

Research article

The mediating role of emotional empathy in the relationship between nursing students' emotional intelligence levels and their self-efficacy in pain management

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ABSTRACT

Background: In nursing care emotional intelligence and emotional empathy are important competencies, so determining their roles in pain management self-efficacy has become required for nursing students.

Aim: To determine the mediating role of emotional empathy in the relationship between nursing students' emotional intelligence levels and their pain management self-efficacy.

Design: This is a cross-sectional and correlational study.

Settings: The study was conducted at a nursing department of a state university in Turkey between 15 May-31 June 2024 in the spring semester of the 2023-2024 academic year.

Participants: The study population consisted of 2nd, 3rd, and 4th year nursing students with clinical practice experience ($N = 326$).

Methods: Data were collected with personal information form, emotional intelligence trait scale short form, pain management self-efficacy scale, and multidimensional emotional empathy scale. Pearson r correlation, linear regression analysis and PROCESS Macro simple mediation analysis were used for advanced data analyses.

Results: There were statistically significant and moderate positive correlation between emotional intelligence and pain management self-efficacy levels ($r = 0.361, p < 0.01$), emotional intelligence and emotional empathy levels ($r = 0.343, p < 0.01$), and pain management self-efficacy and emotional empathy levels ($r = 0.358, p < 0.01$) of the students. Emotional intelligence and emotional empathy were predictors of pain management self-efficacy (13 % and 12.8 %, respectively). Emotional empathy had a partial mediating role in the relationship between emotional intelligence and pain management self-efficacy (indirect effect = 0.1246, 95 % CI = [0.0667, 0.1987]).

Conclusions: Emotional intelligence, emotional empathy, and pain management self-efficacy were positively correlated. Emotional intelligence and emotional empathy can be predictors for pain management self-efficacy. Emotional empathy was a partial mediator that enables nursing students' emotional intelligence skills to reflect on their pain management self-efficacy.

1. Background

Pain knowledge and management constitute an important part of nursing care (Fang et al., 2017; Latina et al., 2015; Kasar and Yilmaz, 2024). The concept of pain management includes skills such as identifying and evaluation of patients' physiological and behavioral responses to pain (Senyüz and Kocası, 2017; Gurel and Kocası, 2022), implementation and follow-up of pain treatment, knowledge about pain pharmacology, monitoring the effect and side effects of the treatment, identifying and implementing non-pharmacological methods, positioning of the patient, providing education for the patients and their

families. Effective pain management may result in conditions, that positively affect patient's quality of life, such as decreased opioid use and complications, increased mobilisation and recovery time, and shortened hospital stay (Senyüz and Kocası, 2017). Therefore, in undergraduate education, students should be provided with sufficient pain management skills mentioned above, before they start nursing profession (Evans and Mixon, 2015). In undergraduate education, students are expected to gain pain knowledge through theoretical courses while improving their pain management skills through clinical practice (Cousins et al., 2022). In literature, it was observed that the majority of the studies aimed to measure the knowledge and attitudes of nursing

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students about pain management (Chan and Hamamura, 2016; Hroch et al., 2019; Karaman et al., 2019), however pain management self-efficacy is also an important factor affecting their attitudes and behaviors (Alzghoul and Abdullah, 2020; Kasar and Yilmaz, 2024). One of the factors that affect pain management is self-efficacy, which is the belief that a person can create good results in a field (Wright and Schutte, 2014). Accordingly, in order to provide effective patient care, it is recommended that nursing students' pain management competency and influencing factors should be determined (Cousins et al., 2022).

Emotional intelligence, which is expressed as competencies such as perceiving, understanding, managing and controlling emotions of one's own and others (Wright and Schutte, 2014), empathy, and social skills (Issa et al., 2022), is a concept frequently encountered in nursing and nursing education in recent years. Emotional intelligence is used as an educational strategy to improve nursing care (Issa et al., 2022), therefore emotional intelligence development in students would be also beneficial in improving their care practices during their clinical practice and before starting the nursing profession (Dugué et al., 2021). Since pain is subjective data it is necessary for nurses to identify and evaluate patients' physiological and behavioral pain responses (Gurel and Kocaşli, 2022). For this reason it is believed that emotional intelligence may be critical in pain management (Herr et al., 2018). It is stated that being aware of one's own emotions and having high emotional intelligence supports taking sufficient time to manage patient pain effectively (Issa et al., 2022). Although studies conducted with nursing students are limited, Chan and Hamamura (2016) reported that nursing students with high emotional intelligence may be more likely to understand the emotions of patients in pain, which may improve the accuracy of pain identifying and management (Chan and Hamamura, 2016). Since self-efficacy is an important factor in effective pain management (Alzghoul and Abdullah, 2020), to determine the impact of emotional intelligence on pain management self-efficacy may contribute to literature.

