The relationship between Vascular Comorbidities and Physical Activity in persons with Multiple Sclerosis

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Background

Vascular comorbidities are prevalent among persons with multiple sclerosis and have been associated with an increased risk of disease progression. Previous literature has shown that physical activity (PA) was inversely associated with self-reported cardiovascular comorbidity symptoms and risk factors, subclinical markers of atherosclerosis, and overall number of comorbidities in PwMS. However, to the best of our knowledge, no studies have reported the relationship between PA levels and diagnosed vascular comorbidities in PwMS.

Objectives

1) To explore the relationship between vascular comorbidities and different aspects of PA in PwMS.
2) To present the prevalence of vascular comorbidities based on PA category in PwMS.

Methods

Participants

A total of 183 PwMS were included in this secondary analysis.

Participants completed a one-time research visit to collect the following variables:

- **Variables Collected at Research Visit**
  - Demographics: Age, gender, race, ethnicity
  - Disease Characteristics: Disease duration, Disability level (Patient Determined Disease Steps: PDDS)
  - Anthropometry: Body Mass Index (BMI) m/kg
  - Vascular Comorbidities: Diabetes, hypertension, hyperlipidemia, peripheral vascular disease, and heart disease
  - Physical Activity: International Physical Activity Questionnaire-Long Form (IPAQ-LF)

Physical Activity Variables

- **PA Category**
  - Low: Does not meet criteria to fit into moderate or high
  - Moderate: 30 min of at least moderate-intensity activity at least 5 days, or 20 min of vigorous-intensity activity at least 3 days, or Total PA of at least 600 MET·min/week over at least 5 days
  - High: Total PA of at least 1500 MET·min/week over at least 5 days of vigorous intensity, or Total PA of at least 3000 MET·min/week over all 7 days

- **Intensity Subscores**
  - Sitting: Minutes/week
  - PA: Sum of walking, moderate, and vigorous MET·min/week

Methods cont.

Statistical Analysis

- Comparisons between PwMS with vascular comorbidities (n=78) and PwMS without (n=105) were performed:
  - Mann-Whitney U test: age, disease duration and PA Intensity and Totals.
  - Medians test: PDDS.
  - Chi Square: gender, race, ethnicity, and PA category.

- The prevalence of vascular comorbidities was reported for each category of PA.

Analyses were performed using SPSS version 26 (SPSS, Chicago, IL).

Results

<table>
<thead>
<tr>
<th>Table 1. Descriptive Statistics presented as Median (IQR) and comparisons for PwMS with vascular comorbidities and those without</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>Age (years)</td>
</tr>
<tr>
<td>Gender (♂)</td>
</tr>
<tr>
<td>Male: n=17</td>
</tr>
<tr>
<td>BMI</td>
</tr>
<tr>
<td>American Indian/Alaskan Native</td>
</tr>
<tr>
<td>Non</td>
</tr>
<tr>
<td>White: n=67</td>
</tr>
<tr>
<td>Unknown: n=5</td>
</tr>
<tr>
<td>Ethnicity</td>
</tr>
<tr>
<td>Non-Hispanic or Latino: n=75</td>
</tr>
<tr>
<td>Disease Duration (years)</td>
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<td>PDDS (score)</td>
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</tbody>
</table>

Discussion

- PwMS with vascular comorbidities had a higher median age and BMI compared to those without, which agrees with previous literature.
- Physical Activity was only different for the Walking subscore and Vigorous subscore between PwMS with and without vascular comorbidities, with PwMS without vascular comorbidities having higher scores.
- PwMS with low and moderate PA had the highest prevalence of High Cholesterol, followed by Hypertension, however PwMS with high PA had the highest prevalence of Hypertension, followed by High Cholesterol.
- The top three vascular comorbidities reported were Hypertension, Diabetes, and High Cholesterol.

Conclusions

The findings here demonstrate that PwMS with Vascular comorbidities tend to walk and perform less vigorous PA throughout the week. Vascular comorbidities were prevalent in each PA category, therefore looking at the type of PA may be more useful in determining the relationship between vascular comorbidity and PA in PwMS. These results can be used to inform clinicians on what type of PA needs to increase in PwMS with vascular comorbidities and guide future interventional studies.

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References