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## RESEARCH ARTICLE

# Emotional Intelligence and Uncertainty among Undergraduate Nursing Students during the COVID-19 Pandemic Outbreak: A Comparative Study

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### Abstract:

#### Background:

Emotional intelligence is considered to be one factor that helps individuals control their feelings.

#### Objectives:

This study aimed to investigate the emotional intelligence and uncertainty among undergraduate nursing students during the COVID-19 pandemic outbreak.

#### Methods:

A descriptive, cross-sectional design was used on a convenience sample, consisting of 284 undergraduate nursing students at the Faculty of Nursing, Zagazig University, Egypt, Faculty of Applied Medical Science, Taibah University, and Al-Ghad International Colleges, Kingdom of Saudi Arabia (KSA). Data were collected as responses to a questionnaire, which incorporated a sociodemographic datasheet, the Emotional Intelligence Scale, and the Intolerance of Uncertainty Scale.

#### Results:

The results showed significant differences in emotional intelligence mean scores between Saudi nursing students, who scored higher than their Egyptian counterparts, whereas the uncertainty mean scores were significantly higher among nursing students in Egypt than those in Saudi Arabia. Students in Saudi Arabia were significantly more satisfied with online education and online exams compared with those in Egypt. A negative correlation was identified between emotional intelligence mean scores and uncertainty mean scores among nursing students.

#### Conclusion:

A focus on the concept of emotional intelligence during university education may assist in the establishment of a supportive environment that can reduce uncertainty among nursing students. Improving, updating, financing, and facilitating online education technology should be a focus of educational institutions and ministries of education worldwide.

**Keywords:** Coronavirus, Emotions, Incertitude, Intelligence quotient, Nursing students, Stress.

### Article History

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## 1. INTRODUCTION

The coronavirus disease 2019 (COVID-19) outbreak has disrupted the lives of individuals worldwide, and the rapidly increasing numbers of infected cases have resulted in increased

feelings of uncertainty and anxiousness regarding the future. The disease outbreak has also triggered an exceptional level of stress among the students, academic staff, and employees at universities. This pandemic-associated stress may also result in unfavorable outcomes for learning and the psychological well-being of students. Students have been sent off-campus to overcome the coronavirus outbreak; however, thousands of college students have reacted to the coronavirus outbreak with

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shock, uncertainty, and sadness. As they rush to organize logistical details regarding their educations, the stress of an uncertain future has already begun to take a toll [1].

Universities should better emphasize psychological health support by updating health guidelines and providing online instruction and lectures designed to provide strategies for stress management while adapting and coping with this pandemic. Any student who experiences feelings of severe stress or anxiety due to COVID-19 should be provided with proper and timely psychological support [2].

The intolerance of uncertainty (IU) has been defined as cognitive bias and thought disturbance that affects how a person perceives, comprehends, analyses, interprets, and responds to uncertain situations on a cognitive, emotional, and behavioral level [3]. IU is primarily characterized by the uncertainty that acts as a stressful factor, disrupting the ability to act, with uncertain situations being perceived as devastating and fundamentally negative conditions that should be avoided. The state of uncertainty itself is associated with a degree of confusion, indetermination, unfairness, or wrongness [4].

Public health experts and government officers have taken several measures, including the implementation of social distancing, self-isolation, or quarantine measures, strengthening the capabilities of health facilities to manage the disease, and asking individuals to work from home. Efforts made to decrease the transmission of the coronavirus amongst younger and adult populations have resulted in the extensive closure of schools, colleges, universities, and other academic institutions, worldwide. As of March 25, 150 countries have closed academic institutions nationwide, impacting over 80% of the world's scholarly and student populations. Several countries have applied localized school closures due to the COVID-19 pandemic outbreak [5]. A large body of literature exists to support the closure of academic institutions as a means of reducing the community transmission of infectious disease by disrupting an important chain of transmission. Universities have moved swiftly to transition various courses and programs from face-to-face instruction to online instruction [6]. Developing emotional intelligence should be a beneficial adjunct that can enhance educational and practical performance and decrease the threat of emotional distress during students' clinical experiences [7].

Emotional Intelligence (EI) has been defined as the ability to control emotions by motivating the regulation of emotions, rather than responding in an aggressive and exaggerated manner. EI is considered to be a strong indicator of mental health and well-being and can play a role in balancing students' mental abilities, personal and social relationships, academic performance, and psychological well-being [8, 9]. EI enables individuals to apply appropriate methods to better understand, express, and transfer emotions, regardless of the positive or negative feelings they may experience [10]. Naeem, Van Der Vleuten [11], Stoller, Taylor [12], Ruiz-Aranda and Extremera [13] defined EI to be a psychological construct, which has recently generated a great deal of attention among academics and researchers in the medical and health professions, due to its anticipated and proposed relationship with self-regulation and meta-cognition, performance in academic arenas, success in the

workplace, the establishment of relationships, adaptive and coping capabilities, and mental well-being.

EI has been associated with advantageous consequences for nursing students. Increased EI has been associated with personal wellness and stress management, improved academic performance, improved nursing leadership, improved clinical performance, and greater patient safety [14]. Current nursing education teaches future nurses using methods designed to instill self-esteem, self-confidence, self-compassion, independence, assertiveness, and the ability to establish proper human relationships [15].

