



# Stress and academic engagement among Saudi undergraduate nursing students: The mediating role of emotion regulation and emotional intelligence

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## Abstract

**Aim:** To assess the mediating role of emotion regulation and emotional intelligence in the relationship between stress and academic engagement among Saudi undergraduate nursing students.

**Design:** This study employed a quantitative cross-sectional research design.

**Methods:** The study recruited 367 Saudi undergraduate nursing students at a major Saudi university. Structural equation modelling was used to explore the mediational model.

**Results:** The results of the ANOVA and Welch *F*-test demonstrated that the emotional intelligence, emotional regulation and academic engagement scores were statistically significantly different according to stress levels ( $p$ -values  $<0.01$ ). Perceived stress has a statistically significant moderate negative correlation with academic engagement and emotional intelligence and a strong negative correlation with emotional regulation. The results also showed that academic engagement had a statistically significant moderate positive association with emotional intelligence and emotional regulation. Results indicate that stress and academic engagement are negatively correlated among Saudi undergraduate nursing students. It focuses on the balancing functions of emotional regulation and emotional intelligence, highlighting their ability to lower stress levels and improve academic engagement.

No Patient or Public Contribution.

## KEYWORDS

academic engagement, emotional intelligence, nursing students, self-esteem

## 1 | BACKGROUND

Stressors are widely discussed in literature during the educational process of nursing programs due to the challenging emotional

engagement with patients, families and peers (Chun & Park, 2016). Nursing students report moderate to high levels of stress (Labrague et al., 2017) due to the baccalaureate nursing program being a very demanding university education (AACN, 2020). Nursing students

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encounter stressors when curricular requirements exceed their capabilities to deal with them (Chun & Park, 2016). Specifically, the clinical training requirements were challenging and were known as stress-producing situations according to students' perceptions (Chaabane et al., 2021). Gibbons et al. (2011) investigated the effects of stress on nursing students and their groundbreaking study revealed that stress is likely to lead to distress and was more often a predictor of well-being. Self-efficacy and support were also important predictors and avoidance coping was the strongest predictor of adverse well-being (Gibbons et al., 2011).

Stress may affect students' health in many dimensions, including physiological, psychological, spiritual and overall well-being (Michelangelo, 2015). Nursing students have psychological and physiological indicators of stress in higher proportion than in other areas. In Girard et al. (2017) study, nursing students reported a higher level of stress when compared with other majors and higher dropout rates, with students openly referring to their decision to stress as a cause for withdrawal from the program. According to Sutch (2022), Stress was one of the major causes of a decrease in the number of nursing graduates each year, which is contradicted by the improving demands of nurses worldwide. This problem may be an important predictor of a future shortage of qualified nurses at the bedside (Sutch, 2022). Therefore, it is essential to trace preventive measures that the students must possess and train to use to achieve better achievement in the academic period and will apply the experience in a future career (Mota et al., 2016). Thus, research on stress and stress prevention is of critical importance. According to Mota et al. (2016), there is a need to study the preventive and therapeutic actions that allow reflection and health outcomes for students' stress.

Student engagement focuses on how students demonstrate an interest in their learning and the strength of their relationships with the school, their peers and their professors (Hughes et al., 2020). Student participation has multiple dimensions, including behavioural, emotional and cognitive aspects. Spending time on educational tasks is a part of behavioural engagement, which is essential for learning (Hughes et al., 2020). Students also need to be emotionally and cognitively engaged; therefore, this form of engagement alone is insufficient (Wang et al., 2021). The degree to which students are invested in each of the three aspects can change over time and across different learning tasks. According to research by An et al. (2017), there is evidence for a favourable association between academic engagement and positive personal characteristics like positive emotions and subjective well-being. Academic engagement and academic efficacy were found to be also associated (An et al., 2017).

High emotional intelligence (EI) is required for the nursing profession. Nowadays, emotional intelligence is one of the required competencies in the job (Thomas et al., 2021). Emotional Intelligence has been identified in other professional areas to be supportive of decreasing stress and improving academic or professional performance (Orak et al., 2016). Emotional Intelligence is known to be one of the required skills to effectively cope with feelings of stress (Orak et al., 2016). Emotional intelligence is the capacity to pay attention

to other people's emotions, distinguish between them and utilize this knowledge to inform one's decisions and behaviour (Mayer et al., 2008). Being emotionally intelligent includes being able to control one's own emotions, comprehend the feelings of others, demonstrate empathy, adjust to changing circumstances and communicate emotions with others, all of which are critical abilities for nurses to possess (Giulia et al., 2019).

It has been observed that emotional intelligence declines stress levels during nursing education programs (Giulia et al., 2019). The decline in nursing students' capacity to perceive others' emotions over time in nursing schools is most notable in research on the emotional intelligence abilities of nursing students (Cheshire et al., 2020). Emotional Intelligence also describes a person's capacity to recognize and comprehend their own emotions, regulate and control them using specific coping mechanisms and apply their understanding of emotions to solve problems (Grewal et al., 2006). People with high emotional intelligence can typically engage with others in a receptive and acceptable manner throughout difficult situations, best responding to their surroundings with drive, perseverance, empathy and mental agility (Lowman & Thomas, 2015). On the other hand, people with low emotional intelligence are more prone to stress and burnout (Lowman & Thomas, 2015). According to a Saudi Arabian study, nurses with high emotional intelligence perform better at work (Hussien et al., 2020).

