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To cite this article: Johanna Fritz, Lars Wallin, Anne Söderlund, Lena Almqvist & Maria Sandborgh (2019): Implementation of a behavioral medicine approach in physiotherapy: impact and sustainability, Disability and Rehabilitation, DOI: 10.1080/09638288.2019.1596170

To link to this article: https://doi.org/10.1080/09638288.2019.1596170

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Implementation of a behavioral medicine approach in physiotherapy: impact and sustainability

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\textbf{ABSTRACT}

\textbf{Purpose:} To explore the effects on and sustainability of physiotherapists’ clinical behavior when using facilitation to support the implementation of a behavioral medicine approach in primary health care for patients with persistent musculoskeletal pain.

\textbf{Methods:} A quasi-experimental pre-/post-test trial was conducted. Fifteen physiotherapists were included in the experimental group, and nine in the control group. Based on social cognitive theory and the Promoting Action on Research Implementation in Health Services framework, facilitation with multifaceted implementation methods was used during a six-month period. Clinical behaviors were investigated with a study-specific questionnaire, structured observations, self-reports and patient records. Descriptive and non-parametric statistical methods were used for analyzing differences over time and effect size.

\textbf{Results:} A sustained increase in self-efficacy for applying the behavioral medicine approach was found. Clinical actions and verbal expressions changed significantly, and the effect size was large; however, changes were not sustained at follow-ups. The behavioral changes were mainly related to the goal setting, self-monitoring and functional behavioral analysis components. No changes in clinical behavior were found in the control group.

\textbf{Conclusion:} Tailored multifaceted facilitation can support the implementation of a behavioral medicine approach in physiotherapy in primary health care, but more comprehensive actions targeting sustainability are needed.

\textbf{IMPLICATIONS FOR REHABILITATION}

- Tailored multifaceted facilitation can support the implementation of an evidence based behavioral medicine approach in physiotherapy.
- Facilitation can be useful for increasing self-efficacy beliefs for using behavioral medicine approach in physiotherapist’s clinical practice.
- Further research is required to establish strategies that are effective in sustaining behavioral changes.

\textbf{Introduction}

A challenge in health care, including physiotherapy, is the implementation of new evidence-based methods and guidelines [1, 2]. One in seven of all consultations in primary health care concerns musculoskeletal pain [3] and most of these patients seek or are referred to physiotherapy. Persistent pain markedly increases the individual’s disability in daily life activities, and one in four persons with persistent musculoskeletal pain believes that pain has had an impact on their employment status [4]. For patients with persistent musculoskeletal pain, a behavioral medicine approach in physiotherapy has shown positive effects on disability [5–7]. However, poor adoption of clinically relevant behaviors has been reported when implementing a behavioral medicine approach in physiotherapy [8–10]. Some changes in knowledge, beliefs and attitudes have occurred after participating in behavioral medicine courses, but changes in clinical actions have been less forthcoming [4, 11, 12]. Insufficient skills training [8, 10], complexity of the clinical intervention [12], physiotherapists’ perceptions of the intervention as ineffective [4], and inadequate duration of the educational input [4, 8] have been reported as reasons for poor adoption. Therefore, continuing to study how to support the implementation of a behavioral medicine approach in physiotherapy is necessary.

There is weak evidence supporting the effects of the most commonly used implementation methods in health care, such as printed educational materials, educational meetings, reminders, audits and feedback, educational outreach, the use of local opinion leaders and tailored interventions, on clinical behaviors [13, 14]. Similar effect sizes, between 4 and 12%, have been reported across these implementation methods [13]. In physiotherapy, multifaceted implementation interventions, i.e., multi-method interventions, have been tested but offer no clear evidence regarding the effects [15].

\textbf{ARTICLE HISTORY}

Received 1 November 2018
Revised 13 March 2019
Accepted 13 March 2019

\textbf{KEYWORDS}

Physiotherapy; clinical competence; evidence-based practice; musculoskeletal pain; primary health care; self-efficacy

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\begin{center}
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\end{center}
The Promoting Action on Research Implementation in Health Services (PARIHS) framework proposes facilitation as a useful method to support the implementation of evidence-based guidelines [16] and has also been confirmed in the primary health care context [17–19]. Facilitation is defined as both the role of a person who facilitates and the process of practice with certain characteristics [20, 21]. The facilitation role differs by being formal or informal, whether the facilitator is recruited internally or externally, and whether the facilitator is trained for the role [20]. The facilitation process is described as a social process using an interactive experiential learning approach, providing problem-solving strategies and support in the context in need of improvement [22–24]. The main features of facilitation involve making change easier and supporting the development of new knowledge and skills by using multiple methods [20]. Although facilitation has been suggested as a key component of successful implementation, it has seldom been examined as a method for supporting implementation in physiotherapy [25].