EI can be consequential in several respects for an individuals' personal and professional lives. EI facilitates the use of proper judgment during decision-making and crisis management. EI can improve self-esteem and life satisfaction by guiding the accomplishment of goals. Individuals who are capable of understanding their own feelings can more accurately perceive their reactions and adapt rapidly to new conditions.

A relationship exists between intellectual health and EI, and the stress associated with human demands can be effectively handled by individuals with high levels of EI, without disturbing their mental health and psychology. Individuals with low EI levels tend to exhibit strong feelings of anxiety and, consequently, fear and frustration, which can delay and deter the success of themselves and those around them [16].

### 1.1. Significance of the Study

We are currently at the onset of a completely new situation for most individuals due to the COVID-19 outbreak. To prevent the spread of this pandemic virus, students have been forced to switch to distance education and examinations at home. This situation may influence the student's EI resulting in the development of uncertainty regarding the future. This situation has never yet been encountered by researchers, especially in nursing; therefore, the researchers conducted this study to investigate the EI and IU scores among nursing students in Egypt and Saudi Arabia during the COVID-19 outbreak. The two countries were included in the study because of the convenience to the researchers, as well as the easy accessibility to the study data.

### 1.2. Aim of the Study

This study aimed to investigate the EI and IU scores among undergraduate nursing students during the COVID-19 pandemic outbreak.

### 1.3. Research Questions

(1) Is there a difference in EI between students in Egypt and those in Saudi Arabia?

(2) Is there a difference in IU between students in Egypt and those in Saudi Arabia?

## 2. MATERIALS AND METHODS

### 2.1. Research Design and Settings

A descriptive, cross-sectional design was used during this study. This study was performed in three settings: the Faculty of Nursing, Zagazig University, in Egypt, and the Faculty of Applied Medical Science, Taibah University, and Al-Ghad International Colleges for Applied Medical Sciences, in Saudi Arabia.

### 2.2. Sampling

A convenience sample of 284 undergraduate nursing students was recruited for this comparative study, of which, 158 were from Saudi Arabia and 126 were from Egypt. A power analysis equation was used to calculate the estimated sample size required to achieve a power of .95, an alpha error of .5, and a medium-size effect of .05, depending on the main variables (EI and IU scores), which indicated that a minimum 202 participants were required for sufficient discriminatory power.

### 2.3. Data Collection Tool

The data collection questionnaire consisted of three sections. The first section was the sociodemographic data collection sheet, which included age, gender, academic education, mothers' and fathers' level of education, whether their fathers and mothers were working, monthly income, satisfaction regarding electronic learning, and satisfaction regarding online examinations.

#### 2.3.1. Emotional Intelligence Scale

Emotional Intelligence Scale by Schutte, Malouff [17], "Schutte Emotional Intelligence Scale" was adopted to assess the level of EI among nursing students. This scale consists of 33 items, which can be divided into 4 main subscales (perception of emotion, managing their own emotions, managing others' emotions, and utilization of emotion). Every item is scaled on a five-point Likert scale, from 1=strongly disagree to 5=strongly agree. A higher mean score reflects the increased EI of an individual and vice versa. The mean score was calculated for each participant, whose EI was then categorized as either low (mean scores between 1 to less than 2.33), moderate (mean scores between 2.33 to less than 3.66), or high (mean scores between 3.66 to 5.00).

#### 2.3.2. The Intolerance of Uncertainty Scale

The Intolerance of Uncertainty Scale, used by Buhr and Dugas [18]; Freeston, Rhéaume [19], was adopted to assess the uncertainty level of nursing students. This 27-item scale assesses the reactions to uncertainty, ambiguous situations, and the future. The items are divided into two categories, uncertainty associated with negative behavioral and self-referential implications, and uncertainty perceived as unfair and spoils everything. Each item is scored on a five-point Likert scale, ranging from 1 (not at all characteristic of me) to 5 (entirely characteristic of me). The mean scale values for each candidate are calculated and classified as having low IU

(mean scores between 1 to less than 2.33), moderate (mean scores between 2.33 to less than 3.66), or high (mean scores between 3.66 to 5.00).

### 2.4. Validity and Reliability

The tool was reviewed by a panel of five experts in the field of psychiatric mental health nursing, to test the content and face validity of the questionnaire, which was deemed acceptable. Reliability was determined using Cronbach's Alpha coefficient test, test-retest, and split-half reliability coefficient, which revealed that each of the two scales (EI and IU) consisted of relatively homogenous items, as indicated by the moderate to high reliability (internal consistency) of each scale (Cronbach's Alpha coefficients were .85 and .83, respectively).

### 2.5. Pilot Study

Before performing data collection for this study, a pilot study was performed, which included 20 university students and represented 10% of the required study sample, to assess the tool for clarity and applicability; however, the responses of the pilot study participants were excluded from the final study. The tool was not modified, based on the positive findings of the pilot study. Moreover, scale reliability was assessed by measuring internal consistency.

### 2.6. Procedures

After explaining the objectives of this study to eligible students, the researchers sent an electronic consent form with a questionnaire, inviting them to participate in the survey. The link was disseminated to the sample population through smart applications, such as WhatsApp and Messenger. The data collection questionnaire required approximately 20 minutes to complete. Data were collected for two months, from 15 March 2020 to 15 May 2020.

