

ORIGINAL ARTICLE

Is Bobath-based therapy used by physiotherapists in the care of stroke patients?

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Abstract

The aim of this study was to investigate if physiotherapists had knowledge and skills in applying Bobath-based therapy (BB), also referred to as Neurodevelopmental Treatment, in the care of stroke patients and if they generally used the therapy in daily practice. This is because of the important emphasis placed on documenting the extent of the therapy given to the client groups compared in outcome studies measuring the efficacy of therapeutic interventions. The study took place as an intervention check for a large outcome study measuring the effects of BB therapy. BB therapy had been implemented on six wards, whereas six other wards did not use this approach. The physiotherapist's ($n=38$) knowledge and skills in making decisions about applying the BB principles in all wards was measured in two steps. In step 1, the physiotherapists received a questionnaire focusing on their physiotherapy strategy, and Bobath education. In step 2, they received a case vignette describing a stroke patient and questions concerning the content of the physiotherapy provided to this patient. An expert panel judged the therapists' responses to the questions of both steps. Of the physiotherapists working in the BB wards, 14 (74%) therapists generally used BB principles, whereas four (21%) therapists did not (one was uncertain). Of the physiotherapists working in the non-BB wards ($n=19$), three (16%) did use BB therapy whereas 10 (52%) therapists did not use the therapy (six responses were missing). The study showed that within the BB wards, the physiotherapists had followed sufficient BB education, as judged by a panel of experts, and demonstrated the knowledge and skills in applying the BB therapy, whereas in the other wards they did not. BB wards could therefore participate in the experimental group of the study measuring the effects of the Bobath therapy, and the non-BB wards could serve as proper control wards.

Key words: *Bobath, cerebrovascular accident, NDT, patients, physiotherapy, rehabilitation, research*

Introduction

Stroke patients generally experience a wide range of problems, including movement problems due to the paralysis of one side of the body as a result of the stroke. Therefore, the rehabilitation needs of these patients are diverse and complex, requiring specific rehabilitative interventions. Evidence shows that physiotherapy improves functional outcome after stroke (1–3); however, the type of optimal rehabilitation therapy for these patients remains unclear (4–6).

Despite the fact that studies have shown that the Bobath-based (BB) therapy (7,8), also referred to as Neurodevelopmental Treatment (NDT), is widely used by therapists (9), therapists had difficulties in explaining the underlying theoretical basis for their choice (9–11). BB therapy aims to restore a maximal degree of bilateral function and to change abnormal patterns of movement so that normal patterns can be introduced (7,8). Physiotherapists and nurses use stimulating and inhibiting techniques to normalize muscle tone, use reflex inhibiting positions and apply balance exercises to help the patient to relearn

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normal postural balancing (7,8). BB therapy, however, has been criticized for the lack of evidence provided for its effects (9,12–14). Of the outcome studies (15–21) and randomized clinical trials (RCT) (22–29) measuring the effects of BB therapy on functional outcome after stroke, all but two studies failed to show positive effects (15,28). Two studies showed negative impacts, i.e. increased length of stay (17,26). However, recent reviews, one of which was undertaken by a Cochrane group, summarized that there is insufficient evidence to conclude that any one physiotherapy treatment approach is more effective than another in promoting functional recovery after stroke (4–6).

Studies have shown that patients trained according to the more recent task-oriented rehabilitation therapy (30,31), which aims directly to assist the patient to relearn motor control, develop strength and endurance during functional motor performance (17,26). Functional gait training and task-oriented interventions are more effective in improving functional recovery of patients with stroke (2,32–39). Despite the lack of evidence for its effects, BB therapy is still the most used exercise therapy for patients with stroke (9). This is strange in light of the fact that current healthcare practices advocate evidence-based practice. It is important that a therapy form so greatly advocated as BB therapy can show some benefit to patient outcomes. If not, then, healthcare professionals, managers and directors of hospitals need to reconsider why such an expensive and ineffective form of therapy is used. The finances would better be used for effective forms of therapy. Today, healthcare professionals increasingly need to provide evidence for therapeutic interventions, because of increased financial pressure from governmental organizations and insurance corporations. Thus, when therapists have a choice of using evidence-based therapies, which have been proved effective, versus those that not proved effective, they indeed need to choose the most effective treatment, bearing in mind the patient's best interest. Acting otherwise is unethical.

