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ORIGINAL ARTICLE

Pediatric Bobath Concept in management of children with cerebral palsy: view of Turkish Bobath therapists

Serebral palsili çocukların tedavisinde Pediatrik Bobath Konsepti: Türk Bobath terapistlerinin görüşü

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Abstract

Purpose: Pediatric Bobath Concept (PBC) is a family-child centered holistic concept applied interdisciplinary to support the functional skills of children with cerebral palsy. The aim of this study was to examine the effects of PBC on children, parents, and themselves from the perspective of Bobath therapists in Turkey.

Methods: In this observational study, 104 (69.2% female) Bobath therapists with a mean age of 37.9+6.1 years participated. The Pediatric-Bobath Impact Questionnaire (P-BIQ) was developed by the Delphi method. Content validity (Lawshe's Content Validity Index-CVI) and test-retest reliability (Intraclass correlation coefficient -ICC) were examined. The relationships between the rates of change in children, parents, and therapists were analyzed using the Chi Square ($\chi 2$) test and the effect sizes of the relationships were analyzed according to Cramer's V values.

Results: According to the P-BIQ (CVI=0.836, ICC >0.737), at least 74% of therapists reported that the PBC positively affected children (compliance with therapy and home program, body structure and function, activity and participation, environmental adaptations), parents (compliance with therapy and home program) and themselves (sense of professional competence and motivation). Compliance of the child, parent, and therapist was positively associated with the child's activity and participation levels and environmental adaptation ($p<0.001$, Cramer's V>0.20).

Conclusion: PBC contributes to the development of children as well as to parental compliance, and to the therapist's training and sense of professional competence. Increased compliance of children, parents, and therapists supports the child's functional development, social participation, and adaptation to the environment.

Keywords: Cerebral palsy, Child, Validation study.

Öz

Amaç: *Pediatrik Bobath Konsepti (PBK), serebral palsi ve benzeri nörogelişimsel probleme sahip çocukların fonksiyonel becerilerini desteklemek amacıyla transdisipliner uygulanan aile-çocuk merkezli holistik bir konsepttir. Bu çalışmanın amacı, Türkiye'deki Bobath terapistlerinin bakış açısından PBK'nin çocuklara, ebeveynlere ve kendilerine etkilerini incelemekti.*

Yöntem: *Bu gözlemsel çalışmaya yaş ortalaması 37.9+6.1 yıl olan 104 (%69.2 kadın) Bobath terapisti katıldı. Delphi yöntemi ile Pediatrik-Bobath Etki Anketi (P-BIQ) geliştirildi. İçerik geçerliliği (Lawshe's İçerik Geçerlik İndeksi-CVI) ve test-tekrar test güvenilirliği (Sınıfiçi Korelasyon Katsayısı-ICC) incelendi. Çocuklar, ebeveynler ve terapistlerdeki değişim oranları arasındaki ilişkiler Ki Kare ($\chi 2$) testi kullanılarak analiz edildi ve ilişkilerin etki büyüklükleri Cramer's V değerlerine göre incelendi.*

Bulgular: *P-BIQ anketine (CVI=0.836, ICC>0.737) göre terapistlerin en az %74'ü PBK'nin çocukları (terapi ve ev programına uyum/motivasyon, vücut yapı ve fonksiyonları, aktivite ve katılımları, çevresel düzenlemeler), ebeveynleri (terapi ve ev programına uyum/motivasyon) ve kendilerini (mesleki yeterlilik hissi ve motivasyon) olumlu etkilediğini belirtti. Çocuk, ebeveyn ve terapistin uyumu/motivasyonu çocuğun aktivite, katılım düzeyleri ve çevresel düzenlemeler ile pozitif ilişkiliydi ($p<0.001$, Cramer's V>0.20).*

Sonuç: Çocukların gelişimine olduğu kadar PBK, ebeveynlerin uyumuna ve terapistin eğitimine ve mesleki yeterlilik duygusuna da katkıda bulunur. Çocukların, ebeveynlerin ve terapistlerin artan uyumu, çocuğun işlevsel gelişimini, sosyal katılımını ve çevreye uyumunu destekler.