Another important concept in human relations is empathy, which is a social skill that involves understanding and sharing the emotional state of another person (Flasbeck et al., 2023). As a multi-dimensional concept, empathy consists of cognitive and emotional sub-dimensions. The individual can distinguish between their own thoughts and the other person's thoughts using the cognitive dimension of empathy. The emotional empathy dimension, on the other hand, is about feeling the same emotion as the person experiencing the event and taking action accordingly (Turan et al., 2021). Establishing an empathic approach in communication with patients helps them to cope with negative emotions and increases patient participation in treatment and care (Petrucci et al., 2016). Effective pain management includes the assessment of emotional and nonverbal pain responses as well as the verbal expression of the patient (Senyüz and Kocaşli, 2017). Emotional empathy, as a component of emotional intelligence, may be important in understanding the underlying meaning of patients' these verbal and nonverbal pain messages. Also in nursing care empathic approach to the patient may help patients express themselves more comfortably and accurately, and this will invariably increase the pain management success (Wu, 2021). These findings may be integrated into issues such as the patient's feeling of pain and participation in pain management. Xu et al. (2023) states that with emotional empathy nursing students may better understand and identify positive and negative emotions of others, such as pain (Xu et al., 2023). Cousins et al. (2022) stated that nursing students can provide effective pain management when they can identify the pain of patients. On the other hand, lived experiences may increase individuals' empathy skills (Teófilo et al., 2019). Therefore, a person experiencing pain will be able to empathize with the pain experienced by others. (Flasbeck et al., 2023). In line with this information, students' individual pain experiences may play a role in their pain management self-efficacy. There are limited studies about the relationship between emotional empathy and pain management self-efficacy levels of nursing nursing students. Therefore findings of current study may contribute to the literature.

Effective pain management needs both physical, emotional and

psychological approach (Alzghoul and Abdullah, 2020). Therefore, emotional intelligence and emotional empathy skills, as including these components, may help healthcare professionals in patient care and communication with them (Sa et al., 2019). When considered in terms of providing appropriate care by communicating with the patient in pain, these skills may help pain management. In the literature, there are different cross-sectional and correlational studies determining the levels of emotional intelligence, empathy, pain management self-efficacy, and pain knowledge of nursing students, but the number of studies determining the level of emotional empathy, which is a dimension of empathy, is limited. While there are studies about the effect of emotional intelligence on individual pain experience and pain coping skills (Ruiz-Aranda et al., 2011; Wright and Schutte, 2014), there is no research determining the mediating role of emotional empathy in the relationship between emotional intelligence and pain management self-efficacy.

In this respect this study aimed to determine the mediating role of emotional empathy in the relationship between nursing students' emotional intelligence levels and their pain management self-efficacy. Based on the literature the study posits the following hypotheses:

H1. There is a positive correlation between nursing students' emotional intelligence and their pain management self-efficacy levels.

H2. There is a positive correlation between nursing students' emotional empathy and their pain management self-efficacy levels.

H3. Emotional intelligence level significantly predicts nursing students' pain management self-efficacy levels.

H4. Emotional empathy level significantly predicts nursing students' pain management self-efficacy levels.

H5. Emotional empathy has a mediating role in the relationship between nursing students' emotional intelligence and their pain management self-efficacy levels.

2. Methods

2.1. Design

This is a cross-sectional and correlational study.

2.2. Setting and participants

The study population consisted of nursing students with clinical practice experience and who were studying in the nursing department of a state university in the spring semester of the 2023–2024 academic year. The first year students were not included in the study because they had no clinical practice experience during the first academic year (not yet providing care to the painful patient). For the study sample, we planned to reach all 2nd, 3rd, and 4th year nursing students with the whole number method. A total of 360 students were enrolled in these classes. According to the sample calculation with known universe; when the population size is 360, a sample size of 187 is required with a 95 % confidence level and a 5 % margin of error. A total of 326 students volunteered to participate in this study (90.5 % participation rate). The non-participant of 10 % were the students who refused to participate in the study.

