



Knowledge, attitudes, and perceptions of physical therapists towards conventional physical therapy- across-sectional study

Alaa M. Albishi, PhD*

Background: Conventional physical therapy (CPT) is widely used in clinical practice and known to contribute beneficially to patient's health conditions but remains loosely defined. Research has shown inconsistency in the definition and utilization of CPT among physical therapists in clinical and research settings, limiting its generalisability and reproducibility. Therefore, this study evaluates physical therapists' knowledge, attitudes, and perceptions toward CPT.

Methods: A cross-sectional study using a self-administered questionnaire containing 36 questions was distributed among 238 licensed physical therapists. Descriptive and inferential statistics were used to measure the physical therapists' knowledge, attitudes, and perceptions towards CPT.

Results: Physical therapists showed limited knowledge of CPT in rehabilitation (4.09 ± 1.698 , 51%). However, the knowledge scores were significantly associated with age ($P = 0.002$), educational levels ($P = 0.006$), and years of work experience ($P = 0.001$). Nevertheless, physical therapists showed an overall positive attitude towards CPT and perceived it as essential to rehabilitation.

Conclusion: Most physical therapists have low knowledge about CPT but positive attitudes and perceptions. Therefore, customized medical education is necessary to incorporate CPT theories and applications into physical therapists' rehabilitation programs.

Keywords: Attitude, control, conventional physical therapy, knowledge, perception, physical therapist, Saudi Arabia, traditional physical therapy, usual therapy

Introduction

Rehabilitation includes multidisciplinary management to improve a patient's functioning and reinforce independence^[1-4]. It focuses on limiting the severity of a patient's initial injury, facilitating neuroplasticity, reducing functional loss, and improving the patient's overall performance^[4-6]. Neuroplasticity is one of the main mechanisms of motor recovery after injury and has been associated with functional gains^[7-9]. Various interventions that provide stimuli, such as changes in behaviours and the environment and the creation of learning experiences, have been used to drive neuroplasticity^[10,11]. Exercise has shown positive benefits by directly encouraging neuroprotection^[12] and causing changes in the neural architecture^[13], as well as indirectly

enhancing brain health and fostering an ideal environment for plasticity^[11].

Physical therapy encompasses several interventions to treat different impairments and functional limitations in a population with a large variability in functional capacity^[14]. Therapists may previously implement care based on their preferred treatment approaches^[15,16]. Therapists must include a wide range of strategies supported by current research evidence in their treatment programs to employ evidence-based practice. It is also crucial to recognize that there are still many important areas of clinical practice for which there needs to be more evidence. As a result, therapists continue to use their clinical reasoning abilities to choose treatment techniques appropriate to patients' and caregivers' needs, wishes, and goals^[17].

During physical therapy sessions, usual or routine care varies in the interventions used, frequency, and intensity^[18-23]. In addition, this variation is noted in research that uses such interventions; some interventions associated with a control group have been called "conventional physical therapy (CPT)," "usual therapy," and "traditional therapy."^[19-23] Despite these variations, some studies use CPT as a control treatment condition and compare its effect to other interventions, such as virtual reality, robotic therapy, and constrained-induced movement therapy^[24]. Thus, it is essential to find a more appropriate definition for CPT within a research setting to ensure that the effect size of a comparative intervention in a trial is correctly measured, establish the internal validity of related findings, and allow the comparison of interventions among trials^[25].

In general, CPTs used in routine clinical practice are known to contribute to the beneficial effects of patient rehabilitation but remain unclear. Further evidence is needed to establish which

Department of Rehabilitation Sciences, College of Applied Medical Sciences, King Saud University, Riyadh, Saudi Arabia

Sponsorships or competing interests that may be relevant to content are disclosed at the end of this article.

*Corresponding author. Address: Department of Rehabilitation Health Sciences, College of Applied Medical Sciences, King Saud University, P.O. Box 10219, Riyadh 11433, Saudi Arabia. Tel.: +966 555 090 015. E-mail: aalbeshi@ksu.edu.sa (A.M. Albishi).

Copyright © 2024 The Author(s). Published by Wolters Kluwer Health, Inc. This is an open access article distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 (CCBY-NC-ND), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.

Annals of Medicine & Surgery (2024) 86:1942-1949

Received 12 February 2024; Accepted 21 February 2024

Published online 4 March 2024

<http://dx.doi.org/10.1097/MS9.0000000000001883>

CPT intervention is most effective, for which patients, at which dose, and its intensity and impact on patients' recovery^[26–29]. Interestingly, CPT has been described as a black box and even a Russian doll, implying that its description is difficult or impossible and, therefore, that it is hard to identify effective and ineffective elements of current PT or even its relative effectiveness when compared to novel therapies^[28–33]. An insufficient description of CPT treatment activities and a lack of use of treatment activity packages limit the reproducibility of many research studies and contribute to the inability to incorporate research findings into clinical practice^[29–31].

Specific guidelines have been produced to overcome these limitations and recommended reporting intervention details of CPT used in research; these include the Template for Intervention Description and Replication (TIDieR) checklist and guide, the Rehabilitation Treatment Specification System (RTSS), and the International Classification of Functioning (ICF)^[31–39]. Despite these various guidelines, there is still a large variability in the CPTs reported in previous studies for even similar patients' conditions. Thus, it is vital to gain insight into the current consensus on what type of interventions physical therapists would consider part of CPT.

