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# Changes in Behavior, Professionalism, and Views on Life and Death among Physical Therapists and Students during the COVID-19 Pandemic in Japan

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## Abstract

Although the mental health disorders of healthcare workers during the coronavirus disease 2019 (COVID-19) pandemic have been examined, little is known about the psychological impact of the pandemic on physical therapists. In this study, an online questionnaire survey was conducted on physical therapists and students aspiring to become physical therapists, to investigate changes in behavior/values and related factors. Increased anxiety about COVID-19, awareness of voluntary restraint, and reduced motivation were observed in comparison with usual levels in both physical therapists and students. The desire to resign and concerns about patients increased significantly, and the desire to resign tended to increase with increases in years of clinical experience. The subjects' views of the profession did not change, but decreased motivation was related to damage to the professionalism. Views on life and death changed significantly in both groups, and change was greater in students than in physical therapists. Anxiety and/or awareness of voluntary restraint and/or experience caring for patients were associated with changes in views on life and death. These results indicate that the COVID-19 pandemic affected the behaviors and values of physical therapists and students through anxiety and reduced motivation.

**Key Words:** COVID-19, physical therapist, anxiety, professionalism, views on life and death

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## Introduction

Coronavirus disease 2019 (COVID-19), which is caused by infection with the newly identified severe acute respiratory syndrome coronavirus 2, emerged in Wuhan, China, and the spread of COVID-19 has not yet been brought under control. Facing this critical situation, healthcare workers continue to be at risk of psychological distress, such as anxiety, fear, depression, insomnia, traumatic stress, and burnout<sup>1-14)</sup>.

Globally, few studies specific to physical therapists have been conducted<sup>15, 16)</sup>, despite the fact that physical therapists are among those professionals in close contact with patients and that limitations placed on face-to-face rehabilitation work can lead to frustration, thereby undermining professionalism. Consequently, little is known about the psychological impact of the COVID-19 pandemic on physical therapists or the factors related to changes in their behaviors and values.

Similar to the increasing mental stress reported overseas among nurses under a pandemic, it is assumed that the pandemic has had no small psychogenic impact on physical therapists in Japan. In addition, it is thought that students who want to become physical therapists may also be affected in some way, but there are no reports on this, including from abroad. Thus, the present study aimed to evaluate the feelings of physical therapists and students aspiring to become physical therapists during a state of emergency and to investigate the changes in their values before and after the onset of the COVID-19 pandemic.

## Materials and Methods

### Study design and composition of the online questionnaire

An online questionnaire survey, using a cloud-based survey development application, was conducted on physical therapists and current students studying physical therapy between August 10–24, 2020, approximately 3 months after the end of the declaration of the state of emergency regarding COVID-19 in Japan. The questionnaire was anonymous and confidentiality was assured and returning the questionnaire was considered to reflect consent to participate. The inclusion criteria were as follows: a) graduated from Morinomiya University of Medical Sciences and currently working as a physical therapist in a medical institution, or b) currently a first- to fourth-year student in the same university. The exclusion criteria were as follows: a) previous diagnosis of a psychiatric disorder, or b) a history of COVID-19 infection. The study protocol was approved by the Ethics Committee for Clinical Investigation of Morinomiya University of Medical Sciences (Permission No.: 2020-019). This study was conducted according to the guidelines of Morinomiya University of Medical Sciences, the ethical guidelines for clinical research of the Japanese government, and the Declaration of Helsinki.

The questionnaire used was developed specifically for this study. It was composed of items on the participants' demographic characteristics and two major sections: A) feelings and behaviors during the state of emergency, and B) changes in behaviors and awareness (Table 1). Section A consisted of six categories (A1 - 6) for physical therapists, and three categories (A1 - 3) for students. Each item was scored on a five-point Likert-scale: 1, not at all; 2, not much; 3, no change; 4, a little; and 5, a lot. Section B consisted of five categories (B1 - 5) for physical therapists and students. Each item was scored on a five-point Likert-scale: 1, large decrease; 2, small decrease; 3, no change; 4, small increase; and 5, large increase. The score for each

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category is shown as the total of the points for all items comprising that category.

