The effects of 60 minutes of supervised weekly walking (in a single vs. 3–5 session format) on depressive symptoms among older women: Findings from a pilot randomized trial

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Abstract

Objective: To investigate the effects of training frequency on psychological benefits resulting from a walking program among older women with subsyndromal depression.

Methods: All participants were randomly assigned to a 4-week-long self-paced walking program including one (G1) or three to five (G3–5) weekly training sessions. They completed the Geriatric Depression Scale (GDS) as a measure of depressive symptoms during the intervention and one month later.

Results: Using statistics for small-n designs, it appeared that, at the end of the program, a significantly greater proportion of women in G3–5 reported GDS values below the cutoff score of 10 (i.e., indicative of the absence of any depressive symptoms) compared to women in G1 (5 of 6 vs. 1 of 6; χ² = 0.48; p < .05). The GDS scores after treatment were significantly lower than baseline scores in both groups (Z = 2.20; p < .03, and Z = 1.99; p < .05 respectively), but the mean decrease of depressive symptoms was significantly larger in G3–5 (48.9%) than in G1 (22.7%).

Conclusion: Breaking 60 min of weekly walking into shorter periods on 3–5 days a week appears to be more effective to alleviate depressive symptoms in older women with subsyndromal depression.

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depression, since low motivation, fatigue, and reduced pleasure are core symptoms of depression (O’Neal, Dunn, & Martinsen, 2000). Behavioral theories of depression emphasize the need to identify pleasurable activities that can be added to daily life to increase enjoyment and self-worth (e.g., Gatz et al., 1998), and engaged in as often as possible (Persons, Davidson, & Tompkins, 2001).

In light of this, it is quite surprising that walking which is by far the activity of choice for many people including elders (Simpson et al., 2003) has not been identified as the main form of exercise for reducing depressive symptoms among the depressed aged. Only 6 of the 13 randomized controlled trials that were included in the meta-analysis by Sjøsten and Kivelä (2006) used walking as a mode of intervention. Additionally, little or no empirical data has been published on the practice requirements (i.e., intensity, frequency, duration) that may influence the relationship between walking and depression in elders.

The primary purpose of this study was to evaluate the antidepresant effects of two group-based walking programs which differed in terms of session frequency (1 session per week vs. 3–5 sessions per week), but not total weekly volume (60 min) of walking, among French older women with subsyndromal depression. It was hypothesized that there would be a greater decline in depressive symptoms for those participants who exercised 3–5 times/week.

1. Methods

1.1. Participants

Participants in this study were 12 women recruited from a sample of community-dwelling elders in the city of Châlons en Champagne (France). These were young–old persons (Mage = 66.8 ± 2.5 y) according to the American Geriatric Society (AGS) classification. Five of them had been widowed for 3 years or more, four were still married, and two had remained single.

All participants met the following inclusion criteria: (a) mild depressive symptoms defined as a GDS score ranging from 10 to 19; (b) not actively engaging in exercise for the preceding 6 months (i.e., less than a half hour of moderate or high-intensity exercise per week); (c) between the age of 60 and 74 years (i.e., young–old persons); and (d) ability to walk unaided for an hour.

Exclusion criteria at screening included: (a) treatment for major depression within the past 3 years; (b) severe depressive symptoms defined as a GDS score higher than 20; (c) current antidepressant treatment; and (d) inability to speak or read French.

1.2. Instruments

The primary outcome measure was the change in the Geriatric Depression Scale score (GDS, Yesavage, 1988) from baseline to 4 weeks. The GDS is a validated measure of severity of depressive symptoms among older adults in exercise studies (Marquez et al., 2006), and is widely used in international research (e.g., Mather et al., 2002).

This is a 30-item self-report instrument in which questions are answered ‘yes’ or ‘no’. One point is assigned (or not) to each answer and the cumulative score is rated on a scoring grid. The grid sets a range of 0–9 as ‘normal’, 10–19 as ‘mildly depressed’, and 20–30 as ‘severely depressed’. A French version of this scale has been developed (Bourque, Blanchard, & Vézina, 1990). Though some authors have suggested that the GDS encompasses several subscales (e.g., ‘Withdrawal/Apathy/Lack of Vigor’, ‘Dysphoria’, ‘Anxiety’, ‘Mental Impairment’, Adams, 2001), the validity of this four-factor structure remains untested in samples of French-speaking respondents. As a consequence, only the single composite score was used in our research.