### 2.7. Ethical Considerations

Official permission to conduct our study was secured through an official letter to the deans of the three academic institutions (Faculty of Applied Medical Science at Taibah University, KSA; Al-Ghad International Colleges for Applied Medical Sciences, KSA; and the Faculty of Nursing at Zagazig University, Egypt), which described the aim of the study and requested permission to perform data collection. Before embarking on the study, oral and written consent was obtained from all participants after explaining the purposes of the study and its procedures. The researchers complied with all research ethics principles, according to the Helsinki Declaration. Students were informed that their participation in the study was totally voluntary, with no consequences if they chose not to complete the questionnaire. The confidentiality and anonymity of all information were guaranteed. Consent was established through the completion of the questionnaire. Permissions were obtained from the relevant authors to use their developed scales for data collection purposes.

### 2.8. Statistical Design

The data collected were analyzed using the software program IBM SPSS, version 22.0. A descriptive, statistical

analysis, using means, frequencies, percentages, and standard deviations, was used to describe the demographic variables. The mean of the EI items scores and the mean of IU items scores were calculated, and each participant was assigned a score from 1–5. The means of each scale was calculated, and each participant was classified as having either a low, moderate, or high level of EI or IU.

The Kolmogorov-Smirnov test returned a significance value below .05, indicating that the data did not follow a normal distribution; therefore, nonparametric tests were used for analysis. The Kruskal-Wallis test was used to determine significant differences in mean values among student groups, for more than two groups, such as for subgroup analyses to examine differences in mean EI and IU scores according to family size, birth order within the family, and fathers’ and mothers’ educational levels. The Mann-Whitney U test was used to assess differences between two independent samples, such as subgroup analysis to examine the country of origin, residence, whether their fathers and mothers were working, and

satisfaction with online education and exams. The Mann-Whitney test and the Kruskal-Wallis test are nonparametric tests used to compare the mean ranks of scores, nevertheless, both tests do not compare medians nor distributions of the scores. Correlation coefficients and linear regression analyses were used to detect independent predictors and the correlation between EI and IU scores among the study sample.

3. RESULTS

Table 1 demonstrated that the majority of the study sample was female (76%), with ages ranging between 21–23 years (65%), and in their fourth year of study (54%). In addition, most respondents were single and lived in urban areas (96% and 73%, respectively). Approximately two-thirds of the Egyptian students’ mothers and fathers had university educations (67% and 62%, respectively), whereas in Saudi Arabia, more than one-third of the students’ mothers could read and write, without a formal education, whereas their fathers completed school, without advancing to university (41% and 42%, respectively).

Table 1. Sociodemographic characteristics of the study sample and their families (N=284).

Sociodemographics	Category	KSA (n = 158)		Egypt (n = 126)		Total	
		n	%	n	%	n	%
Gender	Male	53	34%	14	11%	67	24%
	Female	105	66%	112	89%	217	76%
Age	18–20	17	11%	48	38%	65	23%
	21–23	119	75%	66	52%	185	65%
	≥ 24	22	14%	12	10%	34	12%
Year of study	First year	0	0%	33	26%	33	12%
	Second year	32	20%	6	5%	38	13%
	Third year	47	30%	12	10%	59	21%
	Fourth year	79	50%	75	60%	154	54%
Marital status	Single	152	96%	120	95%	272	96%
	Married	6	4%	6	5%	12	4%
Residence	Urban	125	79%	81	64%	206	73%
	Rural	33	21%	45	36%	78	27%
Family size	Small (≤3)	7	4%	9	7%	16	6%
	Medium (4-5)	25	16%	75	60%	100	35%
	Large (total 6–7)	75	47%	42	33%	117	41%
	Too large (≥ 8)	51	32%	0	0%	51	18%
Order within the family	First	36	23%	51	40%	87	31%
	Second	25	16%	33	26%	58	20%
	Third	24	15%	36	29%	60	21%
	Fourth	13	8%	6	5%	19	7%
	Fifth or higher	60	38%	0	0%	60	21%
Mother’s education	Read and write	65	41%	3	2%	68	24%
	School stage	45	28%	15	12%	60	21%
	University	42	27%	84m	67%	126	44%
	Higher education	6	4%	24	19%	30	11%
Father’s education	Read and write	45	28%	0	0%	45	16%
	School stage	66	42%	9	7%	75	26%
	University	38	24%	78	62%	116	41%
	Higher education	9	6%	39	31%	48	17%

(Table 1) contd....

Sociodemographics	Category	KSA (n = 158)		Egypt (n = 126)		Total	
		n	%	n	%	n	%
Does the mother work?	Yes	46	29%	63	50%	109	38%
	No	112	71%	63	50%	175	62%
Does the father work?	Yes	86	54%	126	100%	212	75%
	No	72	46%	0	0%	72	25%

Note: n=count, %= percent.

**Table 2. Satisfaction with online education and exams among the study sample (N= 284).**

Satisfaction	Country	Response	n	Mean Rank	Mann-Whitney U Test	P-value
Are you satisfied with online education?	Saudi Arabia	Yes	115	177.85	4368	< .001**
		No	43			
	Egypt	Yes	21	98.17		
		No	105			
Are you satisfied with online exams?	Saudi Arabia	Yes	119	176.45	4590	< .001 **
		No	39			
	Egypt	Yes	27	99.93		
		No	99			

\*\* significant at the .01 level (2-tailed).