Capability beliefs and intentions have been identified as strong predictors of healthcare professionals’ clinical actions [18]. These assumptions are based on social cognitive theory, one of the most commonly used social learning theories in implementation research [26–29]. However, studies evaluating the impact of facilitation on capability beliefs and intentions are sparse [17].

Implementation methods have mainly been studied in health care contexts other than physiotherapy and not in relation to a behavioral medicine approach. The implementation methods that would be useful to change physiotherapists’ clinical behavior remain unclear. In the current study, clinical behaviors refer to beliefs, observable clinical actions and verbal expressions [30]. Thus, the aim of this study was to explore the effects on and sustainability of physiotherapists’ clinical behavior when using facilitation to support the implementation of a behavioral medicine approach in primary health care for patients with persistent musculoskeletal pain.

Methods
The TREND statement [31] was used for reporting this study.

Design
A quasi-experimental pre-/post-test trial was conducted [32].

Participants and Settings
All physiotherapists working in primary health care in three county councils were asked to participate in the study. The physiotherapists were allocated to either an experimental or a control group based on the physiotherapists’ wishes and such that participants from the same clinic belonged to the same group. Fifteen physiotherapists working in seven primary health care units were included in the experimental group, and nine physiotherapists working in seven primary health care units were included in the control group. Dropouts and missing data occurred in both groups during the implementation intervention and follow-up periods (Figure 1). There were no significant differences between the groups regarding baseline characteristics (Table 1). Most of the participants had some kind of previous education regarding behavioral medicine, such as motivational interviewing or university courses in behavioral medicine for physiotherapists. Participation was voluntary, and all participants gave written informed consent after receiving oral and written consent.

Figure 1. The participating physiotherapists, dropouts and missing data for each measurement point.
The physiotherapists were affiliated with three county councils of similar sizes located in the middle of Sweden (see Table 1). In the experimental group, all physiotherapists at three of the clinics participated, while at the other four clinics, 25–80% of the physiotherapists participated. In the control group, 25–75% of the physiotherapists at each clinic participated. The physiotherapists reported that the majority of their patients presented for physiotherapy because of persistent musculoskeletal pain (>4 weeks). All the clinics received financial reimbursement for the time spent in the project, corresponding to the physiotherapists’ wage costs.

### Implementation intervention for the experimental group

The implementation intervention consisted of facilitation as a multifaceted intervention [23, 27, 28, 33]. The first author, acting as the facilitator, has comprehensive knowledge and skills of the behavioral medicine approach and the use of behavior change techniques, as well as extensive experience teaching students and physiotherapists using various learning methods. The facilitation methods used consisted of outreach visits, peer coaching, educational materials, video recordings, individual goal setting, self-monitoring, manager support and access to written patient information. Furthermore, the participants could withdraw without any consequences.

For further description of the intervention, see Supplementary Material. The facilitation methods were tailored to each physiotherapist through setting individual goals of importance for learning, optional discussion subjects, problem solving related to individual obstacles, and use of optional educational materials. The implementation intervention period lasted six months. In the experimental group, all physiotherapists participated. In the control group, 25–75% of the physiotherapists at each clinic participated. The physiotherapists received the same book given to the experimental group and were encouraged to read it and use the information in their clinical work. No further support for implementation was given.

### Data collection

As far as we know, there is no tool concerning beliefs for using a behavioral medicine approach. The physiotherapists’ beliefs were therefore investigated using a study-specific questionnaire comprising 24 questions where importance of, self-efficacy for and readiness for using the core components of the behavioral medicine approach were rated by the responders on an 11-point Likert scale. The core components in the behavioral medicine approach consisted of the following: patient’s goal setting, assessment of target behavior, patient’s self-monitoring of actions and cognition related to the target behavior in everyday life situations, individual functional behavioral analysis, basic and applied skills acquisition, and support of maintenance [12, 34]. Data were collected pre- and post-implementation and at the 3-month follow-up. Test-retest reliability of the questionnaire was evaluated on 59 undergraduate students with a two-week interval and analyzed with intraclass correlation, two-way mixed model, and absolute agreement. The results demonstrated good-to-excellent stability of the questionnaire, ICC = 0.95 (95% CI 0.90–0.98).