Simply put, we cannot measure what we cannot identify. Exploring physical therapists' general knowledge, attitudes, and perceptions regarding CPT is an important first step toward understanding CPT and its use in research and clinical settings. Specifically, prior studies have not been conducted among physical therapists regarding their knowledge, attitudes, and perceptions toward CPT in Saudi Arabia. Thus, this study is the first to evaluate physical therapists' knowledge, attitudes, and perceptions toward CPT in Saudi Arabia.

Materials and methods

Study design and population

An observational cross-sectional study was conducted through anonymous distribution of an online self-administered survey to measure knowledge, attitudes, and perceptions based on the applications of CPT in rehabilitation in Saudi Arabia. A convenience sampling approach targeted registered physical therapists in Saudi Arabia to explore their knowledge, attitudes, and perceptions regarding CPT in the rehabilitation sciences. A guideline for reporting results using an observational descriptive studies (STROCSS criteria) checklist was used^[40]. The study was conducted in Hunan, Saudi Arabia, from 8 October 2023 to 20 December 2023.

Eligibility criteria

Only physical therapists licensed to practice in Saudi Arabia [$N=238$] were included in this study. All participants were recruited and provided informed consent after the study was approved by the Internal Review Board at King Saud University (no. E-23-8149).

Data-collection tools and procedure

An administrative survey on knowledge, attitudes, and perceptions regarding CPT applications in physical therapy was generally distributed via the Internet to registered physical therapists in universities and colleges, general and private hospitals, and

research institutions. The research procedures and objectives were explained to all participants, and their informed consent was obtained before participating in the study. The informed consent entails details about the participants' right to withdraw from the study at any time and ensures confidentiality of their given information. To protect the participants' privacy, each participant was assigned a unique code, and the data collected sheets were securely stored in a locked online folder to maintain the subject's confidentiality.

Questionnaire development and validation

Semi-structured interviews with six licensed physical therapists with more than 2 years of work experience were conducted to explore their general understanding of CPT. The research objectives were presented to each participant at the beginning of the interview. The consent form was provided and signed before the participants were asked about their understanding of CPT. Concurrently, literature research was conducted to establish evidence and the availability of questionnaires related to CPT in different databases.

A structured self-administered online questionnaire was developed using the Google Document platform after searching the relevant scientific literature and conducting the semi-structured physical therapist interviews. The questionnaire consisted of 36 questions grouped into four main sections: demographic and general information (15 questions), knowledge (8 questions), attitudes (10 questions) and perceptions (3 questions). The items had scoring scales similar to those reported in previous studies measuring KPA^[41–43]. The demographic items were used to collect information regarding each participant's age, sex, region, level of education, subspecialty, type of workplace, years of work experience, and preferred source of information. Moreover, each participant was asked if they knew the term CPT, searched for information related to CPT, used CPT, the purpose of its use, and what type of CPT they used at their workplace. The knowledge section measured their precise general knowledge of CPT applications and practice, whereas the attitude and perception questions assessed the practitioner's attitudes and perceptions towards CPT in rehabilitation.

Ten experts from the Department of Rehabilitation Sciences at King Saud University and different hospitals in Saudi Arabia were selected to assess the questionnaire's content validity and research experience according to their corresponding level of expertise. The research objectives and questionnaire items were distributed with clear instructions to evaluate each item based on clarity and relevance. Recommendations from the experts were incorporated to enhance the questionnaire's face and content validity. The modified survey achieved satisfactory levels of validity, as indicated by the computed scale-level content validity index based on the average method (S-CVI/Avg)^[44].

The pre-final version of the questionnaire was pilot-tested with 23 physical therapists working in different hospitals. Each physical therapist received an online questionnaire. Based on this test, minor editing was performed to improve the grammar and readability of the questions. The reliability and validity of the questionnaire reached a satisfactory level, similar to previous studies^[44]. After the pilot testing, the CPT questionnaire containing 36 close-ended questions was finalized. The results from the pilot study were excluded from the final analysis.

Minimum sample size estimation

According to information from the Saudi Commission for Health Specialties (SCFHS), the total number of registered/licensed Saudi physical therapists in 2018 was 1,618^[45]. The minimum required sample size was calculated by setting the statistical power at 80%, with a population size of 1618 and a margin of error of 5%. Thus, the minimum sample size required for this study was estimated to be 149 participants.

Data analysis

Statistical analyses were performed using IBM's SPSS Software Version 29. For the knowledge assessment, one point was given for each correct response and zero for each incorrect or uncertain response. A continuous knowledge variable with a maximum possible score of 8 points was computed by summing the attained per-question score for each respondent. The knowledge score of each respondent was categorized based on ranges developed from the accomplished scores using Bloom's cut-off point method^[46]. The knowledge was considered sufficient if the knowledge score was between 60 and 100% (4.8–8.0 points) and insufficient if the score was less than 60% (0.0–4.8). The scores were also divided into low (<4.5), moderate (>4.5–6.32), and high (>6.5) knowledge. Furthermore, the attitude section used a 5-point Likert scale (1 = "strongly agree," 2 = "agree," 3 = "neutral," 4 = "disagree" and 5 = "strongly disagree"). There was a maximum score of 50 points for the attitude section. The attitude score was classified as negative for an attained score of 0–24 points and positive for an achieved score of 25–50 points.

Descriptive statistics of frequency, mean, and standard deviation were used to describe the participants' characteristics, performance, and perceptions. Additionally, the normality of the computed continuous knowledge and attitude scores variables was evaluated using the Shapiro–Wilk test. Nonparametric tests were used due to the skewed distributions of the calculated scores (Shapiro–Wilk, $P < 0.05$). Kruskal–Wallis, Mann–Whitney U, and Spearman's rank correlation tests were used to examine the effects of different factors on the knowledge and attitudes of CPT among the physical therapists. The study results were considered significant at P less than 0.05.