2.3. Data collection

Data were collected through face-to-face interviews with a personal information form, emotional intelligence trait scale-short form, pain management self-efficacy scale, and multidimensional emotional empathy scale between 15 May–31 June 2024 in the spring semester of the 2023–2024 academic year.

2.3.1. Data collection forms

2.3.1.1. Personal information form. It was prepared in line with the literature (Deniz et al., 2013; Turan et al., 2021; Sayılan et al., 2022) and consisted of 8 questions to determine some demographic characteristics of the students.

2.3.1.2. Emotional intelligence trait scale short form. The scale was developed by Petrides and Furnham (2001), and adapted into Turkish by Deniz et al. (2013). The scale determines the level of students' perception of emotional intelligence competencies and is a 7-point Likert-type scale (strongly disagree:1, strongly agree:7). In the scale consisting of four sub-dimensions (well-being, self-control, emotionality and sociability) and 20 items. All items of the scale are summed to obtain a total scale score. A high score obtained from the total scale indicates that individuals have high emotional intelligence competence (Deniz et al., 2013; Kartol et al., 2024). Item 2, 4, 5, 7, 9, 11, 12, 14, 17 and 19 are reversed. Cronbach's alpha coefficient of the scale is 0.81 (Deniz et al., 2013). In the current study, Cronbach's alpha coefficients were calculated as 0.719 for the whole scale, and 0.525 for well-being sub-dimension, 0.545 self-control sub-dimension, 0.505 for emotionality sub-dimension and 0.495 for sociability sub-dimension.

2.3.1.3. Pain management self-efficacy scale. The scale was developed by Macindo et al. (2018), and adapted into Turkish by Sayılan et al. (2022). The scale measures the self-efficacy and confidence perceived by nurses and student nurses in pain management and it consists of 21 items. The scale has four sub-dimensions: self-efficacy in comprehensive pain management (14 items), self-efficacy in evaluative pain management (4 items), self-efficacy in complementary pain management (3 items) and self-efficacy in general pain management (21 items). A minimum score of 0 and a maximum score of 105 are obtained from the scale. The higher the score indicates the higher the individual's self-efficacy in pain management. The Cronbach's alpha coefficient of the scale is 0.90 (Sayılan et al., 2022). In the current study Cronbach's alpha coefficients were calculated as 0.935 for the whole scale and 0.911 self-efficacy in comprehensive pain management sub-dimension, 0.750 self-efficacy in evaluative pain management subdimension, 0.669 self-efficacy in complementary pain management subdimension.

2.3.1.4. Multidimensional emotional empathy scale. The scale including multidimensional assessment of empathic skills was developed by Caruso and Mayer (1998) and adapted into Turkish by Turan et al. (2021). The scale consists of 30 questions and is 5-point Likert-type (strongly disagree = 1, strongly agree = 5). The scale consists of the sub-dimensions of suffering (8 items), positive sharing (5 items), sensitive crying (3 items), emotional attention (4 items), feeling others (4 items), and emotional contagion (2 items). A minimum score of 30 and a maximum score of 150 is obtained from the scale. The Cronbach's alpha coefficient of the scale is 0.90 (Turan et al., 2021). In the current study the Cronbach's alpha coefficients were calculated as 0.862 for the whole scale and 0.719 suffering subdimension, 0.751 positive sharing subdimension, 0.637 sensitive crying subdimension, 0.503 emotional attention subdimension, 0.508 feeling others subdimension, 0.495 emotional contagion subdimension.

2.4. Data analysis

Data were analyzed using a statistical analysis program. Tests of normality and homogeneity of variance, central tendency measures (skewness, kurtosis values) (Table 1) and also Q-Q Plot drawings were conducted respectively. All scale scores were found normally distributed. Therefore parametric analyses were conducted in the current study. Descriptive statistical methods (number, percentage, min-max values, median, mean, standard deviation), independent t t-test, one-

Table 1

Mean scores and distribution characteristics for the scales.