Anahtar kelimeler: *Serebral palsi, Çocuk, Geçerlik çalışması.*

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INTRODUCTION

Cerebral palsy (CP) is a group of permanent movement and posture disorders resulting from damage to the developing brain that is not progressive but causes activity and participation limitations.[1] Motor disorders are often accompanied by sensory, perception, cognition, communication, and behavioral disorders, epilepsy, and secondary musculoskeletal problems, and these comorbidities may persist throughout life.1,2 Rehabilitative practices are central to the treatment of children with CP. The Pediatric Bobath Concept (PBC) was developed by Dr. Karel and physiotherapist Berta Bobath. Today, it is a child- and parent-based concept that includes the International Classification of Functioning, Disability and Health (ICF) framework, which is widely used by physiotherapists, occupational therapists, and speech-language pathologists in the rehabilitation of children with CP and similar neurodevelopmental problems.[2]

The PBC is a transdisciplinary (physiotherapist, occupational therapist, speech-language pathologist) approach that includes a holistic assessment to support gross motor, fine motor, eating-swallowing, and visual functions, which affect the independence of children with neurodevelopmental problems, to decide on adaptive devices and orthoses, and to refer the patients to other medical approaches. The current PBC includes targeted activity-oriented therapeutic interventions that are individualized for the child. The therapist works to improve the child's motor function and postural control by regulating muscle tone and facilitation of automatic and voluntary movements for the target activity.[2,3] Multiple repetition of the target activity is ensured by facilitation of normal movement with different sensory-motor and perceptual stimuli, not only during therapy but also in different environments. In all applications within the concept, the therapy continues dynamically, considering the active participation and motivation of the child and family. Today, the applications of the PBC are shaped under the title of "application with clinical reasoning".[2-4]

The parent is an important team member of the PBC.[3,4] The parent plays a key role in bringing the therapy into daily life and the home program. The therapist focuses on problem solving by analytically and predictively examining the child's movements during assessment and observation, and engages in a collaborative interaction with the child and parent throughout the intervention. First, "what the child can do" and "how the child can do it", then "what the child cannot do" and "why the child cannot do it" are assessed. After the assessment, the parent contributes to the identification of target activities. The parent ensures that these target activities are repeated in different environments (home, school, and social settings) and that child-specific assistive devices and adaptive equipment appropriate to the biomechanics of normal movement are provided to support the target activity. They participate in the adaptation of the environment and the child to each other during the target activities.[3,4]

The concept examines the dynamic interaction of body structures and disorders, activity and participation levels, and personal and environmental factors in CP and similar neurodevelopmental problems from a “systems science perspective”.[2,4] According to the PBC, the realization of target activities can be possible by changing many linear and non-linear systems.[2] Many factors can influence the development of the target activity, ranging from the child's level of exposure to their access to the therapy. It is therefore very difficult to generate scientific evidence.[2,4] In the last few years, many professionals in the world of childhood disability management have emphasized the need for research to demonstrate the impact of the PBC.[5,6] The reason for this is that in the past some practitioners focused on hands-on practices rather than activities and participation, and some practitioners developed different aspects of the PBC and developed various offshoot-approaches under other names.[7,8]

The prevalence of CP is above the world average in Turkey (4.4./1000).[9] In Turkey, the PBC is widely applied for the intervention of CP and similar neurodevelopmental problems. The concept provides comprehensive clinical theoretical and practical training for physiotherapists, occupational therapists, and speech-language pathologists in the lifelong rehabilitation of children. The European Bobath

Tutors Association (EBTA) has set a minimum of 240 hours for therapists for basic training in the PBC.10 After basic training, different durations have been set for advanced courses. There are more than 300 EBTA-approved Pediatric Bobath therapists in Turkey, including four senior Bobath Tutors. The majority of therapists in Turkey are physiotherapists.[10] Many studies and dissertations have been conducted on the concept. Despite its widespread application in Turkey, there is no study evaluating the effects of the PBC on children, parents, and therapists from an ICF perspective.

