

Pedagogical concerns of physical therapist professors and their perceptions of the COVID-19 pandemic

Preocupações pedagógicas do fisioterapeuta professor e suas percepções sobre a pandemia de COVID-19

Preocupaciones pedagógicas del fisioterapeuta-profesor y sus percepciones sobre la pandemia del COVID-19

Cintia Pereira de Araujo¹, Clarice Rosa Olivo²

ABSTRACT | In health professions education, professors usually face some difficulties and concerns. The COVID-19 pandemic has further amplified these challenges, leading to changes in teaching methods and new concerns. This study aimed to identify undergraduate physical therapy professors' concerns (PC) about the learning environment during the COVID-19 pandemic. Physical therapists who served as undergraduate physical therapy professors in Brazil answered a questionnaire on PC (Teacher Concerns Questionnaire – TCQ), a sociodemographic profile questionnaire, and an open-ended question on the perception of changes in PC during the pandemic. A total of 187 physical therapist professors completed the questionnaire and had moderate PC (TCQ 49.6±10.5), with no association with the stage of their teaching career, age, and length of professional training. Participants in continuing education activities had higher PC. Of the participants, 94.1% reported changes in PC resulting from the pandemic. Therefore, professors who participate in continuing education activities are more concerned about the impact of their practice than those who do not participate. At the same time, these concerns seem to have changed during the pandemic.

Keywords | Physical Therapy; Professional Education; Teacher Concern; Online Education; COVID-19 Pandemic.

RESUMO | Na formação dos profissionais de saúde, os professores geralmente vivenciam algumas dificuldades e

preocupações. A pandemia de COVID-19 amplificou ainda mais esses desafios, acarretando mudanças nos métodos de ensino e gerando novas preocupações. O objetivo deste estudo foi investigar quais são as preocupações dos professores (PPs) dos cursos de graduação em Fisioterapia com relação ao ambiente de aprendizagem durante a pandemia de COVID-19. Fisioterapeutas que atuavam como docentes em cursos de graduação em Fisioterapia no Brasil foram convidados a responder a um questionário de sobre as PPs (*Teacher Concerns Questionnaire* – TCQ), sobre perfil sociodemográfico e sobre a percepção de mudanças nas PPs devido à pandemia. Participaram 187 fisioterapeutas professores que apresentaram PP moderada (TCQ: 49,6±10,5), sem associação com o estágio da carreira docente, a idade ou o tempo de formação. Aqueles que participam de atividades de formação continuada em docência apresentaram maior PP. Alterações nas PPs decorrentes da pandemia foram relatadas por 94,1% dos participantes. Conclui-se que os professores que participam de atividades de formação continuada se preocupam mais com o impacto de sua prática do que os que não participam. Ao mesmo tempo, essas preocupações parecem ter mudado durante a pandemia.

Descritores | Educação Profissionalizante em Fisioterapia; Preocupações Pedagógicas; Educação Online; Pandemia COVID-19.

The coordinating center of this study is the Centro de Desenvolvimento de Educação Médica (CEDEM) of the Faculdade de Medicina da Universidade de São Paulo (FMUSP), São Paulo, SP, Brazil.

¹Hospital Moinhos de Vento (HMV) – Porto Alegre (RS), Brazil. Email: cintialaura.fisio@gmail.com. ORCID-0000-0001-6184-9495

²Universidade de São Paulo (USP) – São Paulo (SP), Brazil. Email: clarice.olivo@fm.usp.br. ORCID-0000-0002-3358-8766

RESUMEN | En la formación de los profesionales de la salud, los docentes suelen experimentar algunas dificultades y preocupaciones. La pandemia del COVID-19 intensificó aún más estos desafíos, por provocar cambios en los métodos de enseñanza, dando lugar a nuevas preocupaciones. El objetivo de este estudio fue investigar las preocupaciones de los profesores (PP) de los cursos de graduación en Fisioterapia respecto al ambiente de aprendizaje durante la pandemia del COVID-19. Se invitó a fisioterapeutas que actuaban como profesores en cursos de graduación en Fisioterapia en Brasil a responder un cuestionario sobre las PP (*Teacher Concerns Questionnaire*, TCQ), sobre el perfil sociodemográfico y la percepción de cambios en PP en relación con la pandemia. Participaron 187

fisioterapeutas profesores que presentaron PP moderadas (TCQ: $49,6 \pm 10,5$), sin asociación con la etapa de la carrera docente, la edad y el tiempo de formación profesional. Los participantes en actividades de formación continuada en la docencia tuvieron una PP más alta. El 94,1% de los participantes informaron cambios en PP resultantes de la pandemia. Se concluye que los profesores que participan en actividades de formación continuada están más preocupados por el impacto de su práctica. A la vez, estas preocupaciones parecen haber cambiado durante la pandemia.

Palabras clave | Educación Profesional en Fisioterapia; Preocupaciones Pedagógicas; Educación a Distancia; Pandemia COVID-19.

