on aerobic training (37%). More physical therapists reported that they would supervise exercise (95%) and provide written advice about home exercise (75%) during follow-up appointments, and more would use an exercise diary to monitor exercise adherence (43%). Changes appeared most pronounced in those physical therapists attending the training days supporting 'targeted exercise adherence' and 'individually tailored exercise' interventions. Some of the reported changes were maintained at the post-intervention evaluation, including lower reported rates of other treatments, greater supervision of exercise during follow-up (89%) and use of exercise diaries (49%). However, use of specific aerobic training had reverted to pre-training levels (15%), as had use of written exercise advice during follow-up appointments (69%).

Conclusion: Overall, participating in a dedicated training programme as part of a randomised trial changed some aspects of how physical therapists manage patients with knee OA. This suggests that attending training programmes, particularly those that are highly focused, are useful in terms of changing clinical practice, but multi-faceted approaches are likely to be needed to successfully maintain changes in clinical behaviour over time.

351
GETTING A GRIP ON ARTHRITIS: WEB-BASED CONTINUING HEALTH EDUCATION IMPROVES RURAL/REMOTE PRIMARY HEALTH CARE PROVIDERS' SATISFACTION AND CONFIDENCE WITH MANAGING OSTEOARTHRITIS

E. Badley †‡, L. Fleet §, M. Bell †, S. Lineker ‖·¶, V. Curran §, M. Del Pino #, F. Kirby §, A. Lyddiatt ††, L. Moore ‖, K. Simmons §, R. Sweezie ‖, P. Tugwell ‡‡, E. Ziesmann ‖. † *Univ. of Toronto, Toronto, ON, Canada;* ‡ *Arthritis Community Res. and Evaluation Unit, Toronto, ON, Canada;* § *Mem. Univ., St. John's, NL, Canada;* ‖ *The Arthritis Society, Toronto, ON, Canada;* ¶ *McMaster Univ., Hamilton, ON, Canada;* # *Hlth.Canada, Winnipeg, MB, Canada;* †† *Patient Partners in Arthritis, Toronto, ON, Canada;* ‡‡ *Univ. of Ottawa, Ottawa, ON, Canada*

Purpose: Osteoarthritis (OA) is highly prevalent in Canada's rural/remote communities. Primary health care providers serving these communities are often challenged with delivering optimal OA care and accessing relevant up-to-date information. *Getting a Grip on Arthritis,* a web-based continuing health education module with case-based content developed around best practice guidelines, was recently developed to address these issues. An evaluation of the program's effectiveness in improving primary health care providers' confidence and satisfaction with their ability to manage OA was performed.

Methods: An online learning module was developed for OA based on a needs assessment with primary health care providers, and input from an interdisciplinary expert panel. The module was piloted in two predominantly rural/remote areas of Canada with documented arthritis prevalence and health human resource shortages. These areas encompassed the North West Local Health Integration Network in Ontario and the Central Health Region in Newfoundland. A mixed methods evaluation was performed. This included 1) paired samples analyses of pre/post measurements of confidence and satisfaction with ability to manage arthritis and 2) an evaluation of module content and design. Confidence and satisfaction were measured on 10 point numerical rating scales (0 = not satisfied/not at all confident; 10 = extremely satisfied/confident).

Results: Thirty-four providers participated in the pilot, which exceeded our target of 30. Participants represented various primary health care professions, including physiotherapists, occupational therapists, nurses, and family physicians. After taking the module, satisfaction with ability to manage OA improved significantly ($p = 0.02$). Significant increases in confidence with different aspects of OA care were also observed. Participants' confidence also improved for the comprehensive musculoskeletal examination ($p = 0.02$), prescribing/recommending corticosteroids ($p = 0.02$), ordering/recommending serological tests ($p \leq 0.01$), and managing common musculoskeletal conditions ($p = 0.03$). The majority of respondents agreed that the module was consistent with stated objectives (97.5%), addressed their learning needs (87.2%) and was relevant to practice (80.0%). The planned use of relevant resources in practice and with patients highlighted the participants' commitment to change. Participant feedback highlighted the need for additional information relevant to professions other than physicians to better capture the importance of inter-professional care.