The inconclusive evidence on the effects of BB therapy has been explained by small sample sizes, execution at a single site, the lack of a baseline evaluation, inclusion of not only moderately disabled stroke patients, who might benefit most of a rehabilitation intervention and the absence of outcome criteria based on the International Classification of Functioning (40). A further major limitation of previous studies measuring the effects of the BB therapy is the lack of an intervention check or data on the content of the therapy provided, namely the therapists knowledge and skills in applying BB therapy (41). An intervention check has

been defined as the empirical assessment of the degree to which participants in the study adhere to the treatment conditions (42). When measuring the effects of a therapy it is important to ensure that the actual intervention under study is being given and that sufficient therapy contrast is provided between the groups compared (43). A prior article demonstrated the intervention check of nurses' knowledge and skills in applying the BB principles (42).

Because of the shortcomings of previous outcome studies, a prospective, comparative study was conducted by the authors, measuring the effects of the BB therapy on the functional status, quality of life, depression and shoulder pain of patients in the course of 1 year after the stroke. The results have been published elsewhere (44). The purpose of this current study was to conduct an intervention check with physiotherapists participating in the larger outcome study to measure the effects of the BB therapy (44), by assessing their knowledge and skills in making decisions about applying the BB therapy.

Method

A prospective, descriptive design, composed of a two-step procedure, was used to measure the physiotherapists' knowledge and skills in making decisions about positioning and training stroke patients according to the BB principles.

Subjects

The subjects were all physiotherapists assigned in the treatment of patients with stroke ($n=38$) in the year 2000, who were working on neurological wards of 12 hospitals and who were participating in the prospective outcome study measuring the effects of BB therapy (44). These hospitals were both university and general hospitals, located in various geographic regions in the Netherlands. On six of the neurological wards, multidisciplinary BB therapy had been implemented and therefore these wards took part in the experimental group. The other six wards, however, had not implemented the BB therapy and took part in the control group.

Panel of expert physiotherapy judges

The panel of expert physiotherapy judges ($n=4$) was selected because of their extensive experience in treating stroke patients and in using the NDT approach. They were experienced NDT instructors, who gave certified BB courses in undergraduate physiotherapy programs and postgraduate courses on physiotherapy and BB therapy; they had no

connections with the participating hospitals; they were certified members of the Bobath Association and can be considered representatives of how the NDT therapy is provided within the Netherlands.

Procedure

A letter explaining the purpose of the study, including the questionnaire, was sent to all the 38 physiotherapists and 3 weeks later, the participants received the case vignette by post. In both steps, the respondents were given 2 weeks to respond.

(1) *Assessment of BB knowledge and skills.* It was decided to assess the therapists' knowledge and skills in making decisions in using BB principles rather than assessing their actual practice, as in a prior study (42). This was because observation of actual practice, using participant observation methods in which the therapists would have been observed applying the BB therapy, could have been too obtrusive and disturbing for patients and therefore unethical. This could also lead to adaptation of behavior to the expectation of the researcher or socially desirable behavior. The use of videotape to observe manual guidance given in the intervention provided by the therapists was also considered too obtrusive. Therefore, we chose the current method. The assessment was conducted in a two-step procedure.

Step 1: Questionnaire on the educational background

First, we evaluated whether the physiotherapists had followed the necessary education to achieve sufficient knowledge in applying the BB principles.

