Emotional Intelligence and its Relationship to Leadership, Depression, Anxiety and Stress among Pharmacy Students, Makkah, Saudi Arabia

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Authors’ contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Background: Emotional Intelligence (EI) is the capability of an individual to recognize his own and others’ emotions. The current study was conducted to describe the EI and its relation to leadership, stress, anxiety, and depression among pharmacy students at Umm Al-Qura University, Makkah, Saudi Arabia.

Methods: A cross-sectional study was conducted among pharmacy students enrolled in the Faculty of Pharmacy at Umm Al-Qura University, Makkah, during the educational year 2018/2019. A standardized data collection sheet was used. It inquired about personal and socio-demographic data, habits, general life satisfaction, and the academic stress. It contained also the Schutte Self-Report Emotional Intelligence (SSREI) scale, Depression Anxiety and Stress Scale (DASS), and the authentic leadership questionnaires. Descriptive, inferential statistics and multiple linear regression analyses were conducted.

Results: A total of 400 pharmacy students enrolled in the study. Their mean age was 21.61± 1.45 years. The total EI score (mean ± SD) was 118.42± 14.60. The predictors of the overall EI score were students' high leadership score (>48), general life satisfaction, and physical activity. EI was positively correlated with the authentic leadership scale and negatively correlated to DASS.

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Conclusion: Pharmacy students at UQU have above average EI score. Higher EI was positively associated with better leadership capacity and higher EI was negatively associated with depression, anxiety, and stress levels. Physical activity is an important EI predictor.

Keywords: Emotional intelligence; pharmacy education; stress; anxiety; depression; leadership.

1. INTRODUCTION

Emotional intelligence (EI) plays an important role in medical education; including pharmacy education [1,2,3]. The idea of EI was first introduced by Salovey and Mayer, who defined it as the “capability of an individual to manage his own emotions and the emotions of other individuals, to differentiate among them and to utilize information to facilitate one’s activities, reasoning, and thinking” [4]. EI has been recognized to be more important for academic success than Intelligence Quotient (IQ). During recent decades, experts documented that only 20% of success factors depend on IQ and the other 80% depend on EI [5]. EI helps to elaborate on and fulfill two important competencies, which are self-awareness and professionalism [4]. It also influences the personal ability to adapt to environmental changes and life pressures by a combination of five essential components [6]. These components are namely self-awareness, self-regulation, self-motivation, social skills or managing relationships, and empathy [5].

Effective leaders are those with the most creative, problem-solving, and flexible with others in the work field. They are characterized by high self-awareness of their own emotions and how their emotion affects others [6]. EI has been discussed to have an important role in improving clinical outcome during patients care [7].

On the other hand, the pharmacy program (as any other healthcare programs) requires extraordinary work from the students in order to achieve the adequate knowledge and skills needed in their future professional life [8]. Increasing academic expectations, self-independency, and coping with life demands may lead to mental health disorders, such as stress, anxiety, and depression. These are the most common mental health disorders among healthcare students [9,10]. Individuals who have low EI might suffer from a reduction in their cognitive performance and goals achievements. However, individuals who apply EI competencies are found to have better interpersonal relationships, higher academic achievement, and less likely to have psychological disturbance such as, depression, anxiety, and stress [11]. Moreover, EI is considered a critical factor for academic, professional success. Furthermore, it is an important factor in improving mental health [12].

There is an increasing concern about the importance of EI in different aspects of academic life, especially in pharmacy education. However, there is a very limited amount of studies done on EI and its predictors among pharmacy students in Makkah, Saudi Arabia.

The current study was conducted to determine the domains of EI and its relation to leadership, stress, anxiety, and depression among pharmacy students from Umm Al-Qura University (UAQ), Makkah.

2. METHODS

A cross-sectional study was conducted among pharmacy students at UAQ during the educational year 2018/2019. Pharmacy students of both genders who completed the freshman year (from second to final year), from both programs either Bachelor of Pharmacy (B Pharm), or Doctor of Pharmacy (Pharm.D), who accepted to participate were recruited in the study.

