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Cognitive emotional regulation in physiotherapy students in Croatia

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ABSTRACT

Background: Cognitive emotional regulation refers to a conscious or unconscious process that affects an individual's emotions and the physical and mental health of the individual. The aim of this study was to detect strategies of cognitive emotional regulation used by physiotherapy students in stressful situations.

Methods: The study was conducted from January to March 2022 and enrolled 372 students. An announcement was posted electronically on the web page of each physiotherapy study in Croatia, inviting students to participate in the study. Each participant provided written informed consent. The Cognitive Emotion Regulation Questionnaire was used in the study for detecting cognitive emotional strategies that students use in stressful situations. Statistical analysis of data included descriptive statistics of data groups where values were expressed as mean and standard deviation. The Kolmogorov–Smirnov test was used to test the normality of the distribution. To test the differences between two independent groups, the Mann–Whitney U rank sum test was applied, while the non-parametric Kruskal–Wallis test was used to test the differences of several subgroups of variables. Categorical variables were tested with Fischer's exact test or chi-square test.

Results: The most frequently used emotional cognitive regulation strategies are acceptance and positive reappraisal. There is a statistically significant difference in the use of self-blame ($p < .001$), rumination ($p < .001$) and blaming others ($p = 0.018$) in relation to gender. Also, there is a statistically significant difference in the use of acceptance ($p = 0.022$), rumination ($p < .001$) and blaming others ($p = 0.049$) in relation to the year of study.

Conclusion: Education of physiotherapy students to the use of adaptive strategies could have a positive effect on the students' learning quality, their decision–making abilities and the quality of physiotherapy provided to patients. Encouraging physiotherapy students to engage in cognitively adaptive ways of thinking can serve as a solid method to help students in an academic and professional environment.

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Introduction

Emotional regulation is an important factor influencing a person's successful functioning and mental health. It refers to the regulation of negative and positive emotions. Strategies of cognitive emotional regulation are cognitive responses to emotional events and, consciously, or unconsciously, try to change an individual's emotional experience or the event itself (Aldao & Nolen-Hoeksema, 2020). The extended model of emotional regulation indicates that the creation of emotions and the regulation of emotions through a cyclical appraisal system include three phases: identification (deciding whether the emotion will be regulated or changed), selection (choosing the regulation strategy to be used) and implementation (implementation of the chosen strategy) (Gross, 2015). Despite different ways of regulating emotions, it is considered that key roles of cognitive processes have emotional experience (Garnefski & Kraaij, 2007; Pascual Jimeno & Conejero López, 2019).

Emotion regulation is presumed to develop over time and to particularly mature in late adolescence. Changes in cognitive processing, metacognitive skills, and capacities for planning may influence maturation of emotion regulation skills (Park et al., 2020). The early college years may foster seeking social support as a form of emotional regulation (Park et al., 2020). Also, younger adults are more likely to use maladaptive emotion regulation strategies than middle-aged and older adults (Aldao & Nolen-Hoeksema, 2020). These suggest a tendency for younger adults to try to disengage cognitively and behaviorally from emotional situations (Aldao & Nolen-Hoeksema, 2020). This tendency may decline with age, as a person learns to deal more effectively with emotions, and draw on knowledge and experience to engage with emotions effectively (Aldao & Nolen-Hoeksema, 2020).

It seems that gender differences in self-reports of emotional regulation are strongly influenced by gender role expectations and perceptions of the stressfulness of the environment (Nolan-Hoeksema, 2012). Compared to men, women are more aware of and attentive to their emotions and more likely to engage in concerted efforts to change their emotions (Nolan-Hoeksema, 2012). Also, men may be more likely to engage in automatic, nonconscious emotion regulation compared to the more conscious, linguistically based emotion regulation of women (Nolan-Hoeksema, 2012). This may reflect a greater awareness, understanding, and analysis of emotions in women compared to men (Nolan-Hoeksema, 2012).