**Table 1.** Categories and items in the online questionnaire survey.

Section A	
Feelings and behavior during state of emergency in Japan	
Category	Items
A1: Anxiety and fear about COVID-19	Anxiety about infection with virus Anxiety about spreading the virus to others Fear of COVID-19 Fear of death from COVID-19
A2: Voluntary restraint	Accept request for voluntary restraint Maintain self-quarantine Maintain 3Cs * Maintain social distancing
A3: Motivation	Have positive motivation to care for patients with COVID-19
A4: Experience of discrimination (for physical therapists only)	Have experienced discrimination against you or your family
A5: Desire to resign (for physical therapists only)	Hope to leave or change jobs
A6: Concerns about patients (for physical therapists only)	Concern about delayed functional recovery of patients by lack of adequate rehabilitation
Section B	
Changes in behavior and awareness before and after rise of COVID-19 in Japan	
Category	Items
B1: Frequency of preventive measures	Hand washing Hand sanitization Gargling Use of disposable gloves Cough etiquette Air circulation Wearing a mask
B2: Changes in lifestyle to prevent infection	Daily temperature measurement Daily check of physical condition Avoidance of personal outings Avoidance of eating with friends Avoidance of having conversations without a mask Awareness of getting enough sleep Awareness of ensuring adequate nutrition Awareness of stress relieving behaviors Awareness of exercise
B3: Professionalism	Satisfied with your career choice to be a physical therapist Would recommend profession to others (for physical therapists only) Find the job rewarding Motivated to continue the job (for students only) Find study challenging Motivated to become a physical therapist
B4: Anxiety with regard to work	(for physical therapists only) Anxiety about a job (for students only) Anxiety about future work
B5: Views on life and death	Interest in life Attention to death Time to think about life and death

\*The questionnaire was composed of participants' characteristics and two major sections. Section A of the questionnaire consisted of six categories (A1: Anxiety and fear about COVID-19, A2: Voluntary restraint, A3: Motivation, A4: Experience of discrimination, A5: Desire to resign, and A6: Concerns about patients) for physical therapists and three categories (A1, A2 and A3) for students. Each item was scored by five responses: **1, not at all; 2, not much; 3, no change; 4, a little; 5, a lot.**

Section B of the questionnaire consisted of five categories (B1: Frequency of preventive measures, B2: Changes in lifestyle to prevent infection, B3: Professionalism, B4: Anxiety with regard to work, and B5: Views on life and death) for physical therapists and students. Each item was scored by five responses: 1, large decrease; 2, small decrease; 3, no change; 4, small increase; 5, large increase.

\*3Cs: Closed spaces, Crowded places and Close-contact settings. The Japanese government focused on "3Cs" as infectious environments, and strongly encouraged avoidance of the 3Cs.

## Statistical analysis

The mean score for each category was compared with the criterion value, which was a score of 3 in the absence of COVID-19 impact using Welch's t-test. Differences between the scores of physical therapists and those of students were also analyzed using Welch's t-test. Multiple regression analysis was used to evaluate the factors associated with each category in sections A and B. The standardized partial regression coefficient and 95% confidence interval of each independent variable were calculated. All analyses were performed using R (version 4.0.2)<sup>17)</sup>, and the significance level for each test was set at 0.05.

## Results

### Demographic characteristics

Among the 578 physical therapists and 280 current physical therapy students invited to participate, 150 physical therapists (26.0%) and 260 students (92.9%) responded to the online questionnaire survey (Table 2). Five physical therapists and two students were excluded because of missing data, resulting in a final sample of 145 physical therapists and 258 students. In total, 73 (50.3%) physical therapists and 106 (41.1%) students were female. In addition, 28 (19.3%) physical therapists worked in hospitals that accepted patients with COVID-19, and eight (5.5%) physical therapists had experience caring for patients with COVID-19.