Having followed specific BB education is considered a prerequisite for physiotherapists to make decisions about when and how to apply the BB principles, because the therapy includes specific and complex interventions. BB education is widely provided in the Netherlands in both undergraduate programs or as a postgraduate course, and is accredited by the international organization of instructors teaching the BB concept. A questionnaire containing 20 questions was used to assess the level of the physiotherapists' BB specific education. The content and the relevance of the questions were validated by a physiotherapy tutor, a clinical physiotherapist, with 15 years of experience in treating stroke patients and in using the BB principles. The final version was validated by an expert panel made up of four clinical physiotherapists. In this way, sufficient expert validity and consistency of the questionnaire was reached (Table I).

Table I. Questionnaire on the educational background.

Which basic physiotherapy education did you follow?
Where did you follow this basic physiotherapy education?
When did you follow this basic physiotherapy education?
How extensive was the basic physiotherapy education you followed?
When did you graduate as a physiotherapist?
Did you follow a basic postgraduate BB course(s)?
Which basic postgraduate BB course(s) did you follow?
Where did you follow this basic postgraduate BB course(s)?
When did you follow this basic postgraduate BB course(s)?
How extensive was this basic postgraduate BB course(s)?
Did you follow (a) follow-up postgraduate BB course(s)?
Which follow-up postgraduate BB course(s) did you follow?
Where did you follow this follow-up postgraduate BB course(s)?
When did you follow this follow-up postgraduate BB course(s)?
How extensive was this follow-up postgraduate NDT course(s)?
Did you follow continuing educational BB courses?
Which continuing BB course(s) did you follow?
Where did you follow a continuing BB course(s)?
When did you follow a continuing BB course(s)?
How extensive was this continuing BB course(s)?

Step 2: Case vignettes of a stroke patient and treatment questions

In the second phase, the physiotherapist's use of BB principles in deciding the intervention for a case study was assessed. The therapists received a case vignette by post, describing a real stroke patient and questions concerning the rehabilitation treatment of this patient. These questions addressed the treatment decisions that would differ if the physiotherapist adhered to the BB therapy or not. They were developed by the researcher and two clinical physiotherapists experienced in treating stroke patients according to BB principles and other methods (Table II). The study participants were asked to respond to the questions and to give a description and reason for the treatment provided to the patient. The same panel of experts judged responses to both the questionnaire and the case vignette.

(2) *Judgment of the experts.* In step 1, two experts judged the responses on the questionnaires on the education (Table II). Each expert, blinded to who the physiotherapists were and where they worked, made a judgment of the answers of the 38 physiotherapists, guided by questions such as: (i) Has this physiotherapist followed sufficient BB education to treat stroke patients according to the BB principles? (ii) Is this a certified education? (iii) Is this sufficiently recent education? Thereby, they scored their responses (yes/no) on a scoring form and gave the reason for their scoring. As the answers were very straightforward and the inter-rater reliability 100%, it was considered that more judges would not

Table II. A case vignette describing a stroke patient.

A woman, 74 years of age, had suffered a stroke in the right hemisphere 2 weeks ago. She had paralysis of the left arm and leg, and was admitted to the hospital. During admission, the patient experienced paralysis of the left arm and leg, but no spasm. She could move the left arm if stimulated, but her arm was painful. She was oriented (time and place) and was able to perform certain activities if asked to. The patient had hemianopsia, sensory disturbances in the arm and leg and had a bad trunk ataxia. During the first week, the patient was very tired and sleepy. The patient needed full nursing care and attention; she needed assistance with eating and had difficulty with swallowing. The patient is married to a healthy husband and has two grown-up children living in the neighborhood.

After the first week, the patient was better oriented, but had limited insight in her condition. Trunk balance was improving but still inadequate. It was possible to assist her to a chair with low transfers. At this time, the patient still needed much assistance, even though she did not need full assistance. The nurses assisted her daily, partly with washing herself in the bed and then she finished washing herself sitting in a chair. Every morning she was assisted out of bed and into a chair.