The capacity to control or adjust emotional expressions to promote performance, growth and or self-improvement is known as regulating emotion (ER) (Ononye et al., 2022). Students with a high level of emotional intelligence (EI) may be able to regulate their emotions, which implies that they may be able to make wise judgements and, consequently, be motivated to behave appropriately because of a knowledge of the situation (Giulia et al., 2019). Additionally, Hassan and Masood's (2022) study showed that Emotional Intelligence and emotional regulation are essential for academic performance since they affects one's capacity to influence others, communicate with others, cooperate and function in various academic contexts. Since emotions might extend students' attention and cognition for academic learning, as mentioned by Hassan and Masood (2022), it makes sense to infer that it would probably lead to attaining the desired results. However, depending on a person's drive level, the impact of emotions on attention and cognition may vary (Putwain et al., 2022). Therefore, improving emotional intelligence and emotional regulation skills requires a firm commitment to altering one's thinking and behaviour via growth and training (Santos et al., 2021). According to Santos et al., one of the critical success variables influencing students' personal and academic lives has been identified as emotional intelligence. Therefore, there is a demand to increase students' emotional regulation competencies so that they may succeed (Santos et al., 2021).

Nowadays, nursing students experience a wide range of stressors that affect their ability to use their cognitive and emotional regulation competencies, such as exams, a hostile learning environment, a lack of resources for help, inadequate instructor support and inadequate parental support (Romano et al., 2021). Students who frequently endure these stressors may become apathetic or

uninterested in their academic life, affecting their performance (Romano et al., 2021). It has been shown that emotional regulation and emotional intelligence are crucial human assets that can boost students' outcomes, such as academic performance, under such circumstances (Bermejo-Martins et al., 2021). Emotional regulation correctly anticipates and responds to difficult conditions in an academic setting (Romano et al., 2021).

According to Cassidy (2015), when students face educational challenges, emotional regulation is their capacity to deal with them successfully. It involves minimizing the impact of risk factors such as stressful academic life while enhancing protective factors such as social support, optimism and active coping that improve the capacity to handle such challenges (Cassidy, 2015).

Saudi Arabian undergraduate students who want to pursue a profession in nursing must enrol in a 5 years Bachelor of Nursing Sciences (BSN) program. This 5 years curriculum comprises an obligatory 1 years internship training program and four academic years in the nursing degree. There are two levels in the nursing program for each academic year. Saudi Arabian nursing students must complete theoretical and clinical requirements during their BSN degree. Each academic term takes 16 weeks. Teaching in both theory and practice continues through week 16. Every course has a different number of days spent in clinical placements. The goal of clinical assignments is the same throughout all nursing programs. This entails using a nursing process as a framework of people care, participating in nursing handovers and medical rounds, watching, helping with nursing interventions and maintaining records and notes of peoples' clinical conditions. The clinical evaluation of nursing students is conducted in a variety of methods. The use of a clinical evaluation sheet, an Objective Structured Clinical Examination (OSCE), daily homework assignments and written case studies. Many studies claim that clinical training causes stress for nursing students in Saudi Arabia (Aljohani et al., 2021; Hamaideh et al., 2017). Stress-related unpleasant experiences like these might hinder student learning and lower the standard of care provided to the peoples (Alghamdi et al., 2019).

Traditional nursing bachelor's degree admission requirements, according to Smith (2016), prioritize academic performance but do not include a student's emotional intelligence. Crawford et al. (2021) highlighted that the admissions test of nursing students should not be the primary deciding criteria for enrollment in the nursing program. All essential nursing education programs and careers strongly emphasize emotional intelligence and regulation. Nurses' use of emotional intelligence is crucial because it teaches them how to handle stress, emotions and relationships with patients, families and other healthcare professionals. High emotional intelligence may aid the nurse in upholding and strengthening self-control and emotional regulation (Smith, 2016).

The educational environment varies and there is intense competition among students to succeed. Students often struggle to regulate their emotions when faced with various situations at university. Managing stress and high academic engagement is essential to keep up with higher education programs' demands. Emotional intelligence

and emotional regulation can enhance students' learning competence and make them efficient and successful learners. Employability success (Shi & Du, 2020), life success (Moeller et al., 2020), occupational stress (Cherkowski et al., 2021), resilience in nursing students with academic performance (Crawford et al., 2021) and other factors have all been studied with emotional intelligence (ALmegewly et al., 2022). Based on the literature review, academic engagement can relate to emotional intelligence and emotional regulation and emotional intelligence can function as a mediation factor in the link between academic engagement and stress (ALmegewly et al., 2022; Zheng et al., 2020). However, empirical data integrating emotional intelligence and emotional regulation, as mediating factors affecting the relationship between stress and academic engagement in a single study needs more concentration (Nauman et al., 2019; Roso-Bas et al., 2016; Zheng et al., 2020). This study aimed to assess the mediating role of emotion regulation and emotional intelligence in the relationship between stress and academic engagement among Saudi undergraduate nursing students. This is a crucial research topic since it will provide some insight into the Saudi experience. Additionally, it will contribute significantly to the increasing body of scholarship. Therefore, we hypothesize that perceived stress will be negatively associated with academic engagement. Emotional intelligence and emotion regulation are hypothesized to have a negative association with perceived stress and a positive association with academic engagement. Lastly, emotional intelligence and emotion regulation are hypothesized to have a mediating role in the association between perceived stress and academic engagement.