Conclusions: With knowledge gained from the online module, participants reported an increase in both satisfaction and confidence with managing OA. The module was also relevant to practice and the content addressed the participants' learning needs. The case-based format simulated interaction with 'real' patients and enabled participants to practice their diagnostic and management skills. Feedback is being incorporated into the final version of the module with plans for a national launch in 2014.

Epidemiology and Health Services Research

352
THE RELATIVE CONTRIBUTION OF MECHANICAL STRESS AND SYSTEMIC PROCESSES IN DIFFERENT TYPES OF OSTEOARTHRITIS: THE NEO STUDY

A.W. Visser, R. de Mutsert, S. le Cessie, M. den Heijer, F.R. Rosendaal, M. Kloppenburg, NEO Study Group. *Leiden Univ. Med. Ctr., Leiden, Netherlands*

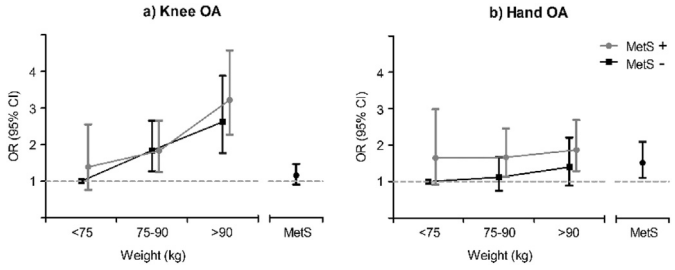
Purpose: Obesity is a risk factor for osteoarthritis (OA) in both weight-bearing and non-weight-bearing joints. In the association between obesity and OA, both increased mechanical stress and systemic processes seem to be of importance, although it is unclear which mechanisms play a role in certain joints. To gain more insight into the relative contribution of mechanical stress and systemic processes to OA of weight-bearing and non-weight-bearing joints, we examined the association of surrogates for both mechanisms with OA of the knees, hands or both.

Methods: The Netherlands Epidemiology of Obesity (NEO) study is a population-based cohort including 6673 lean, overweight and obese participants aged 45–65 years. Weight (kg) and fat mass (kg) were measured, fat free mass (FFM) (kg) was calculated. The metabolic syndrome (MetS) was defined following the ATPIII criteria; based on measured waist circumference (cm), blood pressure (mmHg), triglycerides (mmol/L), HDL cholesterol (mmol/L), fasting glucose (mmol/L), and recorded medication use. Knee and hand OA were defined according to the ACR clinical criteria; pain and stiffness were measured using a standardized questionnaire, physical examination of the knees and hands was performed by trained research nurses. Odds ratios (OR) with 95% confidence intervals (CI) were calculated to associate surrogates for mechanical stress (weight, FFM) and systemic processes (MetS) with OA in knees alone, both knees and hands or hands alone, using individuals without knee or hand OA as reference group. Analyses were adjusted for age, sex, height, smoking, education and ethnicity, and either metabolic factors or weight. Finally, adjusted ORs were calculated for each OA type in three weight categories (<75 kg, 75–90 kg, >90 kg), stratified by MetS. Participants in the lowest weight category without MetS served as reference.

Results: After exclusion of participants with missing data (n = 45), data from 6628 participants were analyzed (median (IQR) age 56 years (50–61), BMI 26 kg/m^2 (23–28), 56% women). The estimated population prevalence of knee, both knee and hand, and hand OA were 10%, 4% and 8%, respectively. After adjustment for metabolic factors, knee OA was associated with both weight (OR 1.49 (95%CI 1.32,1.68)) and FFM (OR 2.05 (1.60,2.62)). Similar results were observed for OA in both knees and hands (OR 1.51 (95%CI 1.29,1.78) and 2.17 (1.52,3.10) respectively). Neither knee OA nor OA in both knees and hands were associated with MetS after adjustment for weight (OR 1.08 (95%CI 0.85,1.39) and (1.03 (0.72,1.46) respectively). In hand OA the opposite was observed; whereas no associations with weight and FFM were observed after adjustment for metabolic factors (OR 1.12 (95%CI 0.96,1.32) and 1.17 (0.83,1.63) respectively), hand OA remained associated with MetS, after adjustment for weight (OR 1.46 (95% CI 1.06,2.02)). The figure illustrates the relative contribution of weight as surrogate for mechanical stress and MetS as surrogate for systemic processes to OA of the knees (a) and hands (b). The adjusted ORs for knee OA were higher in higher categories of weight as compared with the lowest weight category. The adjusted OR of the highest weight category in individuals without MetS was 2.62 (95%CI 1.77,3.88) (Figure). The adjusted OR of highest versus lowest weight category in individuals with MetS was 2.30 (1.29,4.12). The presence of MetS, adjusted for the weight categories, did not result in a higher OR for knee OA (1.16 (95%CI 0.91,1.47)) (Figure). The same