The physiotherapists’ behavioral medicine related clinical actions and verbal expressions were investigated with observation, self-reports and analyses of documentation in patient records. Data were collected before and after the implementation intervention period and at the 3-, 6- and 12-month follow-ups.

### Observation

To identify as many different observable clinical actions and verbal expressions as possible and to facilitate the observations, two treatment sessions per physiotherapist were video recorded by two of the authors (JF, MS). The video recordings were reviewed using an observation protocol by three researchers who were blinded to group affiliation and time point of measurement and not actively involved in the implementation intervention. The completed observation protocols were reviewed by one of the authors (JF) to ensure consistency between the reviewers, and corrections were made if needed. The observation protocol was study specific and consisted of 58 observable clinical actions and verbal expressions, assessed as present/not present, in relation to the core components of the behavioral medicine approach [12, 34], see Supplementary Material for details. Intra-rater reliability for the observation protocol was evaluated on four observers and analyzed with Cohen’s Kappa. The results showed substantial agreement; the Kappa value for the seven components ranged between 0.6 and 0.9. The highest agreement between the first and second observation was found for Goal setting, Kappa = 0.9, and the lowest agreement was found for Assessment of target behavior, Kappa = 0.6.

### Implementation intervention for the control group

The implementation intervention for the control group was selected to simulate the way new guidelines are usually disseminated, i.e., written information and lectures. In the control group, the intervention started with a joint introduction (2 h) at the university consisting of the same lectures the experimental group received about evidence supporting the behavioral medicine approach and an introduction to the approach. The physiotherapists received the same book given to the experimental group and were encouraged to read it and use the information in their clinical work. No further support for implementation was given.

### Table 1. Physiotherapists’ baseline characteristics.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Experimental group (n = 15)</th>
<th>Control group (n = 9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex, male (M)/female (F)</td>
<td>M = 5, F = 10</td>
<td>M = 3, F = 6</td>
</tr>
<tr>
<td>Age (years), median</td>
<td>37 (23–63)</td>
<td>39 (24–57)</td>
</tr>
<tr>
<td>Years of work as a physiotherapist, median (min-max)</td>
<td>9 (1–31)</td>
<td>5 (0.5–30)</td>
</tr>
<tr>
<td>Years of work in primary health care, median (min-max)</td>
<td>9 (1–30)</td>
<td>3 (0.5–16)</td>
</tr>
<tr>
<td>Number of physiotherapists with previous behavioral medicine education</td>
<td>13</td>
<td>7</td>
</tr>
<tr>
<td>County council affiliation, county council A, B and C</td>
<td>A = 5, B = 10</td>
<td>A = 3, B = 3, C = 3</td>
</tr>
</tbody>
</table>
**Self-reports**

The physiotherapists self-reported the content of each of the two treatment sessions in a log-book consisting of the 58 behavioral medicine related clinical actions and verbal expressions, assessed as present/not present, identical to the observation protocol.

**Documentation in patient records**

The physiotherapists’ notes regarding the two treatment sessions were reviewed by one of the authors (JF), blinded to group affiliation, using a checklist similar to the observation. The checklist consisted of 38 of the 58 behavioral medicine related clinical actions and verbal expressions used in the observation protocol and log-book, assessed as present/not present.

**Data analyses**

For each physiotherapist, the scores in the observation protocols of the two treatments were merged, and a score of present clinical actions and verbal expressions in total and per component was calculated. In those cases when only one treatment session was video recorded, all observed data from the physiotherapist was calculated. In those cases when only one treatment session of the two treatments were merged, and a score of present clinical actions and verbal expressions in the observation protocol and log-book, assessed as present/not present.