1.3. Procedure and description of the treatments

This research was approved by our academic Human Subjects Review Committee, and was initially presented as a randomized controlled trial (RCT) with an aim to recruit at least 26 participants. Unfortunately, only fourteen women were eligible and gave written informed consent for our study after a 3-month period of on-site advertisement in local senior citizens community centers and commercial malls. The main reasons for ineligibility were: (1) insufficiently high GDS score, and (2) current antidepressant treatment; and the main reasons for final refusal to participate were: (1) the necessity to attend all the scheduled walking sessions, and (2) concerns about exercise-related negative outcomes (e.g., stiffness), which may be due to the anticipation of being obliged to walk for 1 h in a row. These fourteen participants were randomly assigned to one of the two exercise treatments: (1) walking for 1 h once a week (G1), or (2) walking at a higher frequency by breaking this weekly dose of exercise into 3–5 workouts with the goal of accumulating 60 min of weekly walking (e.g., 2 × 15 min, 2 × 10 min, 2 × 15 min, 2 × 10 min + 1 × 30 min, 4 × 15 min, 3 × 10 min + 2 × 15 min, etc.) (G3–5). This allowed greater flexibility for successful participation since women in this group could easily make up for one missed workout by increasing the duration of the next one. Therefore, each participant virtually received the same amount of exercise during the study. Two women dropped out before actual treatment began, thus reducing the number of participants with complete data to 6 in each group.

The walking sessions were group-based and organized outdoors on a fitness loop of 2/3 of 1 mile, located within a 1000-acre natural area park, just 2 miles from downtown Chalons en Champagne. In G3, the 1-h long walking-tour was scheduled on Saturday afternoons, whereas training sessions took place every Monday through Friday morning (between 10:00 and 11:30 am) for participants in G3–5. The first author conducted each session as follows: (1) transport and conveyance of participants to the walking site by hired minibus, (2) participants identified their preferred walk pace (i.e., slow, medium, brisk), (3) under the supervision of first author, the first author, every 3 min, participants were asked whether they felt comfortable with their exercise pace, and adjustments were made accordingly to maintain a preferred intensity. The supervisor facilitated this process as best he could for sub-groups walking at different speeds; (4) after a cool-down period of 4–5 min, participants were driven home.

The Geriatric Depression Scale was completed at the screening interview (assessment conducted at our university lab), at baseline (at participants’ home on the day preceding the beginning of the walking program), at the end of the 1st, 2nd, 3rd and 4th week of the exercise program (in the minibus on the way back to home after walking), and one month after the completion of the program at the occasion of a final one-hour appointment in our university lab during which retrospective accounts about participation in the study (with a particular emphasis on what was most enjoyed) were also recorded. Questions were asked in an open-ended format to allow participants the opportunity to expand on their personal thoughts, feelings, and experiences.

1.4. Data analysis

Given the small number of participants in each treatment, descriptive mean (SD) data were presented, individual data plotted on graphs, and non-parametric statistics (Wilcoxon rank-sum test; Mann–Whitney test) performed. Finally, follow-up interview
content was transcribed to text and analyzed using a content analysis approach to identify common elements and ideas. Common ideas were then further analyzed and combined to form themes.

2. Results

2.1. Compliance and adverse events

Table 1 includes detailed information on each participant’s training diary. As indicated, no woman missed more than 25 percent of her assigned walking program. One participant in G1 discontinued all exercise at 3 weeks due to a mild form of liver disease (i.e., a virus-induced hepatitis) but was included at assessments at 4 weeks.

2.2. Primary outcome

Mean (SD) GDS scores and group differences (with 95% confidence intervals) are shown in Table 2.

As can be seen, a key finding is that all participants in G3–5 experienced a relief of their symptoms (at various degrees) as soon as the end of the second week (compared to baseline), whereas, in the meanwhile, two women from G1 reported increased depression. Dichotomization of scores collected at week 4 (i.e., <10 vs. 10 or more) allowed for a 2 × 2 contingency table to be developed. It appeared that, at this time, a significantly greater proportion of women in G3–5 no longer met the criteria for mild depression using the GDS (i.e., 5 [83.3%] of 6 vs. 1 [16.6%] of 6 in women from G1; $\phi^2 = 0.48; p < .03$).

GDS scores significantly decreased from baseline to week 4 in women from both groups (i.e., for G3–5: $Z = 2.20; p < .03$; and for G1: $Z = 1.99; p < .05$). However, the between-group comparison of change in participants’ ratings showed that those in G3–5 reported a significantly greater reduction in depressive symptoms ($Z = 2.88; p < .01$). GDS scores were reduced by 48.9% in G3–5, and 22.7% in G1.

2.3. Follow-up interviews analysis

Each participant provided at least three positive comments about the walking programme with a collective list of 53 statements. Examples of the statements and the themes that emerged are presented in Table 3.