According to Gross, the process of emotional regulation is assessed through cognitive reconsideration and expressive repression, i.e. emotional regulation strategies that are activated before or after an event (Akbar Foroughi et al., 2021). It is believed that the strategies of emotional regulation do not represent a positive or negative character of a person, but are based on specific situations in the life of an individual (Akbar Foroughi et al., 2021). The same situation can provoke different emotions in individuals and this difference affects their well-being and social relationships. However, some individuals experience emotional difficulties that affect the effectiveness of the regulatory mechanism (Aldao & Nolen-Hoeksema, 2020). Difficulties in emotional regulation and the use of dysfunctional emotional regulation strategies are factors that negatively affect mental health (Akbar Foroughi et al., 2021; Aldao & Nolen-Hoeksema, 2020). Maladaptive strategies such as ruminating, self-blaming and catastrophizing are associated with symptoms

of depression, anxiety or borderline personality disorder, while adaptive strategies such as positive reappraisal or putting into perspective, are inversely related to these symptoms (Aldao & Nolen-Hoeksema, 2020; Potthoff et al., 2016). Physiotherapy students' personality traits, emotion regulation strategies, and empathic behavior are considered powerful predictors for their future achievements, professional adjustment, and mental strength (Romosan et al., 2018; Sheikhbardsiri et al., 2020). They should be capable of controlling their emotions when facing critical situations, with strong coping abilities (Romosan et al., 2018).

Physiotherapy students provide biopsychosocial model of care for patients by showing empathy, support, expanding trust, honesty, listening to patients, creating a therapeutic environment and focusing on the physical and psychosocial needs of patients (Abdollahyar et al., 2016; Dillon et al., 2023; McGrath et al., 2024a). The physiotherapy approach cannot be detached from emotional involvement, and since certain emotion regulation mechanisms are known to be maladaptive, the way in which physiotherapy students process and regulate their emotions becomes very important, because it can affect their physical and mental well-being (Romosan et al., 2018).

The abilities to empathize, recognize emotions in others, emotion recognition skills and implement emotion regulation strategies in adjustable and efficient ways can vary substantially between physiotherapy students (Romosan et al., 2018). By identifying the physiotherapy students' emotional cognitive strategies, it is possible to detect vulnerable students and help them to use more effective or adaptive strategies while studying and learning skills in working with patients. Also, identifying the physiotherapy students' emotional cognitive strategies could help educational designers and teachers facilitate learning by finding appropriate teaching methods. In this regard, cognitive emotional regulation is one of the important determinants of physiotherapy students' academic and professional success.

Research on physiotherapy students is very scant, literature data providing little information on the cognitive emotional regulation in physiotherapy students. Also, research points to differences in the use of cognitive emotional regulation strategies between medical students (e.g. general medicine, densitry medicine, general nursing) (Romosan et al., 2018). Relatively little research has focused on the assessing of emotional self-regulatory abilities across the college years among physiotherapy students. Therefore, which cognitive emotion regulation strategies are used during the college years in the physiotherapy students remains unclear.

Assessment of emotional cognitive strategies is important in physiotherapy students to gain insight into how they cope with stressful situations. They will meet in everyday clinical work in stressful and challenging situations. Work with patients can constrain physiotherapists' ability to navigate emotions and distress within clinical encounters (Dillon et al., 2023). Psychological distress can lead to significant consequences, including reduced quality of life, long- term disability, and premature (McGrath et al., 2024b).

Nonetheless, during medical studies, undergraduates experience significant amounts of stress (Romosan et al., 2018). Medical studies, like physiotherapy, are usually perceived as very stressful, students being expected to assimilate large amounts of information in short periods of time, a fact that may involve certain social and personal sacrifices (Romosan et al., 2018). Some researchers suggest that this waning is due to high levels of emotional distress or the burden of achieving performance (Romosan et al., 2018;

Shapiro, 2008). Also, McGrath et al. (2024c) suggest that is important to prioritize mental health training in physiotherapy curricula so that these professionals have the skills and knowledge to effectively support the mental health of their patients and maintain their own well-being.