Due to missing data and attrition, the 3- and 12-month values were not included in Friedman’s ANOVA. To identify when the changes occurred, post hoc calculations were performed using the Wilcoxon Matched-Pairs Signed Rank test for within-group analyses [35]. Pre-values were compared with post- and follow-up values. To identify in which behavioral medicine components the changes occurred, the Wilcoxon Matched-Pairs Signed Rank test was used for within-group analyses comparing pre- and post-values [35]. The effect sizes were based on the observed clinical action and verbal expression outcomes pre- and post-implementation intervention. The effect size was calculated within the experimental group using Pearson’s correlation coefficient $r$, where $r = 0.10$ represents a small effect, $r = 0.30$ represents a medium effect and $r = 0.50$ represents a large effect [36]. The significance level was set at $p \leq 0.05$. IBM Statistical Package for the Social Sciences (SPSS), version 24, was used for all analyses.

**Ethical approval**

The study was approved by the Regional Ethical Review Board, Uppsala, Sweden, Dnr 2015/385.

**Results**

**Effects on the physiotherapists’ beliefs**

The self-reported self-efficacy in the experimental group increased significantly for most of the core components in the behavioral medicine approach after the implementation intervention and was sustained after three months (see Table 2). A significant increase in perceived readiness for using the behavioral medicine approach was sustained after three months (see Figure 1). Scores in log books and checklists for patient records were handled in the same manner. The results are presented using descriptive statistics. The effects of the implementation intervention over time, i.e., the changes and sustainability in ratings of beliefs and the changes in number of exhibited clinical actions and verbal expressions in observations, self-reports and patient records pre- and post-implementation, and at follow-ups, were calculated using Friedman’s ANOVA [35].

<table>
<thead>
<tr>
<th>Importance</th>
<th>Pre (n = 15) median (IQR)</th>
<th>Post (n = 15) median (IQR)</th>
<th>3 months (n = 11) median (IQR)</th>
<th>Difference over time (df = 2, N = 11)</th>
<th>Chi²</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>patients’ goal setting</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>biopsychosocial assessment</td>
<td>6 (5–8)</td>
<td>8 (6–9)</td>
<td>7 (6–8)</td>
<td>4.9</td>
<td>.09</td>
<td></td>
</tr>
<tr>
<td>promoting patients’ self-monitoring</td>
<td>9 (8–10)</td>
<td>9 (7–10)</td>
<td>7 (7–9)</td>
<td>2.6</td>
<td>.28</td>
<td></td>
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<tr>
<td>follow up of patients’ self-monitoring</td>
<td>5 (3.75–6.5)</td>
<td>5 (4–6)</td>
<td>5 (4–6)</td>
<td>.24</td>
<td>.89</td>
<td></td>
</tr>
<tr>
<td>functional behavior analysis</td>
<td>6 (4–8)</td>
<td>7 (4.75–8.25)</td>
<td>6 (4–7)</td>
<td>4.3</td>
<td>.12</td>
<td></td>
</tr>
<tr>
<td>basic skills</td>
<td>9 (7–10)</td>
<td>10 (8–10)</td>
<td>8 (7–9)</td>
<td>5.5</td>
<td>.06</td>
<td></td>
</tr>
<tr>
<td>applied skills</td>
<td>8 (7–9)</td>
<td>8 (6.75–9.25)</td>
<td>7 (7–8)</td>
<td>1.5</td>
<td>.48</td>
<td></td>
</tr>
<tr>
<td>maintenance</td>
<td>8 (6–10)</td>
<td>9 (7–9)</td>
<td>8 (7–10)</td>
<td>1.4</td>
<td>.50</td>
<td></td>
</tr>
<tr>
<td>Self-efficacy</td>
<td></td>
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<tr>
<td><em>patients’ goal setting</em></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>biopsychosocial assessment</td>
<td>5 (4–6)</td>
<td>7 (6–8)</td>
<td>6 (5–7)</td>
<td>17.6</td>
<td>&lt;.01**</td>
<td></td>
</tr>
<tr>
<td>promoting patients’ self-monitoring</td>
<td>6 (5–8)</td>
<td>7 (6–8)</td>
<td>6 (6–8)</td>
<td>1.9</td>
<td>.39</td>
<td></td>
</tr>
<tr>
<td>follow up of patients’ self-monitoring</td>
<td>4 (3–5)</td>
<td>7 (6–8)</td>
<td>6 (5–7)</td>
<td>16.7</td>
<td>&lt;.01**</td>
<td></td>
</tr>
<tr>
<td>functional behavior analysis</td>
<td>4 (0–8)</td>
<td>8 (5–9)</td>
<td>6 (5–8)</td>
<td>12.4</td>
<td>&lt;.01**</td>
<td></td>
</tr>
<tr>
<td>basic skills</td>
<td>4 (1–4)</td>
<td>5 (4–7)</td>
<td>5 (4–7)</td>
<td>10.9</td>
<td>&lt;.01**</td>
<td></td>
</tr>
<tr>
<td>applied skills</td>
<td>6 (4–8)</td>
<td>8 (7–10)</td>
<td>8 (7–9)</td>
<td>9.0</td>
<td>&lt;.01**</td>
<td></td>
</tr>
<tr>
<td>maintenance</td>
<td>5 (3–7)</td>
<td>8 (5–8)</td>
<td>7 (7–8)</td>
<td>4.7</td>
<td>.10</td>
<td></td>
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<tr>
<td>Readiness</td>
<td></td>
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<tr>
<td><em>patients’ goal setting</em></td>
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</tr>
<tr>
<td>biopsychosocial assessment</td>
<td>6 (5–7)</td>
<td>8 (5–9)</td>
<td>7 (5–8)</td>
<td>3.7</td>
<td>.15</td>
<td></td>
</tr>
<tr>
<td>promoting patients’ self-monitoring</td>
<td>7 (5–10)</td>
<td>7 (5–8)</td>
<td>7 (6–8)</td>
<td>.41</td>
<td>.81</td>
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<tr>
<td>follow up of patients’ self-monitoring</td>
<td>5 (3–7)</td>
<td>7 (2–10)</td>
<td>6 (5–7)</td>
<td>3.1</td>
<td>.22</td>
<td></td>
</tr>
<tr>
<td>functional behavior analysis</td>
<td>5 (0–9)</td>
<td>7 (5–9)</td>
<td>6 (5–8)</td>
<td>5.6</td>
<td>.06</td>
<td></td>
</tr>
<tr>
<td>basic skills</td>
<td>4 (2–5)</td>
<td>5 (4–7)</td>
<td>5 (4–6)</td>
<td>5.9</td>
<td>.05*</td>
<td></td>
</tr>
<tr>
<td>applied skills</td>
<td>8 (6–9)</td>
<td>8 (7–10)</td>
<td>8 (7–9)</td>
<td>3.7</td>
<td>.15</td>
<td></td>
</tr>
<tr>
<td>maintenance</td>
<td>6 (4–8)</td>
<td>8 (5–8)</td>
<td>7 (6–8)</td>
<td>2.4</td>
<td>.30</td>
<td></td>
</tr>
</tbody>
</table>