	Min-Max	Mean \pm SD	Skewness	Kurtosis
Pain Management Self-Efficacy Scale	41.00-97.00	77.13 \pm 14.01	-0.652	-0.408
Comprehensive pain management self-efficacy	25.00-67.00	52.08 \pm 9.29	-0.701	-0.276
Evaluative pain management self-efficacy	8.00-20.00	15.05 \pm 2.87	-0.438	-0.409
Complementary pain management self-efficacy	4.00-15.00	10.00 \pm 2.57	-0.217	-0.605
Emotional Intelligence Trait Scale Short Form	47.00-99.00	74.71 \pm 10.24	-0.012	-0.373
Well-being	11.00-28.00	20.33 \pm 3.53	-0.526	-0.323
Self-control	9.00-26.00	17.17 \pm 3.92	-0.111	-0.345
Emotionally	6.00-27.00	18.22 \pm 4.28	-0.270	-0.096
Sociability	10.00-27.00	18.98 \pm 3.28	-0.106	-0.075
Multidimensional Emotional Empathy Scale	85.00-140.00	117.67 \pm 13.49	-0.634	-0.578
Suffering	22.00-40.00	34.37 \pm 4.14	-0.739	-0.400
Positive sharing	13.00-25.00	21.39 \pm 3.04	-0.760	-0.102
Sensitive crying	3.00-15.00	10.13 \pm 3.01	-0.432	-0.396
Emotional attention	8.00-19.00	14.03 \pm 2.71	-0.332	-0.692
Feeling others	8.00-20.00	14.81 \pm 2.66	-0.506	-0.340
Emotional contagion	3.00-10.00	7.72 \pm 1.59	-0.502	-0.233

way analysis of variance and Pearson's r correlation were used. A linear regression analysis was used to test the relationship between pain management self-efficacy, emotional intelligence and emotional empathy. A simple mediation model was executed utilizing the spss PROCESS Macro simple mediation analysis.

2.5. Ethical considerations

Ethics committee permission (Number: E-10333602-050.04-239,692, date: February 15, 2024), written and verbal permissions were obtained from the students. Written permissions were obtained from scale owners via e-mail between November 13, 2023, and December 20, 2023.

3. Results

Of the students who participated in the study, 52.2 % were female, 35.6 % were 3rd year students, and the mean age was 21.86 ± 1.75 years. The students reported that they most frequently (73.3 %) experienced acute pain during their life (Table 2).

When the mean scores of the scales were examined, the mean score of pain management self-efficacy scale was 77.13 ± 14.01 (min:41, max:97), the mean score of the emotional intelligence trait scale was 74.71 ± 10.24 (min:47, max:99) and the mean score of the multidimensional emotional empathy scale was 117.67 ± 13.49 (min:85, max:140) (Table 1). The mean scores of the scales for some socio-demographic data of the students were also analyzed. The mean scores of the 4th year students on the emotional intelligence scale (77.06 ± 0.97) were significantly higher than the mean scores of the students in the other years ($F = 4.962, p = 0.008$). The mean pain management self-efficacy scores of students who reported that they most frequently experienced chronic pain individually during their life (82.34 ± 9.36) were significantly higher than the mean scores of students who most frequently experienced acute pain individually (75.25 ± 14.47) ($F = 8.472, p = 0.000$). The mean scores of the students in terms of other sociodemographic characteristics were similar ($p > 0.05$).

Pearson correlation analysis was performed. There were statistically significant and moderate positive correlation between emotional

Table 2
Mean scale scores according to some sociodemographic characteristics of the students (N = 326).