The sample size was determined using the formula for the calculation sample from the cross-sectional study [13].

\[ n = \frac{Z^2 \times p \times (1-p)}{L^2} \]

Where “n” is the minimal calculated sample, “Z” is a constant =1.96 at a 95% confidence level, and “p” was assumed to be 50% (as the most conservative sample because there was no previous similar study in Makkah), and “q” = 1-p = 0.5. So, the minimal estimated sample size to accomplish a precision of 0.05%, at a 95% Confidence Interval (CI) was 384 students, which was exceeded to reach 400 participants for the stratification purpose.
A multi-stage stratified random sampling technique was used. The first stage stratification considered the students’ gender. The second and third sampling stages were done according to the students’ educational year (second year to final year) and clinical residency year for Pharm-D, and the educational program (B-Pharm and Pharm D).

A standardized self-administered data collection sheet was used. It inquired about:

1- Personal and socio-demographic data (as age, gender, marital status, GPA of the last semester, program type, educational year, etc.).

2- Habits: Like smoking and exercise practicing. Students were asked about practicing physical exercise, the duration and frequency were inquired.

3- Student’s general life satisfaction.

4- Student’s academic stress: the student asked about exposure to any academic stress during the previous semester.

5- The Schutte Self-Reported Emotional Intelligence (SSREI): It consists of 33 questions with answers on a 5-point Likert scale. The answers then were divided into 4 sub-scales namely: Emotion Perception (EP), Managing Self-Relevant Emotions (MSE), Managing Others’ Emotions (MOE), and Utilizing Emotion (UE). Higher scoring of the scale representing greater levels of EI trait. The (SSREI) scale has been found to have well construct validity.

6- The Depression Anxiety and Stress Scale 21 (DASS-21). The score of the overall DASS score was multiplied by two to be matched with the original long version (DASS-42). According to the reliability scores of the scales in terms of Cronbach’s alpha scores rate the overall DASS-21 reliability at 0.93, depression scale at 0.88, anxiety scale at 0.90, and stress scale at 0.93 in the normative sample [16]. Moreover, DASS-21 had an overall good construct validity of 0.79 [17].

7- The Authentic Leadership Scale: It consists of 16 questions with 4 subscales. These subscales are the self-awareness, internalized moral, balanced processing, and relational transparency and each subscale consist of 4 questions. The responses recorded by 5-point Likert scale ranging from 1 for “strongly disagree” to 5 for “strongly agree”. The 16-item ALQ scale developed by Walumbwa, et al. (2008), and has good discriminant validity of 0.67 and overall reliability of 0.91; while its dimensions demonstrated the following reliabilities: self-awareness domain was 0.73, internalized moral perspective was 0.73, relational transparency was 0.77, and balanced processing was 0.70. The overall authentic leadership score can be interpreted using the following guidelines: Very high = 65-80, high = 49-64, low = 33-48, and very low = 16-32. Scores in the upper ranges indicate stronger authentic leadership, whereas scores in the lower ranges indicate weaker authentic leadership. The leadership was categorized into a high score ≥48, and a low score < 48 [18].

All statistical analysis was performed by SPSS version 22. Descriptive statistics were done. For inferential statistics, independent sample t-test and ANOVA tests were also used to compare means. The post hoc test was done using the Least Significant Difference (LSD). Pearson’s Product-moment Correlations were also calculated. Multiple-linear regression analyses were constructed to model the linear relationship between the study independent variables and the outcome (dependent) variable of the study (EI). All levels of significance were set at P-value ≤ 0.05.

3. RESULTS

An overall 400 pharmacy students were accepted to participate in the study. Their mean age was 21.61 ± 1.45 years. About four-fifths (79.9%) of the students reported feeling academic stress. On the other hand, about three-fourths (72.4%) of them reported general life satisfaction.

Table (1) shows that the total mean EI score of the students was 118.72 ± 14.60. Females had a slightly higher overall EI score and EP, MSE, MOE domains compared to males. However, there are no statistically significant differences (P > 0.05). Similarly, there is no statistical association (P > 0.05) between EI domains and the age of pharmacy students. On the other hand, single students had higher mean scores of UE domain of EI compared to married students, with a statistically significant difference (P <
Better achievers (GPA ≥ 3.5 / 4) had a significantly higher mean score of EP (32.71±3.74) compared to others (31.67±4.06), with a statistically significant difference (P < 0.05). Similarly, good achievers had significantly better means of MSE (Student's t-test = 3.06, P < 0.01), and overall EI (Student's t-test = 2.25, P < 0.05) compared to others. Furthermore, students enrolled in Pharm-D program had higher scores in all four EI domains and overall EI scores than others. However, there are no statistically significant differences (P > 0.05).