Ethical considerations

The study was conducted in accordance with the guidelines of the Declaration of Helsinki and approved by the Institutional Review Board of King Saud University (no. E-23-8149). Participants were informed that their involvement in the study was entirely voluntary, and they had the freedom to decide whether or not to participate in the study. To ensure the confidentiality of the participants, subjects were given a study code, and their information was securely stored. The analysis was conducted using the subjects' codes to avoid potential bias, and the subjects' identities remained anonymous. These ethical standards were implemented to protect participants' rights and well-being throughout the research process.

Results

Participant's characteristics

A total of 238 physical therapists completed the study questionnaire with no missing data. Subjects had a mean age of

29.48 years (SD = 4.537). The gender distribution showed that the majority of the participants were female (72.7%), while 27.3% were male. In terms of educational qualifications, the largest proportion of the participants held a bachelor's degree (83.6%), followed by those with a master's degree (14.7%) and a smaller percentage with a doctoral degree (1.7%). The subspecialty focus of the participants varied, with a large majority in general physical therapy (76.9%), while other areas included orthopaedics (11.8%), paediatrics (6.7%) and neurology (4.6%). Participants had varying levels of experience, with the most prevalent falling within the "6–10 years" category (30.7%), followed by those with "2–5 years" (28.2%) and then "0–1 year" (18.9%) of work experience. Most participants were from the central region (46.2%), followed by the western (17.2%), eastern (11.3%), southern (12.6%) and northern (12.6%) regions. Regarding the main practice location, most of our participants worked at general hospitals (56.3%), followed by private practice (31.5%). The primary sources of knowledge for the participants were articles (28.9%), discussions with colleagues (24.8%), textbooks (15.0%) and conferences (12.7%).

Most participants (87.4%) indicated familiarity with the term CPT. In contrast, 12.6% of the participants stated that they were unaware of the term. A large percentage of the respondents (79.8%) reported using CPT in their practice, while 20.2% reported not using it. Regarding prior research, 61.8% of the participants reported conducting searches regarding CPT, while 38.2% had not. When asked about their purpose in using CPT, participants indicated a range of applications, with intervention being the most common (55.5%), followed by assessment (30.3%), diagnosis (7.6%), prognosis (3.8%) and other (2.9%). Regarding the types of CPT used in their work, 24.5% indicated employing a variety of techniques, including strength exercise (18.8%), joint mobilization (16.2%), and soft tissue mobilization (12.5%). The data regarding demographic information are presented in Table 1.

Assessment of CPT knowledge

The knowledge items and their rates of responses are presented in Table 2. Approximately 39.9% of the respondents acknowledged that CPT was not consistently defined as one concept in various studies or among physiotherapists and countries. In comparison, 60.1% indicated incorrect responses, resulting in a mean score of 0.39 (SD = 0.490) on this item. In addition, 43.3% of the participants recognized that CPT ranged from no intervention to maintaining physical activity levels, with a mean score on this item of 0.43 (SD = 0.496). Only 29.0% of respondents identified that CPT was not based on a specific source of knowledge, leading to a mean score of 0.29 (SD = 0.454) on this item. In addition, 51.7% of participants recognized that CPT was equivalent to terms like "usual care" or "traditional therapy," with a mean score of 0.51 (SD = 0.500) on this item. Approximately 76.5% of the respondents reported that CPT was not exclusively a modality, with a mean score on this item of 0.76 (SD = 0.425). In addition, 85.3% of participants indicated that CPT as a multimodal intervention included exercise, with a mean score on this item of 0.85 (SD = 0.355).

Moreover, 44.5% of participants acknowledged that CPT did not entail using high technological equipment such as virtual reality and brain stimulation, resulting in a mean score of 0.44 (SD = 0.498) on this item. In addition, 37.8% of respondents

Table 1
Demographic factors

Item	Subcategory	N (%)
Sex	Female	173 (72.7)
	Male	65 (27.3)
Education	Doctoral degree	4 (1.7)
	Master degree	35 (14.7)
	Bachelor degree	199 (83.6)
Subspecialty	Neurological physical therapy	11 (4.6)
	Paediatrics physical therapy	16 (6.7)
	Orthopaedic physical therapy	28 (11.8)
	General physical therapy	174 (76.9)
Year of working experience	0–1	45 (18.9)
	2–5	67 (28.2)
	4–5	29 (12.2)
	6–1	73 (30.7)
	> 10	24 (10.1)
Region	Central	110 (46.2)
	Western	41 (17.2)
	Eastern	27 (11.3)
	Southern	30 (12.6)
	Northern	30 (12.6)
Main place of practice	General hospital	134 (56.3)
	Teaching hospital	2 (0.8)
	Research institute	2 (0.8)
	Private practice	75 (31.5)
	University	7 (2.9)
	Other	18 (7.6)
The main source of knowledge	Articles	171 (28.9)
	Conferences	75 (12.7)
	Textbooks	89 (15.0)
	Discussions with colleagues	147 (24.8)
	Mass media	76 (12.8)
	Word of mouth	23 (3.9)
	Other	11 (1.9)
Do you know the term conventional physiotherapy	Yes	208 (87.4)
	No	30 (12.6)
Did you use conventional physiotherapy	Yes	190 (79.8)
	No	48 (20.2)
Did you search before about conventional physiotherapy	Yes	147 (61.8)
	No	91 (38.2)
What do you use conventional physiotherapy for	Assessment	72 (30.3)
	Intervention	132 (55.5)
	Prognosis	9 (3.8)
	Diagnosis	18 (7.6)
	Other	7 (2.9)
What type of conventional physiotherapy are you using at work	Soft tissue mobilization.	63 (12.5)
	Joint mobilization	82 (16.2)
	Facilitation of muscle activity/movement	60 (11.9)
	Positioning	59 (11.7)
	Specific sensory input	23 (4.5)
	Strength exercise	95 (18.8)
	All of the above	124 (24.5)

believed that CPT was superior to no physical therapy intervention, with a mean score on this item of 0.38 (SD = 0.486). The overall total knowledge scores aggregated the results of all questions, indicating that more than half of the subjects (51.0%) had sufficient knowledge, while 49.0% did not have adequate knowledge regarding CPT. The overall knowledge score was relatively low, with a mean of 4.09 (SD = 1.698).