	n (%)	Pain Management Self-Efficacy Scale	Emotional Intelligence Trait Scale	Multidimensional Emotional Empathy Scale
Gender	186(52.2)	78.00 ± 13.69	75.00 ± 10.42	118.77 ± 13.19
Female	146(48.8)	76.06 ± 14.36	74.34 ± 10.03	116.30 ± 13.76
Male		(<i>t</i> = 1.233; <i>p</i> = 0.219) ¹	(<i>t</i> = 0.572; <i>p</i> = 0.568) ¹	(<i>t</i> = 1.641; <i>p</i> = 0.102) ¹
Age	136	75.72 ± 14.63	74.39 ± 9.70	117.86 ± 13.06
<22	(41.79)	78.14 ± 13.49	74.93 ± 10.63	117.53 ± 13.81
>22	190(58.3)	(<i>t</i> = -1.517; <i>p</i> = 0.130) ¹	(<i>t</i> = -0.471; <i>p</i> = 0.638) ¹	(<i>t</i> = 0.215; <i>p</i> = 0.830) ¹
($\bar{X} \pm SD$; 21.86 ± 1.75)				
Grade	113(34.7)	76.73 ± 14.68	73.69 ± 10.13	117.15 ± 13.43
2	117(35.6)	77.26 ± 12.74	73.07 ± 9.63	117.83 ± 13.24
3	96 (29.7)	77.44 ± 14.75	77.06 ± 10.49 (<i>F</i> = 4.962; <i>p</i> = 0.008*) ²	13.94 ± 13.94
4		(<i>F</i> = 0.074; <i>p</i> = 0.928) ²		(<i>F</i> = 0.137; <i>p</i> = 0.872) ²
Type of pain experienced before				
Acute pain				
Chronic pain				
Both	239(73.3)	75.25 ± 14.47	75.82 ± 10.57	117.43 ± 14.10
	43 (13.2)	82.34 ± 9.36	71.79 ± 9.12	118.53 ± 11.89
	44 (13.5)	82.27 ± 12.82	71.47 ± 8.15	118.13 ± 11.59
		(<i>F</i> = 8.472; <i>p</i> = 0.000*) ²	(<i>F</i> = 0.911; <i>p</i> = 0.110) ²	(<i>F</i> = 0.151; <i>p</i> = 0.860) ²

¹ Independent *t*-test

² One-Way Anova

* Significant at level *p* < 0.01.

intelligence competence levels and pain management self-efficacy levels ($r = 0.361$, $p < 0.01$), emotional intelligence competence levels and emotional empathy levels ($r = 0.343$, $p < 0.01$), and emotional empathy levels and pain management self-efficacy levels ($r = 0.358$, $p < 0.01$) (H1 and H2 accepted respectively) (Table 3).

Linear regression analysis was performed to investigate the effect of emotional intelligence and multimodal emotional empathy on pain management self-efficacy. Emotional intelligence ($\beta = 0.493$, $t = 6.961$, $p < 0.01$) had a significant and positive effect on pain management self-efficacy and explained 13 % of the model ($R^2 = 0.130$) (H3 accepted). On the other hand multidimensional emotional empathy ($\beta = 0.372$, $t = 6.904$, $p < 0.01$) also had a significant and positive effect on pain management self-efficacy, explaining 12.8 % of the model ($R^2 = 0.128$) (H4 accepted). In this analysis emotional intelligence and emotional empathy were identified predictor variables and pain management self-efficacy as the predicted variable (Table 4). Another linear regression analysis was performed to investigate the effect of emotional intelligence on multimodal emotional empathy. Emotional intelligence ($\beta = 0.452$, $t = 6.576$, $p < 0.01$) had a statistically significant and positive effect on multidimensional emotional empathy and explained 11.8 % of the model ($R^2 = 0.118$). In this analysis emotional intelligence was identified as a predictor variable and emotional empathy as the predicted variable (Table 5).

The mediating role of emotional empathy in the relationship between emotional intelligence and pain management self-efficacy was investigated via PROCESS macro simple mediation analysis. The direct effect of emotional intelligence on pain management self-efficacy ($\beta = 0.3686$, $SE = 0.0728$, $p < 0.01$) and its indirect effect ($\beta = 0.1246$, 95 % CI [0.0667–0.1987]) were both found to be positive and significant. According to results, the effect of emotional intelligence on pain

Table 3
Correlations between scores of the scales.

		Pain Management Self-Efficacy Scale	Multidimensional Emotional Empathy Scale
Emotional Intelligence Trait Scale	<i>r</i>	0.361	0.343
	<i>p</i>	0.000*	0.000*
Multidimensional Emotional Empathy Scale	<i>r</i>	0.358	
	<i>p</i>	0.000*	

* Significant at the level $p < 0.01$.

management self-efficacy decreased ($\beta = 0.1246$) but still persisted. In the analysis performed with the Bootstrap method, the 95 % confidence interval of the mediation effect (0.0667, 0.1987) did not contain zero (0) and the indirect effect was significant. Hence the identification of essential key elements for a mediator effect has been accomplished (Hayes, 2022; Bozkurt, 2023). This result indicates that emotional empathy had a partial mediator role in the relationship between emotional intelligence and pain management self-efficacy (H5 was accepted). In this analysis emotional intelligence was identified as predictor variable, emotional empathy as mediating variable, and pain management self-efficacy as the predicted variable (Table 6).