INTRODUCTION

Some studies suggest that health professions teachers find satisfaction in contributing to the growth and development of students^{1,2}. However, they also play the cumulative role of researcher and clinician, which they consider to be more valued. As a result, these teachers dedicate little time to educational activities^{3,4} and generally have no formal training as teachers.

Moreover, a good teacher is commonly assumed to be someone who is highly qualified in a specific professional area. Often, didactic training programs are neither required nor offered to health professionals who work as teachers⁵. Consequently, they rarely use evidence-based educational practices⁶. This situation is no different in Brazilian universities, including in physical therapy courses⁷. In this context, physical therapist professors end up building their teaching practice based on their life experience⁷.

However, this scenario is changing as evidence on education practice emerges⁶. The educational philosophy of student-centered learning has been incorporated into higher education, leading to a transformation in the role of teachers, who now become facilitators or guides in the learning process^{8,9}. Moreover, clinical education and its supervisory process, such as patient management demonstrations, are an important part of health professions training and a valuable learning opportunity for physical therapy students, as are discussions with the teacher, feedback, and assessment¹⁰. Thus, physical therapist professors must recognize that their role requires not only theoretical knowledge and technical competence in physical therapy, but also pedagogical skills. However, studies addressing the pedagogical concerns of professors,

especially physical therapist professors, are still scarce and the existing literature lacks research on the possible changes they face throughout their teaching careers.

Recently, the educational system underwent a radical change due to the COVID-19 pandemic, which forced teachers to transition to emergency remote classes and most institutions applying their teaching and assessment methods online, often with limited time for teachers and students to receive adequate training and support¹¹⁻¹³. The transition to online education, in which students attend classes remotely, has created uncertainty about its effectiveness, educational outcomes, and pedagogical consequences¹³. Even before the COVID-19 pandemic, the effectiveness of digital tools in the learning process in curricula designed to be permanently online already raised concerns^{14,15}. Moreover, due to social isolation during the pandemic, clinical education activities were either canceled or drastically shortened.

Thus, this study aimed to identify the pedagogical concerns of physical therapists who serve as undergraduate physical therapy professors and to address possible changes in their concerns resulting from emergency remote teaching during the COVID-19 pandemic. Moreover, the study aimed to assess the relationship between these concerns and the different stages of the teaching career and the level of training in teaching in higher education.

METHODOLOGY

Participants

Physical therapists who served as undergraduate professors in Brazil during the data collection period

(August to October 2021) were invited to participate in the study. Individuals who did not agree with the informed consent form or who were not both physical therapists and undergraduate physical therapy professors were excluded from the study. According to the Brazilian Ministry of Education¹⁶, the country had 537 undergraduate physical therapy courses in 2020. The sample size was estimated considering an average of 15 physical therapy professors per course. Expecting a frequency of 80% of professors with some change in their pedagogical concerns during the COVID-19 pandemic and a 95% confidence interval, at least 239 participants would be needed. Sample size was estimated using OpenEpi 3.01¹⁷.

Considering the social isolation recommended by the World Health Organization during the COVID-19 pandemic, participants were intentionally recruited using non-probabilistic methods, such as email, messaging apps, and social media. After accepting the invitation, they were asked to share the invitation with their colleagues, following the snowball sampling technique. This is a non-probabilistic sampling technique in which the initial participants refer new participants, who in turn refer other participants, and so on.

Data collection

The digital invitation sent to participants provided a concise explanation of the study and a link to an electronic form. The digital form included questions related to the sociodemographic profile of participants, a questionnaire about their pedagogical concerns, and an open-ended question about any potential changes in their pedagogical concerns resulting from the COVID-19 pandemic. All participants electronically signed the informed consent form.

Sample characterization

Data was collected on age, academic degree, time since graduating in physical therapy, teaching experience, type of higher education institution in which they worked (public, private, or public-private), Brazilian state where they worked, and participation in continuing education programs for teaching in higher education.

Pedagogical concerns

Pedagogical concerns were assessed using the Portuguese version of the Teacher Concerns Questionnaire

(TCQ)¹⁸. This scale includes 15 questions divided into three domains: self-concern, task concerns, and impact concerns. The questions should be answered according to the degree of concern: (1) not concerned; (2) a little concerned; (3) moderately concerned; (4) very concerned; and (5) extremely concerned. Thus, the sum of the scale ranges from 15 to 75 points, and the closer to the maximum value, the more concerned the teacher.

Participants also answered “yes” or “no” to the question: “Do you think your concerns about the teaching-learning process have changed during the COVID-19 pandemic?” If the participant answered “yes,” they were directed to an open-ended question: “What specific changes in your pedagogical concerns did you experience during the pandemic?”