†Scale 0–10. 0 means not at all, and 10 means very important/capable/ready. * $p \leq 0.05$, ** $p < 0.01$. 

Table 2. Median values and interquartile ranges (IQRs) for perceived beliefs about importance of, self-efficacy for and readiness for using the behavioral medicine components in the experimental group, pre-, post-implementation intervention and at the 3-month follow-up.
core component functional behavioral analysis and maintenance was also found. However, the post hoc analyses could not confirm the functional behavioral analysis component. The increase in readiness for using the behavioral medicine core component maintenance occurred after the implementation intervention and was sustained after three months. No changes in beliefs were seen in the experimental group concerning the importance of using the behavioral medicine approach or in the control group concerning any beliefs.

Effects on the physiotherapists’ clinical actions and verbal expressions

There was a significant increase in the observed Chi² (2, N = 12) = 12.3, p < 0.01 and documented Chi² (2, N = 12) = 9.5, p = 0.01 clinical actions and verbal expressions when comparing pre-, post- and 6-month follow-up values. However, no difference was found regarding self-reported clinical actions and verbal expressions Chi² (2, N = 11) = 2.4, p = 0.30. According to the post hoc tests on observed clinical actions and verbal expressions, the changes occurred after the implementation intervention (z = 2.70, N-Ties = 13, p = 0.01) but were not sustained at the three-, six- or twelve-month follow-up. According to the post hoc tests on documented clinical actions and verbal expressions, the changes occurred after the implementation intervention (z = 2.88, N-Ties = 14, p < 0.01) and were sustained at the three-month follow-up (z = 2.33, N-Ties = 8, p = 0.02) but not beyond. The median values of identified clinical actions and verbal expressions in the experimental and control groups are illustrated in Figure 2.

