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**Outcome measures, Lifestyles**

**Physical function and disease activity are affected by social determinants of health in patients with rheumatoid arthritis; Real world data from a Rheumatoid Arthritis Registry in Canada**

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**Background:**

The relationship between social determinants of health (SDH) (e.g. income, education, and employment status) and disease outcomes in the RA population is not well documented.

**Objectives:**

We aimed to understand the effect of different SDH on disease activity and functional ability.

**Methods:**

All retrospective data were extracted from the Ontario Best Practices Research Initiative- Rheumatoid Arthritis (OBRI-RA) registry for the period January 2008 to April 2022. We conducted adjusted generalized linear mixed models analysis to investigate the effect of baseline SDH on disease activity, using the Clinical disease activity index (CDAI), and functional disability, using the Health Assessment Questionnaire-disability index (HAQ-DI) at 12 months follow-up. The main analysis was completed on multiple imputed data (Imputation Chained Equation, N=20).

**Results:**

Two thousand six hundred fifty-one patients were identified with a mean (SD) age of 58.1 years (12.9) and 77.8% were female.

Being retired (adj  $\beta$  =-1.62; 95%CI: -3.11,-0.14) was associated with higher improvement in disease activity at 12 months (Table 1). Currently smoking had a borderline significant association with lower improvements in disease activity.

Being employed (adj  $\beta$  =-0.24; 95%CI: -0.32,-0.16) or retired status (adj  $\beta$  =-0.16; 95%CI: -0.25,-0.07), having higher income (adj  $\beta$  =-0.10; 95%CI: -0.16, -0.04), and post-secondary education (adj  $\beta$  =-0.07; 95%CI: -0.11, -0.02) were all associated with greater improvement of physical function at 12 months (Table 1). Being Caucasian and alcohol consumption were also associated with a positive impact on functional ability. In contrast, currently smoking was significantly associated with lower improvements in physical function (adj  $\beta$  = 0.08; 95%CI: 0.01, 0.14) at 12 months.

**Conclusion:**

RA patients who reported being retired, non-smokers showed greater improvements in both disease activity and functional outcomes at 12 months follow-up. Having higher income, post secondary education, alcohol consumption, and being Caucasian had a positive impact only on physical function.

Our study suggests that disease activity and functional ability are affected by different SDH factors at 12 months follow-up. These differences in SDH must be addressed to provide equitable healthcare for all patients with RA.

**Table 1.**

| <b>N=2651</b>                                       | <b>CDAI*</b><br><b>β (95% CI), P</b> | <b>HAQ-DI**</b><br><b>β (95% CI), P</b> |
|---|--------------------------------------|---|
| <b>Employment</b> (Ref: unemployed)                 |                                      |   |
| Employed  | -0.66 (-1.81, 0.49), 0.26            | <b>-0.24 (-0.32, -0.16), &lt;0.0001</b> |
| Retired   | <b>-1.62 (-3.11, -0.14), 0.03</b>    | <b>-0.16 (-0.25, -0.07), 0.0008</b>     |
| <b>Annual household income</b> (Ref: ≤ 50K CAD)     |                                      |   |
| > 50K CAD   | -0.50 (-1.52, 0.53), 0.34            | <b>-0.10 (-0.16, -0.04), 0.002</b>      |
| <b>Current Smoking</b> (ref: former /never)         | <b>0.95 (-0.02, 1.92), 0.05</b>      | <b>0.08 (0.01, 0.14), 0.02</b>          |
| <b>Married</b> (ref: single)                        | 0.16 (-0.86, 1.18), 0.76             | -0.003 (-0.07, 0.06), 0.94              |
| <b>Living Alone</b> (ref: not alone)                | -0.42 (-1.67, 0.83), 0.51            | -0.03 (-0.11, 0.05), 0.49               |
| <b>Education</b>                                    |                                      |   |
| Post-secondary education (Ref: high school or less) | -0.22 (-0.97, 0.53), 0.56            | <b>-0.07 (-0.11, -0.02), 0.009</b>      |
| <b>Rural Residence</b> (ref: Urban)                 | 0.63 (-0.29, 1.56), 0.18             | 0.04 (-0.02, 0.10), 0.22                |
| <b>Caucasian</b> (ref: non- Caucasian)              | 1.01 (-0.17, 2.19), 0.09             | <b>-0.08 (-0.16, -0.004), 0.04</b>      |
| <b>Alcohol consumption</b>                          |                                      |   |
| Current use (ref: never/past use)                   | -0.33 (-1.17, 0.51), 0.44            | <b>-0.09 (-0.15, -0.04), 0.001</b>      |
| Rarely use (ref: never/past use)                    | -0.33 (-1.26, 0.58), 0.47            | <b>-0.09 (-0.15, -0.03), 0.004</b>      |
| <b>Health insurance coverage</b>                    |                                      |   |
| Both public and private (ref: only public health)   | 0.02 (-0.83, 0.87), 0.96             | -0.01 (-0.06, 0.05), 0.78               |

\*Model was additionally adjusted for age, gender, disease duration, positive RF, oral steroid use, current biologic use, CVD, depression, and HAQ-DI

\*\* Model was additionally adjusted for age, gender, disease duration, positive RF, oral steroid use, current biologic use, CVD, depression, and CDAI

CDAI: Clinical Disease Activity Index; HAQ-DI: Health Assessment Questionnaire-disability index.

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