Teaching career stages

The participating professors were classified according to the length of their teaching career¹⁹:

- Career entry (Group 1 – G1): one to three years.
- Stabilization stage (Group 2 – G2): four to six years.
- Diversification or questioning stage (Group 3 – G3): seven to 25 years.
- Stage of serenity and detachment and/or conservatism and lamentation (Group 4 – G4): 26 to 35 years.
- Divestment, withdrawal, and internalization stage (Group 5 – G5): 36 to 40 years.
- Individuals who had worked as professors for less than one year were included in G1, and individuals who had worked for more than 40 years were included in G5.

Data analysis

Categorical and quantitative data were analyzed using SPSS Statistical Package version 22.0 (IBM Corp., Armonk, NY, EUA). Data distribution was assessed by the Kolmogorov-Smirnov test. The descriptive analysis of the variables was presented as frequency and percentages for categorical data and mean±standard deviation or median (25–75% percentiles) for quantitative data, depending on data distribution. The total TCQ score in the different teaching career stages was compared using a general linear model (GLM) with Bonferroni post hoc analysis. Moreover, the degree of pedagogical concern in the domains of self, task, and impact concerns was compared using the Kruskal-Wallis test with Bonferroni post hoc. To further analyze

the TCQ scores, the Mann-Whitney U-test was used to compare the scores between the following groups: (1) professors with and without training focused on education or higher education; (2) professors who work in institutions with continuing education in teaching and professors whose institutions do not offer these programs; (3) professors who participate in continuing education activities and professors who do not participate; and (4) male and female professors. Correlations between the total TCQ score and age and time since graduating in physical therapy were tested using Spearman's test. A 95% statistical significance level was adopted.

To identify possible changes in pedagogical concerns resulting from the COVID-19 pandemic in the discursive responses of participants (corpus), corpus linguistics methodologies and tools were used. The text was processed using AntConc 3.5.9²⁰ to generate a list of tokens (linguist units/words) based on their frequency of use (WordList). To reduce noise in the generation of the word list, a list of highly occurring grammatical words was used (stop list; Supplementary Table 1). After manually analyzing the list generated by AntConc, lexical units that could function as central elements of potential pedagogical concerns were obtained. The concordance and cluster tools were used to assess the context in which the words were used. Lemmatization was then applied to the word list, grouping them into categories according to their meaning (lemma). After lemmatization, a list of keywords was generated using the keyword list tool. The lemma concern* (concern, concerns, concerned, worry, worries, worried, preoccupation, preoccupations, preoccupied) was not considered in the frequency count, as it was the focus of the study and was included in the question to be answered, so its linguistic use would not be spontaneous (Supplementary Material).

RESULTS

Sample characterization

A total of 215 individuals filled the research form, of which 187 declared themselves to be physical therapists and undergraduate physical therapy professors and thus participated in the study. The sample included professionals from all regions of Brazil, most from the Southeast (44.4%), followed by the South (29.4%), Northeast (13.4%), Midwest (7.5%), and North (5.3%).

Most professors worked in public higher education institutions (55.1%), 40.1% in private institutions, and 4.8% in public-private institutions. Most were in G3 (56.7%) and 1.1% were in G5. In total, 3.2% had been working for less than one year and no participant had worked as a professor for more than 40 years (Table 1).

All professors held a Graduate degree: 63.7% held a doctoral degree (PhD), of which 19.8% had already completed a post-doctoral fellowship. However, 23.5% of participants had no training focused on education or teaching in higher education (Table 1). A total of 25% of participants worked in an institution that did not offer continuing education in teaching and 28.3% they did not participate in continuing education activities. Almost 4% of professors without training focused on education or teaching in higher education stated that they worked in institutions that offered continuing education programs but did not participate in these activities. On the other hand, 13.9% of the participants who had no training focused on education or teaching in higher education worked in institutions that offered continuing education programs and participated in these activities.

Table 1. Sample characterization

Characteristic	n=187
Age, years old	41 (35-47)
Gender	
Women, n (%)	133 (71.1%)
Men, n (%)	54 (28.9%)
Time since graduating in physical therapy, years	18 (13-24)
Teaching career stage, n (%)	
up to 3 years (G1)	26 (13.9%)
4 to 6 years (G2)	30 (16%)
7 to 25 years (G3)	106 (56.7%)
26 to 35 years (G4)	23 (12.3%)
36 to 40 years (G5)	2 (1.1%)
Highest academic degree	
Specialization	12 (6.4%)
Master's degree	56 (29.9%)
Doctoral degree	119 (63.7%)
Highest level of training in teaching	
Short-term courses	39 (20.9%)
Specialization	25 (13.4%)
Master of Sciences degree	34 (18.2%)
Professional Master's degree	3 (1.6%)
Doctoral degree	42 (22.5%)

Data expressed as median (interquartile range 25–75%) or frequency (n) and percentage (%). G1: career entry; G2: stabilization stage; G3: diversification or questioning stage; G4: stage of serenity and detachment and/or conservatism and lamentation; G5: divestment, withdrawal, and internalization stage; PhD: Doctor of Philosophy.