**Table 2.** Demographic characteristics of the participants.

	Physical therapists (n = 145)		Students (n = 258)
Age (years)	27.1 ± 3.4	Age (years)	20.0 ± 1.6
Sex		Sex	
Female	73 (50.3%)	Female	106 (41.1%)
Male	72 (49.7%)	Male	152 (58.9%)
Years of clinical experience		Year of study	
<1 year	16 (11.0%)	First year	65 (25.2%)
1 to 6 years	66 (45.5%)	Second year	67 (26.0%)
>6 years	63 (43.4%)	Third year	62 (24.0%)
		Fourth year	64 (24.8%)
Working in a hospital that accepts patients with COVID-19	28 (19.3%)		
Experience caring for patients with COVID-19	8 (5.5%)		

## Feelings and behaviors of physical therapists and students during the state of emergency in Japan

As shown in Figure 1, anxiety about COVID-19 (A1) were significantly increased compared with the baseline (base level score of 3) in both the physical therapist and student groups, and both adhered well to behavior regarding voluntary restraint (A2). No significant differences in scores for A1 and A2 were observed between physical therapists and students. Motivation (A3) for work and study showed lower than usual levels in both groups, and the rate of decline was greater in physical therapists than in students. In addition, physical therapists experienced discrimination (A4) and considered resignation (A5) more than usual, and were more concerned about patients (A6).

Factors associated with each category of section A were also evaluated (Table 3). Motivation

(A3) was reduced more in physical therapists in hospitals that accepted patients with COVID-19 than in hospitals that did not. Furthermore, working in hospitals that accepted patients significantly affected the desire to resign (A5) and concerns about patients (A6). Experience caring for patients with COVID-19 was not associated with any category of section A. Female physical therapists experienced more anxiety about COVID-19 (A1) and discrimination (A3) than did males, whereas no sex difference was observed in students. Desire to resign (A5) increased with increases in years of clinical experience (0.06 points a year of experience,  $p < 0.05$ ). In addition, among students, motivation (A3) decreased as years of study increased (-0.19 points per year of study,  $p < 0.05$ ).

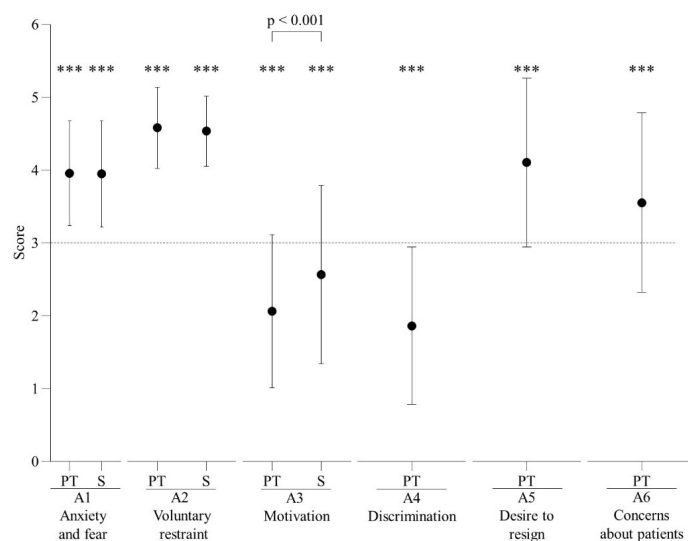


Figure 1. Feelings and behaviors during the state of emergency in Japan.

PT: physical therapist, S: student. Values are mean  $\pm$  standard deviation.  
 \*\*\* $p < 0.001$  vs. base level.

Table 3. Factors associated with each category of section A.