Evidence-based practices are needed to demonstrate the widespread impact of the Bobath approach.[2-8] Evidence-based practices can be possible with evaluation methods appropriate to the nature of the concept. The aim of this study was to examine the effects of the PBC on the child, parents, and therapist from the therapist's perspective within the framework of ICF. Our hypotheses were: 1) The PBC affects the child's compliance with therapy and home program, functions, activity, and participation levels, and determination of environmental arrangements, 2) The PBC affects the parental compliance with therapy and home program, 3) The PBC affects the therapist's sense of professional competence and motivation, 4) Changes in the child's, parent's, and therapist's personal characteristics (sense of competence, compliance) are associated with changes in the child's functioning, activity, participation level, and environmental arrangements.

METHODS

This is a prospective cross-sectional study. Ethics committee approval for the study was obtained from Hacettepe University, Non-Interventional Clinical Ethics Committee (2022/01-48, Date: 04.01.2022). The study was conducted at Hacettepe University, Faculty of Phsical Therapy and Rehabilitation, Cerebral Palsy and Pediatric Rehabilitation Unit.

Participants

The population of the study was Bobath therapists who were members of the Bobath Therapists Association (BTA). The inclusion criteria were: voluntarily agreeing to participate in the study, having completed at least 8 weeks (240 hours) of EBTA-approved Basic Pediatric Bobath Concept training, having received the title of Bobath Therapist, and having at least one year of PBC experience, and working in Turkey. Therapists who answered the survey questions incompletely were excluded from the study. In addition to the ethics committee approval, permission was obtained from the BTA to reach its members.

Assessment

A web-based questionnaire was used in the study. The questionnaire consisted of two parts. In the first part, the characteristics of the participants such as gender, age, occupation, type of institution, and duration of employment were questioned. In the second part, the Pediatric Bobath Impact Questionnaire (P-BIO) was questioned.

P-BIO was created to assess the impact of PBC on the characteristics of children, parents, and therapists from the perspective of therapists. Under the leadership of a specialist pediatric physiotherapist with 35 years of experience (Bobath Tutor certificated by EBTA), 6 pediatric Bobath physiotherapists with at least 5 years of experience developed the questionnaire according to the Delphi method by making video conferences with a focus group at four different times.[11]

In the first round, the target group (therapists), what to measure (Bobath's impact from therapists' perspective), and how to measure it (Likert-type questionnaire) were decided. Since the core team of the Bobath approach is the child, the parent, and the therapists, the impact of the intervention can only be predicted by these people. During these interviews, it was decided to first develop a questionnaire for therapists, considering the ICF sub-dimensions, family, and child-based approach in order to be up-to-date. Considering the ICF sub-dimensions of the questionnaire (body structure and functions, activity, participation, and personal and environmental factors), team members (therapist, parent, and child), the items were prepared about how PBC practices affect these dimensions. In the second round, all question items were combined to form a question pool. Similar or redundant items were removed. The content validity of the items deemed "necessary and appropriate" for the questionnaire among the candidate items was

calculated according to Lawshe's Content Validity Index (CVI). CVI>0.62 was found to be appropriate in terms of content validity.[12] Items below this value were removed. At the third meeting, expert opinions were combined to create a survey of 11 items including child (7 items), parents (2 items), and therapists (2 items). A Likert-type survey with options as "decreased" "no change", and "increased" was selected to have two-way answers and not to put psychological pressure on therapists when answering. The final CVI value of the questionnaire was 0.83. In the fourth meeting, the comprehensibility of the questionnaire through the draft version was asked to the focus group (Fourteen Bobath therapists). After revisions, the final version of the standardized form of the questionnaire was prepared by two physiotherapists using a web-based form. Two additional questions were asked: 1) the effect of the PBC on the therapist's general clinical knowledge, assessment, and therapy process for children with CP, and 2) the effect of the principles of the PBC on infants, children, and adolescents.