Table (2) shows that smoking was negatively associated with MOE domain of EI (P < 0.05). The total mean EI score was lower among smokers compared to the non-smoker, but without a statistically significant difference (P > 0.05). Physically active students had significantly higher mean scores of all four EI domains compared to non-physically active students (P ≤ 0.05). Furthermore, students who exercising ≥3 days/week had significantly higher mean scores in EP, MSE, UE, and total EI compared to other students. The overall EI score among those who exercising ≥3 days/week was 121.90±14.04 compared to only 118.80±12.29 among those who practiced <3 days/week, and 117.49±12.95 among those who didn’t practice at all. A highly statistical significant difference was found (F = 4.65, P < 0.01). Regarding the type of exercise, students who practiced aerobics had the highest mean score of MSE compared to those practicing other exercise types, and those who didn’t exercise at all. There is statistical significant difference (F=2.49, P < 0.05).

Furthermore, the duration of exercise ≥30 min/day has statistically significant associations with MOE and UE domains and with the overall EI (F = 3.66, P < 0.05).

### Table 1. Mean scores of emotional intelligence domains according to personal and socio-demographic characteristics of pharmacy students, Umm Al-Qura University

| EI Domains | EP Mean ± SD | MSE Mean ± SD | MOE Mean ± SD | UE Mean ± SD | Total EI Mean ± SD |
|------------|--------------|---------------|---------------|--------------|--------------------|
| Total EI   | 31.96 ± 4.03 | 34.12 ± 4.42  | 29.53 ± 3.62  | 23.44 ± 4.52 | 118.72 ± 14.60     |
| Gender     |              |               |               |              |                    |
| Male       | 31.93 ± 4.86 | 33.93 ± 5.02  | 29.22 ± 4.09  | 23.33 ± 4.24 | 118.42 ± 16.40     |
| Female     | 32.05 ± 3.55 | 34.30 ± 3.90  | 29.71 ± 3.36  | 23.29 ± 3.37 | 119.37 ± 11.68     |
| Student's t-test: | -0.44 (0.66) | -0.89 (0.41) | -1.37 (0.20) | 0.10 (0.92) | -0.69 (0.49)       |
| Age        |              |               |               |              |                    |
| ≤ 21       | 31.98 ± 4.29 | 34.09 ± 4.51  | 29.38 ± 3.79  | 23.17 ± 3.61 | 118.64 ± 13.70     |
| >21        | 31.99 ± 3.71 | 34.23 ± 4.10  | 29.68 ± 3.46  | 23.42 ± 3.73 | 119.33 ± 13.09     |
| Student's t-test: | -0.15 (0.98) | -0.34 (0.73) | -0.81 (0.42) | -0.67 (0.49) | -0.52 (0.60)       |
| Marital Status |          |               |               |              |                    |
| Single     | 32.02 ± 4.02 | 34.19 ± 4.27  | 29.59 ± 3.59  | 23.42 ± 3.59 | 119.22 ± 13.27     |
| Married    | 31.50 ± 3.58 | 33.70 ± 4.72  | 28.60 ± 3.99  | 21.20 ± 4.56 | 115.00 ± 14.94     |
| Student's t-test: | 0.56 (0.57) | 0.50 (0.61) | 1.19 (0.23) | 2.65 (0.009) | 1.38 (0.17)        |
| Program Type |            |               |               |              |                    |
| Basic years | 31.91 ± 4.19 | 34.32 ± 4.33  | 29.33 ± 3.78  | 23.21 ± 3.76 | 118.59 ± 14.05     |
| B. Pharm   | 31.82 ± 3.66 | 34.12 ± 4.02  | 29.63 ± 3.07  | 23.11 ± 3.28 | 118.66 ± 10.93     |
| Pharm-D    | 32.41 ± 4.08 | 34.35 ± 4.54  | 29.86 ± 3.86  | 23.68 ± 3.92 | 120.29 ± 14.57     |
| ANOVA test F: | 0.69 (0.5)  | 0.11 (0.89) | 0.71 (0.49) | 0.75 (0.47) | 0.60 (0.55)        |
| Education year |          |               |               |              |                    |
| Second     | 32.19 ± 3.65 | 34.45 ± 3.18  | 29.49 ± 2.94  | 23.42 ± 2.84 | 119.56 ± 9.99      |
| Third      | 31.66 ± 4.46 | 33.83 ± 5.16  | 29.19 ± 4.41  | 23.03 ± 4.43 | 117.72 ± 16.92     |
| Fourth     | 32.51 ± 4.11 | 34.34 ± 4.61  | 30.06 ± 3.91  | 23.04 ± 4.03 | 119.96 ± 14.27     |
| Fifth      | 31.96 ± 3.81 | 34.22 ± 4.18  | 29.62 ± 3.27  | 23.44 ± 3.33 | 119.25 ± 12.12     |
| Sixth      | 31.69 ± 3.54 | 34.03 ± 3.89  | 29.40 ± 3.05  | 23.91 ± 3.53 | 119.03 ± 11.97     |
| ANOVA test F: | 0.58 (0.67) | 0.27 (0.89) | 0.64 (0.64) | 0.53 (0.71) | 0.36 (0.84)        |