3. Discussion

This study was designed to compare the effect of frequent and infrequent aerobic exercise (but of the same total weekly duration) on depressive symptoms in older women with subsyndromal depression. Under-recruitment limited the analyses, but both walking groups appeared to reduce depressive symptoms as measured by the Geriatric Depression Scale. These findings link well with a recent study by Ekkekakis, Backhouse, Gray, and Lind (2008) who provided empirical evidence supporting the assumption that walking really is pleasant among middle-aged and older adults. In their experiment, both outdoors and indoors 15-min self-paced walks were associated with significant and positive affective changes (i.e., increased self-reported energy). Participating in enjoyable and pleasant exercises makes it more likely that decreases in depression will occur. This fits well with current behavioral programs for depressed patients which aim to increase pleasurable activity while reducing aversive experiences (e.g., Gatz et al., 2008).
et al., 1998; O’Neal et al., 2000; Persons et al., 2001). Furthermore, this echoes recent findings by White, Kendrick, and Yardley (2009) who suggested that changes (increases) in positive affect should be viewed as a strong candidate mechanism for mediating change in depression in the early stages of physical activity.

In the present study, participants were encouraged to adjust to their preferred walking pace regularly during each session, and this may have contributed to the observed reductions in depressive symptoms. In a study by Vazou-Ekkekakis and Ekkekakis (2009), 19 female students were asked to engage in two 30-min bouts of treadmill exercise (administered one week apart), only the first of which allowed the participants to set the initial speed and to modify the speed to their liking. Exercising at an imposed rather than self-selected level of intensity – although perceived exertion was similar in both conditions – resulted in a significantly reduced perception of autonomy and choice, and attenuated increases in energy and pleasure.

The main finding from our study was that frequent exercise was associated with more pronounced antidepressant effects than infrequent exercise, despite other training parameters being similar. The underlying mechanism which may explain this finding can only be speculative at this stage of our investigations. There is scientific agreement that exercise temporarily makes people feel more positively activated (Reed & Ones, 2006) so that more frequent exercise may lead to a greater cumulative effect on positive affect and perhaps more opportunities to reduce negative thoughts and ruminative processes. This is in line with behavioral therapies for depression which seek to re-engage clients in pleasant activities as often as possible. Unfortunately, acute exercise-induced mood changes were not assessed in this study so that we have no empirical data available to support (or contradict) this possible mechanism of action.

One month after the intervention, the reduction in depressive symptoms had been maintained. Unfortunately, we did not collect data throughout the study on unsupervised physical activity so it is not clear if the effects remained due to continued participation in self-initiated walking or other physical activity.

Reducing the duration of each session, rather than completing one session of 60 min, may have been a confounding factor in attributing the effects of the intervention to frequency of sessions. Completing one 60 min session may have been less enjoyable (and more fatiguing) than multiple short bouts of 10–20 min, especially for an inactive sample.

The absence of a passive control condition (with equivalent social contact time) limits the scope of the present study in that reductions of depression in both groups could be attributed to a number of alternative explanations (e.g., spontaneous remission, social support).

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**Table 3**

Selected examples of significant statements corresponding to common ideas and themes emerging from participants’ perceptions of the walking program they took part in.

<table>
<thead>
<tr>
<th>Example of significant statement</th>
<th>Common idea</th>
<th>Theme (endorsement rate %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>“has treated us with utmost respect and consideration”</td>
<td>carefulness of researcher worker</td>
<td>coordinator’s skills (33.3%)</td>
</tr>
<tr>
<td>“has set goals as to what should be accomplished; punctual”</td>
<td>organisational abilities of researcher worker</td>
<td></td>
</tr>
<tr>
<td>“met other women with whom I shared similar experiences in the past”</td>
<td>common background with other participants</td>
<td>social interactions between members (41.7%)</td>
</tr>
<tr>
<td>“made new acquaintances, and even new friends... when you’re walking with other people, it’s hard not to talk a little bit and strike up friendships”</td>
<td>development of new social network</td>
<td></td>
</tr>
<tr>
<td>“had nothing to worry about; we were fully taken charge of by Fabien”</td>
<td>stress–free participation</td>
<td>organisational considerations (58.3%)</td>
</tr>
<tr>
<td>“walks were in a very quiet and well-suited place”</td>
<td>safe practice</td>
<td></td>
</tr>
<tr>
<td>“didn’t need to be an athlete to succeed here”</td>
<td>suitability of exercise regime</td>
<td>exercise format (41.7%)</td>
</tr>
<tr>
<td>“we were given an opportunity to make decisions about the format of the exercise programme”</td>
<td>perception of personal control</td>
<td></td>
</tr>
</tbody>
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![Fig. 1. Participants’ individual GDS scores as a function of treatment group (a: G3–5; b: G1) and time of assessment.](image-url)
Further research is needed to address these important issues, and also explore the effects among men.

In conclusion, the present pilot study provides the basis for a larger study which could address some of the identified limitations, and further examine the effects of exercise dose on depression symptoms.

References


Barome`tre sante´ 2005