## 2 | METHODS

### 2.1 | Research design

Cross-sectional descriptive correlational design using questionnaires to understand the relationship between the variables and the mediating role of emotional intelligence and emotional regulation. A cross-sectional study design was selected for this study because, according to the Institute for Work and Health (2015), this design provides an opportunity for any study to be able to explore the relationship between different variables. Additionally, the cross-sectional design made it possible to conduct a study efficiently (Setia, 2016). The STROBE guideline was used to report this study.

### 2.2 | Sample

A convenient sampling method was used to invite Bachelor nursing students from King Saud University's Nursing Program, who represented a range of academic levels. Student nurses included in the study were full-time nursing students, male or female, sufficiently informed about the study, had signed a consent form and had comprehended the English language. In the selected faculties, the curricula are composed of a theoretical part and clinical training. Students

who had previously been enrolled in a technical nursing diploma program changed their major and then applied to the BSN program and those with known social or psychiatric issues, were all disqualified from the program. A sample of 235 students was required based on a population size of 600 nursing students, a confidence level of 95% and a margin of emotional regulation of 5%. The required sample size was calculated using a ratio of 15:1, based on an 80% power level and a moderate effect size of 0.3. However, this study uses structural equation modelling to create a mediation model. To appropriately power the study and identify an effect, a total sample size of 340 students was required.

## 2.3 | Recruitment and data collection

A sampling frame was sought after the director of King Saud University's nursing department was approached. They gave the list of potential nursing students to the investigators. The university emails of the students were on the list. A message inviting 410 students via email was issued to the students. The email contained a request for a consent form, the lead investigator's contact information and comprehensive research details. Included were those who responded with a completed consent form. 367 of the 410 students who were asked to respond gave their approval, resulting in an 89% response rate. The students gave reasons for not taking part in the study that had to do with their circumstances. A data-collecting period extending from September 2022 till April 2023 was utilized.

## 2.4 | Setting

The Nursing students were recruited from one of the top universities in the country and the first to be founded 'King Saud University'. The nursing curriculum at King Saud University lasts for 4 years, in addition to an extra required year of internship as a step toward entering the workforce. Students can choose from a variety of learning activities in the curriculum, including high-fidelity simulations, team-based learning, problem-based learning, video-based simulations and traditional classroom lectures. Additionally, clinical practice at the associated hospital is made available to students during the study years and is required of them.

## 3 | INSTRUMENTS

A *demographic questionnaire* was included in the survey to assess the sample's age, gender and academic level.

### 3.1 | Emotional intelligence

Using the Wong and Law Emotional Intelligence Scale (WLIES; Wong & Law, 2002a, 2002b), we assessed the emotional intelligence of

undergraduate nursing students. The WLEIS is developed based on the Mayer and Salovey conceptualization of emotional intelligence (Mayer & Salovey, 1997) and consists of 16 items, with a 5-point Likert-type scale (1=disagree, 5=agree). The questionnaire has four subscales: self-emotion appraisals, others' emotion appraisals, regulation of emotion and use of emotion. Previous research has found support for the underlying four-factor structure, reliability and convergent and discriminant validity of the WLEIS scores (Law et al., 2004, 2008; Shi & Wang, 2007; Wong & Law, 2002a, 2002b). This questionnaire is widely used in Arabian contexts and thus enables culturally sensitive measurement (Ali & Ali, 2016; Sabbah et al., 2020). In this study, the Cronbach alpha was calculated and determined to be 0.91.

### 3.2 | Emotion regulation

The current study assessed participants' emotion regulation skills using the emotion regulation questionnaire (ERQ; Gross & John, 2003). The emotional regulation questionnaire is a 10-item tool that assesses how much people rely on cognitive reappraisal and suppression strategies to control their emotional states. Cognitive reappraisal refers to efforts to control emotional experience by changing one's interpretation of internal and external cues. In contrast, suppression refers to efforts to prevent behavioural responses that result from emotional states. Both terms are used in process models of emotion regulation (Gross, 2015). Participants reported their level of agreement with each of the presented items using a 7-point Likert-type scale (1=strongly disagree, 7=strongly agree). Prior research has established the factorial and convergent validity of the instrument when applied to university students. Further, reliability analyses indicated that the reappraisal (Cronbach's  $\alpha=0.84$ , McDonald's  $\omega=0.85$ ) and suppression (Cronbach's  $\alpha=0.78$ , McDonald's  $\omega=0.78$ ) subscales of the emotional regulation questionnaire demonstrated acceptable levels of internal consistency in the current investigation. In this study, the Cronbach alpha was 0.90.