The questionnaires were delivered to the therapists via a web-based link. Informed consent was obtained from the participants with the informed consent form included in the questionnaire sent to the therapists. Therapists were asked to answer the questions in the questionnaire completely.

Statistical analysis

The Statistical Package for Social Sciences (IBM Corp., Armonk, NY, USA, 2019) version 26.0 were used. The compatibility of the data distribution was reviewed visually (probability plots and histograms) and through analytical methods (Kolmogorov–Smirnov/Shapiro–Wilk's test). Continuous variables are presented with mean ± standard deviation (SD). Categorical variables are summarized as frequencies and percentages.

According to item number of the P-BIO, at least 55 children were planned to be included in the study since the sample size should be at least 5-10 times the number of questions. For test-retest reliability, at least one-fifth of the participants re-took the test. ICC values were analyzed for test-retest reliability. ICC values are defined as follows: < 0.5, poor; between 0.5 and 0.75, moderate; between 0.75 and 0.9, good; and > 0.9 excellent reliability.[13]

Chi-squared tests were used to examine the associations between the child's, parent's and therapist's compliance with therapy after the PBC and children's functioning, activity and participation levels, and changes in environmental factors. The effect size in the relationships was analyzed with Cramer's V values. Cramer's V coefficient was calculated to measure the effect size in a cross-tabulated table: a calculated effect size for cross-tables and interpreted as 0.5: large effect (or relation), 0.3: medium effect, and 0.1: small effect.[14] A p-value less than 0.05 was accepted as statistically significant.

RESULTS

One hundred and sixty-five Bobath therapists were invited to the study. Twenty-five of them were excluded because they did not accept the study and 36 of them were excluded because their data were incomplete. One hundred and four Bobath therapists completed the study, and the mean age was 37.89+6.11 years (27-55 years), 72 (69.2%) of the participants were female, and 32 (30.8%) were male. Most of the participants (40%) were working in special education and rehabilitation centers. According to their educational status, 18% had a master's degree and 23.8% had a doctorate degree. More than half of the therapists were Bobath therapists for at least six years. Working hours were most often ranged between 5-7 days a week, 4-9 hours a day (Table 1).

The test-retest reliability values of the items of the P-BIO questionnaire were between 0.737 and 0.910. The highest reliability was "change in compliance with the home program". The lowest reliability was "change in activities of daily living" (Table 2).

According to the P-BIO questionnaire: Ninety-four percent of the therapists reported positive improvements in children's body structure and function after the PBC, 74% reported an increase in children's activity, 81% reported an increase in children's social participation, and 75% reported an increase in the identification of environmental factors.

Eighty-two percent of the therapists reported that after the PBC, parental compliance with therapy increased and 75%

reported that parental compliance with home program increased.

After becoming a pediatric Bobath therapist, 82% of therapists reported increased professional motivation and 83% of therapists reported an increased sense of professional competence (Table 3).

According to the therapists, the PBC contributed greatly to the general clinical knowledge, assessment, and every stage of the treatment process in CP (Figure 1). The three topics that the PBC contributed the most within the framework of general physiotherapy and rehabilitation clinical knowledge were muscle tone and regulation (85.7%), typical-atypical development in children (84.8%), and holistic view of the child (84.7%). The three subjects it contributed the most during the evaluation process were observation (92.4%), individual goal selection (86.6%), and clinical problem solving (82.9%) skills. Its contribution to the therapy process was listed as facilitation of normal movement and reactions (85.8%), activity-based individualized program (79.1%), and family education (74.3%) (Figure 1).

According to Bobath therapists: Among the principles of the PBC, parental education and home program were most effective in infants with CP (66.9%), the principles of recommending adaptive devices (orthotics, walking aids, and necessary additional interventions) were most effective in children with CP (52.8%), and the principles of managing secondary problems (contracture, pain and loss of muscle strength) and supporting social participation were most effective in adolescents with CP (50.4%) (Figure 2).