Teacher concerns questionnaire (TCQ)

Participants were moderately concerned (total TCQ score: 49.6 ± 10.5) about their teaching practice. Generally, they scored higher on items related to concerns about the impact of their teaching practice. Meeting the needs of different types of students, challenging unmotivated students, and guiding students towards intellectual and emotional growth

received the highest scores, while the lack of teaching materials was the least worrying aspect (Table 2). We found no differences between the different teaching career stages in the total score of the TCQ ($p=0.588$) and the domains self ($p=0.107$), task ($p=0.709$), and impact concerns ($p=0.940$). The total TCQ score did not correlate with age ($\rho=-0.082$; $p=0.262$) or time since graduating in physical therapy ($\rho=-0.096$; $p=0.191$).

Table 2. Pedagogical concerns

TCQ	n=187
Self-concerns	15 (12-18)
Doing well when a supervisor is present	2 (1-4)
Feeling more adequate as a teacher	4 (2-5)
Being accepted and respected by professional persons	3 (2-3)
Getting a favorable evaluation of my teaching	4 (2-4)
Maintaining the appropriate degree of class control	3 (3-4)
Teaching Tasks concerns	15 (12-18)
Lack of instructional materials	2 (1-3)
Feeling under pressure too much of the time	3 (2-4)
Too many instructional duties	4 (3-4)
Working with too many students each day	3 (2-4)
The routine and inflexibility of the teaching situation	3 (2-4)
Teaching Impact concerns	20 (17-22)
Meeting the needs of different kinds of students	4 (3-5)
Diagnosing student learning problems	4 (3-4)
Challenging unmotivated students	4 (3-5)
Guiding students towards intellectual and emotional growth	4 (3-5)
Whether each student is getting what they need	4 (3-4)
Total score	49.6 \pm 10.5

Data expressed as median (interquartile range 25-75%) or mean \pm standard deviation. TCQ: teacher concerns questionnaire.

We found no differences in the total score of the TQC and its domains between professors with and without training focused on education or higher education or among professors who worked in institutions with continuing education in teaching and professors whose institutions did not offer these activities ($p>0.05$). However, professors who participated in continuing education activities had higher total TQC scores

compared with professors who did not participate [51 (44–58) vs. 46 (41.5–54.5), respectively; $p=0.049$], since participants in continuing education activities had higher scores in the impact domain [20 (18–23) vs. 18 (15–21.5); $p=0.005$] (Figure 1). We observed no differences in the degree of pedagogical concern between men and women ($p>0.05$).