Statistical investigation of other factors, such as gender, region, the main source of knowledge, type of workplace, and subspecialty, with knowledge of CPT application revealed a significant effect of age ($P = .04$), subspecialty ($P = 0.006$), and years of work experience ($P = 0.029$). In addition, we found a significant relationship between education and knowledge ($P = 0.001$); the total knowledge score was higher in master's (4.74 ± 1.804) and PhD (6.0 ± 1.414) degree holders compared to bachelor's degree holders (3.93 ± 1.6). The differences among these scores were significant ($P = 0.002$). However, the results also indicated no correlation between the specialists' knowledge and gender or region ($P > 0.05$). These factors are presented in Table 4.

Attitudes towards CPT

The questionnaire items assessing the physical therapists' attitudes and their response rates are shown in Table 3. Approximately 75.6% of the participants believed that patients could benefit from CPT, and an overwhelming proportion (74.3%) of respondents considered that there were benefits in understanding the meaning of CPT for physical therapist providers. Most respondents (67.7%) agreed that a CPT intervention was superior to no intervention but not necessarily better than any other intervention. Respondents were generally open to referring patients to treatment in CPT, with 52.6% agreeing. A substantial proportion (68.0%) of respondents agreed that having a unified agreement on what CPT means would help improve patient care. Respondents generally believed that all physical therapists used different forms of CPT, with 66.0% agreeing.

Meanwhile, respondents were somewhat divided on the possibility of defining CPT as an isolated category or approach, with 71.9% providing responses that were either neutral or in agreement. In addition, the PTs did not necessarily believe that CPT was always based on evidence-based practice, with only 20.9% of respondents agreeing that it was. The confidence level regarding knowledge of CPT varied, with 42.9% of respondents expressing confidence, but 16.1% strongly disagreed that they were confident. The total attitude score aggregated the responses to all questions, demonstrating a generally positive attitude towards CPT among the respondents. The mean attitude score was 41.15 out of 50 (SD = 5.499).

Statistical investigation of other factors, such as gender, region, the main source of knowledge, type of workplace, and subspecialty, with attitude towards CPT application revealed a significant effect of age ($P = 0.002$) and years of work experience ($P = 0.001$). Moreover, we found a significant relationship between education and knowledge ($P = 0.006$). The total score of attitude was higher with master's (42.77 ± 4.49) and PhD (48 ± 3.915) degree holders compared to bachelor's degree holders (40.73 ± 5.560), and the differences among these scores were significant ($P = 0.005$). However, the results indicated no correlation between the specialists' attitudes with regard to gender, region, or subspecialty ($P > 0.05$). These factors are presented in Table 4.

Table 2
Knowledge assessment of physical therapists in Saudi Arabia regarding conventional physiotherapy

Questions	Frequency (percentage) of responders, N (%)		
	Correct	Incorrect	Mean ± SD
1- Theoretically, conventional physiotherapy is not usually defined as one concept in various studies among physiotherapists or even countries.	95 (39.9)	143 (60.1)	0.39 ± 0.490
2- Conventional physiotherapy in research ranges from no intervention at all to maintaining physical activity levels.	103 (43.3)	135 (56.7)	0.43 ± 0.496
3- Conventional physiotherapy is based on a specific source of knowledge.	69 (29.0)	169 (71.0)	0.29 ± 0.454
4- Conventional physiotherapy generally has the same meaning as the terms "usual care" or "traditional therapy."	123 (51.7)	115 (48.3)	0.51 ± 0.500
5- Conventional physiotherapy" is modality only.	182 (76.5)	56 (23.5)	0.76 ± 0.425
6- Conventional physiotherapy is a multimodal intervention that includes exercise.	203 (85.3)	35 (14.7)	0.85 ± 0.355
7- Conventional physiotherapy includes using high technological equipment such as Virtual reality and brain stimulation.	106 (44.5)	132 (55.5)	0.44 ± 0.498
8- Conventional Physiotherapy intervention is superior to no physical therapy intervention.	90 (37.8)	148 (62.2)	0.38 ± 0.486
Total Knowledge Score	51.0%	49.0%	4.09 ± 1.698

Perceptions of CPT

The perception items and their rates of responses with overall knowledge and attitude scores are presented in Table 5. The participants' perceptions of CPT varied, with a considerable portion reporting no negative perception (39.1%), with a mean of 4.28 ± 1.550 and 42.15 ± 4.766 for the knowledge and attitude scores, respectively. Others had various opinions, including "skeptical" (10.1%), "only complimentary" (6.7%), and "bad experience" (3.4%). Some mentioned unfavourable interactions (2.5%), while others (38.2%) indicated diverse viewpoints. In addition, participants were asked about the importance of using CPT, with the majority (69.7%) considering it important, with a mean of 3.99 ± 1.687 and 40.78 ± 4.235 for knowledge and attitude scores, respectively. Meanwhile, 20.2% deemed it not important. Similarly, when assessing the importance of understanding CPT, a majority considered it important (55.9%), with a mean of 4.03 ± 1.852 for knowledge and 40.16 ± 3.838 for attitudes, while 41.2% believed it was not important.