According to the responses to the P-BIO questionnaire, therapists' motivation and sense of professional competence, and family compliance and motivation were positively associated with positive improvements in children's functioning, activity, and participation levels, and environmental modifications. In particular, an increase in parental compliance with therapy had a large effect size on the child's activities of daily living and social participation, while family compliance with the home program had a large effect size on the child's functional development ($p<0.05$, Cramer's $V>0.20$, Table 4).

Table 1. Characteristics of the participants.

	Mean±SD
Age (year)	37.9±6.1
	n (%)
Gender	
Female	72 (69.2)
Male	32 (30.8)
Education level	
License	25 (24.0)
Master's degree	60 (57.7)
Doctorate degree	19 (18.3)
Bobath therapist (year)	
1 to 3	20 (19.2)
4 to 6	30 (28.8)
7 to10	34 (32.7)
>10	20 (19.2)
Organization type	
Public hospital	8 (7.7)
Special education center	40 (38.5)
Private hospital	5 (4.8)
University	25 (24.0)
Counseling center	26 (25.0)
Working day	
1-2	2 (1.9)
3-4	12 (11.5)
5-7	90 (86.5)
Working hours	
1-3	6 (5.8)
4-6	24 (23.1)
7-9	71 (68.3)
10-12	3 (2.9)

Table 2. Test-retest reliability values of the Pediatric-Bobath Impact Questionnaire (P-BIQ) items.

P-BIQ items	ICC	95% CI
Item 1	0.766	0.560-0.904
Item 2	0.855	0.673-0.940
Item 3	0.737	0.547-0.887
Item 4	0.855	0.673-0.940
Item 5	0.876	0.707-0.950
Item6	0.878	0.721-0.950
Item 7	0.863	0.690-0.943
Item 8	0.878	0.721-0.950
Item 9	0.863	0.690-0.943
Item 10	0.910	0.788-0.963
Item 11	0.870	0.702-0.946

ICC; intra-class correlation coefficient (Two-way mixed effects model (2,1) for absolute agreement with a 95% confidence interval).
CI: Confidence interval.

DISCUSSION

Although it is a widely used therapeutic intervention in Turkey for infants at high risk of CP, children diagnosed with CP, and children with similar neurodevelopmental problems, there exists no report examining the collaborative effect of the PBC. In this study, for the first time in Turkey, the effects of the PBC on children, parents, and therapists are examined from the therapist's perspective under the ICF framework. A valid and reliable subject-specific P-BIO questionnaire was developed. According to the Bobath therapists, the PBC is useful in improving the function, activity, and participation level of the child with CP and identifying their environmental needs. After the PBC, the increase in the child's, parent's, and therapist's motivation and adherence to the therapy program, the increase in the therapist's sense of professional competence, and the increase in the child's functioning, activities, and level of participation have positive effects. The PBC is also effective in training therapists. It is especially useful in terms of education in children with CP in terms of muscle tone and regulation, observational assessment, individual goal setting, and facilitation of typical movements and reactions during functional activity. According to the Bobath therapists, among the principles of the PBC, the principles of family education and home program were most important in infancy, the principles of

Table 3. Percentage distribution of responses to the Pediatric-Bobath Impact Questionnaire (P-BIQ) items.