	A1 Anxiety and fear	A2 Voluntary restraint	A3 Motivation	A4 Discrimination	A5 Desire to resign	A6 Concerns about patients
Independent Variable	SPRC(95% CI)	SPRC(95% CI)	SPRC(95% CI)	SPRC(95% CI)	SPRC(95% CI)	SPRC(95% CI)
<b>Physical therapists</b>						
Hospital that accepts patients with COVID-19						
No						
Yes	0.07(-0.36 to 0.49)	-0.06(-0.49 to 0.37)	0.50(0.09 to 0.92) *	-0.08(-0.49 to 0.34)	0.56( 0.16 to 0.97) *	-0.59(-1.00 to -0.17) *
Experience caring for patients with COVID-19						
No						
Yes	0.11(-0.62 to 0.84)	0.40(-0.33 to 1.14)	0.39(-0.32 to 1.11)	0.47(-0.24 to 1.19)	-0.20(-0.91 to 0.50)	0.71(-0.00 to 1.42)
Sex						
Female						
Male	-0.41(-0.74 to -0.09) *	-0.22(-0.55 to 0.11)	0.22(-0.10 to 0.54)	-0.48(-0.80 to -0.16) *	0.08(-0.23 to 0.40)	-0.11(-0.43 to 0.21)
Years of clinical experience						
< 1 years						
1 to 6 years	-0.05(-0.60 to 0.50)	0.24(-0.31 to 0.79)	-0.14(-0.68 to 0.39)	0.30(-0.24 to 0.83)	0.66( 0.13 to 1.19) *	0.11(-0.43 to 0.64)
> 6 years	0.01(-0.54 to 0.56)	0.36(-0.19 to 0.91)	-0.28(-0.81 to 0.26)	0.19(-0.35 to 0.73)	0.85( 0.31 to 1.38) *	0.30(-0.24 to 0.84)
<b>Students</b>						
Sex						
Female						
Male	-0.13(-0.38 to 0.12)	-0.07(-0.31 to 0.18)	0.16(-0.09 to 0.41)			
Year of study						
First and second						
Third and fourth	-0.04(-0.29 to 0.20)	0.20(-0.04 to 0.45)	-0.26(-0.50 to -0.01) *			

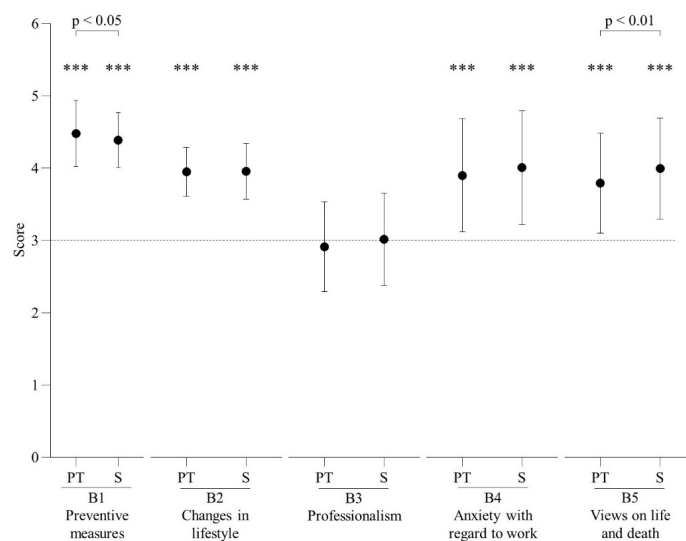
SPRC: standardized partial regression coefficient, CI: confidence interval. \* $p < 0.05$ .

## Changes in behaviors and values of physical therapists and students

As shown in Figure 2, a significantly increased frequency of engaging in preventive measures (B1) and positive lifestyle changes to prevent infection (B2) were observed in both groups compared with before the pandemic. In addition, the frequency of engaging in preventive measures (B1) showed a greater change in physical therapists than in students. Furthermore, anxiety about job (B4) was significantly increased in both groups. Although no change in professionalism (B3) was found in either group, views on life and death were more positive in both groups. Of note, more changes in views on life and death were seen in students than in physical therapists.

Factors associated with each category of section B are shown in Table 4. Regarding physical therapists, a significant relation was observed between awareness of voluntary restraint (A2) and an increased frequency of preventive measures (B1), whereas no significant relation was found between anxiety about COVID-19 (A1) and an increased frequency of preventive measures (B1). Among physical therapists, awareness of voluntary restraint (A2) was also significantly related to positive lifestyle changes to prevent infection (B2). On the other hand, among students, anxiety about COVID-19 (A1) were associated with an increased frequency of preventive measures (B1), and both anxiety about COVID-19 (A1) and awareness of voluntary restraint (A2) were significantly related to positive lifestyle changes to prevent infection (B2).