Discussion

This study used a self-administered survey to explore the Knowledge, attitudes, and perceptions (KAP) of 238 physical therapists towards CPT in Saudi Arabia. The number of female respondents (72.7%) was slightly higher than that of males, which is similar to previous studies; a higher proportion of females could reflect that the practice of physical therapy in Saudi Arabia, which is independent and may be similar to other health specialties, as wide discrepancies in gender distribution was reported in the various medical areas^[47]. The mean age (and SD) of our respondents was 29.48 years (SD=4.537), similar to other studies^[47]. Approximately 83.6% of our respondents were physical therapists with a bachelor's degree, while only 16.4% were senior specialists with a master's degree and doctoral degree. At the time of our study, most participants practiced in general physical therapy (73.1%), but only a few were subspecialized in orthopaedics or neurology. A similar statistic was reported in previous studies, demonstrating that the relative number of post-professional physical therapists was lower than that of physical therapists with bachelor's degrees and clinical doctors of physical therapy (DPTs).

Table 3
Attitudes of physical therapists in Saudi Arabia towards conventional physiotherapy

Questions	Frequency (percentage) of responders, N (%)					Mean ± SD
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	
1- The patient can benefit from Conventional Physiotherapy	7 (2.9)	6 (2.5)	45 (18.9)	129 (54.2)	51 (21.4)	3.88 ± 0.871
2- Physical therapist providers can benefit from understanding the meaning of conventional physiotherapy	7 (2.9)	8 (3.4)	46 (19.3)	121 (50.8)	56 (23.5)	3.88 ± 0.904
3- We can define conventional physiotherapy as an isolated category (physiotherapy approach)	12 (5.0)	45 (18.9)	107 (45.0)	64 (26.9)	10 (4.2)	3.06 ± 0.909
4- Conventional physiotherapy is always based on an evidence-based practice	30 (12.6)	103 (43.3)	73 (30.7)	20 (8.4)	12 (5.0)	2.50 ± 0.988
5- Conventional physiotherapy intervention is always superior to any other interventions	12 (5.0)	42 (17.6)	102 (42.9)	66 (27.7)	16 (6.7)	3.13 ± 0.954
6- Conventional physiotherapy intervention is superior to no interventions	7 (2.9)	40 (16.8)	80 (33.6)	77 (32.4)	34 (14.3)	3.38 ± 1.019
7- I will refer a patient to be treated in conventional physical therapy	6 (2.5)	18 (7.6)	89 (37.4)	97 (40.8)	28 (11.8)	3.51 ± 0.889
8- Having a unified agreement on what conventional therapy means will help to improve patient care	8 (3.4)	6 (2.5)	62 (26.1)	116 (48.7)	46 (19.3)	3.78 ± 0.901
9- I am confident regarding my knowledge of conventional physiotherapy	12 (5.0)	38 (16.0)	86 (36.1)	78 (32.8)	24 (10.1)	3.27 ± 1.012
10- All physical therapists use different forms of conventional physiotherapy.	8 (3.4)	15 (6.3)	58 (24.4)	121 (50.8)	36 (15.1)	3.68 ± 0.922
Total Attitude Score	4.6%	13.5%	31.4%	37.4%	13.2%	41.15 ± 5.499

Table 4
Correlations between demographic factors and knowledge and attitude scores among physical therapists in Saudi Arabia

Spearman's rho	Sex	Age	Education	Subspecialty	Years of working experience	Region
Total Knowledge Score						
Correlation coefficient	0.04	0.133 ^a	0.213 ^b	-0.177 ^b	0.142 ^a	-0.027
Significance	0.542	0.040	0.001	0.006	0.029	0.679
Total attitude score						
Correlation coefficient	0.076	0.20	0.178 ^b	-0.037	0.247 ^b	-0.023
Significance	0.246	0.002	0.006	0.569	0.000	0.723

^aCorrelation is significant at the 0.05 level (2-tailed).

^bCorrelation is significant at the 0.01 level (2-tailed).

This is understandable due to the lack of post-professional physical therapy and residency programs in Saudi Arabia. Most participants worked mainly in general hospitals (56.3%). The majority of our participants were from the central region of Saudi Arabia (46.2%), which has many physical therapy programs and a wide range of hospitals as reported in previous studies^[34,35].

One of the study's aims was to assess the basic knowledge of CPT among different subgroups of physical therapists. Most of our participants (87.4%) were familiar with CPT; ~80% reported using CPT in their practice, and 62% had conducted searches regarding CPT. More than half of our participants indicated that they used a diverse range of sources for their professional knowledge and had used CPT in various ways, including, but not limited to, strength exercises, joint, and soft tissue mobilizations. Furthermore, 43.3% of the participants recognized that CPT could range from no intervention to all types of interventions, while ~68.% indicated that CPT may not be superior to no intervention. These results demonstrate that CPT is a familiar term but could not be specifically identified or used in one way among our participants, which is aligned with what has been reported in the literature^[17-23]. In addition, research has shown that the effectiveness of CPT could vary according to the patient's condition and type of treatment administered^[14,17,23]. Approximately 40% of the participants acknowledged that CPT could not be defined as one concept, but more than half of our sample recognized CPT as equivalent to terms like "usual care" or "traditional therapy." These findings suggest that a substantial portion of

respondents appreciated the broad spectrum of interventions considered as CPT in research and recognized the diversity in how CPT was defined and understood within their rehabilitation field.