Obtaining data on cognitive emotional regulation in physiotherapy students is important, so that additional education and workshops about the importance of using effective cognitive emotional regulation strategies could be provided during the college years.

Therefore, due to the importance of this issue, the present research was designed and carried out to explore emotional cognitive strategies in physiotherapy students. Successful emotional regulation strategies are crucial for physical health, physiotherapy students' emotions, interpersonal relationships, and well-being.

The aim of this study is to detect strategies of cognitive emotional regulation used by physiotherapy students in stressful situations.

Material and methods

Study design and participants

This cross-sectional study used a questionnaire to detect strategies of cognitive emotional regulation in physiotherapy students in Croatia. The questionnaire was conducted in Croatia between January to March 2022. The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Ethics Committee (approval number: 2137-0336-08-21-17, 31st December 2021). Each participant provided written informed consent. All participants ($N = 374$) were physiotherapy students. An announcement was posted electronically on the web page of each physiotherapy study in Croatia, inviting students to participate in the study. There were 372 respondents, but two questionnaires were removed due to their partial completion. The flowchart of the study is shown in Figure 1.

Measures

The Cognitive Emotion Regulation Questionnaire, a self-report instrument for detecting cognitive emotional strategies that a person uses after facing a negative event or situation, was used in the study (Garnefski et al., 2001; Soldo & Vulić-Prtorić, 2018).

Garnefski et al. (2001) showed that α reliabilities of the nine subscales ranging from 0.75 to 0.86 and the Croatian version of questionnaire reported by Soldo and Vulić-Prtorić (2018) showed α reliabilities of the nine subscales ranging from 0.73 to 0.89. In our sample α reliabilities of the nine subscales range from 0.58 to 0.67. According to Kline (2011), the values of Cronbach alpha of more than 0.5 are sufficiently discriminatory and the internal consistency reliability of Cronbach alpha is satisfactory. Principal component analyses supported the allocation of items to subscales, together explaining 64.6% of the variance with communalities ranging from 0.53 to 0.75 (Garnefski et al., 2001; Soldo & Vulić-Prtorić, 2018). Also, the nine subscales are highly intercorrelated, and they are grouped into adaptive and less adaptive regulation strategies where the α reliabilities for the adaptive and less adaptive strategy groups are 0.91 and 0.87 (Jermann et al., 2006). The Cognitive Emotion Regulation Questionnaire was adapted into several languages, and its good psychometric properties demonstrated in Italy
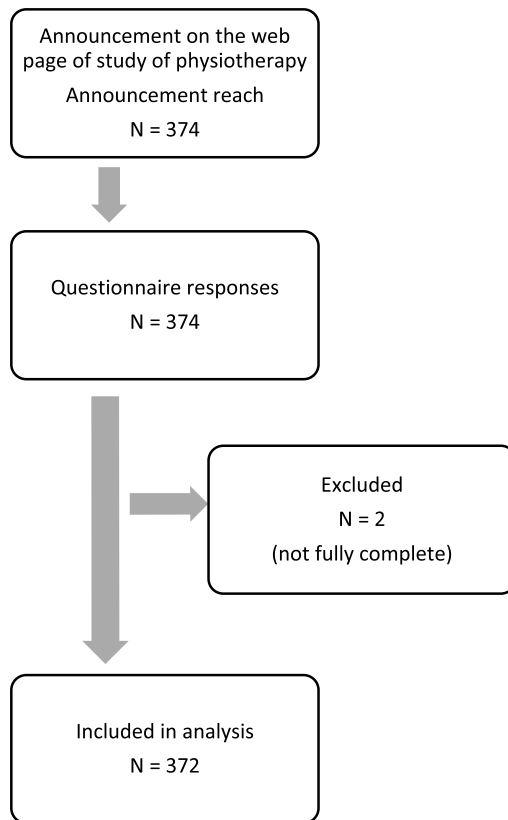
Figure 1. Flowchart of the study. Flow diagram of participant allocation is presented.