### 3.3 | Perceived stress

We assessed undergraduate students' perceptions of stress using the 10-item perceived stress scale (PSS; Cohen et al., 1983). The PSS measures comprehensive perceived stress experienced across the past 30 days on a 5-point scale (0 = never, 1=rarely, 2=once in a while, 3=often, 4=very often). Six of the 10 items were worded and scored in the non-reversed direction (i.e., 'how often have you said that you were unable to control the important things in your life'). Four of the 10 items were worded and scored in the reversed direction (i.e., 'how often have you said that things were going your way'). Total scores range from 0 to 40. The PSS was shown to demonstrate acceptable levels of internal consistency in the current examination (Cronbach's  $\alpha=0.82$ , McDonald's  $\omega=0.81$ ).

### 3.4 | Inventory of university student engagement

In the current study, the University Student Engagement Inventory (USEI), developed by Maroco et al. (2014), was used to gauge nursing students' participation. The three sections of the survey are behavioural, emotional and cognitive. Behavioural engagement is termed as students' engaged participation in academic and extracurricular activities offered by universities (Maroco et al., 2014). Positive and negative responses that happen in the academic setting, directed toward either people or events, are referred to as emotional engagement. Finally, cognitive engagement includes activities that have an impact on students' learning, like ideas that motivate them to act. The 15 self-reported items that make up the USEI are assessed on a Likert scale from '1-never' to '5-always'. Previous studies have looked at the USEI's internal consistency and psychometric validity. The Cronbach alpha in this study was calculated and found to be 0.87.

All four questionnaires were distributed to participants in the English language since all nursing programs in Saudi Arabia are offered in English. The generally agreed language among healthcare professionals in Saudi Arabian healthcare facilities is English, according to nurses' diversity.

## 4 | ETHICAL CONSIDERATIONS

Research Ethics Committee approval was obtained from the Institutional Review Board (IRB) at King Saud University Research and Ethics Committee (ECO-R-160). Nursing students were informed about the purpose of the study and signed the consent form prior to participating in the research. Participants were provided with a cover letter to clarify the purpose of the study, the anonymity of the respondents, their right to withdraw at any time and the confidentiality of the data in which no one, except the researcher, will have access to the data. All questionnaires adopted and used in the study were published freely online. Confidentiality and anonymity of the data were ensured throughout the study. Participants were not required to include their names. Data was secured correctly and saved in the researcher's password-protected computer. Also, the software containing data was further secured through different passwords. The questionnaires were coded by numbers related to the university and no one except the primary researcher knew the coding system or had access to the data.

## 5 | DATA ANALYSIS

The computer program, IBM-SPSS Windows (version 26.0) was used to analyse the data using central tendency measures (means and medians) and dispersion measures (standard deviation and ranges). To examine the moderation effect two-model multiple hierarchical regression analysis was used. The independent variables *t*-test to explore the association between study variables and

gender and the Welch *F*-test was used to determine if there is an association between academic level and study variables. Welch *F*-test was used instead of ANOVA due to the inability to satisfy the assumption of equal variances. AMOS was used to carry out structure equation modelling (SEM) to test direct and indirect effects among study variables.

## 6 | RESULTS

### 6.1 | Participants' characteristics

The study sample was made up of 264 (71.9%) male students and 103 (28.1%) female students. The majority of the students in the sample were in their second and third year of study, where the mean age of the participants was  $21.11 \pm 1.63$  years (Table 1).

### 6.2 | Descriptive statistics of study variables

The mean perceived stress score of the participating students was  $23.60 \pm 7.73$ , which is within the range for moderate perceived stress level. The mean engagement score was  $51.34 \pm 0.67$ , emotional intelligence was  $74.66 \pm 1.25$  and emotional regulation was  $43.23 \pm 14.00$  (Table 2). By examining the histograms and Q-Q plots, it seems that the data is approximately normally distributed with minor skewness to the left. The confidence intervals had a minimal standard error (Table 2, Figure S1 in File S1).

Descriptive statistics showed that the vast majority (58%) of the students reported moderate stress levels. The mean scores of academic engagement, emotional intelligence and emotional regulation were examined by the level of perceived stress. The results showed that data was more normally distributed among students reporting

TABLE 1 Participant's characteristics.

Category	N	%
Gender		
Male	264	71.9
Female	103	28.1
Academic Level		
Semester 1	2	0.5
Semester 2	3	0.8
Semester 3	65	17.7
Semester 4	62	16.9
Semester 5	90	24.5
Semester 6	22	6.0
Semester 7	74	20.2
Semester 8	17	4.6
Internship	32	8.7
Age (M±SD)	21.11 ± 1.63	

	Mean	SD	SE	95% CI
Perceived Stress	23.60	7.73	0.40	22.81, 24.40
Academic Engagement Total	51.34	12.83	0.67	50.02, 52.66
Emotional Intelligence Total	74.66	24.03	1.25	72.20, 77.13
Emotional Regulation	43.23	14.00	0.73	41.79, 44.67

TABLE 2 Distribution of scores of study variables.