After the Pediatric Bobath Concept	Decreased n (%)	No change n (%)	Increased n (%)
Child			
How did the body structure of the children you treated change?	0 (0)	6 (6)	98 (94)
Tonus problems			
Pain			
Fatigue			
How did the physical functioning of the children you treated change?	0 (0)	6 (6)	98 (94)
Range of motion of the joint			
Selective movements			
Body stabilization			
Postural control			
How have activities of daily living changed?	1 (1)	26 (25)	77 (74)
Sitting, walking, transferring, going up and down stairs			
Nutrition			
Personal care			
The Game			
How has participation changed?	0 (0)	20 (19)	84 (81)
Daily life routines			
Social activities			
How has the child's environment changed?	1 (1)	25 (24)	78 (75)
Domestic modifications			
Modifications in social environments			
Orthotics and assistive device support			
How did the compliance of the children you took into therapy change?			
How has the compliance of the children in your therapy changed with the home program?	1 (1)	8 (13)	95 (86)
Parent	1 (1)	8 (13)	95 (86)
How did his/her compliance with therapy change?	2 (2)	22 (18)	80 (82)
How did his/her compliance with the home program change?	1 (1)	25 (24)	78 (75)
Therapist			
How was your professional motivation affected?	13 (12)	6 (6)	85 (82)
How has your sense of professional competence been affected?	1 (1)	17 (16)	86 (83)

Table 4. Associations between changes in therapist, child and parent after the PBC and children's functioning, activities of daily living, social life and environmental regulation.

	Functions			Activities of daily living		
	Increased (n)	No change (n)	Decreased (n)	Increased (n)	No change (n)	Decreased (n)
Compliance and motivation of the child						
Increased	92	3	0	73	22	0
No change	5	3	0	3	4	1
Decreased	1	0	0	1	0	0
p/ Cramer's V		0.001/0.393			0.003/0.277	
Parental compliance with therapy						
Increased	79	1	0	68	12	0
No change	18	4	0	9	13	0
Decreased	1	1	0	0	1	1
p/ Cramer's V		<0.001/0.398			<0.001/0.584	
Parental compliance with the home program						
Increased	78	0	0	69	9	0
No change	20	5	0	8	16	1
Decreased	0	1	0	0	1	0
p/ Cramer's V		<0.001/0.541			<0.001/0.411	
Professional motivation of the therapist						
Increased	81	4	0	65	20	0
No change	4	2	0	2	4	0
Decreased	13	0	0	10	2	1
p/ Cramer's V		0.009/0.300			0.010/0.251	
Therapist's sense of professional competence						
Increased	84	2	0	70	16	0
No change	13	4	0	7	10	0
Decreased	1	0	0	0	0	1
p/ Cramer's V		0.003/0.337			<0.001/0.748	

Cramer's V, 0.5: large effect, 0.3: medium effect and 0.1: small effect.

management of assistive devices used to support target activities were most important in childhood-adolescence, and the principles of prevention of secondary problems and promotion of social participation were most important in adulthood.

The PBC provides therapists with a training model that includes general clinical knowledge and assessment and treatment principles specific to children with CP.[2-4] It's a child- and parent-centered living concept based on theoretical scientific knowledge about typical/atypical movement development.[2-4] In recent systematic reviews examining the impact of the PBC, it has been stated that it is a passive practice according to experimental studies with insufficient level of evidence.[5-6] On the other hand, the importance of empirical evidence for interventions is undeniable, but scientific knowledge is also a major factor in the basis and shape of an intervention. Reasons ranging from brain involvement to living conditions may affect the effectiveness of intervention in CP rehabilitation differently for each child.[15] It is therefore also difficult to establish evidence for the concept. The PBC is an approach that includes many therapeutic aspects rather than an intervention. In light of its holistic approach, it supports the neurodevelopmental processes of the child, while providing parents/caregivers with home programs and education, and physiotherapists with both educational and clinical practice skills.[2-4] Therefore, it is necessary to investigate the effects on the parent/caregiver and therapist as well as on the functioning of children with CP. In this study, according to the P-BIO questionnaire, the PBC was shown to have effects on the functional skills of children as well as on parents and therapists.