The changes in the experimental group were mainly related to the behavioral medicine components patient’s goal setting (observation: z = 2.33, N-Ties = 9, p = 0.02; self-reports: z = 2.36, N-Ties = 9, p = 0.02; documentation: z = 2.45, N-Ties = 6, p = 0.01), assessment (documentation: z = 2.33, N-Ties = 9, p = 0.02), patient’s self-monitoring (observation: z = 2.26, N-Ties = 6, p = 0.02; self-reports: z = 2.64, N-Ties = 8, p = 0.01, documentation: z = 2.27, N-Ties = 6, p = 0.02) and functional behavioral analysis (observation: z = 1.98, N-Ties = 8, p = 0.05). The range of the numbers of changed observed clinical actions and verbal expressions was large within the experimental group (Figure 3); however, no changes were observed in the control group. The effect size for observed behavioral medicine related changes in clinical actions and verbal expressions after the implementation intervention was large (r = 0.72) in the experimental group.

Discussion

The multifaceted facilitation methods seem to have been most successful in increasing the physiotherapists’ clinical behaviors regarding self-efficacy for using the behavioral medicine approach. The facilitation methods used in this study included several important components for increasing self-efficacy [27, 37], such as enabling the physiotherapists to master increasingly challenging tasks by setting individual goals, reinforcing the physiotherapists’ success and providing social support from peers and the facilitator. The results indicate that the facilitation methods used had the intended impact on self-efficacy.

The facilitation support also seems to have impacted the physiotherapist’s use of behavioral medicine related clinical actions and verbal expressions but not their ability to sustain an increased use of these clinical behaviors. Difficulties in sustaining clinical behaviors regarding actions and verbal expressions have been confirmed in many studies included in a review by Wiltsey Stirman et al. [38]. These authors found that partial continuation was more common than for the entire intervention; however, this result was not seen in our current study. They also found that resources and workforce stability particularly influenced sustainability as well as the context (policies, culture, structure), innovation itself (adaptability, effectiveness) and process (fidelity, monitoring, evaluation) [38].

Immediately after the implementation intervention, the physiotherapists’ clinical actions and verbal expressions increased regarding four of the seven behavioral medicine components, all concerning assessment and analyses of the patients’ problems. Rusk et al. [39] propose that an intervention needs to address multiple domains, helping the system to “tip over” and change, and that self-efficacy can be such a domain. Although beliefs about one’s capabilities have been shown to be important predictors for changing behavior [26], the increased self-efficacy in this study did not seem to have sufficient impact to change the physiotherapists’ clinical actions and verbal expressions for all the
behavioral medicine components. Intentions have also been shown to be important predictors of changing behavior [26]. According to the results, the physiotherapists did not value the behavioral medicine components as important in their clinical practice, which probably affected their intentions to use them. The physiotherapists’ readiness for using the behavioral medicine components varied. However, they did not doubt their own confidence in using the components, indicating that they might have been hindered by something else. Their perceived importance of the behavioral medicine approach could be one barrier, and contextual factors affecting the implementation could be another.

The effect size of the facilitation intervention was large according to Field’s [36] effect size levels but also in relation to other studies in which different implementation methods were shown to have moderate effect sizes [13]. The physiotherapists’ experiences of these methods and their perception of which methods were most valuable for supporting their clinical behavior change contribute useful information for future studies.

Despite the lack of sustainability, the results could yet be seen as promising, compared to those of other studies where no changes in clinical actions have been found when implementing a behavioral medicine approach using local opinion leaders [4], a university course [11] or a training program in combination with supervision [12] as implementation methods. In a review by Alagoz et al. [17], all studies including facilitation of practice were reported to have significant effects. Similar to our study, frequent individualized follow-ups were important components of facilitation in these studies. Our findings are comparable to results from previous studies in which facilitation has been found to be a useful implementation method, particularly when the focus is on changing clinical behavior [18, 23, 40].

No changes in clinical actions and verbal expressions were found for the behavioral medicine components concerning treatment of patients and support of patients’ maintenance of behavior change. One reason could be the complexity of the behavioral medicine approach. According to the observation protocol (see Supplementary Material), the behavioral medicine approach in the current study involved 58 different observable clinical actions and verbal expressions of the physiotherapist. The multiplicity of clinical behaviors for physiotherapists to adopt contributes to its complexity [9] and emphasizes the challenge for successful implementation [41].