was observed in relation to OA in both knees and hands. In hand OA on the contrary, the ORs were not associated with weight. The adjusted OR of highest versus lowest weight category was 1.40 (95%CI 0.89,2.21) in individuals without MetS (Figure), and 0.77 (0.39,1.51) in individuals with MetS. MetS on the other hand was associated with hand OA, adjusted for the weight categories; individuals with MetS had a higher OR for hand OA as compared to individuals without MetS (1.52 (95%CI 1.10,2.09)) (Figure).

Conclusion: This study suggests that in knee OA, whether or not in co-occurrence with hand OA, mechanical stress is the most important underlying mechanism, whereas in hand OA alone, systemic processes might contribute most.



353

LONG-TERM EFFECTIVENESS OF GLUCOSAMINE AND CHONDROITIN IN TREATING KNEE OSTEOARTHRITIS: AN ANALYSIS WITH MARGINAL STRUCTURAL MODELING

S. Yang †, C.B. Eaton ‡, T. McAlindon §, K.L. Lapane ‖. † *Virginia Commonwealth Univ., Richmond, VA, USA;* ‡ *Mem. Hosp. of Rhode Island, Pawtucket, RI, USA;* § *Tufts Univ., Medford, MA, USA;* ‖ *Univ. of Massachusetts Med. Sch., Worcester, MA, USA*

Purpose: In the United States, one third of patients with osteoarthritis (OA) take glucosamine and chondroitin for arthritis symptoms in the United States. Despite the prevalent use of these two supplements, evidence from randomized controlled trials regarding their efficacy is inconsistent. The purpose of this study was to estimate the long-term effectiveness of glucosamine and chondroitin in relieving knee symptoms and slowing disease progression among patients with knee OA.

Methods: Using data from the Osteoarthritis Initiative, we identified 1,579 participants who had radiographic knee OA and were not taking glucosamine or chondroitin at baseline. The 4-year follow-up data were analyzed. At each annual assessment, use of glucosamine with or without chondroitin for at least 4 days per week was considered exposed (GLU/CHON). Knee symptoms were measured with WOMAC Pain, Stiffness and Physical Function, and structural progression of OA was measured with joint space width in the medial compartment. Sociodemographic characteristics (time-invariant) and indices of disease severity (time-varying) were considered as potential confounders. To take into account that the indices of disease severity may be simultaneously confounders and intermediate variables, we used marginal structural modeling to estimate the long-term treatment effects. To determine the clinical relevance of our findings, we compared the estimates with minimal clinically important difference of the WOMAC subscales (i.e., 1.2, 0.5 and 4.1 for Pain, Stiffness and Function, respectively).

Results: During the 4-year study period, 280 (18%) participants initiated treatment, 148 (9%) used the treatment at one assessment, and 65 (4%) were persistent users at all assessments. After adjustment for potential confounders with marginal structural models, we found no statistically or clinically significant differences between persistent GLU/CHON users and never-users in WOMAC Pain: 0.83 (95% CI: −0.01 to 1.68); WOMAC Stiffness: 0.31 (95% CI: −0.10 to 0.72); WOMAC Function: 1.80 (95% CI: −0.79 to 4.39); or joint space width: 0.04 (95% CI: −0.32 to 0.23).

Conclusions: Long term use of glucosamine with or without chondroitin did not appear to relieve symptoms or modifying disease progression among radiographically confirmed OA patients. Our findings are consistent with the results from several long-term clinical trials and support the latest guidelines for OA treatment which recommend against using glucosamine and chondroitin. Future qualitative research is necessary to understand why patients choose to continue using supplements which lack efficacy.