TABLE 3 Total scores by stress level.

Perceived Stress	N			%	-	-	
Low	51			13.9	-	-	
Moderate	213			58	-	-	
High	103			28.1	-	-	
Perceived Stress	Low		Moderate		High		-
	Mean ± SD	Variance	Mean ± SD	Variance	Mean ± SD	Variance	
Academic Engagement	41.29 ± 17.08	291.57	50.58 ± 10.63	113.06	57.88 ± 10.89	118.65	-
Emotional Intelligence	55.58 ± 29.99	899.88	74.29 ± 21.27	452.33	84.90 ± 20.07	402.73	-
Emotional Regulation	24.00 ± 12.17	148.08	42.41 ± 9.45	89.37	54.43 ± 11.52	132.72	-

moderate stress. Despite the histograms and normality curves in the other stress groups having minor skewness to the left, the Q-Q plots show indications of normality. This is expected considering the unequal groups, where the results of the descriptive statistics indicate unequal variances (Table 3).

### 6.3 | Univariate analysis

An independent *T*-test was carried out to determine if there was an association between gender and the study variables. The results of Levene's test showed equal variances for all variables except academic engagement. The test did not show any important differences in means according to gender, where the recorded *p*-values were >0.05, except for emotional regulation, where males recorded a higher mean than females (*p*=0.04). An ANOVA was carried out to determine if there is an association between academic level and the study variables. The homogeneity of variance test showed that ANOVA cannot be used for the emotional intelligence scores. Therefore, a Welch *F*-test was used for that matter. The ANOVA test showed that the engagement, perceived stress and emotional regulation scores were not statistically significantly different according to academic level (*p*>0.05). The Welch *F*-test results were similar (Table 4).

The results showed that the emotional intelligence, emotional regulation and academic engagement scores were statistically significantly different according to stress levels (*p*-values<0.01). A post hoc Games-Howell showed an important difference in all mentioned variables and at thresholds of all stress levels (low to moderate, low to high, moderate to high, *p*<0.01) (Table 5).

A bivariate Pearson correlation was carried out between the total scores of the study variables. The results showed that perceived

stress has a statistically significant moderate negative correlation with academic engagement ( $r=-0.44$ ,  $p<0.01$ ) and emotional intelligence ( $r=-0.40$ ,  $p<0.01$ ) and a strong negative correlation with emotional regulation ( $r=-0.70$ ,  $p<0.01$ ). The results also showed that academic engagement had a statistically significant moderate positive association with emotional intelligence ( $r=0.48$ ,  $p<0.01$ ) and emotional regulation ( $r=0.49$ ,  $p<0.01$ ) (Table 6).

Based on the previous results, multiple structural equation models were conducted to identify how the association between the study variables and their subscales operates. The results showed that important pathways exist between subscales of emotional regulation and emotional intelligence and that of academic engagement ( $p<0.05$ ). Important pathways were also identified between perceived stress and academic engagement (Table 7).

The results further demonstrated that perceived stress had an important direct and total effect on academic engagement, yet no important indirect effect was identified. However, an important direct effect was observed between emotional intelligence, emotional regulation and academic engagement ( $p<0.05$ ). Thus, this indicates that the association between perceived stress and academic engagement is mediated by emotional intelligence and emotional intelligence. Another important negative pathway was identified between emotional regulation, emotional intelligence and perceived stress (Table 8). The model is presented in Figure 1 and Figure 2.

## 7 | DISCUSSION

The results of this study shed important light on how the regulation of emotions and emotional intelligence mediate the link between stress and academic engagement. The findings advance our knowledge of the variables that affect Saudi nursing students' academic achievement

TABLE 4 The difference in total scores according to gender and academic level.

		Mean	SD	Test statistic	95% CI	p-value
Perceived Stress	Male	23.76	7.71	0.59	-1.23449, 2.30304	0.55
	Female	23.22	7.83			
Academic Engagement Total	Male	50.69	13.55	-1.73	-4.96150, 0.32844	0.08
	Female	53.01	10.68			
Emotional Intelligence Total	Male	75.01	24.38	0.44	-4.27107, 6.72099	0.66
	Female	73.79	23.20			
Emotional Regulation	Male	44.16	14.13	2.04	0.11807, 6.49138	<b>0.04</b>
	Female	40.85	13.47			
		Sum of Squares	df	Mean Square	F	p-value
Academic Engagement Total	Between Groups	1432.18	8.00	179.02	1.09	0.37
	Within Groups	58896.56	358.00	164.52		
	Total	60328.74	366.00			
Perceived stress	Between Groups	345.225	8	43.153	0.72	0.68
	Within Groups	21554.85	358	60.209		
	Total	21900.07	366			
Emotional Regulation	Between Groups	2022.17	8	252.772	1.30	0.24
	Within Groups	69803.14	358	194.98		
	Total	71825.31	366			
		Statistic	df1	df2	p-value	
Emotional Intelligence Total	Welch	2.10	8	17.15	0.09	-

Significant p-values are bold.