Table 4. *Continued.*

	Social inclusion			Environmental adaptations		
	Increased (n)	No change (n)	Decreased (n)	Increased (n)	No change (n)	Decreased (n)
Compliance and motivation of the child						
Increased	79	16	0	74	20	1
No change	4	4	0	3	5	0
Decreased	1	0	0	1	0	0
p/ Cramer's V		0.065/0.229			0.121/0.187	
Parental compliance with therapy						
Increased	73	7	0	68	12	0
No change	11	11	0	10	12	0
Decreased	0	2	0	0	1	1
p/ Cramer's V		<0.001/0.514			<0.001/0.571	
Parental compliance with the home program						
Increased	70	8	0	78	0	0
No change	14	11	0	0	25	1
Decreased	0	1	0	0	0	0
p/ Cramer's V		<0.001/0.417			<0.001/1.0	
Professional motivation of the therapist						
Increased	73	12	0	67	17	1
No change	1	5	0	2	4	0
Decreased	10	3	0	9	4	0
p/ Cramer's V		<0.001/0.409			0.126/0.186	
Therapist's sense of professional competence						
Increased	74	12	0	70	15	1
No change	10	7	0	8	9	0
Decreased	0	1	0	0	1	0
p/ Cramer's V		0.004/0.325			0.011/0.251	

Cramer's V, 0.5: large effect, 0.3: medium effect and 0.1: small effect.

Providing evidence on a topic is possible through qualitative or quantitative evaluation methods. Methodologically, specific questionnaires can be developed on a topic by taking the attitudes and opinions of experts. The primary validity to be considered in questionnaire development is the content validity of the measurement tool. Content validity determines the extent to which each item covers the trait intended to be measured.[16,17] In previous studies, no comprehensive specific questionnaire evaluating the effect of the PBC was found. First of all, in order to be methodologically strong in this study, the P-BIO questionnaire was created by taking expert opinion with the Delphi method.[18] The question items selected to show the effect of the PBC had high content validity based on expert opinions. A questionnaire should have temporal stability as well as validity. Temporal stability is determined by test-retest reliability. Test-retest reliability refers to the consistency of results when the same test is repeated on the same sample at a different time point. For test-retest reliability, a sufficient period of time should elapse so that the participant does not change their mind but also forgets their answers to the questionnaire. An average period of 2-4 weeks is methodologically recommended.[19] In our study, the questionnaire was sent to the therapists at two-week intervals and the temporal stability of the P-BIO questionnaire was found to be adequate by the therapists.

Maintaining a stable posture during functional activities requires a complex interaction between the musculoskeletal and the nervous system. Head-trunk stabilization (i.e. axial segment stabilization) is the primary reference frame for postural control.[20] During the PBC, postural reactions and head-trunk stabilization are facilitated for typical functional

movement development. Akbaş et al.[21] showed that "Bobath-based trunk training" applied for eight weeks, 2 days a week for 45 minutes increased trunk extensor muscle activation in children with CP. Arı et al.[22] stated that "Bobath-based trunk control training" applied for 6 weeks, 2 days a week, 45 minutes a day increased trunk muscle strength in children with CP. Türker et al.[23] found that "Bobath-based goal directed therapy" applied for 12 weeks, 3 days a week in children with CP increased functional independence and quality of life of children in daily life. Acar et al.[24] emphasized that Bobath-based neck and trunk control (45 min.2 g/12 hf) exercises were effective on feeding and swallowing functions of children with CP. In this study, according to three-quarters of the therapists who have been applying the PBC for at least one-year, neurodevelopmental therapy contributed positively to body structure and function, activity, and participation levels of children during this period. In conclusion, individualized goal-oriented and activity-focused PBC for children with CP is beneficial for both function and activity and participation levels.

CP is a chronic neurodevelopmental disorder that requires lifelong therapeutic exercise habits. The acquisition of this habit can be achieved through personal compliance and motivation.[25] Motivation also supports the learning of a functional skill. Furthermore, as the motivation of the child and the parents increases, the sustainability of the intervention increases.[25,26] In this study, it was found that the increase in the compliance and harmony of the therapist, family, and child after the PBC positively affected the increase in the child's functioning, activities of daily living, social participation, and environmental regulation. In this study, when the age groups were examined separately according to the therapists, the importance of family education and home program management in infancy, management of adaptive devices in childhood, and management of secondary problems and social participation in adolescence were emphasized. We can say that the PBC is a living concept that responds to all habilitative and rehabilitative needs of individuals with CP from infancy to adulthood. We can also say that the harmony and motivation of team members in the PBC will support the functional development of the individual.

