How does multimorbidity impact on the direct and indirect costs in patients with rheumatoid arthritis?

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Background and Objectives
• Comorbidities are prevalent in patients with rheumatoid arthritis (RA) and associated with worse outcomes as well as higher economic burden.
• To describe how multimorbidity impacts on the cost-of-illness, including direct and indirect costs, in patients with RA.

Methods
• Data from the Scottish Early Rheumatoid Arthritis Registry were linked to routinely collected health data (hospitalisation and prescribing) (Figure 1).
• Direct costs were estimated by applying relevant unit costs to healthcare resource use quantities; indirect costs were obtained from information on work absence and hospital admissions, valued by age and sex specific wages.

Results
• Distribution of direct and indirect costs was dominated by direct costs across multimorbidity groups. (Table 1)
• The presence of comorbidity contributes significant excess to both direct and indirect costs among RA patients.
• The distribution of cost components was comparable by using the Charlson Comorbidity Index and EULAR list; however, cost estimates for patients with comorbidity were lower when using EULAR list. (Figure 2)

CONCLUSION
RA patients with multimorbidity incurred 3.3 times higher annual costs than having a single comorbidity and 10.6 times higher than RA alone.

The six comorbidities highlighted in the EULAR recommendations are useful in characterising distinct comorbidity burden and can serve as a potential framework when multiple types of data are available.

Table 1. Annualised mean costs according to multimorbidity groupings

<table>
<thead>
<tr>
<th>Multimorbidity group (Charlson Comorbidity Index)</th>
<th>RA alone</th>
<th>Single comorbidity</th>
<th>Multimorbidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct costs £ (95%CI)</td>
<td>611 (507 - 736)</td>
<td>1,910 (1,478 - 2,468)</td>
<td>6,486 (4,927 - 8,538)</td>
</tr>
<tr>
<td>Indirect costs £ (95%CI)</td>
<td>34 (7 - 101)</td>
<td>186 (50 - 498)</td>
<td>267 (75 - 749)</td>
</tr>
<tr>
<td>Total costs £ (95%CI)</td>
<td>645 (539 - 777)</td>
<td>2,107 (1,638 - 2,712)</td>
<td>6,861 (5,235 - 8,991)</td>
</tr>
</tbody>
</table>

Table 1. Annualised mean costs according to multimorbidity groupings

Figure 1. Data sources used to define multimorbidity, according to both the Charlson Comorbidity Index (CCI) and the EULAR list of comorbidities

• Two-part models (probit followed by generalised linear model) were employed, adjusting for age, gender, health utilities (EQ5D) and functional status (HAQ scores).
• Number of comorbidities was categorised into RA alone, single comorbidity, and multimorbidity (>1 comorbidity).

Figure 2. Distribution of direct and indirect costs across multimorbidity groupings