In contrast, 76.5% of respondents reported that CPT was not exclusively a modality, demonstrating a relatively high level of awareness that CPT encompasses various interventions beyond modalities. Meanwhile, 44.5% acknowledged that CPT did not include high technological equipment, such as virtual reality and noninvasive brain stimulation. This suggests that incorporating technology was limited in CPT, but a substantial portion still held misconceptions about it. As expected, 85.3% of participants indicated that CPT is a multimodal intervention that includes exercise, reflecting a strong sense of the comprehensive nature of CPT, as exercise is a common practice used in physical therapy settings.

The total knowledge score aggregated the results of all questions. It indicated that 51.0% of respondents had sufficient knowledge regarding the concept of CPT, but there was still a relatively low level of knowledge found among them. The overall mean knowledge score was 4.09 (SD = 1.698). The knowledge score was significantly impacted by age, education, subspecialty, and years of work experience, similar to what was reported by previous researchers regarding factors that might affect the knowledge of clinical practitioners^[42]. In fact, we found that the overall knowledge of our post-graduate participants was moderately higher compared to the participants with bachelor's degrees. Thus, it is clear that the level of education was a

Table 5
Perceptions of physical therapists in Saudi Arabia towards conventional physiotherapy

Questions	Subcategory	Frequency (percentage) of responders; N (%)	Mean ± SD knowledge	Mean ± SD attitude
What is your perception of conventional physiotherapy	Skeptical of conventional Physiotherapy	24 (10.1)	3.62 ± 1.689	36.87 ± 7.798
	Bad experience	8 (3.4)	4.25 ± 1.281	40.50 ± 3.338
	No negative perception	93 (39.1)	4.28 ± 1.550	42.15 ± 4.766
	Only complimentary	16 (6.7)	4.12 ± 2.187	39.87 ± 6.761
	Unfavourable interactions	6 (2.5)	5.00 ± 1.265	41.66 ± 5.955
	Others	91 (38.2)	3.93 ± 1.794	41.50 ± 4.904
Importance of using conventional physiotherapy	Not important	24 (10.1)	4.34 ± 2.036	38.91 ± 4.717
	Important	166 (69.7)	3.99 ± 1.687	40.78 ± 4.235
	Very important	48 (20.2)	4.31 ± 1.559	43.54 ± 8.353
Importance of understanding conventional physiotherapy	Not important	7 (2.9)	2.43 ± 1.512	38.14 ± 5.367
	Important	133 (55.9)	4.03 ± 1.852	40.16 ± 3.838
	Very important	98 (41.2)	4.28 ± 1.412	42.70 ± 6.903

contributing factor driving some knowledge scores to be higher, and most of our participants were holders of bachelor's degrees. The results suggest that the lower level of knowledge and mixed landscape of knowledge and understanding regarding CPT among physical therapists in Saudi Arabia could be better with greater access to post-graduate education^[33,34]. While most respondents seemed to understand some concepts well, there were important misconceptions and variations in knowledge levels across different aspects of CPT. These findings suggest areas where further education and clarification might be needed within the profession.

Overall, most of the participants had a positive attitude towards the concept of CPT. Approximately 76% of the participants believed that patients could benefit from CPT, and 68.0% believed that having a unified agreement on what CPT means would improve patient care. The respondents were generally open to referring patients to treatment using CPT, with a 52.6% agreement rate. This indicates that physical therapists have a positive attitude toward CPT's effectiveness in patient care even though they may not have sufficient knowledge regarding CPT. Perhaps the participants have a positive attitude regarding CPT because they recognized it was used in the field despite their lack of knowledge. At the same time, some were not open to referring patients for CPT because of their lack of knowledge. However, more than half of our participants (67.7%) agreed that CPT could be superior to no intervention but not necessarily better than any other specific intervention (34.4%), which is in alignment with the established evidence that highlighted the discrepancy in the effect size of CPT when compared to other physical therapy interventions^[19,24,25,29,30]. In general, 66% of the participants believed that physical therapists used different forms of CPT. Most of the responses were neutral regarding defining CPT as an isolated category or approach, which reflects the uncertainty of our participants about whether CPT was a single category or more than one category. This again aligned with the variation in how the research identifies CPT^[25-30].

More than half of the respondents believed that CPT was an evidence-based practice. Given that our participants used different sources to obtain their knowledge, one would expect discrepancies in the type of CPT used and whether it was considered evidence-based. This could also explain why 42% of the respondents did not feel confident regarding their knowledge of CPT. The total attitude score results demonstrated a generally positive attitude towards CPT among most respondents; the results also revealed significant effects of age, education, and years of work experience on the participants' attitudes. Similar to knowledge, educational level was important in the participants' attitude scores. In summary, the physical therapists' attitudes towards CPT in Saudi Arabia appeared largely positive, emphasizing its potential benefits for patients and providers. However, there was also evidence of skepticism regarding its evidence-based nature and variability in attitudes towards specific attributes.

In terms of their specific CPT perceptions, the participants had varied: 39.1% had no negative perception regarding CPT, others had differing opinions, including skepticism towards CPT (10.1%), and CPT was only complimentary (6.7%), but only 3.4% reported having had a bad experience with CPT. A majority (69.7%) considered the application of CPT important for PT, and more than half perceived it as important to understand CPT. Our findings offer insights into physical therapists' perceptions and attitudes, which should be further explored and

discussed in subsequent research. We recommend advancing knowledge on the use of CPT among rehabilitation specialists; it is recommended that CPT guidelines be established that incorporate current knowledge in physical therapy educational programs, especially in courses that address neuroplasticity and evidence-based concepts in rehabilitation, to understand better the mechanism and rationale for using CPT.