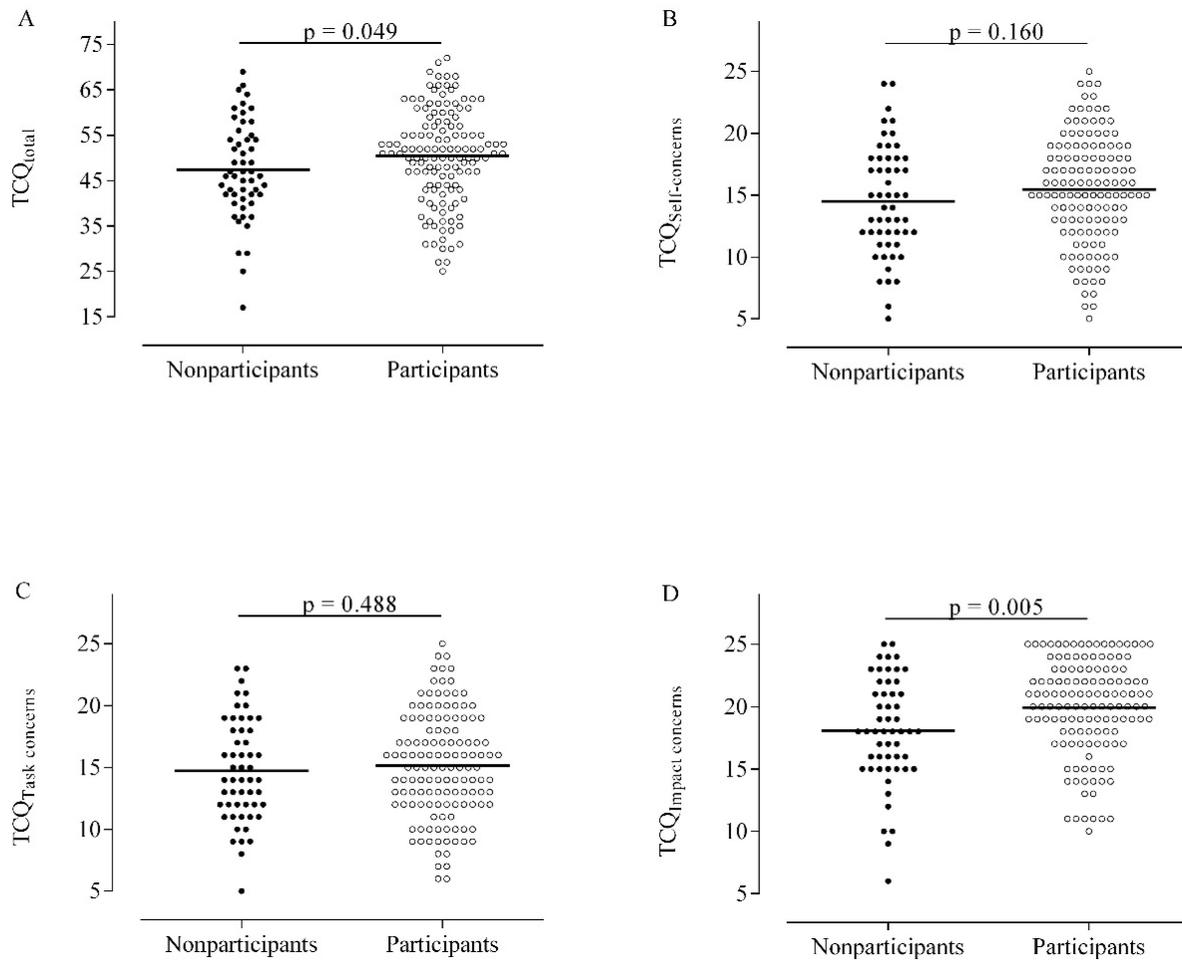


Figure 1. Pedagogical concerns of professors who participated (Participants) and did not participate (Nonparticipants) in continuing education activities. A) Total score on the Teacher Concerns Questionnaire (TCQ) of nonparticipants [51 (44-58)] and participants [46 (41.5-54.5)]; B) score in the self-concern domain for nonparticipants [14 (11.5-18)] and participants [15 (13-19)]; C) score in the task concern domain for nonparticipants [14 (12-18)] and participants [15 (12-18.25)]; D) score in the impact concern domain for nonparticipants [18 (15-21.5)] and participants [20 (18-23)]. The dash marks the median of the scores.

Qualitative analysis

A total of 176 (94.1%) participants reported that their concerns about the teaching-learning process changed during the COVID-19 pandemic, and 170 answered the discursive question. When analyzing the discursive responses, we found 2,211 tokens and divided them into 529 lemmas. The most frequent lemmas used by participants were: 1) teach*/learn* (n=151); 2) student* (male student, male students, male and female students combined, female student, female students, and synonyms; n=148); 3) remote* (remote, remotely, video, videos, video lesson, video lessons, online, virtual, and synonyms; n=120); 4) class* (class, classes; n=73); 5) practice* (practice, practices, practical, internship, and synonyms; n=57); 6) method* (method, methods, methodology, way,

ways, format, and synonyms; n=52). The other lemmas had a frequency below 50. The Supplementary Material presents the original words in Portuguese. We extracted ten keywords from the corpus after lemmatizing the words. Table 3 shows the keywords and their main contexts. Supplementary Table 2 presents the original keywords and excerpts in Portuguese. Generally, the keywords describe concerns related to the difficulty in the online teaching-learning process, due to the adaptation of classes to remote teaching and its possible impact on student learning.

Besides the concerns represented by the keywords, 17 participants (11 women; G1: n=2; G2: n=1; G3: n=11; G4: n=2; and G5: n=1) were concerned about interacting or bonding with the students, which made it difficult to identify possible learning difficulties.

Table 3. Keywords in the context of changes in relation to pedagogical concerns faced during the pandemic

Keyword	n	Keyness	Context
Students	83	116.08	“Concern about how students were actually learning the content in remote learning.” “Keeping students captivated and motivated in class, as they are remote.”
Classes	54	75.16	“(…) whether I would achieve effective student participation in online classes .” “Need to adapt theoretical and practical classes due to the online method.”
Online	35	48.56	“(…) the change raised concerns about the online teaching-learning process (…)”
Practical/Practice [§]	27	37.41	“The suspension of practical classes and the interruption of supervised internships.” “The lack of practice will have an impact on the training of physical therapists.”
Activities	22	30.46	“Greater concern for practical activities (…)” “The changes were towards integrating remote and online activities into my teaching practices.”
Difficulty	16	22.13	“I highlight the difficulty of assessment, not only during tests, but also in discussions and practices.” “The difficulty of seeing, perceiving the students, perceiving individual demands.” “(…) issues related to the difficulty of accessing the internet (…)”
Learning	15	20.74	“Assessment of learning .” “Engage the student and make them feel responsible for their learning .”
Assessment	14	19.36	“Developing new learning assessment activities to be completed in a virtual environment.” “Offering constant online feedback and quality assessment of the teaching-learning process.”
Remote	13	17.97	“ Remote classes (…)”
Subjects	12	16.59	“Adapting subjects with practical content to the remote teaching methodology.”

n: frequency of words in the corpus; Keyness: the quality of a word or phrase is “key” in its context[†]; Context: excerpts chosen to represent the main contexts in which the keywords were used. [§]Both words are represented by one word in Portuguese—see Supplementary Table 2 for the original keywords and excerpts in Portuguese.