Table 2 shows significant differences with regards to the nursing students’ satisfaction with online education and online exams between those in Saudi Arabia and those in Egypt ( $p < .001$ ). These findings showed that nursing students in Saudi Arabia were significantly more satisfied with online education and online exams compared with nursing students in Egypt.

Table 3 shows that the mean scores for the “Utilization of Emotion” were high in both Saudi Arabia and Egypt ( $M = 3.8861$  and  $3.8770$ , respectively). The lowest mean score among Saudi Arabian nursing students was for the subscale, the “Perception of Emotions”, whereas the “Managing Own Emotions” subscale had the lowest mean score among Egyptian nursing students. However, the comparison demonstrated significant differences for the mean scores of “Managing Own Emotions”, “Managing Others’ Emotions” and “EI Total Scores”, for which Saudi Arabian students

scored significantly higher ( $p < .01$ ).

Table 4 illustrates the IU scores among undergraduate nursing students, revealing that the mean score of IU factor 2, “Uncertainty is unfair and spoils everything” was significantly higher than that for factor 1 “Uncertainty has negative behavioral and self-referential implications”. Nursing students in Egypt scored significantly higher on the IU scale and subscales than students in Saudi Arabia ( $p < .001$ ).

Table 5 shows significant differences in mean EI scores according to the demographic characteristics of the students; however, students from Saudi Arabia, who were married, satisfied with online education and online exams, from urban areas, and whose fathers were working scored significantly higher than students from Egypt, who was single, not satisfied with online education and exams, from rural areas, and whose fathers were not working ( $p < .05$ ).

**Table 3. Mean scores for the EI subscales (N = 284).**

EI subscales	Country		Total mean	Total level	Mean Rank		Mann-Whitney U Test	P-value (2-tailed)
	Saudi Arabia	Egypt			Saudi Arabia	Egypt		
	(n =158)	(n =126)						
	Mean ± SD	Mean ± SD						
Perception of Emotion	3.5234 ± 0.55891	3.4738 ± 0.42992	3.5014	Moderate	148.91	134.46	8941.500	0.140
Managing Own Emotions	3.6751 ± 0.57078	3.2989 ± 0.47045	3.5082	Moderate	172.24	105.20	5254.500	0.000**
Managing Others’ Emotions	3.8861 ± 0.63905	3.7113 ± 0.49786	3.7813	High	156.22	125.30	7786.500	0.002**
Utilization of Emotion	3.8861 ± 0.63905	3.8770 ± 0.54413	3.8820	High	146.84	137.06	9268.500	0.316
EI mean scores	3.7068 ± 0.51770	3.5570 ± 0.37784	3.6403	Moderate	160.06	120.48	7179.000	0.000**

\*\* significant at the .01 level (2-tailed).

Low EI: 1.00 to less than 2.33, Moderate EI: 2.33 to less than 3.66, High EI: 3.66 to 5.00

**Table 4. Mean scores of the IU Subscales (N = 284).**

IU Subscales	Country		Total mean	Total level	Mean Rank		Mann-Whitney U Test	P-value (2-tailed)
	Saudi Arabia	Egypt			Saudi Arabia	Egypt		
	(n = 158)	(n = 126)						
	Mean ± SD	Mean ± SD						
Uncertainty has negative behavioral and self-referential implications	2.7207 ± 0.73208	3.2683 ± 0.84985	2.9636	Moderate	121.70	168.58	6667.5	0.000**
Uncertainty is unfair and spoils everything	3.1762 ± 0.73170	3.5853 ± 0.79236	3.3577	Moderate	125.74	163.51	7306.5	0.000**
Mean of Total IU scale	2.9231 ± 0.68217	3.4092 ± 0.79753	3.1388	Moderate	123.61	166.19	6969.0	0.000**

\*\* significant at the .01 level (2-tailed).

Low IU: 1.00 to less than 2.33, Moderate IU: 2.33 to less than 3.66, High IU: 3.66 to 5.00

**Table 5. The differences in EI mean rank according to the personal characteristics of the study sample (N = 284).**

Personal characteristics		Mean Rank	Test	P-value
Country	Saudi Arabia	160.06	Mann-Whitney U =	< .001**
	Egypt	120.48	7179.000	-
Marital status	Single	140.27	Mann-Whitney U =	.029*
	Married	193.08	1025.000	-
Are you satisfied with online education?	Yes	152.84	Mann-Whitney U =	.042*
	No	133.00	8658.000	-
Are you satisfied with online exams?	Yes	160.52	Mann-Whitney U =	< .001**
	No	123.43	7442.500	-
Family size	Small (≤3)	193.06	Kruskal-Wallis Test	.012*
	Medium (4-5)	129.27	Chi-Squared = 10.869	-
	Large (total 6-7)	139.70	-	-
	Too large (≥ 8)	159.01	-	-
Residence	Urban	148.93	Mann-Whitney U =	.032*
	Rural	125.51	6709.000	-
Father's education	Read and write	176.53	Kruskal-Wallis Test	.006**
	School stage	148.99	Chi-Squared = 12.619	-
	University	126.67		
	Higher education	138.71		
Does the mother work?	Yes	164.51	Mann-Whitney U =	< .001**
	No	128.79	7138.500	-

\*\* significant at the .01 level (2-tailed).

