EFFECTS OF THE MINDFULNESS-BASED STRESS REDUCTION PROGRAM ON BLOOD PRESSURE IN ADULTS: A LITERATURE REVIEW

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Disclosure

- **Learner objectives**
  - To identify the effect of the mindfulness-based stress reduction program on blood pressure in adults with elevated blood pressure or hypertension.

- **No conflict of interest**
Background

Uncontrolled blood pressure

Consequences of elevated blood pressure

Complementary therapy
Mindfulness means paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally (Kabat-Zinn, 1994)

The MBSR program has an educational focus, is person-centered, systematic, and well defined (Santorelli, 2014)
Weekly session during 8 weeks

Informal practices
- Awareness of pleasant and unpleasant events
- Awareness of breathing
- Deliberate awareness of routine activities and events
- Repetitive cognitions and emotions and their relationship to bodily sensations

Formal practices
- Body scan meditation
- Sitting meditation
- Hatha yoga
- Walking meditation

Daily home assignments

Silent retreat
Aim

- To evaluate the effectiveness of the MBSR program on blood pressure in adults diagnosed with hypertension or elevated blood pressure.

- No systematic reviews or meta-analysis identifying the effectiveness of the MBSR program in reducing blood pressure were found in the literature yet.
Methods

- **Design**: Systematic literature review

- **PICO question**
  - How effective is participation in a Mindfulness-Based Stress Reduction program on reducing systolic and diastolic blood pressure in people with hypertension?

- **Search strategy**
  - **Databases**: PubMed, EMBASE, Web of Science, PsychINFO, and Cochrane Library
  - **Keywords**: mindfulness-based stress reduction and MeSH terms (Hypertension, Prehypertension, Mindfulness)
Eligibility criteria

- **Inclusion criteria:**
  - **Study design:** RCTs.
  - **Population:** adults with elevated BP (120-129/ <80mmHg), stage 1 hypertension (130-139/80-89 mmHg) or stage 2 hypertension (≥140/90 mmHg)
  - **Intervention:** MBSR based on the program developed by John Kabat-Zinn
  - **Outcome:** systolic and diastolic BP measured and reported at pre-test and post-test
  - **Language:** English and Spanish
  - **Time:** 2012-2017

- **Exclusion criteria:**
  - **Main intervention:** short versions of the MBSR program or other mindfulness-based interventions not described as MBSR
  - **Type of article:** Published abstracts without full article
Methods

- **Data extraction**
  - Recommendations of the Cochrane Collaboration
  - Study methods, characteristic of population, the intervention and control group, outcomes, and findings of interest

- **Risk of bias and study quality**
  - Cochrane Collaboration’s tool for assessing the risk of bias
RESULTS
**Study characteristics**

- Blom et al., 2014; Hughes et al., 2013; Momeni, Omidi, Raygan & Akbari, 2016; Nejati, Afroomkhteh, Rahmani & Hoveida, 2015; Palta et al., 2012
- Published between 2012-2016
- Countries: 2 = USA, 2 = Iran, 1 = Canada.
## Risk of bias summary

<table>
<thead>
<tr>
<th></th>
<th>Random sequence generation (selection bias)</th>
<th>Allocation concealment (selection bias)</th>
<th>Blinding of participants and personnel (performance bias)</th>
<th>Blinding of outcome assessment (detection bias)</th>
<th>Incomplete outcome data (attrition bias)</th>
<th>Selective reporting (reporting bias)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bloom 2014</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Hughes 2013</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>Momeni 2016</td>
<td>+</td>
<td>?</td>
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<td>+</td>
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</tbody>
</table>

- **Low risk of bias**
- **Unclear risk of bias**
- **High risk of bias**
Sample Characteristics

- **Sample size**: 20 – 101 participants
  - Total 267, of them 131 people were in the intervention groups
- **Participants’ age**: 20 to 75 years old
  - 1 study exclusively older adults (≥62 years old)
- **Blood pressure measurements**: clinical and/or ambulatory blood pressure measurement