The path diagram, explaining the simple mediation results, is given in Fig. 1. Emotional intelligence had a significant and positive direct effect on pain management self-efficacy ($c' = 0.3686$). Emotional intelligence firstly had a significant and positive effect on emotional empathy ($a = 0.452$) and then emotional empathy also had a significant and positive effect on pain management self-efficacy ($b = 0.372$). Since the emotional empathy had a mediator role, emotional intelligence had an indirect effect (0.1246, CI[0.0667–0.1987.9]) on pain management self-efficacy. Additionally total effect of emotional intelligence on pain management self-efficacy as the sum of direct and indirect effects is significant and positive ($c = 0.4932$) (Fig. 1).

4. Discussion

4.1. Emotional intelligence levels of the students

In the current study, the emotional intelligence levels of nursing students were moderate compared to the literature findings. In the nursing profession emotional intelligence is a necessary skill to establish therapeutic relationships with patients and their families (Okumus and Ugur, 2017; Dugué et al., 2021), and to meet the physiological and emotional needs of patients (Okumus and Ugur, 2017). Since it is a skill that can be learned and developed at any age according to the results of the study, it is necessary to identify and increase the nursing school candidates' awareness of emotional intelligence. In the literature, there are findings supporting our study (Coban, 2022; Kaya et al., 2017), as well as a study (Yagcan et al., 2021) that determined higher levels of emotional intelligence in nursing students.

The emotional intelligence levels of 4th year students were significantly higher compared to those of the students in lower grades. We can say that emotional intelligence can develop and increase with increasing

Table 4
Regression for predicting emotional intelligence and emotional empathy on pain management self-efficacy.

Predicted variable	Predictor variables	β	SE	Beta	t	p	F	p	R ²
Pain Management Self-Efficacy Scale	Constant	40.284	5.343	–	7.540	0.000*	48.462	0.000*	0.130
	Emotional Intelligence Trait Scale	0.493	0.071	0.361	6.961	0.000*			
	Constant	33.371	6.380	–	5.230	0.000*	47.665	0.000*	0.128
	Emotional Empathy Scale	0.372	0.054	0.358	6.904	0.000*			

SE: Standard Error

* Significant at the level $p < 0.01$.

Table 5
Regression for predicting emotional intelligence on emotional empathy.

Predicted variable	Predictor variable	β	SE	Beta	t	p	F	p	R ²
Emotional Empathy Scale	Constant	83.916	5.181	–	16.197	0.000*	43.242	0.000*	0.118
	Emotional Intelligence Trait Scale	0.452	0.069	0.343	6.576	0.000*			

SE: Standard Error

* Significant at the level $p < 0.01$.

Table 6
The mediating role of emotional empathy in the relationship between emotional intelligence and pain management self-efficacy.

Path	Effect	β	SE	t	p	Status
Emotional Intelligence Trait → Pain Management Self-Efficacy	Total effect	0.4932	0.0709	6.9615	0.000*	Accepted
Emotional Intelligence Trait → Multidimensional Emotional Empathy → Pain Management Self-Efficacy	Direct effect	0.3686	0.0728	5.0635	0.000*	Accepted
	Indirect effect	0.1246	(%95 CI = 0.0667–0.1987)			Significant

SE: Standard Error, CI: Confidence Interval

* Significant at the level $p < 0.01$.

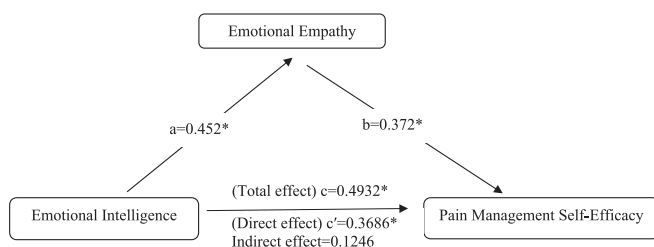


Fig. 1. The path diagram explaining the simple mediation results (*Significant at the level $p < 0.01$).

educational level and through clinical experience. Contrary to the research results supporting our findings (Foster et al., 2017; Budler et al., 2022; Bsharat, 2024; Jawabreh, 2024), Chan and Hamamura (2016) determined the highest level of emotional intelligence in 1st year students (Chan and Hamamura, 2016).