Although professionalism (B3) did not change significantly in physical therapists and students (Fig. 2), reduced motivation (A3) was associated with damage to professionalism in both groups, and a relationship was seen between desire to resign (A5) and damaged professionalism (B3) in physical therapists. In addition, anxiety about COVID-19 (A1), awareness of voluntary restraint (A2), and experience caring for patients with COVID-19 were positively related to changes in views on life and death among physical therapists. In students, anxiety about COVID-19 (A1) were associated with a change in views on life and death and these changes were larger in female than in male students. Neither type of hospital, years of clinical experience, students' year of study, nor experience caring for patients with COVID-19 affected any category of section B.



**Figure 2.** Influence of the COVID-19 pandemic on changes in behaviors and views.

PT: physical therapist, S: student. Values are mean ± standard deviation.  
\*\*\*p<0.001 vs. base level.

**Table 4.** Factors associated with each category of section B.

Independent Variable	B1	B2	B3	B4	B5
	Preventive measures SPRC(95% CI)	Changes in lifestyle SPRC(95% CI)	Professionalism SPRC(95% CI)	Anxiety with regard to work SPRC(95% CI)	Views on life and death SPRC(95% CI)
<b>Physical therapists</b>					
A1 (Anxiety and fear)	0.03(-0.15 to 0.21)	0.07(-0.12 to 0.26)	0.04(-0.13 to 0.21)	0.28( 0.10 to 0.47) *	0.21( 0.04 to 0.38) *
A2 (Voluntary restraint)	0.31( 0.14 to 0.48) *	0.31( 0.13 to 0.49) *	-0.04(-0.20 to 0.12)	0.03(-0.14 to 0.20)	0.32( 0.16 to 0.49) *
A3 (Motivation)	-0.12(-0.28 to 0.03)	-0.03(-0.19 to 0.13)	0.16( 0.02 to 0.31) *	-0.17(-0.33 to -0.01) *	-0.12(-0.27 to 0.03)
A4 (Discrimination)	0.05(-0.11 to 0.20)	0.02(-0.14 to 0.19)	-0.06(-0.21 to 0.09)	-0.01(-0.18 to 0.15)	-0.12(-0.28 to 0.03)
A5 (Desire to resign)	-0.08(-0.23 to 0.08)	0.05(-0.12 to 0.22) *	0.55( 0.40 to 0.69) *	-0.19(-0.35 to -0.03) *	-0.08(-0.23 to 0.07)
A6(Concerns about patients)	0.28(0.12 to 0.44) *	0.04(-0.13 to 0.21)	0.01(-0.15 to 0.16)	0.15(-0.02 to 0.31)	0.03(-0.13 to 0.19)
Hospital that accepts patients with COVID-19					
No	-----	-----	-----	-----	-----
Yes	-0.13(-0.54 to 0.27)	0.03(-0.40 to 0.47)	-0.09(-0.48 to 0.29)	0.06(-0.35 to 0.48)	-0.28(-0.68 to 0.12)
Experience caring for patients with COVID-19					
No	-----	-----	-----	-----	-----
Yes	-0.46(-1.13 to 0.20)	0.37(-0.35 to 1.09)	0.47(-0.17 to 1.10)	0.12(-0.57 to 0.81)	0.71( 0.06 to 1.37) *
Sex					
Female	-----	-----	-----	-----	-----
Male	-0.18(-0.48 to 0.13)	0.07(-0.26 to 0.40)	-0.03(-0.33 to 0.26)	0.03(-0.29 to 0.34)	-0.14(-0.44 to 0.16)
Years of clinical experience					
< 1 years	-----	-----	-----	-----	-----
1 to 6 years	-0.12(-0.62 to 0.38)	0.25(-0.29 to 0.79)	-0.38(-0.86 to 0.10)	0.27(-0.25 to 0.79)	0.17(-0.33 to 0.66)
> 6 years	-0.25(-0.76 to 0.26)	0.28(-0.27 to 0.84)	-0.43(-0.92 to 0.06)	0.47(-0.07 to 1.00)	-0.02(-0.53 to 0.48)
<b>Students</b>					
A1 (Anxiety and fear)	0.17( 0.04 to 0.30) *	0.13( 0.01 to 0.26) *	0.08(-0.04 to 0.21)	0.25( 0.12 to 0.38) *	0.39( 0.27 to 0.51) *
A2 (Voluntary restraint)	0.13(-0.01 to 0.26)	0.23( 0.10 to 0.36) *	0.03(-0.10 to 0.16)	0.01(-0.12 to 0.14)	-0.01(-0.13 to 0.11)
A3 (Motivation)	0.09(-0.03 to 0.21)	0.04(-0.08 to 0.16)	0.28( 0.16 to 0.40) *	-0.08(-0.20 to 0.05)	0.08(-0.04 to 0.19)
Sex					
Female	-----	-----	-----	-----	-----
Male	0.08(-0.17 to 0.32)	0.02(-0.22 to 0.26)	0.21(-0.03 to 0.45)	0.18(-0.06 to 0.42)	-0.26(-0.49 to -0.03) *
Year of study					
First and second	-----	-----	-----	-----	-----
Third and fourth	-0.03(-0.28 to 0.21)	0.03(-0.21 to 0.27)	0.03(-0.21 to 0.27)	0.19(-0.05 to 0.43)	-0.12(-0.35 to 0.11)