Parents are in the center of pediatric rehabilitation. Evan-Rogers et al.[27] investigated the experience of parents after short-term and intensive PBC and emphasized that parents found the PBC by experienced therapists to be beneficial and supportive for their children's functional development. In addition, according to the parents, in the PBC, the therapists' setting of collaborative goals with the child and parents is motivating.[27] In this study, according to most of the therapists, parents' and children's motivation and compliance with the home program increased after the PBC. In the concept, parents are given responsibility for the home program process. It can be said that the reason for the increase in compliance and motivation of the parents is that they feel responsibility as a team member and the instinct to own the process.

In a study conducted in Spain, the Bobath experiences of a group of Bobath therapists working with children with CP were questioned. As a result of a thematic analysis, the core features of the Bobath concept were identified as 1) normal movement, 2) global concept, 3) observation, 4) the centrality of tone, 5) working with families. Additional principles were identified as including assessment and therapy, applying motor learning principles, and transferring treatment into function. Therapists reported that they no longer adhere to the theoretical perspective of pathological reflexes and reflex/tone inhibition.4 In Brazil, it was reported that most of the good therapeutic work is carried out by Bobath therapists. In Brazil, Bobath therapy uses the child's own active self-movement, participation in therapeutic planning, and family involvement.7 The situation is similar in Turkey. This study is the first cross-sectional study on Bobath therapists in Turkey and it is seen that two out of every five people have postgraduate education and most of them have knowledge about the research design. We can say that most of the therapists who are interested in PBC are also the ones who follow the current literature. In this study, it was stated that the PBC contributed to the therapists mostly in tone knowledge, atypical-typical motor development knowledge, observation, clinical problem solving, individualized goal setting, and facilitation of typical movements during activity. In addition,

most Bobath therapists have reported that their sense of professional competence was positively affected after the PBC training. The concept provides a framework intended to be applied in clinical practice, education, and research for Bobath therapists.

Limitations

This study has several limitations. The PBC is applied by physiotherapists, speech-language pathologists, and occupational therapists. In Turkey, the number of Bobath therapists in the field of occupational therapists and speech-language pathologists is quite small. A limitation of the study is that the expert committee and focus group that developed the P-BIO questionnaire consisted only of physiotherapists. Another limitation is that although we have reached a large number of Bobath therapists, a high number of participants gave incomplete answers. The questionnaire was prepared to be administered over the phone for the convenience of the respondents. It is thought that there are deficiencies in the data due to the system shutting down while switching between questions and difficulties in marking matrixed answers by touching the small phone screen.

Conclusion

According to Bobath therapists, the PBC is a comprehensive intervention that contributes to all aspects of the child's development, especially physical development, as well as to the compliance/motivation of the parents and the therapist's education, sense of professional competence and compliance with therapy. Increased compliance and motivation of the child, parents and therapist supports the child's functional development, social participation and adaptation of the environment to the child. The PBC is continuously updated in the light of the neurodevelopmental and neurophysiological theoretical knowledge on which it is based, and is developed after regular meetings, congresses, and workshops within the professional organizations formed by educators. Setting individual measurable goals, activity and participation-oriented perspective, orthotic and adaptive device recommendations to support activity, and in-home modifications are within the scope of the concept. We think that the P-BIO questionnaire, which was developed specifically for this study, is a questionnaire that can be used to evaluate the effect of the PBC on the therapist, the child, and the parent from the ICF perspective. In order to be complementary, we are planning to develop versions that examine parents' and children's perspectives. It is thought that evaluating other psychometric properties of the P-BIO in future studies will support the usability of the questionnaire.

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