- **Exclusion criteria**
  - People with hypertension-related complications, e.g. renal disease, myocardial infarction, or comorbidities such as diabetes.
  - Individuals undergoing pharmacological treatment with antihypertensive drugs
Study Characteristics

- **Control groups** were heterogeneous
  - Passive: wait list or no treatment
  - Active: social support and progressive muscle relaxation

- **Blood pressure measurement** was heterogeneous
  - Clinical and ambulatory blood pressure
  - Electronic methods and auscultatory methods
Effect of the MBSR program on blood pressure

- **Between groups** (Intervention vs Control)
  - **Mixed results**
    - Studies reporting clinical blood pressure had significant reductions on blood pressure from pre- to post-test (Hughes et al., 2013; Momeni et al., 2016; Nejati et al., 2015; Palta et al., 2012).
    - Conversely, studies reporting ambulatory blood pressure did not show significant differences neither in systolic nor diastolic blood pressure from pre- to post-test (Blom et al., 2014; Hughes et al., 2013).
## Within intervention group analysis of blood pressure reductions

<table>
<thead>
<tr>
<th>Articles</th>
<th>Statistical test</th>
<th>Type of BP measure</th>
<th>Systolic BP(^1) reduction (mm Hg)</th>
<th>Diastolic BP(^1) reduction (mm Hg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nejati et al., 2015</td>
<td>Mean difference</td>
<td>Unknown</td>
<td>16.56</td>
<td>4.44</td>
</tr>
<tr>
<td>Momeni et al., 2016</td>
<td>Mean difference</td>
<td>Clinical (auscultation)</td>
<td>15.83</td>
<td>1.66</td>
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<tr>
<td></td>
<td></td>
<td>Clinical AOBP(^2)</td>
<td>16.28</td>
<td>2.26</td>
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<tr>
<td>Palta et al., 2012</td>
<td>Mean difference</td>
<td>Clinical</td>
<td>11</td>
<td>3.7</td>
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<tr>
<td></td>
<td>Multiple linear regression</td>
<td></td>
<td>21.92*</td>
<td>16.70**</td>
</tr>
<tr>
<td>Hughes et al., 2013</td>
<td>Hierarchical multiple linear regression</td>
<td></td>
<td>4.9*</td>
<td>1.9**</td>
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<tr>
<td></td>
<td></td>
<td>Clinical (completers)</td>
<td>6.5*</td>
<td>2.6**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ambulatory (awake)</td>
<td>3.1</td>
<td>1.4</td>
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<td></td>
<td></td>
<td>Ambulatory (nighttime)</td>
<td>2.3</td>
<td>1.7</td>
</tr>
<tr>
<td>Blom et al., 2014</td>
<td>Repeated measures ANOVA</td>
<td></td>
<td>Ambulatory (24 hour)</td>
<td>1.8**</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Ambulatory (awake)</td>
<td>2.1**</td>
</tr>
</tbody>
</table>
|                     |                        |                    | Ambulatory (nighttime)             | 0.8                                 | 0.1

\(^*\)Sig p < 0.05 \(^**\) Sig p < 0.01

\(^1\) Blood Pressure

\(^2\)Automated oscillometric blood pressure device
Discussion

- Most studies found the intervention group had more reductions in systolic and diastolic blood pressure than control groups, however this reduction was only observed in clinical and not in ambulatory blood pressure.

- Within group analysis suggests that the MBSR program reduces clinical blood pressure in the intervention group from pre to post test, and those reductions may be of clinical relevance.
Discussion

intention → attention → connection → regulation → order → health.

Shapiro, Carlson, Astin & Freedman, (2006)
Limitations

- Articles’ methodological issues
  - BP measurement - different protocols
  - Clinical and ambulatory – no consistency in type of blood pressure measurement
  - Small sample sizes
  - Heterogeneous sample characteristics
  - No follow up
  - No cost-effectiveness analysis
Conclusion

- There is no sufficient evidence to determine the effectiveness of the MBSR program on blood pressure.
- Based on preliminary findings, MBSR program may be a promising behavioral complementary blood pressure therapy.
- More research is needed in this field.
  - Explore the mechanism by which the program influences BP.

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Be Mindful Today!
¡GRACIAS!