TABLE 5 The difference in total scores according to the perceived stress level.

		Statistic	df1	df2	p-value
Emotional intelligence Total	Welch	<b>22.45</b>	<b>2</b>	<b>119.01</b>	<b>0.00</b>
Academic Engagement Total	Welch	26.72	2	115.29	<b>0.00</b>
Emotional Regulation	Welch	112.56	2	117.55	<b>0.00</b>

Significant p-values are bold.

TABLE 6 Correlation between study variables.

		Academic Engagement	Emotional Intelligence	Emotional Regulation	Perceived Stress
Academic Engagement	R-value	1.00	0.48	0.49	-0.44
	p-value		<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
	N	367.00	367.00	367.00	367.00
Emotional Intelligence	R-value	0.48	1.00	0.41	-0.40
	p-value	<b>0.00</b>		<b>0.00</b>	<b>0.00</b>
	N	367.00	367.00	367.00	367.00
Emotional Regulation	R-value	0.49	0.41	1.00	-0.70
	p-value	<b>0.00</b>	<b>0.00</b>		<b>0.00</b>
	N	367.00	367.00	367.00	367.00
Perceived Stress	R-value	-0.44	-0.40	-0.70	1.00
	p-value	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	
	N	367.00	367.00	367.00	367.00

Significant p-values are bold.

TABLE 7 Standardized path coefficients.

	Standardized coefficients	Standard emotional regulation	Lower bound	Upper bound	p-value
Perceived Stress → Vigour	-0.26	0.03	-0.19	-0.32	<b>0.00</b>
Perceived Stress → Dedication	-0.24	0.03	-0.18	-0.29	<b>0.00</b>
Perceived Stress → Absorption	-0.23	0.03	-0.17	-0.29	<b>0.00</b>
Cognitive Reappraisal subscale → Vigour	-0.24	0.03	-0.19	-0.29	<b>0.00</b>
Expressive Suppression subscale → Vigour	-0.33	0.04	0.26	0.41	<b>0.00</b>
Cognitive Reappraisal subscale → Dedication	0.23	0.03	0.18	0.28	<b>0.00</b>
Expressive Suppression subscale → Dedication	-0.36	0.04	0.28	0.43	<b>0.00</b>
Cognitive Reappraisal subscale → Absorption	0.23	0.03	0.18	0.28	<b>0.00</b>
Expressive Suppression subscale → Absorption	-0.33	0.04	0.25	0.41	<b>0.00</b>
Self-Emotional Appraisal → Vigour	0.31	0.03	0.25	0.36	<b>0.00</b>
Regulation of emotions → Vigour	0.31	0.04	0.24	0.38	<b>0.00</b>
Use of emotions → Vigour	0.33	0.03	0.26	0.40	<b>0.00</b>
Others' Emotion Appraisal → Vigour	0.32	0.04	0.25	0.39	<b>0.00</b>
Self-Emotional Appraisal → Dedication	0.22	0.03	0.16	0.28	<b>0.00</b>
Regulation of emotions → Dedication	0.25	0.04	0.18	0.32	<b>0.00</b>
Use of emotions → Dedication	0.25	0.04	0.18	0.32	<b>0.00</b>
Others' Emotion Appraisal → Dedication	0.25	0.04	0.18	0.32	<b>0.00</b>
Self-Emotional Appraisal → Absorption	0.26	0.03	0.20	0.32	<b>0.00</b>
Regulation of emotions → Absorption	0.28	0.04	0.21	0.35	<b>0.00</b>
Use of emotions → Absorption	0.27	0.04	0.20	0.34	<b>0.00</b>
Others' Emotion Appraisal → Absorption	0.26	0.04	0.20	0.33	<b>0.00</b>

Significant *p*-values are bold.

TABLE 8 Direct and indirect effect coefficients and significance.

	Direct effect	Indirect effect	Total effect
Perceived Stress → Academic Engagement	-0.73 (0.00)	-0.20 (0.06)	-0.91 (0.05)
Emotional Regulation → Perceived Stress	-0.39 (0.00)	-0.35 (0.00)	-0.73 (0.00)
Emotional Intelligence → Perceived Stress	-2.08 (0.00)	-0.72 (0.00)	-2.7 (0.00)
Emotional Regulation → Academic Engagement	0.45 (0.00)	0.25 (0.00)	0.70 (0.00)
Emotional Intelligence → Academic Engagement	4.12 (0.00)	2.74 (0.00)	6.76 (0.00)

and general well-being. The dependent variable in this study, academic engagement, has been linked to positive effects, including academic success, motivation and satisfaction during the educational experiences of learners (Fredricks et al., 2021). Our findings showed an important positive association between academic engagement and emotional intelligence, which is consistent with previous studies (Chen & Zhang, 2022; Molero Jurado et al., 2020). This demonstrates that students who are more engaged in their academic work are more likely to possess higher levels of emotional intelligence, which includes the ability to understand, recognize and effectively control emotions (Thomas & Allen, 2021). These results are consistent with the notion that motivated students are more likely to exhibit emotional maturity and self-regulation skills, which in turn influence their overall academic success. Our study also discovered a strong inverse association between academic engagement and stress among Saudi undergraduate

nursing students. These findings are consistent with recent studies by Levecque et al. (2017), Wang et al. (2021) and Sharififard et al. (2020) that have frequently demonstrated the negative impacts of stress on students' academic engagement.