(Presaghi & Ercolani, 2005), France (Jermann et al., 2006), China (Zhu et al., 2008), Romania (Perte & Miclea, 2011), Hungary (Miklósi et al., 2011), Iran (Abdi et al., 2012), Turkey (Tuna & Bozo, 2012), Spain (Domínguez-Sánchez et al., 2013), Argentina (Medrano et al., 2013), Germany (Görgen et al., 2015), and Portugal (Costa Martins et al., 2016).

The questionnaire consisted of two parts. The first part consisted of three questions, and included demographic data about age, gender and year of study. The second part of the questionnaire consisted of 36 items, and nine subscales (self-blame, acceptance, rumination, positive refocusing, refocus on planning, positive reappraisal, putting into perspective, catastrophizing, blaming others), and each subscale consists of 4 items referred to cognitive strategies and emotional regulation. Less effective ways of cognitively reappraising a stressful or demanding situation include self-blame, rumination, catastrophizing and blaming others. More effective ways towards cognitively reappraising one's emotions include acceptance, positive refocusing, putting into perspective, positive reappraisal and refocus on planning (Garnefski & Kraaij, 2007).

The answers were offered on a scale from 1 to 5, where 1 indicated 'never', 2 'very rarely', 3 'sometimes', 4 'often' and 5 'always'. Subscale scores are calculated by summing the item scores that correspond to the related subscale (the subscales have scores ranging from 4 to 20).

The obtained results show the frequency of use of a particular strategy (Fernández Cruz et al., 2020). Higher scores indicate greater use of the coping strategy assessed, while a lower score indicates less use of the strategy (Fernández Cruz et al., 2020).

Data analysis

The Statistical Package for MedCalc (MedCalc Statistical Software 14.8.1, Oostende, Belgium) was used to conduct data analysis. The sample size was obtained by analysis of power with an estimated size of $d = 0.05$, significance level $\alpha = 0.05$ and power of 80% test and required 356 respondents. The variables used in the statistical analysis are based on the Cognitive Emotional Regulation Questionnaire, which includes nine sub-scales (self-blame, acceptance, rumination, positive refocusing, planning, positive reappraisal, putting in perspective, catastrophizing and blaming others). Furthermore, the research was conducted on two research groups according to gender and year of study.

Statistical analysis of data included descriptive statistics of data groups where values were expressed as mean and standard deviation. The Kolmogorov–Smirnov test was used to test the normality of the distribution. To test the differences between two independent groups, the Mann–Whitney U rank sum test was applied, while the non-parametric Kruskal–Wallis test was used to test the differences of several subgroups of variables. Categorical variables were tested with Fischer's exact test or chi-square test. All results were interpreted at the level of statistical significance $p < 0.05$.

Results

Demographic data of the participants are presented in Table 1. A total of 372 respondents were included in the study, with women making up the larger population group. The distribution of respondents according to the year of study revealed an even distribution across all years of study (>30%).

The most frequently used emotional cognitive regulation strategies are acceptance (9.18%, 10.21%) and positive reappraisal (6.12%, 7.30%) in both genders, which indicates that women and men most often use the mentioned strategies of emotional cognitive regulation.

In the first year of studies, planning (6.03%) and positive reappraisal (6.03%) are most often used as strategies of cognitive emotional regulation, while in the second and third year of study, acceptance (16.27%, 7.87%) is mostly used as strategies of cognitive emotional regulation. The frequency of using strategies of cognitive emotional regulation among students is presented in Table 2 and cognitive emotional regulation of students in

Table 1. Distribution of students in relation to age, gender and year of study.

Age (Years)	$x \pm$ SD
	20.98 ± 2.81
Gender *N* (%)	
Female	274 (73.6)
Male	98 (26.3)
Year of study *N* (%)	
First	116 (31.2)
Second	129 (34.7)
Third	127 (34.1)

Table 2. Frequency of using strategies of cognitive emotional regulation among students.

