Is the International Physical Activity Questionnaire (IPAQ-sf) valid to assess physical activity in patients with COPD? Comparison with accelerometer data

Joana Cruz1,2,*, Cristina Jácome2,3, Alda Marques2,4

1Centre for Innovative Care and Health Technology (cITechCare), School of Health Sciences, Polytechnic Institute of Leiria (ESLEI), Leiria, Portugal. 2Respiratory Research and Rehabilitation Laboratory (Lab3R), School of Health Sciences, University of Aveiro (ESSUA), Aveiro, Portugal. 3Center for Health Technologies and Information Systems Research (CINTESIS), Faculty of Medicine, University of Porto, Porto, Portugal. 4Institute of Biomedicine (iBIMED), University of Aveiro, Aveiro, Portugal. *corresponding author: joana.cruz@ipleiria.pt

Background

• The International Physical Activity Questionnaire short form (IPAQ-sf) was primarily designed for physical activity (PA) surveillance in people with an age range of 15-69 years. However, studies conducted in older people have shown conflicting results, suggesting that it may not be adequate for this population.

• Thus, the use of the IPAQ-sf for the assessment of PA in patients with chronic conditions such as chronic obstructive pulmonary disease (COPD), in which patients are frequently older, remains unclear.

Aims

• This exploratory cross-sectional study aimed to preliminary evaluate the validity and test-retest reliability of the IPAQ-sf to assess PA in patients with COPD.

Methods

Procedures:

• 10 stable patients with COPD (71.6±7.3yrs, 7♂, FEV1 77.2±20.7%predicted) were included.

• Participants completed the IPAQ-sf on 2 occasions separated by 1 week (T1, T2) and wore an accelerometer (Actigraph GT3X+) for 7 consecutive days.

Statistical analysis:

1. Pearson’s correlation coefficient (r) was used to assess correlations between the results obtained from the IPAQ-sf (PA in METs-min/week; sitting time in min/day) and the accelerometer (total moderate-to-vigorous physical activity [MVPA] per week; recommended MVPA per week – i.e., MVPA conducted in bouts of ≥10min, as internationally recommended2; sedentary time in min/day);

2. %agreement and Cohen’s kappa were used to assess the agreement between categorical scores obtained from the two measures, i.e., ‘sufficiently’/‘insufficiently’ active according to the guidelines2 (further information on the classification is provided in the QR code).

3. Intraclass Correlation Coefficient (ICC2,1) and 95% limits of agreement were used to assess test-retest reliability and agreement.

Results

• Significant correlations were found between IPAQ-sf METs-min/week and total MVPA (r=0.729, p=0.017), but not between METs-min/week and recommended MVPA (r=0.346, p=0.327) or between IPAQ-sf sitting time and accelerometer-based sedentary time (r=-0.383, p=0.308).

• Agreement between the IPAQ-sf and accelerometer-based data in identifying ‘sufficiently’/‘insufficiently’ active patients was low (Table 1):

<table>
<thead>
<tr>
<th>IPAQ-sf (T1)</th>
<th>Active</th>
<th>Inactive</th>
<th>% agreement</th>
<th>Kappa (95% CI)</th>
<th>Active</th>
<th>Inactive</th>
<th>% agreement</th>
<th>Kappa (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>total MVPA (accelerometer)</td>
<td>1</td>
<td>3</td>
<td>20%</td>
<td>-0.538 (-1.081→0.005)</td>
<td>1</td>
<td>3</td>
<td>50%</td>
<td>-0.087 (-0.679→0.505)</td>
</tr>
<tr>
<td>Recommended MVPA (accelerometer)</td>
<td>1</td>
<td>3</td>
<td>20%</td>
<td>-0.538 (-1.081→0.005)</td>
<td>1</td>
<td>3</td>
<td>50%</td>
<td>-0.087 (-0.679→0.505)</td>
</tr>
</tbody>
</table>

• Test-retest reliability of the IPAQ-sf was poor to moderate (METs-min/week: ICC2,1=0.439, 95%CI -0.267→0.838; sitting time/day: ICC2,1=0.511, 95%CI -0.178→0.864).

• Wide limits of agreement were found for the variables ‘METs-min/week’ and ‘sitting time/day’, suggesting that test-retest agreement of the IPAQ-sf was low (Fig. 1):

![Figure 1: Bias and limits of agreement of the IPAQ-sf test-retest: (A) physical activity in METs-min/week; (B) sitting time in min/day](image)

Conclusion

• Findings suggest that the IPAQ-sf has limited validity and reliability in the assessment of PA and sedentary time in patients with COPD.

• Further research with a larger sample is needed to support these findings.