Nevertheless, this study has some limitations. The survey was implemented with Google Forms, which implies that the responding practitioners used computer support. Most of our participants were from the central region of Saudi Arabia, which could limit the generalizability of the results to other regions. Moreover, the survey mostly targeted physical therapists and did not include all rehabilitation specialists or other individuals who might potentially work with patients in this area. Further validation of our findings with other populations of rehabilitation practitioners is needed to assess their knowledge and attitudes towards CPT in rehabilitation.

Conclusions

Most physical therapists had insufficient knowledge of CPT, which could be largely attributed to their level of education. Therapists with higher education levels had higher knowledge scores than those with lower educational levels. A high educational level and years of experience also led to a positive attitude towards CPT among physical therapist practitioners.

Ethical approval

The study was conducted in accordance with the guidelines of the Declaration of Helsinki and approved by the Institutional Review Board of King Saud University (no. E-23-8149).

Informed consent

Written informed consent was obtained from all participants.

Sources of funding

The study received no fundings or support from any sponsors.

Author contribution

A.M.A. conducted the study concept, design, data collection/analysis, interpretation, and writing of the paper.

Conflicts of interest disclosure

The author declares no conflict of interest.

Research registration unique identifying number (UIN)

Not applicable.

Guarantor

Alaa M. Albishi.

Data availability statement

The datasets generated during the current study are available from the corresponding author upon reasonable request.

Provenance and peer review

Not commissioned, externally peer-reviewed.