\* significant at the .05 level (2-tailed).

When implementing the Mann-Whitney U test to identify causes of significant differences in EI total scores among students from various family sizes, the mean rank of EI scores for students who came from small families were significantly higher than those of students who came from all other family sizes.

Additionally, when implementing the Mann-Whitney U test to identify the causes of significant difference in EI total scores among students based on their fathers' education levels, the mean rank of EI scores among students whose fathers can only read and write, without having completed formal education, was significantly higher than among students whose fathers attained higher educational levels.

Table 6 shows that nursing students in Saudi Arabia demonstrated lower mean rank IU scores, which reflected low

uncertainty among nursing students at Saudi Arabian universities. Nursing students from rural areas displayed significantly higher mean rank IU scores than those from urban areas. The mean rank IU scores were significantly lower among nursing students whose fathers do not work than among those whose fathers do work. When implementing the Mann-Whitney U test to identify significant differences in mean rank IU scores among students based on their birth order within families, the mean rank IU scores for students who were born first was significantly higher than those for other students.

When implementing the Mann-Whitney U test to identify significant differences in IU scores among students based on their fathers' level of education, the mean rank of IU scores for students whose fathers had university educations was significantly higher than those for students whose fathers had other educational levels. In addition, the mean rank IU scores

of students with university-educated mothers were significantly higher than those for students whose mothers attained other educational levels. Students who were not satisfied with online education and online exams scored significantly higher in mean rank IU scores than those who were satisfied with the online conditions ( $p < .05$ ).

Table 7 shows a negative correlation between mean EI scores and mean IU scores (Pearson's correlation coefficient =  $-.085$ ,  $p = .153$ ), and a significant positive correlation was identified between students' satisfaction with online education and their satisfaction with online exams (Pearson's correlation coefficient =  $.777$ ,  $p < .001$ ). Similarly, a significant negative correlation between mean IU scores and students' satisfaction with online education was identified (Pearson's correlation coefficient =  $-.169$ ,  $p = .004$ ). Finally, the study found a significant positive correlation between mean EI scores and students' satisfaction with online exams (Pearson's correlation coefficient =  $.178$ ,  $p = .003$ ). However, a significant negative correlation between the mean IU scores and satisfaction with

online exams was also detected (Pearson's correlation coefficient =  $-.173$ ,  $p = .003$ ).

The regression test revealed significance once conducted between mean IU scores and the mean EI subscales scores. To identify independent predictors of higher mean IU scores among students, a linear regression analysis was performed, which revealed that the second and the fourth EI subscales (Managing Own Emotions and Utilization of Emotions) were independent predictors of increased IU scores among nursing students (Table 8).

A prediction equation for students' IU scores was determined from the linear regression between the mean IU scores and the mean EI subscale scores, as follows:  $y = .190x_1 - .629x_2 - .056x_3 + .421x_4 + 3.26$ , where  $y$  is the IU mean score,  $x_1$  is the "Perception of Emotion" mean score,  $x_2$  is the "Managing Own Emotions" mean score,  $x_3$  is the "Managing Others' Emotions" mean score,  $x_4$  is the "Utilization of Emotions" mean-score, and 3.26 is a constant.

**Table 6. Differences in mean rank IU scores according to personal characteristics (N = 284).**

Personal characteristics		Mean Rank	Test	P-Value
Country	Saudi Arabia	19,530	Mann-Whitney U = 6969	< .001**
	Egypt	20,940		
Gender	Male	141.94	Mann-Whitney U = 1477	.227
	Female	156.25		
Residence	Urban	131.80	Mann-Whitney U = 5830	< .001**
	Rural	170.76		
Birth order within the family	First	163.68	Kruskal-Wallis Test Chi-Squared = 13.994	.007**
	Second	151.56		
	Third	119.97		
	Fourth	146.34		
	Fifth or higher	124.34		
Mother's education	Read and write	128.53	Kruskal-Wallis Test Chi-Squared = 16.589	< .001**
	School stage	135.92		
	University	162.47		
	Higher education	103.47		
Father's education	Read and write	124.14	Kruskal-Wallis Test Chi-Squared = 27.784	< .001**
	School stage	117.98		
	University	173.28		
	Higher education	123.63		
Does the father work?	Yes	148.14	Mann-Whitney U = 6436	.047*
	No	125.89		
Are you satisfied with online education?	Yes	132.19	Mann-Whitney U = 8661.5	.042*
	No	151.98		
Are you satisfied with online exams?	Yes	132.54	Mann-Whitney U = 8619.5	.035*
	No	153.04		

\*\* significant at the .01 level (2-tailed).  
\* significant at the .05 level (2-tailed).

**Table 7. Correlation matrixes among IU scores, EI scores, and satisfaction with online education and exams.**

Scales:	Pearson Correlation Coefficient		
	EI	IU	Satisfaction with online education
IU	$-.085$ P (2-tailed) = .153	-	-

(Table 7) contd....