354

EFFECTIVENESS OF INTERNET AND DVD DECISION AIDS FOR PATIENTS WITH HIP AND KNEE OSTEOARTHRITIS

K.D. Allen †‡, L. Sanders ‡, M. Olsen †‡, L. Bowlby ‡, J.N. Katz §, R.C. Mather, III ‡, B.J. Powers ‖, N.R. Sperber †‡, C.I. Voils †‡, J.W. Williams †‡. † *Durham VA Med. Ctr., Durham, NC, USA;* ‡ *Duke Univ. Med. Ctr., Durham, NC, USA;* § *Harvard Med. Sch., Boston, MA, USA;* ‖ *St. Luke's Clinic – Internal Med., Meridian, ID, USA*

Purpose: A recent meta-analysis showed that decision aids improve knowledge, reduce decisional conflict, and improve other decision-making outcomes in the context of chronic health conditions. However very little is known about the effectiveness of decision aids for patients with osteoarthritis (OA). This study examined the effects of internet and DVD format decision aids for patients with hip and knee OA.

Methods: This study involved n = 155 patients with physician diagnoses of hip and or knee OA from a general internal medicine clinic and an orthopedic clinic in the Duke University Healthcare System. Participants were randomized to view either the internet or DVD format of a decision aid for knee / hip OA (according to the most severely affected joint) from the Informed Medical Decisions Foundation. The Decision Quality Index – Facts about OA scale DQI Facts; range of 0–100, with higher scores indicating more knowledge about OA and its treatment) and Decisional Conflict Scale (DCS; range of 0–100, with lower scores indicating less conflict about preferred OA treatment) were administered before and immediately after viewing the decision aid, as well as 30 days later. The Preparation for Decision Making Scale (PDM; range 0–100, with higher scores indicating greater helpfulness of the decision aid) was administered immediately after viewing the decision aid. We hypothesized that both decision aid formats would be associated with improvement in outcomes and that changes would be similar between the two formats. Generalized linear models fit with generalized estimating equations (GEE) were used to examine change in DQI Facts and DCS over time, both between decision aid groups and within the sample overall. Group differences in the PDM scale were estimated with a general linear model (GLM).

Results: 60.6% of participants were female, the mean age was 61.8 (SD = 11.7), 26% had twelve or fewer years of education, and the majority (82.6%) indicated the knee was their most severely affected joint. Participants spent an average of about 30 minutes viewing the internet versions of the decision aids (range = 17–50 minutes), and the DVDs were about 45 minutes. There was a significant increase in DQI: Facts scores over time ($p < 0.001$); scores increased from baseline (mean = 50.0, SD = 19.5) to immediate post-decision aid (mean = 66.5, SD = 19.6) but declined somewhat by 30-day follow-up (mean = 56.4, SD = 19.7). These changes were similar between internet and DVD decision aid groups ($p = 0.46$). There was also a significant decrease in DCS scores over time ($p < 0.001$); scores decreased from baseline (mean = 25.0, SD = 26.0) to immediate post-decision aid (mean = 4.7, SD = 11.9) and remained low at 30-day follow-up (mean = 6.3, SD = 17.0). These changes were similar between internet and DVD decision aid groups ($p = 0.82$). PDM scores were relatively high overall but were lower for the internet format (mean = 74.9, SD = 22.9) than the DVD format (mean = 85.2, SD = 13.7, $p < 0.001$).

Conclusions: Internet and DVD Decision aids are relatively brief and feasible to deliver in health care settings and are associated with meaningful improvements in decision-making outcomes for patients with hip and knee OA. Although there was some attenuation in knowledge over time, improvements in decisional conflict persisted. The internet and DVD formats yielded similar improvements in knowledge and decisional conflict, but the DVD version was rated as more helpful in decision making. Further study is needed regarding the best approaches and formats for incorporating decision aids for hip and knee OA into clinical care.

355

ASSOCIATION OF LARGE JOINT OSTEOARTHRITIS WITH ALL-CAUSE DEATH: THE JOHNSTON COUNTY OSTEOARTHRITIS PROJECT

R.J. Cleveland, T.A. Schwartz, J.B. Renner, J.M. Jordan, L.F. Callahan. *Thurston Arthritis Res. Ctr., Univ. of North Carolina-Chapel Hill, Chapel Hill, NC, USA*

Purpose: Only a limited number of studies have investigated mortality among persons with osteoarthritis (OA). Most of these investigations