4.2. Emotional empathy levels of the students

In the current study, the emotional empathy levels of the students were moderate compared to literature findings. Considering that empathy is related to concepts such as clinical communication competence and professional attitude (Ding et al., 2020), this result may have been determined due to the insufficient clinical experience of nursing students. Ensuring therapeutic communication with patients through clinical practices (Moudatsou et al., 2020) may also positively affect the emotional empathy levels of students. There are a limited number of studies in the literature that determine the nursing students' emotional empathy levels. While the findings of Durgun and Aksoy (2024) were similar to the results of this study, Xu et al. (2023) determined a lower level of emotional empathy in nursing students (Xu et al., 2023).

4.3. Pain management self-efficacy levels of the students

In order to provide effective patient care, the practical skills of pre-nursing students for pain management should be determined (Cousins et al., 2022). In the study, the pain management self-efficacy levels of the students were determined at a moderate level compared to the literature findings, and the results show that the self-confidence of the students should be improved. It is recommended that nursing students should encounter different patient populations with different reactions to pain. As students' clinical experience increases, their pain assessment skills will also increase (Evans and Mixon, 2015). In this way, they will be adequately prepared for clinical practice and future nursing roles (Chow and Chan, 2015). Although the findings of Belli (2022) are similar to the results of this study, there are also studies that determine students' pain knowledge and management skills at a lower level and report that students have deficiencies in clinical area (Fang et al., 2017; Karaman et al., 2019; Sayilan et al., 2022; Hroch, et al., 2019). Supporting the students who are/will be practicing in the clinics in both theoretical and practical terms will increase their pain management self-efficacy.

4.4. The relationship between emotional intelligence, pain management self-efficacy, and emotional empathy levels of the students

In the current study, a correlation was found between students' levels of emotional intelligence and pain management self-efficacy. Students with high emotional intelligence can also perform individualized care (Culha and Acaroglu, 2019). This situation may be effective for students to make individualized pain identification and management. Thus, emotional intelligence may be a helpful property in the management of the patient with high pain levels. In the literature, it is reported that high emotional intelligence is related with high pain management awareness (Issa et al., 2022). Unlike the study result, Chan and Hamamura (2016) reported a negative correlation between nursing students'

emotional intelligence and pain knowledge levels (Chan and Hamamura, 2016). In the current study, a significant correlation was found between students' emotional intelligence and emotional empathy levels. Students with high levels of emotional intelligence may have an emotional empathetic approach. This supports that empathy is a component of emotional intelligence (Issa et al., 2022). Similar to our findings, Lopez-Zafra et al., 2013 found that emotional intelligence is related to both cognitive and emotional aspects of empathy and Arora et al. (2010) indicates that higher emotional intelligence is positively correlated with more compassionate and empathetic patient care. On the other hand, the effect of self-control, emotionality, and sociability (which are the determinants of emotional intelligence) on the emotional attention dimension of emotional empathy is quite high. Thus, nurses with high emotional intelligence will be able to better perceive the emotions of the patients they communicate with and treat them more sensitively (Kaya et al., 2017). In the literature, along with the research result that emotional intelligence will affect emotional empathy (Kim, 2022), there are also studies reporting that the general concept of empathy (Sa et al., 2019; Maximiano-Barreto et al., 2020; Deng et al., 2023) is related to emotional intelligence.

One of the important parameters affecting the pain assessment self-efficacy level was determined as emotional empathy. In this study, a significant correlation was found between students' levels of emotional empathy and pain assessment self-efficacy. These findings indicate that emotional empathy plays a crucial role in improving students' pain management self-efficacy due to they may feel more confident in pain management. The higher the empathy levels of nursing students, the greater their ability to understand the physical and psychological pain caused by the disease and the more they will be able to provide individualized care (Wang et al., 2020). It is reported that students with high empathic skills also have positive attitudes towards pain management (Coban, 2022).