Scales:	Pearson Correlation Coefficient		
	EI	IU	Satisfaction with online education
Satisfaction with online education	.101 P (2-tailed) = .090	- .169** P (2-tailed) = .004	-
Satisfaction with online exam	.178** P (2-tailed) = .003	- .173** P (2-tailed) = .003	.777** P (2-tailed) < .001

\*\* significant at the .01 level (2-tailed).

Table 8. Best fitting multiple linear regression model for the IU mean scores.

Model	Unstandardized Coefficients		Standardized Coefficients	t-test	p-value
	B	Std. Error	Beta		
(Constant)	3.260	.348		9.372	< .001**
Perception of Emotion (EISSUB1)	.190	.115	.124	1.654	.099
Managing Own Emotions (EISSUB2)	-.629	.121	-.456	-5.223	< .001**
Managing Others' Emotions (EISSUB3)	-.056	.115	-.041	-.484	.629
Utilization of Emotion (EISSUB4)	.421	.097	.325	4.343	< .001**

\*\* significant at the .01 level (2-tailed).

Dependent Variable: IU mean-scores.

Predictors: (Constant), Mean EISSUB1, Mean of EISSUB2, Mean of EISSUB3, Mean of EISSUB4.

4. DISCUSSION

EI is one of the most important qualities among nurses, which can influence the quality of nursing care, influencing factors including decision-making abilities and critical thinking; generally, individuals with high EI are more able to focus on various issues and use problem-solving techniques that improve their mental capabilities and social acceptability [20].

The novel coronavirus disease 2019 (COVID-19) is currently causing widespread morbidity and mortality worldwide; therefore, fear and uncertainty are normal and expected response as much of the world had implemented non-pharmaceutical interventions, including the prevention of large gatherings, voluntary or enforced social distancing, contact tracing, and quarantines, to prevent infections from overwhelming healthcare systems and exacerbating mortality rates [21]. Under these circumstances, the researchers chose to conduct this study to investigate the EI and IU among undergraduate nursing students during the COVID-19 pandemic outbreak because this population represents one of the most affected populations, whose studies and academic futures have been affected by these exceptional circumstances.

The results of our study showed that the majority of the study sample were females, aged between 21–23 years, in their fourth year of study, single, and living in urban areas. Moawed, Gemeay [22] performed a similar comparative study between nursing students in Saudi Arabia (Riyadh) and Egypt (Tanta) and also found that the vast majority of the participants were females, aged between 20 to 23 years.

The present study demonstrated significant differences among nursing students in Saudi Arabia and those in Egypt regarding their satisfaction with online education and online exams. Online education has been reported to be the preferred and most commonly used mode of education among new nursing graduates and practitioner nurses at a tertiary hospital in Saudi Arabia, compared with classical lectures and textbooks [23]. However, the mean EI scores for all of the EI

subscales were higher among nursing students in Saudi Arabia than among those in Egypt; moreover, a positive correlation was identified between EI scores and satisfaction with both online education and online exams. The precautionary measures that were taken suddenly as a result of the spread of the coronavirus, such as closing universities, have resulted in the increased prevalence of online teaching and online tests. Saudi Arabian universities already had the necessary infrastructure for distance education and online systems in place, which have been used effectively for educational courses and exams for many years. However, most universities in Egypt did not have the necessary infrastructure in place for distance education and universities in Egypt are completely dependent on traditional education within universities. These differences in educational infrastructure may explain the differences in student satisfaction with the online education experience.

The preparations necessary for online learning, for both students and instructors, are distinct from those that are necessary for traditional classroom learning. Both students and the academic institution must be cognizant of these differences. The successful completion of online courses involves a mixture of technical, private, cognitive, motivational, and emotional issues. Computer literacy, reading and writing skills, and effective verbal and written communication contribute positively to the success of online educations. In addition, online students must be given an incentive to attend and succeed in virtual online classes, which lack face-to-face human interactions.

These findings were congruent with those in the study by Timmons [24], who reported that identifying those student characteristics that contribute to online failure and resolving them prior to enrolment could enhance student success. Similarly, Berenson, Boyles [25] concluded that effective learning is a function of the emotional response to a learning environment, rather than the techniques and structures on which the learning is based. People differ in their emotional responses to situations. Adult learners, in particular, require



emotional comfortable with a learning situation for learning to occur. Similarly, Beauvais, Brady [26] reported that nursing students are required to manage numerous clinical situations, adapt to the different teaching styles and expectations of instructors, work independently to fulfill pre-set goals, and achieve proper conflict management strategies. In addition, some features of academic education may be considered difficult and highly stressful, such as examinations and clinical evaluations, which require a high level of emotional management.

The results of this study demonstrated a moderate level of EI in both study groups, with the highest mean scores observed for the "Utilization of Emotions" and "Managing Other's Emotions" subscales. Comparisons among the mean scores demonstrated significant differences for "Managing Own Emotions", "Managing Others' Emotions" and "EI total score", with Saudi Arabian students scoring higher than their Egyptian counterparts. No one is born with high EI levels. To develop EI, students requiring training, practice, and experience, which can assist nursing students in the management of their own and others' emotions, facilitating the demonstration of genuine emotional responses, improving empathy, and increasing the ability to communicate emotions without introducing conflict.