	Gender		Year of study		
	Male	Female	First	Second	Third
Strategies of cognitive emotional regulation	N (%)	N (%)	N (%)	N (%)	N (%)
Self-blame	1 (1.02)	1 (0.36)	1 (0.86)	1 (0.77)	0 (0.00)
Acceptance	9 (9.18)	28 (10.21)	6 (5.17)	21 (16.27)	10 (7.87)
Rumination	0 (0.00)	11 (4.01)	5 (4.31)	0 (0.00)	6 (4.72)
Positive refocusing	0 (0.00)	4 (1.45)	0 (0.00)	4 (3.10)	0 (0.00)
Refocus on planning	3 (3.06)	10 (3.64)	7 (6.03)	5 (3.87)	1 (0.78)
Positive reappraisal	10 (6.12)	20 (7.30)	7 (6.03)	14 (10.80)	5 (3.93)
Putting into perspective	0 (0.00)	12 (4.37)	1 (0.86)	9 (6.97)	2 (1.27)
Catastrophizing	0 (0.00)	1 (0.36)	1 (0.86)	0 (0.00)	0 (0.00)
Blaming others	0 (0.00)	1 (0.36)	1 (0.86)	0 (0.00)	0 (0.00)

relation to gender and year of study are presented in Tables 3 and 4. There is a statistically significant difference in the use of self-blame ($p < .001$), rumination ($p = 0.001$) and blaming others ($p = 0.018$) in relation to gender, where men use more self-blame and blaming others strategies, while women use rumination more. Also, there is a statistically significant difference in the use of acceptance ($p = 0.022$), rumination ($p < .001$) and blaming others ($p = 0.049$) in relation to the year of study.

In the strategies in which a statistically significant difference was determined, post hoc analysis showed that in all three strategies there was a statistically significant difference between the first and third as well as the second and third year of study, while no statistically significant difference was determined in any of the strategies between the first and second year of study. Acceptance is more used in the first and second year of study in contrast to rumination and blaming others, which is more used in the third year of study.

Emotional regulation refers to the way individuals regulate, experience and express their own emotions (Zhang & Bian, 2020; Zhao et al., 2020). It includes biological, social, behavioral and cognitive components and refers to a conscious or unconscious process that affects an individual's emotions (Lasa-Aristu et al., 2019). Changes in the cognitive process, metacognitive skills and planning abilities can affect the maturation of emotion regulation skills (Compas et al., 2017; Park et al., 2020).

Table 3. Cognitive emotional regulation of students in regard to gender.

Strategies of cognitive emotional regulation	Gender	Average rank	Mann-Whitney U	Test statistic Z	P value
Self-blame	Male	218.3	10310.0	3.4	<.001
	Female	175.1			
Acceptance	Male	188.4	13236.5	0.2	.834
	Female	185.8			
Rumination	Male	156.8	10516.0	3.2	.001
	Female	197.1			
Positive refocusing	Male	189.1	13166.5	0.3	.775
	Female	185.6			
Refocus on planning	Male	193.3	12752.0	0.7	.456
	Female	184.0			
Positive reappraisal	Male	185.6	13347.5	0.1	.931
	Female	186.7			
Putting into perspective	Male	189.3	13147.0	0.3	.758
	Female	185.5			
Catastrophizing	Male	189.5	13135.5	0.3	.749
	Female	185.4			
Blaming others	Male	208.4	11280.0	2.4	.018
	Female	178.7			

Table 4. Cognitive emotional regulation of students in regard year of study.