“Online classes make it difficult to interact with students, to perceive learning [difficulty in getting to know and assessing individual students] (…).” (ID210)

“Lack of emotional connection with the students, especially the new ones.” (ID186)

Five participants (three women; G1: n=1; G2: n=2; G3: n=1; and G4: n=1) reported concern about the increased workload:

“Increased workload, need to use new resources (…).” (ID20)

“Increased workload due to didactic material preparation (remote teaching) (…).” (ID52)

“Working hours, (…) double shift (…).” (ID110)

“Increased workload and the need for daily changes in pedagogical planning.” (ID125)

“Greater workload, greater demands [quality of work], increased working hours in my home environment (…).” (ID137)

On the other hand, four participants (two women; G3: n=3, and G4: n=1) reported positive changes in their teaching practice during the pandemic:

“I consider this [adoption of e-learning strategies] to be a positive change for theoretical classes, and I intend to keep them in the long term, incorporating them into my teaching routine.” (ID42)

“On the other hand, new challenges and new resources have arisen in the teaching of physical therapy, which I’ve incorporated into my classes, and I intend to keep them after returning to face-to-face teaching.” (ID45)

“The changes were in the sense of integrating remote and online activities into my teaching practices. This was positive. I believe, however, that a balance is needed in the future to maintain the positive aspects of remote

teaching with the pedagogical requirements that can only be developed face-to-face.” (ID57)

“Opening a new range of possibilities for activities to better develop the teaching-learning process.” (ID179)

DISCUSSION

This study showed that physical therapists who work as undergraduate physical therapy professor in Brazil have a moderate degree of pedagogical concerns and this is not related to teaching career stage, age, or time since graduating in physical therapy. We found no differences in the degree of pedagogical concerns between physical therapist professors with and without training focused on education or higher education. However, professors who participated in continuing education programs showed a higher degree of pedagogical concerns compared with nonparticipants. Moreover, we observed a high prevalence of changes in the concerns of physical therapist professors due to emergency remote teaching during the COVID-19 pandemic.

Fuller²¹ classified teachers' concerns into three dimensions of teaching: with themselves as individuals; with the tasks and content of the “art” of teaching; and with the impact of their teaching on student behavior. Later, Fuller, Parsons, and Watkins²² published the theory of the four stages of development of secondary school teachers' concerns, which is also applicable to higher education professors. Before the teaching experience, concerns relate to teaching tasks, with a greater interest in learning content and teaching methodologies. Self-concerns arise in the second stage. In the third stage, self-concerns decrease and concerns about the teaching situation increase. Finally, task concerns also diminish and concerns about the impact on students become dominant. As far as we know, the theory of concerns has not been studied to date in undergraduate physical therapist professors, and studies on this topic are still scarce in the literature.

This theory was studied among different professionals, especially physical education teachers^{23,24}, who pointed to working conditions as one of the first career concerns²⁵. Later, their concerns shifted to teaching practice and government proposals for public schools, and, finally, to the social problems to which students are exposed. Importantly, physical education professionals are generally trained to be teachers, unlike physical therapists, who

do not receive this training during their undergraduate studies²⁶, which explains the lack of differences in pedagogical concerns between the different career stages of physical therapist professors.

Moreover, not all professors follow the same timeline or experience all teaching career stages. Personal paths begin to diverge more from the diversification stage onwards¹⁹. Huberman¹⁹ suggested that before stabilization, uncertainties make teachers prefer to restrict attempts to diversify classroom management and tend to establish a certain pedagogical rigidity. However, in teaching, stabilization can have other meanings, such as belonging to a professional body and independence. Therefore, stabilizing expresses the increase in professors' degree of freedom¹⁹, which makes them more comfortable diversifying their teaching practice, characterizing the diversification stage. This study showed physical therapist professors interested in changing their teaching practice based on their experiences in emergency remote teaching due to the COVID-19 pandemic, although some of them develop a sense of routine from the stabilization stage, without undergoing significant innovative activity. This different profile among professors is probably due to different backgrounds or social environments¹⁹ and may be the reason behind the concern about the difficulty in adapting to online teaching reported by our sample.

We also highlight that, in the context of the COVID-19 pandemic, professors' emotional state might have influenced their activities, students' learning, and their willingness to adopt new technologies or resist innovation²⁷. Moreover, health professions teachers often combine several roles: they are not only teachers, but also clinicians or researchers. For some, the role of teacher is an important part of their identity, but for others, the roles of clinician or researcher are much more central². The physical therapist's identity as a professor can influence their pedagogical concerns. Besides that, as physical therapy training in Brazil is predominantly face-to-face, during the pandemic, physical therapist professors had to reorganize their teaching strategies and use new tools that they were not familiar with. This context created a scenario that represents the early stage of a teacher's career, with concerns related to teaching tasks.