These results are congruent with those of Mahmoud, Abd El-Dayem [27], who reported that nursing students at Alexandria University in Egypt generally had moderate levels of EI; furthermore, the EI levels of these students made no progress and improved with additional academic semesters. This finding was also similar to that of Dag and Can [28], who reported a moderate EI level among nursing students in Izmir, Turkey. The researchers reported that undergraduate nursing education must provide a learning environment that emphasizes the importance of EI by nurturing and facilitating the development of these qualities.

The present study identified a significant correlation between EI scores and some personal characteristics. The highest EI level was observed for Saudi Arabian nursing students, in urban residences, from small family sizes, and who had working mothers. In small families, large efforts are made to satisfy the educational needs of the nursing students, which may explain the higher EI mean scores observed among nursing students from small families.

In addition, living in urban areas with access to good internet infrastructure enhances a student's motivation to engage in online education. In addition to internet access and online communication self-efficacies, the readiness for electronic and technology-based learning among nursing students is associated with the potential for adult self-directed learning, learner control, and self-motivation. Bocchi, Eastman [29] revealed that online success can be predicted by several self-regulatory functions, including effective self-management, emotional self-regulation, self-generated motivation, self-efficacy, persistence, internal consistency, and a locus of control. The current study also reported a higher mean rank EI scores for nursing students whose fathers can only read and write compared to students whose fathers attained higher educational levels. The findings of this study were also mirrored by those reported by Moawed, Gemeay [22] in their

comparative study between nursing students in Saudi Arabia and Egypt, which revealed that the educations of students' mothers and fathers were associated with the students' EI.

According to the present study's findings, the highest mean IU score among undergraduate nursing students in both countries was observed for the value "uncertainty is unfair and spoils everything". Mean IU scores were significantly higher among nursing students in Egypt than those in Saudi Arabia. A significant negative correlation between mean IU scores and students' satisfaction with online education were identified, which may be attributed to the adoption in Saudi Arabia of satisfactory electronic mechanisms for the final evaluation of their students, whereas in Egypt, a delay in the adoption of final evaluation strategies for students resulted in the students feeling fear and uncertainty regarding their educational futures and graduation dates. The feeling of uncertainty is often associated with anxiety, stress, and feelings of dread, in addition to ignorance and denial. Uncertainty occurs when perceptions and behaviors do no longer respond properly to sudden exceptional situations, which reduces the capability of an individual to perform duties with accuracy.

This result agreed with those reported by Al-Rabiaah, Temsah [1], who stated that the COVID-19 outbreak had disrupted the lives of many humans worldwide, the global speed at which the number of patients affected with coronavirus has grown has created an intense feeling of uncertainty and anxiousness regarding the future. The pandemic conditions have also induced stress amongst college students, which may lead to adverse consequences in their abilities to learn and for their psychological health.

The results of this study were also congruent with those reported by Kearns [30], who explained that applying online assessments to courses that were designed for face-to-face learning is a challenging task. Students and faculty are uncertain regarding the procedures for administrating outstanding assignments, projects, and other continuous assessments; in addition, labs, practicums, and performance tests cannot be conducted online. Students who lack internet facilities will suffer disadvantages during the assessment and evaluation process, which can unfavorably affect their scores and grade point averages [31].

In addition, Sahu [32] reported that being kicked off-campus in attempts to contain the COVID-19 infection has caused shock, uncertainty, and sadness among college students; however, throughout the process of making proper logistic arrangements for this disease outbreak, the stress associated with uncertainty can have tremendous effects on students' psychological welfare.

This study demonstrated that females showed higher mean IU scores compared with males, although this difference was not significant. No significant relationships were identified between IU scores and sociodemographic characteristics, including age and gender, which may be due to both male and female participants having the same perception towards stress, as they are exposed to the same workloads and study in very similar university environments. These results were similar to those reported by Mumina, Wafa [33], who also found no

significant difference in stress perception between males and females. Both genders can manage and control their own emotions and the emotions of others to handle stress. Similarly, Ranasinghe, Wathurapatha [34] found no significant differences in the perception of stress between the two genders and indicated that both genders could enhance their EI and reduce stress levels to achieve better academic performance.

In this study, the independent predictors of IU scores were country, place of residence, birth order in the family, fathers' and mothers' education levels, whether fathers were working, satisfaction with online education, and satisfaction with online exams. The mean IU score was significantly higher among nurses from Egypt, who lived in rural residences, whose fathers had university educations, and whose fathers work. Life in Egypt is full of difficulties and challenges for both students and people, in general, in addition to the difficulties imposed by the COVID-19 outbreak. The lack of a clear future causes Egyptian university students to suffer more uncertainty compared with their counterparts in Saudi Arabia. Living in rural areas is often associated with limited internet network connections, which poses challenges for students expected to transition to online education, causing more uncertainty. Being the oldest offspring and the first in birth order within an Egyptian family means holding high responsibilities, similar to being a second father, and is associated with an increased financial burden, especially under the stressful circumstances of COVID-19, which has led to increased uncertainty. In addition, as most fathers have started to work from home due to the COVID-19 quarantine, increasing the strain on internet use and other students in the house also rely on electronic learning, electronic devices can become unavailable for everyone, simultaneously, likely resulting in many negative psychological impacts, including uncertainty. Staying home for fathers, who are accustomed to a daily work routine, and monetary difficulties have increased levels of home tension, stress, and feelings of uncertainty in all family members.