Questions concerning the case

How do you handle and treat the patient's arm?

How do you assist the patient from lying on the bed to sitting on the side of the bed?

How do you assist the patient in transferring from the bed to sitting in a chair?

Is standing and balance training a possible therapy option for this patient? Explain why (not).

increase validity in this step. Each expert judged 30 of the responses, namely, panel-member A judged responses 1–30 and member B judged responses 10–38. A total agreement was found on their judgments of the sample of 20 to establish inter-rater reliability (Table III).

In the second step, all four experts, also blinded, judged the responses to the case vignette, guided by questions such as: Has this physiotherapist used the BB principles in the treatment of the patient described in the case? The experts scored their evaluations (yes/no) on a scoring form (Table III). If three of the four panel members scored a response as being treated according to the NDT approach, it was judged as such and vice versa.

Data analysis

The SPSS (Statistical Package for Social Sciences) version 10.0 was used for calculation of non-parametric and descriptive statistics. The study was approved by the medical ethics committees of the participating hospitals.

Results

Both questionnaires and case vignettes were sent to the 38 therapists, i.e. 19 who worked on the BB wards and 19 on the non-BB wards (Table III).

Table III. Education of physiotherapists and content of the therapy given.

Variable	BB wards (n = 6)	Non-BB wards (n = 6)
Physiotherapists participating, n	19 (50%)	19 (50%)
Education of physiotherapists		
Physiotherapists responding, n (missing)	19 (0)	15 (4)
Mean years of experience in stroke service (SD)	15 (± 7)	13 (± 8)
Mean years of physiotherapy education years (SD)	4 (± 0)	4 (± 0)
Had followed post-graduate basic BB courses, n (%)	15 (79%)	4 (21%)
Had followed advanced BB courses, n (%)	5 (26%)	0 (0%)
Were following continuous BB education, n (%)	9 (47%)	0 (0%)
Sufficient BB education (expert judges), n (%)	15 (79%)	2 (11%)
Not sufficient BB education (expert judges), n (%)	4 (21%)	13 (69%)
Content of the therapy given		
Physiotherapists responding, n (missing)	19 (0)	13 (6)
BB therapy provided (as judged by the expert panel)		
Yes	14	3
No	4	10
Uncertain	1	0

Step 1: Questionnaire on the educational background

Of the 38 questionnaires sent to the participants, four were not returned, leaving a response rate of 89%. All the physiotherapists ($n = 38$) had Dutch qualifications and had finished (mean $\pm$ SD) 4 ± 0 years of education from various schools of physiotherapy. Of the total group, 26 (76%) had been qualified for more than 10 years and 31 (91%) for more than 5 years. The physiotherapists' mean years of experience in working with stroke patients was 15 ± 7 years for the BB group as compared with 13 ± 8 years for the non-BB group (Table III).

On the BB wards, 15 (79%) of the therapists had followed postgraduate Bobath courses, whereas four (21%) on the non-BB wards. The mean length of the postgraduate courses attended was 3 weeks. Five therapists in the BB group had attended advanced Bobath courses and none in the non-BB group. Nine of the therapists in the BB group (47%) were at the time of the study attending continuous BB education, as opposed to none in the other group. On the BB wards, 15 physiotherapists (79%), were judged by the experts as having followed sufficient basic and postgraduate BB courses (Table III). Four therapists, working in three of the BB wards, were judged as not having followed sufficient BB

education as they had not followed any BB courses. Thirteen physiotherapists (68%) working on the non-BB wards were judged by the panel of experts as not having followed postgraduate BB courses. Two therapists in one of the non-BB wards were judged as having followed postgraduate BB courses. Four responses were missing (Table III).

Step 2: Case vignette on the content of the therapy

A total of 32 case vignettes were returned, giving a response rate of 84%. On the BB wards, 14 physiotherapists (74%) were using the BB therapy in the treatment of the case (3/4 judges). The panel was uncertain about one therapist. Four therapists were not using the BB therapy. On the non-BB wards, 10 physiotherapists (52%) were not using the BB therapy in the treatment of the case (according to 3/4 judges) and three were using the BB therapy. The responses from six therapists from four wards were missing. (Table III).