The interquartile ranges displayed in Figure 3 indicate a variability in changed clinical actions and verbal expressions among the physiotherapists in the experimental group, implying that some individuals had implemented the behavioral medicine approach to a considerably larger extent than others. Further investigation of these individual differences is important for deepening the understanding of the mechanisms of impact for behavior change. A process evaluation of the current intervention will be reported elsewhere.

**Strengths and limitations**

When the sample is small, only non-parametric statistical analyses can be used, and they are not as powerful as parametric analyses.
for detecting existing differences [35]. We are aware that small
differences might not have been noted, and the results should
therefore be interpreted with caution.

The physiotherapists were allocated to groups based on their
own wishes. This could potentially lead to bias if physiotherapists
already interested in, and with knowledge about the behavioral
medicine approach chose to participate in the experimental
group. However, we perceived that the interest in the behavioral
medicine approach varied within both groups, and there were no
significant differences of performed clinical behavior between the
groups before the implementation intervention.

The observation protocol, log-book for self-reporting and
checklist for analysis of patient records assessed the behavioral
medicine related clinical actions and verbal expressions as pre-
sent/not present instead of assessing the frequency, implying that
there may be quality differences in the physiotherapists’ perform-
ance depending on frequency as well as variations in performance
[42]. However, we had no intention to identify the frequency or
quality of performance of the behavioral medicine approach in
this study. Another weakness related to the instruments used is
that their sensitivity to detect changes has not been investigated.
It is therefore possible that small changes occurred but were not
registered in the observation protocol. To strengthen the results
and decrease the risk for type I error, the observed, self-reported
and documented data were triangulated [35]. The findings from
observations and patient records in the experimental group
pointed in the same direction, thereby strengthening the internal
validity of the results.

A strength of the study was the design aimed to decrease
threats to the internal validity of the study results. By including a
control group whose implementation was supported in the way
new guidelines are usually implemented, we were able to control
for historical effects. Additionally, to minimize the effect of history,
the implementation intervention period started at the same time
for all participants, and all physiotherapists were assessed during
the same time period. To avoid diffusion of the intervention [32],
all participants at the same clinic had to belong to either the
experimental or control group. The physiotherapists were also
advised to not discuss the behavioral medicine approach or the
implementation intervention with colleagues outside the clinic.

Two treatment sessions were video recorded for each physio-
therapist at pre- and post-implementation intervention to
strengthen the measurement validity. This strategy led to compre-
hensive data that might have decreased a random effect.
However, some behavioral medicine components, such as per-
forming and communicating an functional behavioral analysis and
supporting patients’ maintenance of behavior change and relapse
prevention, probably occurred less frequently than other behav-
ioral medicine components. Despite the comprehensive amount
of data, these components may have been missing in the
observed treatment sessions. This weakness may explain the
scarce number of observed behaviors related to functional behav-
ioral analysis, maintenance and relapse prevention. To avoid
biased ratings, the observers were blinded to which group the
physiotherapists in the video recordings belonged and which
measurement point was observed.

At the post-implementation assessment of clinical actions and
verbal expressions, there were two dropouts, one in each group.
No differences between these individual physiotherapists and the
rest of the two groups of physiotherapists were found at the pre-
implementation assessment. Therefore, these dropouts probably
did not affect the overall findings for clinical actions and verbal
expressions post implementation. During the follow-up period,
there were several dropouts and missing data. When data from
one measurement point were missing for a participant, the par-
ticipant was excluded from the analysis, which led to a small sam-
ple. To achieve as large a sample as possible, Friedman’s test was

In conclusion, facilitation, as used in this study, contributed to
changes in physiotherapists’ clinical behavior, but the changes
were not sustained at follow-up. Although self-efficacy beliefs for
relevant clinical behaviors increased, this increase was not enough
to affect sustained changes in physiotherapists’ clinical behavior.
The findings indicate that future studies should focus on targeted
actions to achieve sustained behavior change.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

Funding was provided by AFA Insurance, Sweden. Assistance with
data collection was provided by Ann-Christin Johansson, and
Thomas Overmeer is greatly appreciated.

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