Concerns influence how teachers implement or fail to adopt any kind of change in schools²⁸, such as the transition to online education. Remote teaching and asynchronous learning networks, such as Moodle, Google Classroom, and Blackboard, were no longer considered new, even before the COVID-19 pandemic. However,

while some teachers took full advantage of new e-learning opportunities, others were reluctant or apprehensive to embrace them²⁹. Teachers who taught online before the pandemic expressed concerns about online teaching, often associated with the issues of workload, inadequate assessment procedures, and connection with students^{30,31}. Shea³¹ showed that novice online teachers were more concerned about the lack of face-to-face interaction with students than teachers who taught online frequently. They were also concerned about their limited training for online teaching. Faculty members in education, business, and liberal arts courses with little or no experience with online education feel uncomfortable in this environment and have concerns about the most basic aspects of remote learning, such as technological skills, responsiveness to students, and training for online teaching²⁹. These findings corroborate the reports presented in this study about the concerns of physical therapist professors regarding emergency remote teaching during the COVID-19 pandemic.

Moreover, some physical therapist professors were particularly concerned about teaching practical skills and clinical teaching and questioned the quality of learning during these difficult times. Due to social isolation during the COVID-19 pandemic, practical activities were canceled or drastically reduced, thus, contamination was not a concern for our sample.

Another interesting finding was that the lack of teaching materials was the least concerning aspect according to the TCQ. However, professors reported that the lack of equipment and internet access for students was a challenge. Moreover, professors who regularly participated in faculty development activities showed greater concern about the impact of their teaching practice. In this case, we are faced with the classic “chicken and egg” dilemma, wondering whether they were more concerned because they were involved in these activities or whether they got involved in these activities because they were already concerned about the impact of their teaching.

This study has limitations, such as the sample size. However, despite not reaching the expected sample, it can be considered sufficient, since a prevalence of 94.1% of professors showed changes in their pedagogical concerns due to the COVID-19 pandemic. Therefore, a sample of 86 physical therapist professors would be sufficient, considering a confidence interval of 95%. Moreover, the TCQ is not specific for health professions teachers, thus, it does not include concerns about patient and

student safety in practical classes (clinical instruction with patients), nor does it cover teachers’ research activities. Besides being an old tool and not addressing concerns about new technologies and methodologies for assessing teaching and learning, the psychometric properties of the TCQ are not available.

CONCLUSION

Physical therapist professors have a moderate degree of pedagogical concerns in general and are more concerned about the impact of their teaching practice on students, especially those who participate in continuing education activities. Pedagogical concerns do not differ between teaching career stages. Most physical therapist professors reported changes in their pedagogical concerns due to emergency remote teaching during the COVID-19 pandemic, especially about the online teaching-learning process and the adaptation of classes and assessment methods. They were also concerned about their possible impact on student learning, particularly on the practical skills inherent to physical therapy. Further studies are suggested to deepen the topic.

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SUPPLEMENTARY MATERIAL

Methods

A stop list is a list of very frequent words with little meaning (such as articles, prepositions, pronouns, conjunctions), which are generally disregarded in text mining. The stop words used to reduce the noise in the generation of the word list is presented in Supplementary Table 1.

The word concern* (concern, concerns, concerned, worry, worries, worried, preoccupation, preoccupations, preoccupied) was not considered in the frequency count, as it was the focus of the study and it was included in the question to be answered, so its linguistic use was not considered spontaneous. The Portuguese words that were not considered to generate the word list are

*preocup** (*preocupação, preocupações, preocupada, preocupadas, preocupado, preocupados, preocupo*).

RESULTS

The most frequent categories of words in Portuguese used by the participants were 1) ensin*/aprend* (*ensino, ensinar, ensinado, ensinamos, aprendizagem, aprendizado, aprendizados, aprender, aprendendo*), n=151; 2) alun* (*aluno, alunos, aluna, alunas, acadêmica, acadêmico, acadêmicos, discente, discentes, estudante, estudantes*), n=148; 3) remot* (*remoto, remotos, remota, remotas, remotamente, vídeo, vídeos, videoaula, videoaulas, on-line, virtual, virtuais, virtualizada, virtualização*), n=120; 4) aula* (*aula, aulas*), n=73; 5) práctic* (*prática, práticas, prático, práticos, estágio, estágios*), n=57; 6) forma*/método* (*forma, formas, formato, formatos, metodologia, metodologias, método, métodos, metodológico, metodológicos, meio, meios, modo, via*), n=52.