Strategies of cognitive emotional regulation	Year of study	Average rank	H	Ht; df = 2	P value
Self-blame	1st year	182.5	2.9	3.0	.220
	2nd year	177.2			
	3rd year	199.5			
Acceptance	1st year	193.4	**7.2**	**7.3**	**.022**
	2nd year	200.3			
	3rd year	166.2			
Rumination	1st year	185.7	**15.2**	**15.4**	**<.001**
	2nd year	160.8			
	3rd year	213.3			
Positive refocusing	1st year	196.0	2.3	2.3	.316
	2nd year	188.8			
	3rd year	175.6			
Refocus on planning	1st year	194.8	2.6	2.6	.265
	2nd year	191.2			
	3rd year	174.2			
Positive reappraisal	1st year	189.6	2.6	2.6	.272
	2nd year	195.5			
	3rd year	174.5			
Putting into perspective	1st year	196.4	1.6	1.6	.454
	2nd year	184.2			
	3rd year	179.8			
Catastrophizing	1st year	192.3	0.8	0.8	.661
	2nd year	180.0			
	3rd year	187.8			
Blaming others	1st year	167.4	**5.9**	**6.0**	**.049**
	2nd year	190.0			
	3rd year	200.4			

Cognitive emotional regulation strategies enable the improvement, maintenance or reduction of emotional reactions (Dunsmore et al., 2013; Zhang & Bian, 2020) and affect the physical and mental health of the individual (Minkel et al., 2012), interpersonal relationships and interaction with others (English et al., 2012). Belief about the regulation of emotions plays an important role when choosing a strategy for dealing with stressful situations (Gross, 2015) and the use of adaptive cognitive emotional regulation strategies is crucial for emotional status (Cai et al., 2012; McRae et al., 2012).

Discussion

The findings of this paper provide insight into the cognitive emotional regulation strategies of students which they use in stressful situations.

The most frequently used emotional cognitive regulation strategies are acceptance and positive reappraisal in both genders, which is in line with Hu et al. (2016) and Fernández Cruz et al. (2020). Acceptance allows physiotherapy students to deal with everyday academic and clinical stress while positive repraisal helps physiotherapy students to focus on those positive aspects in the academic and clinical environment (Fernández Cruz et al., 2020).

Research indicates that use of less effective cognitive emotional strategies is associated with negative mental health outcomes, such as depression and anxiety (Compas et al., 2017; Zhao et al., 2020) while the use of effective strategies is inversely proportional to negative mental health outcomes (Martin & Dahlen, 2005; Potthoff et al., 2016). The use of positive reappraisal is considered to have a beneficial role with regard to its positive effect on mental health, good interpersonal functioning, social relationships and a higher level of

well-being (Aldao et al., 2010; Dan-Glauser & Gross, 2011). Also, previous research has shown that by applying positive reappraisal in a stressful situation, there is greater activation of the prefrontal brain regions involved in cognitive control (Drabant et al., 2009). This results in our study pointing out that physiotherapy students of both genders most often use effective cognitive emotional regulation strategies in order to cope with stressful situations more easily, which certainly contributes to their mental health.

We have found a significant difference between female and male physiotherapy students in the use of self-blame, rumination and blaming others, which indicates that women more often use less effective ways of cognitively reappraising a stressful or demanding situation. These findings are in line with results of Nolan-Hoeksema (2012), Romosan et al. (2018) and Parkins (2012) which suggest that women use less effective cognitive emotional regulation strategies compared to men. Garnefski et al. (2004) indicated that women reported to ruminate as well as to catastrophize more often than men, while suggesting that males scored significantly higher than females only in blaming others. But contrary to results, Hu et al. (2016), point out that male students tended to use maladaptive strategies such as catastrophizing and blaming others. This difference could be related to sample groups and different countries' cultures.

Empirical research indicates that women generally tend to rely on passive and emotion-coping strategies to a greater extent than men (Vingerhoets & Van Heck, 1990). It is considered that gender is a predictor in the development of cognitive emotional regulation strategies (Flannery et al., 2018; Park et al., 2020). Also, it is believed that women tend to focus more on their emotional experience, acknowledge emotions and talk about them more openly and think about emotions more than men (Garnefski et al., 2004). A previous study suggests that women generally have more ruminative responses than men, and they are more likely to boost their mood by thinking about their depressive states than men (Nolan-Hoeksema, 2012). The reason for the above may be the greater awareness and tendency of women towards their own emotions.