SPRC: standardized partial regression coefficient, CI: confidence interval. \*p<0.05.

## Discussion

Many reports have primarily centered on the mental health disorders of nurses who work on the front lines of COVID-19 care, for whom mental health burdens have been reported to be more severe in comparison with other healthcare workers<sup>3, 6, 8)</sup>. In contrast to the large number of reports specific to nurses, few studies have investigated the influence of the COVID-19 pandemic on physical therapists<sup>15, 16)</sup>. A cross-sectional survey in Korea reported that 32.3% and 18.5% of physical therapists had symptoms of anxiety and depression, respectively, both of which are higher than the average prevalence of anxiety and depression<sup>15)</sup>. Another study examining the presence of anxiety and depression among healthcare workers in nursing care hospitals found a higher incidence of depression in occupational therapists than in physical therapists and nurses<sup>15)</sup>. These studies suggest a substantial burden on healthcare workers required to have close contact with patients.

During the COVID-19 pandemic, anxiety has been one of the leading causes of mental stress among healthcare workers<sup>1-16)</sup>. The results of the present study indicate that anxiety surrounding COVID-19 was significantly increased in physical therapists extracted in our survey (Fig. 1), even though the numbers of infected patients and deaths were much smaller than those in Western countries. Unexpectedly, the type of hospital (whether it accepts or does not accept COVID-19-infected patients) and experience caring for infected patients did not raise anxiety about COVID-19 (Table 3), and no difference in the severity of anxiety about COVID-19 was found between physical therapists and students (Fig. 1). In this study, anxiety was similarly



observed even in those who were not in direct contact with infected patients. In addition, female physical therapists felt more anxiety about COVID-19 than did males, consistent with previous reports finding that female sex was associated with severe symptoms of anxiety<sup>3, 6)</sup>. Both physical therapists and students had significantly changed their ways of life to prevent infection (Fig. 2); however, while anxiety concerning COVID-19 was associated with lifestyle changes in students, they were not associated in physical therapists (Table 4), suggesting the immaturity of students as medical personnel.