Table 1. List of Portuguese words used as stop words (stop list)

a	chi	disso	foi	nada	outras	quanta	teu
à	cm	disto	for	não	outrem	quantas	teus
agora	coisa	dito	foram	naquela	outro	quanto	ti
ah	coisas	diz	fosse	naquele	outros	quantos	tido
ai	com	dizem	fossem	naqueles	para	que	tinha
aí	comigo	do	fui	naquilo	pela	quem	tinham
ainda	como	dos	grande	naquilos	pelas	são	to
algo	conforme	dr	grandes	nas	pelo	se	tô
alguém	conosco	dra	há	né	pelos	seja	toda
algum	consigo	e	haver	nela	pequena	sejam	todas
alguma	contigo	é	haverá	nelas	pequenas	sem	todavia
algumas	contra	e'	havia	nele	pequeno	sempre	todo
alguns	contudo	efes	heim	neles	pequenos	sendo	todos
ali	convosco	eia	hem	nem	per	ser	trás
alô	cuja	ela	html	nenhum	perante	será	tu
ambos	cujas	elas	http	nenhuma	pode	serão	tua
ampla	cujo	ele	hum	nenhumas	pôde	sereis	tuas
amplas	cujos	eles	ih	nenhuns	podendo	seremos	tudo
amplo	d	em	ir	nessa	poder	seria	ué
amplos	da	embora	irei	nessas	poderia	seriam	uh
ante	daquele	enquanto	iremos	nesse	poderiam	seu	ui
antes	daqueles	entre	isso	nesses	podia	seus	última
ao	das	era	isto	nesta	podiam	si	últimas
aos	de	eram	já	nestas	pois	sido	último

(continues)

Table 1. Continuation

apenas	dela	éramos	la	neste	por	só	últimos
após	delas	essa	la	ninguém	porém	sob	um
aquela	dele	essas	lá	nisso	porque	sobre	uma
aquelas	deles	esse	lhe	no	portanto	sou	umas
àquelas	depois	esses	lhes	nos	posso	sua	uns
aquele	desde	esta	lo	nós	pouca	suas	vai
aqueles	dessa	está	logo	nossa	poucas	ta	vária
aqui	dessas	estamos	mais	nossas	pouco	tá	várias
aquilo	desse	estão	mas	nosso	poucos	talvez	vário
as	desses	estar	me	nossos	pq	também	vários
às	desta	estariam	menos	num	pqp	tampouco	vc
assim	destas	estas	mesma	numa	pra	tanta	vendo
ate	deste	estava	mesmas	nunca	primeiro	tantas	ver
até	deste	estavam	mesmo	o	primeiros	tanto	vez
através	destes	estávamos	mesmos	ó	própria	tantos	vindo
bis	deve	este	meu	ô	próprias	tão	vir
bla	devem	estes	meus	oba	próprio	tb	você
br	devendo	estou	mim	oh	próprios	te	vos
c	dever	etc.	minha	olá	psit	tem	vós
cá	deverá	eu	minhas	onde	psiu	têm	vossa
cada	deverão	fazendo	ml	opa	q	tendo	vossas
caso	deveria	fazer	muita	ora	quais	tenha	vosso
certa	deveriam	feita	muitas	os	quaisquer	ter	vossos
certas	devia	feitas	muito	os	qual	terá	vou
certo	deviam	feito	muitos	ou	qualquer	teria	x
certos	disse	feitos	na	outra	quando	teriam	

Table 2. Portuguese keywords in the context of changes in relation to teaching concerns faced during the pandemic

Keywords	n	Keyness	Context
Alunos	83	116.08	"Preocupação em quanto os alunos estavam realmente aprendendo os conteúdos por meio do ensino remoto." "Manter os alunos cativados e motivados nas aulas, visto que são remotas."
Aulas	54	75.16	"(...) se conseguiria a participação efetiva dos alunos nas aulas on-line." "Necessidade de adaptação das aulas teóricas e práticas devido ao método on-line."
On-line	35	48.56	"(...) a mudança trouxe preocupação em relação ao processo ensino-aprendizagem on-line (...)."
Práticas	27	37.41	"A suspensão das aulas práticas e a interrupção dos estágios supervisionados." "Ausência de práticas terá impacto na formação de fisioterapeuta."
Atividades	22	30.46	"Maior preocupação com as atividades práticas (...)" "As mudanças foram no sentido de integrar atividades remotas e on-line às minhas práticas pedagógicas."
Dificuldade	16	22.13	"Ressalto a dificuldade de avaliação não apenas em momentos de prova, mas também de discussões e práticas." "A dificuldade de ver, perceber os alunos, perceber demandas individuais." "(...) questões de dificuldade de acesso à internet (...)"
Aprendizado	15	20.74	"Avaliar o aprendizado ." "Engajar o aluno e fazer com que também se sinta responsável por seu aprendizado."
Avaliação	14	19.36	"Elaborar novas atividades de avaliação de aprendizado para serem respondidas em ambiente virtual." "Oferecer feedbacks on-line constantes e a qualidade da avaliação do processo ensino-aprendizagem."
Remotas	13	17.97	"As aulas remotas (...)"
Disciplinas	12	16.59	"Adaptação de disciplinas com conteúdo prático à metodologia de ensino remoto."

n: frequency of words in the corpus; Keyness: the quality of a word or phrase being "key" in its context; Context: Portuguese excerpts chosen to represent the main contexts in which the keywords were used.