In comparison our results on physiotherapy students to other medical students, Romosan et al. (2018) showed that general medicine students scored significantly higher than dental medicine, and general nursing students in blaming others, and that dental medicine student scored significantly higher in blaming others. They revealed significant differences between general, dental, and nursing students in respect to emotion recognition abilities, and emotion regulation (coping) strategies (Romosan et al., 2018). The dissimilarities in emotional cognitive strategies between medical students of different profiles (physiotherapy, general medicine, dental medicine, general nursing) may be due to differences in courses or teaching techniques.

The present study showed a statistically significant difference in the use of acceptance ($p = 0.022$), rumination ($p = 0.001$) and blaming others ($p = 0.049$) in relation to the year of study. This is in line with the results of Kneeland and Dovidio (2020) suggesting that first-year students use more effective cognitive emotional strategies, but contrary to the study Livingstone et al. (2020), Aldao (2013), Srivastava et al. (2009) and Conley et al. (2010). They suggest that students use more maladaptive emotion regulation strategies over the first two years of college (Aldao, 2013; Conley et al., 2010; Livingstone et al., 2020; Srivastava et al., 2009).

Although we expected to see greater use of adaptive (and lesser use of maladaptive) emotion regulation over time, findings from our study indicate more use of rumination

and blaming others in the third year of college. Findings from Park et al. (2020) indicate that emotion regulation strategies change over the first, second and third year of college, but changes aren't consistent with maturation towards the use of more adaptive and less maladaptive emotion regulation strategies. The reason for our findings may be the COVID-19 pandemic, that is, that the duration of the pandemic led to a greater use of rumination and self-balming among third-year students. So, the results may be a reflection of adaptation to a new environment and the specific requirements of certain situations such as COVID-19, at the beginning of this study. During their first year of study, these (third year) students encountered the beginning of the COVID-19 pandemic, and various challenges (following classes, mastering study content, academic environment) which can lead to insecurity in the ways of expressing emotions or the experience of unpleasant situations, which results in the use of less effective strategies (Park et al., 2020).

Universities are considered to provide significant support to first-year students, while institutional support decreases in the second year of study (Park et al., 2020). The transition to the second year of study is associated with an increase in academic and interpersonal stressful situations (Conley et al., 2010; Ishitani, 2016). The second year of study is considered an academic turning point due to developing a sense of purpose, gaining functional independence, consolidation of the main field of study and more intense interpersonal relationships (Black, 2014; Sterling, 2018). Consequently, the first two years of study are considered a critical period for the development of cognitive emotional regulation strategies (Park et al., 2020).

Therefore, due to the critical period of study due to the COVID-19 pandemic and adaptation to academic challenges, physiotherapy students in the third year used more maladaptive emotional regulation strategies despite our expectations for the use of adaptive emotional regulation strategies.

Emotional regulation affects the involved cognitive processes in learning, from motivation, information processing, establishing significant connections between new content and previous knowledge to using information or demonstrating what has been learned through tests and exams (Fernández Cruz et al., 2020). So, it is important to assess the cognitive emotional regulation of physiotherapy students in stressful academic situations (such as learning efforts, achieving an activity in at certain time, demonstrating knowledge in front of an examiner or on an exam) which could affect their academic performance or can jeopardize the student's academic progress (Fernández Cruz et al., 2020). Also, the use of less effective cognitive emotional regulation strategies is associated with academic failure (Fernández Cruz et al., 2020).

So, it is necessary to keep in mind that each emotion is triggered by a particular stimulus, and that the effectiveness of regulatory strategies depends on the stimulus that caused the emotional reaction (Sterling, 2018). It is considered that applying the same strategy when dealing with different emotional stimuli is unlikely to be equally effective (Sterling, 2018).