These results are similar to those of Sahu [32], who reported that the transition to online learning had raised questions among the faculty regarding their abilities to deal with existing technology; furthermore, due to working from home during the coronavirus outbreak, computers, networks, and information technology equipment at home have been in high demand and were overloaded, due to use by parents, children, and other relatives. Many academic facilities and educational institutions do not have the suitable infrastructure and electronic resources to implement online learning with immediate effect. For all of these reasons, working at home can be a difficult task.

In both public and private universities and even before the COVID-19 pandemic outbreak, the educational system in Saudi Arabia used to adopt online education for undergraduate students for at least two courses per semester. The courses are assigned to the students online using different modalities, like the blackboard, Moodle, google classroom, and many other programs. Those technologies help students to find the electronic resources, references, online tests, assignments, and evaluation modalities readily available between the students' hands, which made the students in Saudi Arabia more

comfortable and ready to cope with the full investment of the electronic learning in their educational system, which in turn had a positive effect in limiting their feeling of uncertainty.

On the other hand, there was a delay in the evaluation process in Egyptian universities compared to that in Saudi Arabia, at the time, undergraduate students in Saudi Arabia had completed the final evaluation for the second semester of the current academic year and started the summer semester, the students in Egypt did not yet start the final evaluation of the second semester, which may rationalize the significantly higher feeling of uncertainty among them.

The results of this study reported a negative correlation between students' EI scores and their IU scores, indicating that students with high EI were less uncertain. Among the four EI subscales, the present study found that a significant, negative, independent, predictor of uncertainty was "Managing Own Emotions", whereas a significant, positive, independent predictor of uncertainty was the "Utilization of Emotions". These results were similar to those by Shaheen and Shaheen [9] & Koubova and Buchko [10], who demonstrated that EI plays a role in balancing students' thought processes, mental equilibriums, social relationships, academic performances, and psychological well-being. EI enables people to use the proper channels of communication and interaction to perceive, express, and communicate their feelings, irrespective of the positive or negative effects.

## CONCLUSION

In conclusion, the present study provides significant information pertaining to the EI and IU scores among undergraduate nursing students in Saudi Arabia and Egypt. Nursing students in Saudi Arabia demonstrated significantly higher mean scores for the "Managing Own Emotions", "Managing Others' Emotions", and "EI total scores" compared with those in Egypt. However, nursing students in Egypt scored significantly higher on the IU scale and subscales compared with students in Saudi Arabia. The COVID-19 outbreak has likely caused more stress and is likely a primary source of uncertainty among nursing undergraduate students.

## RECOMMENDATIONS

We recommend performing similar future studies, considering longitudinal research designs that include more educational facilities and random sampling, with a larger sample size.

EI is an important competency for nursing students during their undergraduate education and their clinical practice; therefore, focusing on EI, as a core concept, in the undergraduate nursing curriculum should be a high priority and is highly recommended. More focus should be directed toward identifying the sources of uncertainty among nursing students, working to overcome both stress and uncertainty, and offering more supportive environments for nursing students that can contribute to their success in the academic, clinical, and social aspects.

To obtain additional confirmatory data regarding correlations between the COVID-19 outbreak and students'

uncertainty levels, this study should be performed again after COVID-19 control efforts have been lifted to compare uncertainty levels and explore the aftermath of the COVID-19 outbreak. Egyptian universities should establish the necessary infrastructure for online education, exam systems, and networking facilities, in anticipation of future extended periods of quarantine and emergency conditions, such as the COVID-19 pandemic. The adoption of distance education systems for some undergraduate courses is also likely to make adaptations during future crises easier.

## IMPLICATIONS

Focusing on EI among nursing students takes high priority, as encouraging EI among nurses may help them become more successful in both academic and community life. Identifying the sources of uncertainty among nursing students is crucial to for reducing uncertainty and making them more active and positive contributors to society; furthermore, integrating EI and uncertainty concepts in the nursing curriculum represents a constructive action that can build the nursing future, resulting in higher quality and safer nursing care in the clinical field.

Online learning is likely to contribute to the future of nursing university education, as online classes can guarantee education process continuity, both during and after the COVID-19 outbreak, which can help reduce students' uncertainty. More focus should be given to improving, updating, financing, and facilitating online education technology by educational institutions and ministries of education around the world.

## ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The approval letter was obtained to perform data collection from the three study settings: the Faculty of Nursing, Zagazig University, Egypt, the Faculty of Applied Medical Science, Taibah University, KSA, and Al-Ghad International Colleges, KSA (EA 2/12-3/2020).

## HUMAN AND ANIMAL RIGHTS

No animals were used in this research. All human research procedures were followed in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national), and with the Helsinki Declaration of 1975, as revised in 2013.

## CONSENT FOR PUBLICATION

Informed consent was obtained from all participants.

## AVAILABILITY OF DATA AND MATERIALS

Not applicable.

## FUNDING

None.

## CONFLICT OF INTEREST

Although the researchers work as an assistant professor and lecturers at the colleges used for the study setting, the

authors declare no conflicts of interest pertinent to data collection and interpretation.

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