4.5. The mediating role of emotional empathy

As each patient experiences pain in different ways, during clinical practice nursing students can acquire empathizing skills such as understanding the patient's world and to feel and think from the patient's point of view without judgement (Yang et al., 2020). In pain management, when the patient verbally states that they have pain, it is necessary to believe it (Gurel and Kocaşlı, 2022). In this respect, emotional empathy, as a part of the concept of emotional intelligence, may help students in identifying and evaluating the patient's pain effectively.

Emotional intelligence, that is necessary for better care for patients, is related to emotional aspects of empathy (Martos et al., 2013). In the current study it was found that emotional empathy mediates the relationship between emotional intelligence and pain management self-efficacy in nursing students. According to this finding, nursing students with high emotional intelligence may empathize and better understand patients' pain experiences, and this makes them feel more proficient in pain management. Since with emotional empathy, nursing students understand and identify positive and negative emotions of others (Velando-Soriano et al., 2023), the students believe that they can succeed in pain management by understanding the pain and emotions of patients when they give care to patients with pain during clinical practice. Showing understanding of their patients' pain experiences and making necessary interventions will be able to strengthen their communication with patients (Wu, 2021). When the patient-nursing student communication is strong, this may allow the patient to establish trust and they may be more involved in the pain treatment process. Therefore this can increase nursing students success in pain management.

In a systematic review and meta-analysis, it has been reported that students with high emotional empathy can experience pain and emotions similar to those of patients suffering from some difficult treatment processes, such as surgery or complications related to chemotherapy

(Velando-Soriano et al., 2023). When pain is considered an unpleasant experience, accordingly, individual pain experience may have a role in pain management by providing an empathetic approach to patients' pain. So in the current study we evaluated whether students have individual acute and chronic pain experience, affect their pain management self-efficacy. We found that students who individually experienced chronic pain most frequently compared to acute pain, got higher pain management self-efficacy levels, which supports that lived experiences of the students may increase their empathy skills.

4.6. Strengths and limitations of the study

It is essential to accept some limitations of this study. First, findings of the study were based on self-report datas which may lead to various methods biases (e.g., response bias, social desirability). Second, since our study has a cross-sectional design, it is not possible to determine the direction or causal effects of the relationships between variables. Third, the study included only nursing students in a department of a state university, so findings cannot be generalized to the universe or other student populations. Fourth, in the current study, we focused on key variables of interest so we exclude some demographic variables and other potential predictors from the regression models because they did not show a statistically significant effect ($p > 0.05$). Future research could explore the effect of these factors on the outcome variables, as their inclusion may influence model predictions. The strength of the research is that it contributes to the literature by being the first study that determined the mediating role of emotional empathy in the relationship between emotional intelligence and pain management self-efficacy among nursing students.

5. Conclusion

The findings suggest that emotional intelligence, emotional empathy and pain management self-efficacy are correlated concepts; however, prospective studies are needed to better understand the direction and/or strength of these correlations. Besides that, such studies on the factors that influence pain management self-efficacy of nursing students are important to help improve their patient care skills. Emotional intelligence may be a predictor for pain assessment self-efficacy. This finding shows that nursing students may have higher pain management self-efficacy levels when they can use their emotional intelligence more effectively. The current study also showed that emotional empathy was a partial mediator that enables nursing students' emotional intelligence skills to reflect on their pain management self-efficacy. It reveals that nursing students with emotional empathy may feel more self-efficacy in pain management processes. This result should be taken into consideration that emotional empathy is an important factor which supports nursing students to communicate effectively and to be more successful in pain management by displaying an empathetic approach.

5.1. Implications for practice

It is important to improve students' emotional intelligence in order for them to manage pain management processes more effectively. Including emotional intelligence-based skills educational settings or interventions may be beneficial in terms of improving pain management skills in nursing students. In addition, emotional empathy is a critical mediator that enables nursing students' emotional intelligence skills to reflect on their pain management self-efficacy. So, emotional empathy-oriented educational strategies may have a significant potential to strengthen pain management skills. By the way, it should not be ignored that while the lack of emotional empathy, which is one of the dimension of empathy, may negatively affect patient-health profession communication and patient care, state of extremity may also cause difficulty in maintaining emotional boundaries, excessive stress, burnout etc. Therefore it is important that nursing students should acquire skills for a

balanced empathy.

CRedit authorship contribution statement

Ilkay CULHA: Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

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Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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