The results in this study emphasize the importance of promoting the use of effective cognitive emotional regulation strategies as a protective factor when dealing with stressful situations, in order to achieve positive outcomes and the psycho-physical well-being of physiotherapy students.

We use the Cognitive Emotion Regulation Questionnaire to detect frequently used cognitive emotional strategies in physiotherapy students' stressfull events in order to

provide appropriate interventions. Also, assessing coping mechanisms in physiotherapy students can be helpful in identifying individuals that are more vulnerable to stress. Vulnerable students have the tendency to experience a mixture of disruptive thoughts and emotions and are, therefore, more prone to engage in maladaptive coping responses (Romosan et al., 2018).

Interventions that promote more adaptive emotion regulation, may also be usefully delivered in a university setting, perhaps as part of student wellness or integrated into coursework of physiotherapy students (Park et al., 2020). Also, workshops and the course of counseling with physiotherapy students, encouraging students to engage in cognitively adaptive ways of thinking can serve as solid method to help physiotherapy students in an academic and professional environment (Hu et al., 2016). Explicit focus on emotion regulation skills may be a key element of such interventions (Park et al., 2020). Sarani et al. (2020) reported that effective control over one's emotions is necessary along with the cognitive skills for the acquisition of significant academic skills. Moreover, they suggest that an improvement in the physiotherapy students' emotional intelligence leads to optimal learning and improving the quality of educational outcomes (Sarani et al., 2020).

Education of the physiotherapy student's on the use of more adaptive strategies could have a positive effect on the students' learning quality, self-efficacy at the educational level, their decision-making abilities, their performance during stressful situations, and the quality of physiotherapy provided to patients (Sarani et al., 2020; Sheikhbardsiri et al., 2020). In this way, physiotherapy students could more easily cope with stressful situations during their college years and in clinical work with patients, which could contribute to greater efficiency in future professional tasks and maintenance of mental health.

The literature demonstrating that healthy emotion regulation is strongly implicated not only in academic success but also in personal health and well-being suggests that interventions to promote more adaptive emotion regulation may have large long-term benefits for physiotherapy students (Abdollahyar et al., 2016; Park et al., 2020).

Therefore, the implications of the findings can help in the detection of vulnerable physiotherapy students, education about more effective cognitive emotion regulation strategies and integration of emotional cognitive skills in the courses during college years. To teach physiotherapy students about adaptive emotion regulation strategies and interpersonal communication strategies, and provide them with opportunities to interact and practice emotion regulation strategies in their relationships, and maybe specific educational schedules should be developed for physiotherapy students.

Also, the findings of this study will contribute to greater attention and awareness of teachers towards the cognitive-emotional response of physiotherapy students, which will contribute to the quality of the teaching process.

The limitations of the study refer to the impossibility of comparing the results with students of other studies in the field of social sciences, natural sciences and humanities with the aim of seeing if cognitive emotional regulation strategies are related to the field of study.

In conclusion, we can say that assessment of cognitive emotional regulation strategies in physiotherapy students is important because it can affect their academic and professional success. The results of this study suggest the necessity of developing guidelines

for the adoption of more effective cognitive emotional regulation strategies among physiotherapy students. Effective emotional responses facilitate the individual's functional adaptation to stressful emotional situations. The ability to regulate the impact of stress effectively is essential for the physical and emotional health of physiotherapy students.

Author's contribution

All authors have substantially contributed to the study and the current article. MA contributed to the conception and design of the study, literary research, analysis and interpretation of the data and writing of the manuscript. AK contributed to the data collection. MĆ contributed to the analysis and interpretation of the data. PV contributed to critical revision of the study. All authors approved the final manuscript. The study was conducted in accordance with the Declaration of Helsinki and was approved by an Institutional Review Board/Ethics committee. See details under Methods. Participants have given informed consent to participate in the research.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Data availability statement

Data are not available due to ethical restrictions. Due to the nature of this research, participants of this study did not agree for their data to be shared publicly, so supporting data are not available.

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