The results show that less stressed nursing students are more actively involved in their studies. To increase Saudi nursing students' academic engagement, this research highlights the importance of promoting stress management strategies. Importantly, our study discovered that emotional regulation and emotional intelligence play a mediating role in the relationship between academic engagement and stress among Saudi undergraduate nursing students. One must be able to track, evaluate and adjust emotional reactions to achieve desired goals (Lee & Jang, 2021). The findings suggest that students who are more involved in their coursework are more likely to employ effective emotional regulation

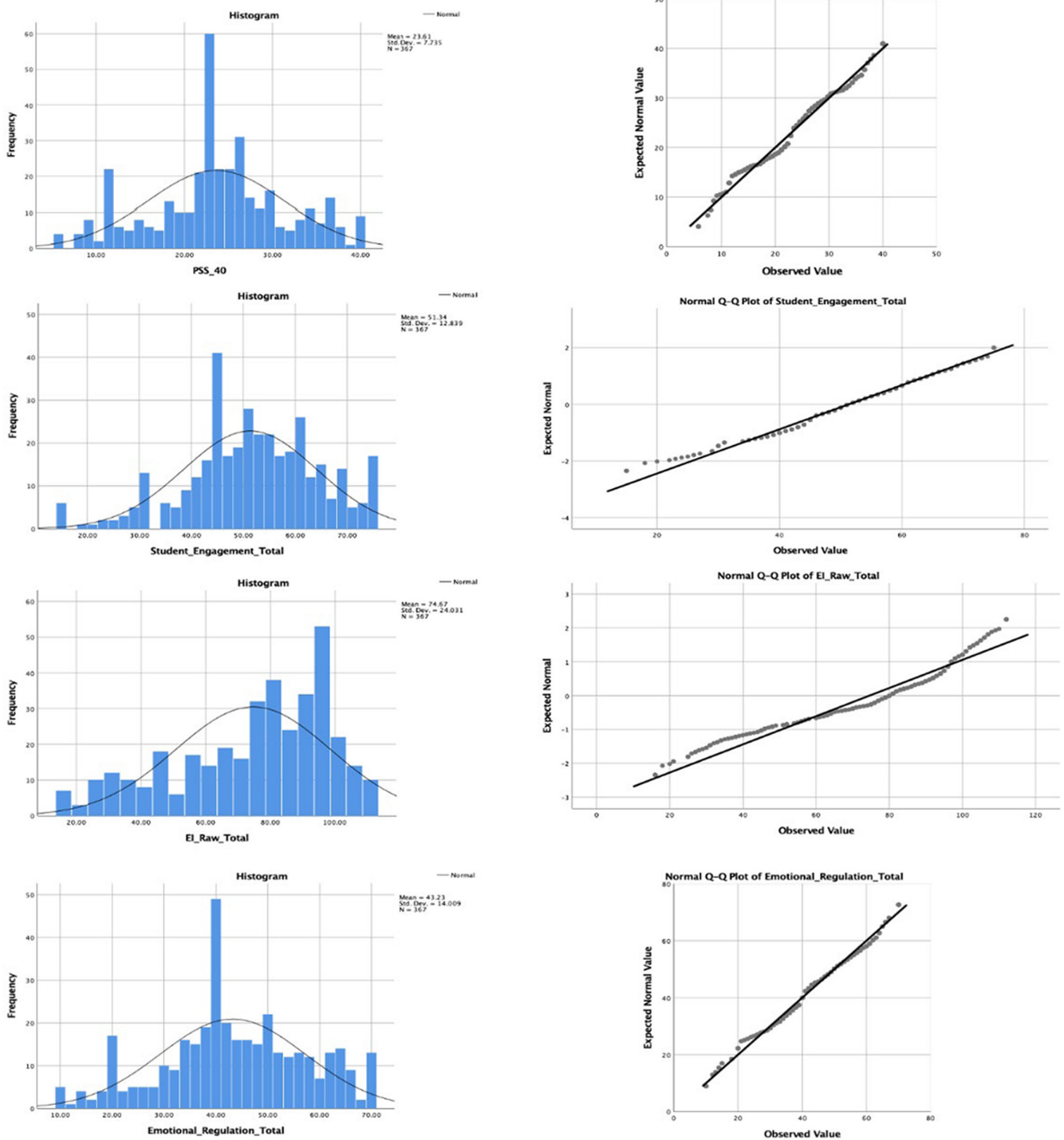
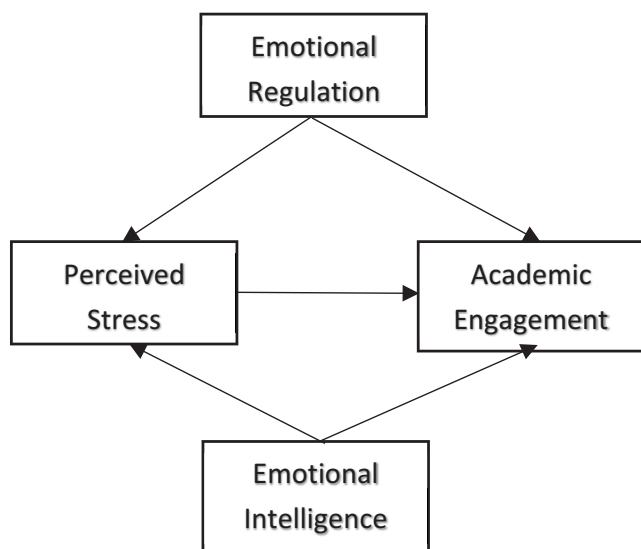