Discussion

The importance of documenting the content of the therapy given to the groups being compared in outcome studies that measure the efficacy of therapeutic interventions is increasingly being emphasized (41,43). Previous studies, measuring the effects of BB therapy, were hampered by the lack of an intervention check and were limited in their description of the content of the therapy being studied (17,21,22,26). However, recently, van Vliet and colleagues (41) demonstrated the differences between the BB therapy (7) and the Movement Science (MS) framework of task-oriented therapy outlined by Carr and Shepherd (31). In the van Vliet study, the BB therapists provided more social conversation, more use of physiotherapy equipment and a physiotherapy assistant. The MS therapists gave more detailed feedback to the patient, made more use of everyday objects in training, more frequently listed specific components as the patient's main problems and involved relatives more in positioning to stretch muscles (41).

The findings of this study shows that the physiotherapists participating in the larger outcome study, who were assigned to the treatment of the patients on the BB wards, had sufficient knowledge and skills in applying BB therapy as deemed by this panel of experts, whereas the therapists working on the other wards did not. The physiotherapists working on the BB wards had generally followed recent education on how to use the BB therapy and were found to be applying the principles to the treatment of the patient described in the case. In contrast, the

physiotherapists on the non-BB wards generally had not followed BB courses and did not apply the principles to the patient described in the case.

This intervention check, conducted as the two-step method described here, may be considered an inexpensive way of controlling whether physiotherapists who participate in an outcome study to measure the effects of the Bobath therapy are applying interventions according to the BB principles. Likewise, this method may be used to control for the application of other therapeutic interventions in outcome studies. The questions in the first step provided qualitative information on the content of the BB education of the therapists, considered an important prerequisite for the knowledge and skills therapists need for making decisions about using Bobath therapy. The assessment of their education provides some baseline information about their knowledge and skills. The use of the case vignette, in which therapists were asked to explain their treatment decisions, revealed how the therapist chose to treat the case and why they did so. The panel of experts judged the physiotherapists on the BB wards as applying the Bobath principles in the treatment of the case, whereas the therapists on the non-BB wards were found not to apply this therapy. It is important to note that the judges were blinded, i.e. they did not know the names of the physiotherapists participating or whether they formed the experimental or control group of the larger study; they did not know which hospitals were participating in the study. The question is raised as to whether the participant physiotherapists might have provided "expected" answers by using Bobath-related "jargon", which might be judged as Bobath therapy. This, however, was not likely, as the therapists needed to give a description of the therapy provided and to justify why they chose this treatment. This required a substantial knowledge of the Bobath principles and the theoretical background of the approach.

Although theoretical evidence of knowledge and skills in competence is not a guarantee for practice behavior, observing actual practice was in this case not considered to solve the problem of discrepancy between the theoretical competence and actual behavior. Observation of actual practice is obtrusive, and can easily and without being controlled lead to adaptation of behavior to the expectation of the researcher or socially desirable behavior, which would be more difficult to conceal than in the case of completion of a questionnaire. The use of videotape to observe manual guidance given in the intervention provided by the therapists was considered too obtrusive (41). We therefore consider the use of the combined approach of the questionnaire

on the therapist's educational background and the case vignette, which revealed his/her decisions and actions based on his theoretical and clinical knowledge, to be a valuable starting point for assessing the therapist's knowledge and skills of applying the BB therapy.

This study is, to our knowledge, the first study to attempt to report the findings of an intervention check of BB therapy in an outcome study measuring the effects of the BB therapy. Previous studies did not provide such data, and this was considered an important limitation. The method used in this study may be of help to other researchers when measuring the effects of various therapy approaches and interventions as it can provide information on the content of the therapy provided.

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