In addition to increased anxiety, motivation decreased (Fig. 1), with a greater decrease observed in physical therapists than in students (Fig. 1). This finding may be related to the frustrating situation wherein rehabilitation was restricted. As expected, the work environment was associated with reduced motivation in physical therapists (Table 3). Interestingly, motivation in students decreased as years of study increased (Table 3), suggesting that students became more realistic about future job security as they progressed. Additionally, a desire to resign tended to increase with increases in years of clinical experience among physical therapists (Table 3). Of interest, it was reported that physical therapists in their 30s and 50s had a significantly higher risk of depression than did those in their 20s during the COVID-19 pandemic<sup>16)</sup>. Given these observations, increasing years of clinical experience may be a risk factor for mental health disorders and withdrawal from work.

The present study investigated how the COVID-19 pandemic affected the values of physical therapists and students. A number of studies have suggested that the COVID-19 pandemic would severely affect job satisfaction among healthcare workers<sup>18-22)</sup>; however, no previous report has examined changes in professionalism. In the present study, professionalism was evaluated by four items: satisfaction with choosing to be a physical therapist, recommendation of the profession of being a physical therapist to others, finding the job rewarding, and motivation to continue in the profession of physical therapy. In stark contrast to previous reports<sup>20, 22)</sup>, the COVID-19 pandemic did not damage the professionalism of physical therapists or students (Fig. 2). However, reduced motivation during the state of emergency was closely associated with damaged professionalism in both physical therapists and students (Table 4). Since the limitations placed on rehabilitation during the pandemic<sup>18, 19)</sup> can reduce motivation, establishing new rehabilitation programs such as telerehabilitation<sup>23)</sup> should be considered.

Notably, this study evaluated changes in views on life and death among physical therapists and students during the COVID-19 pandemic. Both groups had more time than before the pandemic to think about life and death (Fig. 2), indicating that they are more concerned than ever about life and death, have a greater sense of life, and feel closer to death. This change was associated with anxiety about COVID-19 and experience caring for infected patients (Table 4). Of interest, changes in views on life and death were significant in students, especially females (Table 4), as compared with physical therapists (Fig. 2), suggesting the importance of appropriate education about life and death for younger and more sensitive students.

It is regrettable that physical therapists experienced discrimination (Fig. 1). Discrimination, harassment, and violence toward healthcare workers in other countries have been reported to cause mental health problems<sup>24, 25)</sup>. Although experiencing discrimination did not significantly affect the behaviors, feelings, and values of physical therapists and students in the present

study (Table 4), social efforts should be made to help prevent unreasonable attacks on healthcare workers.

This study had several limitations. First, no established scales were used as objective measures to evaluate the severity of anxiety and the degree of job satisfaction. Therefore, the present assessments may be less accurate compared with previous studies that used measures such as the Generalized Anxiety Disorder Scale, the Self-rating Anxiety Scale, the Collett–Lester Fear of Death Scale, the Hospital Anxiety and Depression scale, the Professional Quality of Life scale, or the Minnesota Satisfaction Questionnaire. Second, obvious differences are apparent in the environments of Japan and other countries. Since many fewer cases of infection and deaths have been reported in Japan than in Western countries, the impact of the COVID-19 pandemic as seen in the present study may be less substantial when compared to data from other countries. Third, an analysis by years of experience was conducted in a group of physical therapists, but there is a lack of evidence for the grouping of years of experience. This is a pilot analysis. Finally, the self-administered questionnaire used in the present study was not sufficiently validated. The questionnaire should be verified through a comparison with established scales with regard to the sensitivity for detect anxiety or job satisfaction.

The present study indicates that the COVID-19 pandemic had significant psychological impacts on physical therapists and students extracted in our survey, followed by significant changes in their behaviors and values. Reduced motivation affected their professionalism, and increased anxiety was associated with changes in views on life and death among both physical therapists and students. These findings could lead to a better understanding of changes in physical therapists and students facing such a critical situation. This study also suggests the importance of coping strategies for anxiety, education on life and death, and the establishment of new approaches to maintain motivation and professionalism.

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There is no contributor who does not meet the criteria for authorship.

### **Declaration of interest statement**

The authors have no competing interests to declare.

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None.

### **Data availability statement**

The datasets supporting the conclusions of this article are included within the article. The datasets used and analyzed during the present study are available from the corresponding author on reasonable request.

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