References

- [1] Goodwill AM, Teo W-P, Morgan P, *et al.* Bihemispheric-tDCS and upper limb rehabilitation improves retention of motor function in chronic stroke: a pilot study. *Front Hum Neurosci* 2016;10:258.
- [2] Pascual-Leone A, Amedi A, Fregni F, *et al.* The plastic human brain cortex. *Annu Rev Neurosci* 2005;28:377–401.
- [3] Piron L, Turolla A, Agostini M, *et al.* Motor learning principles for rehabilitation: a pilot randomized controlled study in poststroke patients. *Neurorehab Neural Re* 2010;24:501–8.
- [4] Winstein C, Varghese R. Been there, done that, so what's next for arm and hand rehabilitation in stroke? *Neuro Rehab* 2018;43:3–18.
- [5] Kleim JA, Jones TA. Principles of experience-dependent neural plasticity: implications for rehabilitation after brain damage. *J Speech Lang Hear Res* 2008;51:225–39.
- [6] Carr JH, Shepherd RB. *Neurological Rehabilitation: Optimizing Motor Performance.* Elsevier Health Sciences 2010:3–15.
- [7] Cramer SC, Sur M, Dobkin BH, *et al.* Harnessing neuroplasticity for clinical applications. *Brain*. 2011;134:1591–609.
- [8] Navarro X, Vivo M, Valero-Cabre A. Neural plasticity after peripheral nerve injury and regeneration. *Prog Neurobiol* 2007;82:163–201.
- [9] Nudo RJ. Neural bases of recovery after brain injury. *J Commun Disord* 2011;44:515–20.
- [10] Lipp I, Tomassini V. Neuroplasticity and motor rehabilitation in multiple sclerosis. *Front in Neurol* 2015;6:59.
- [11] Petzinger GM, Fisher BE, McEwen S, *et al.* Exercise-enhanced neuroplasticity targeting motor and cognitive circuitry in Parkinson's disease. *Lancet Neurol* 2013;12:716–26.
- [12] Hirsch M, Farley B. Exercise and neuroplasticity in persons living with Parkinson's disease. *Eur J Phys Rehabil Med* 2009;45:215–29.
- [13] Dimyan MA, Cohen LG. Neuroplasticity in the context of motor rehabilitation after stroke. *Nat Rev Neurol* 2011;7:76–85.
- [14] Campbell E, Coulter EH, Mattison PG, *et al.* Physiotherapy rehabilitation for people with progressive multiple sclerosis: a systematic review. *Arch Phys Med Rehabil* 2016;97:141–151.e3.
- [15] Kollen BJ, Lennon S, Lyons B, *et al.* The effectiveness of the Bobath concept in stroke rehabilitation: what is the evidence? *Stroke* 2009;40:e89–97.
- [16] Pollock A, Baer G, Pomeroy V, *et al.* Physiotherapy treatment approaches for the recovery of postural control and lower limb function following stroke. *Cochrane Database Syst Rev* 2007;24:CD001920.
- [17] Lennon S, Stokes M. *Pocketbook of Neurological Physiotherapy E-book.* Elsevier Health Sciences 2008:97–111.
- [18] De Oliveira MPB, Lobato DFM, Smaili SM, *et al.* Effect of aerobic exercise on functional capacity and quality of life in individuals with Parkinson's disease: a systematic review of randomized controlled trials. *Arch Gerontol Geriatr* 2021;95:04422.
- [19] Winsor SJ, Paul LF, Magnus LKL, *et al.* Economic evaluation of exercise-based fall prevention programs for people with Parkinson's disease: a systematic review. *J Altern Complement Med* 2019;25:1225–37.
- [20] Deuel LM, Seiberger LC. Complementary therapies in Parkinson disease: a review of acupuncture, Tai Chi, Qi Gong, yoga, and cannabis. *Neurother* 2020;17:1434–55.
- [21] Alwardat M, Etoom M, Al Dajah S, *et al.* Effectiveness of robot-assisted gait training on motor impairments in people with Parkinson's disease: a systematic review and meta-analysis. *Int J Rehabil Res* 2018;41:287–96.
- [22] Lei C, Sunzi K, Dai F, *et al.* Effects of virtual reality rehabilitation training on gait and balance in patients with Parkinson's disease: a systematic review. *PLoS One* 2019;14:e0224819.
- [23] Schootemeijer S, van der Kolk NM, Bloem BR, *et al.* Current perspectives on aerobic exercise in people with Parkinson's disease. *Neurother* 2020; 17:1418–33.
- [24] Pollock A, Farmer SE, Brady MC, *et al.* Interventions for improving upper limb function after stroke. *Cochrane Database Syst Rev* 2014; CD010820. doi:10.1002/14651858
- [25] Bowen A, James M, Young G. Royal College of Physicians 2016 National Clinical Guideline for Stroke. RCP.
- [26] Donaldson C, Tallis RC, Pomeroy VM. A treatment schedule of conventional physical therapy provided to enhance upper limb sensorimotor recovery after stroke: expert criterion validity and intra-rater reliability. *Physiother* 2009;95:110–9.
- [27] Hunter SM, Crome P, Sim J, *et al.* Development of treatment schedules for research: a structured review to identify methodologies used and a worked example of mobilisation and tactile stimulation for stroke patients. *Physiother* 2006;92:195–207.
- [28] Hoskovcová M, Růžička E, Gál O. The category of conventional physiotherapy: the case of Parkinson's disease guidelines. *J Pers Med* 2022; 12:730.
- [29] Pomeroy V, Tallis R. Neurological rehabilitation: a science struggling to come of age. *Physiother Res Int* 2002;7:76–89.
- [30] Marsden J, Greenwood R. Physiotherapy after stroke: define, divide and conquer. *J Neurol Neurosurg Psychiatry* 2005;76:465–6.
- [31] Grimmer K, Bialocerkowski A, Kumar S, *et al.* Implementing evidence in clinical practice: the “therapies” dilemma. *Physiother* 2004;90:189–94.
- [32] Bode RK, Heinemann AW, Semik P, *et al.* Patterns of therapy activities across length of stay and impairment levels: peering inside the “black box” of inpatient stroke rehabilitation. *Arch Phys Med Rehabil* 2004;85:1901–8.
- [33] DeJong G, Horn SD, Gassaway JA, *et al.* Toward a taxonomy of rehabilitation interventions: using an inductive approach to examine the “black box” of rehabilitation. *Arch Phys Med Rehabil* 2004;85: 678–86.
- [34] Yamato T, Maher C, Saragiotto B, *et al.* The TIDieR checklist will benefit the physical therapy profession. *Braz J Phys Ther* 2016;20:191–3.
- [35] Hart T, Dijkers MP, Whyte J, *et al.* A theory-driven system for the specification of rehabilitation treatments. *Arch Phys Med Rehabil* 2019;100:172–80.
- [36] Van Stan JH, Dijkers MP, Whyte J, *et al.* The rehabilitation treatment specification system: implications for improvements in research design, reporting, replication, and synthesis. *Arch Phys Med Rehabil* 2019;100: 146–55.
- [37] Lennon S, Bassile C. *Guiding principles for neurological physiotherapy In: Pocketbook of Neurological Physiotherapy.* Elsevier; 2009: pp. 97–111.
- [38] Van Peppen RP, Hendriks HJ, van Meeteren NL, *et al.* The development of a clinical practice stroke guideline for physiotherapists in the Netherlands: a systematic review of available evidence. *Disabil Rehabil* 2007;29:767–83.
- [39] Nair KS, Wade DT. Satisfaction of members of interdisciplinary rehabilitation teams with goal planning meetings. *Arch Phys Med Rehabil* 2003; 84:1710–3.
- [40] Mathew G, Agha R. for the STROCSS Group. STROCSS 2021: Strengthening the Reporting of cohort, cross-sectional and case-control studies in Surgery. *Int J Surg* 2021;96:106165.
- [41] Sack W, Radler DR, Mairrella KK, *et al.* Physical therapists' attitudes, knowledge, and practice approaches regarding people who are obese. *Phys Ther* 2009;89:804–15.
- [42] AlHadi AN, AlShiban AM, Alomar MA, *et al.* Knowledge of and attitude toward repetitive transcranial magnetic stimulation among psychiatrists in Saudi Arabia. *J ECT* 2017;33:30–5.
- [43] Feleke BT, Wale MZ, Yirsaw MT. Knowledge, attitude and preventive practice towards COVID-19 and associated factors among outpatient service visitors at Debre Markos Compress Specialized Hospital, North-West Ethiopia, 2020. *PLoS One* 2021;16:e0251708.
- [44] Yusoff MS. ABC of content validation and content validity index calculation. *Educ Med J* 2019;11:49–54.
- [45] Saudi Commission for Health Specialties. *Health Workforce*; 2018 Accessed August 03, 2021. Available from: <https://www.scfhs.org.sa/Media/DigitalLibrary/DocumentLibrary/OtherPublications/Pages/default.aspx>
- [46] Bloom BS. *Learning for Mastery. Instruction and Curriculum (Topical Papers and Reprints, Number 1).* Comment Evaluation, v1 n2 May 1968. Center for the Study of Evaluation of Instructional Programs, ERIC. 1968:12.
- [47] Hussein HM, Alshammari SF, Alanazi IA, *et al.* Sex-related differences in physical therapy career expectations in Ha'il, Saudi Arabia. *Acta Neuropsychol* 2022;20:385–92.