FIGURE 1 Histograms and Q-Q Plots of total scores.

strategies, which in turn reduces their stress levels. These results are consistent with recent studies (Arici-Ozcan et al., 2019; Xu et al., 2021) that highlighted the significance of emotion regulation in stress reduction and overall well-being. Additionally, it was discovered that a key mediator in the relationship between stress and academic engagement was emotional intelligence. Students who are more academically occupied, committed and energized tend to have higher emotional intelligence, which assists them to

better comprehend and control their stress levels. Our results are consistent with other research that has emphasized the protective function of emotional intelligence in reducing stress. The ability to successfully negotiate the demands and obstacles of their academic environment allows nursing students to experience less stress and more academic engagement (Dugué et al., 2021). Moreover, our results resonate with that of Rodríguez-Leal et al. (2023), which show that stressors that are experienced by



**FIGURE 2** Path model of perceived stress, emotional intelligence, emotional regulation and academic engagement.

nursing students during their clinical practice are usually attenuated by emotional intelligence. The results of this study have several implications for nursing practice and education. First and foremost, educational institutions need to emphasize developing an inviting, supportive and stimulating educational atmosphere that encourages academic engagement. Innovative instructional approaches, chances for learners to have autonomy and choice and building a feeling of community within the educational environment can all help achieve this. Such programs could lower nursing students' stress levels and increase their general academic engagement. Second, solutions should concentrate on improving nursing students' ability to regulate their emotions and enhance emotional intelligence. Students can acquire the skills they need to effectively manage stress and control their emotions through training programs and seminars that support the development of emotional intelligence abilities and teach effective emotion regulation tactics. The nursing curriculum can incorporate these interventions to give students continuing assistance as they progress through their studies.

### 7.1 | Limitations

This study has some interesting findings; however, there are certain limitations that should be noted. First, the cross-sectional nature of the research design restricts our capacity to demonstrate causation between the variables. The dynamic links between academic engagement, regulation of emotions, emotional intelligence and stress among nursing students may be better understood by future longitudinal investigations. Second, the self-report methods used to gather the data in the present research are susceptible to biases such as social desirability and response bias. To improve the

validity and dependability of the results, future studies may use objective metrics or numerous data sources. SEM was utilized in the present research to decrease these consequences, but subsequent investigations could use performance or execution strategies to get additional information about probable variations in the correlations between parameters while reducing subjectivity.

## 8 | CONCLUSION

This study's main finding is that stress and academic engagement are negatively correlated among Saudi undergraduate nursing students. It focuses on the balancing functions of emotional regulation and emotional intelligence, highlighting their ability to lower stress levels and improve academic engagement. Educational institutions and policymakers may support the academic achievement and general well-being of nursing students by taking these findings into account and putting the suggested measures into practice, which will eventually enhance the standard of healthcare delivery by preparing competent nurses.

### AUTHOR CONTRIBUTIONS

Conceptualization, M.F., R.A and A.A.; methodology, S.A.; validation, M.A., A.A. and L.B.; formal analysis, M.F.,R.A and Y.A.; investigation, S.L.; resources, A.A.; data curation, A.A.; writing—original draft preparation, M.F., R.A and Y.A.; writing—review and editing, M.F., R.A and Y.A.; visualization, A.A.; supervision, A.A.; project administration, A.A., M.A. and L.B; All authors have read and agreed to the published version of the manuscript.

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### CONFLICT OF INTEREST STATEMENT

None.

### DATA AVAILABILITY STATEMENT

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

### ETHICS STATEMENT

The researcher was granted the approval from the university's Research and Ethics Committee (Name and Number: ECO-R-160). All ethical considerations were applied according to the International Declaration of Helsinki's principles and guidelines, where the students were informed about all details of the study before recruitment and were not forced to be inducted.

## CONSENT TO PARTICIPATE

No disadvantages were reported to students who did not participate and written informed consent was obtained.

## PATIENT CONSENT STATEMENT

No patient consent was needed as this study did not involve patients.

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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