*EP: Emotion Perception, MSE: Management of self-Emotions, MOE: Managing Others’ Emotions, UE: Utilizing Emotion*
Table 1. Mean scores of emotional intelligence domains according to personal and socio-demographic characteristics of pharmacy students, Umm Al-Qura University (Continue)

| EI Domains          | EP Mean | SD  | MSE Mean | SD  | MOE Mean | SD  | UE Mean | SD  | Total EI Mean | SD  |
|---------------------|---------|-----|----------|-----|----------|-----|---------|-----|--------------|-----|
| Grade Point Average |         |     |          |     |          |     |         |     |              |     |
| < 3.5               | 31.67   | 4.06| 33.73    | 4.45| 29.40    | 3.70| 23.20   | 3.80| 118.01       | 13.89|
| ≥ 3.5               | 32.71   | 3.74| 35.14    | 3.74| 29.86    | 3.39| 23.54   | 3.39| 121.26       | 11.85|
| Student's t-test:   | -2.43   |     | -3.06    |     | -1.17    |     | -0.84   |     | -2.25        |     |
| (P-value)           | (0.02)  |     | (0.002)  |     | (0.24)   |     | (0.40)  |     | (0.02)       |     |
| Father education    |         |     |          |     |          |     |         |     |              |     |
| Less than university| 31.95   | 4.17| 33.94    | 3.61| 29.59    | 4.68| 23.40   | 5.18| 118.66       | 13.28|
| University & above  | 31.96   | 3.92| 34.24    | 3.63| 29.47    | 4.21| 23.46   | 3.95| 119.15       | 13.57|
| Student's t-test:   | -0.03   |     | -0.67    |     | 0.34     |     | -0.11   |     | -0.36        |     |
| (P-value)           | (0.97)  |     | (0.50)   |     | (0.73)   |     | (0.91)  |     | (0.72)       |     |
| Mother education    |         |     |          |     |          |     |         |     |              |     |
| Less than university| 32.15   | 4.12| 34.40    | 4.19| 29.82    | 3.28| 23.87   | 5.06| 120.03       | 12.16|
| University & above  | 31.78   | 3.94| 33.86    | 4.60| 29.26    | 3.88| 23.04   | 3.95| 117.95       | 14.34|
| Student's t-test:   | 0.92    |     | 1.22     |     | 1.55     |     | 1.82    |     | 1.55         |     |
| (P-value)           | (0.35)  |     | (0.22)   |     | (0.12)   |     | (0.07)  |     | (0.12)       |     |
| Residency           |         |     |          |     |          |     |         |     |              |     |
| With family         | 31.96   | 3.98| 34.12    | 4.30| 29.48    | 3.58| 23.29   | 3.65| 118.87       | 13.27|
| Not With family     | 32.00   | 4.97| 33.95    | 6.31| 30.23    | 4.31| 26.00   | 12.21| 120           | 16.41|
| Student's t-test:   | -0.04   |     | 0.17     |     | -0.92    |     | -1.01   |     | -0.42        |     |
| (P-value)           | (0.97)  |     | (0.86)   |     | (0.44)   |     | (0.32)  |     | (0.67)       |     |
| Academic stress     |         |     |          |     |          |     |         |     |              |     |
| Yes                 | 32.19   | 3.71| 34.10    | 4.08| 29.42    | 3.49| 23.14   | 3.58| 118.85       | 12.45|
| No                  | 31.63   | 4.44| 34.13    | 4.88| 29.68    | 3.80| 23.86   | 5.59| 118.52       | 17.25|
| Student's t-test:   | 1.36    |     | 0.06     |     | 0.71     |     | 1.58    |     | -0.23        |     |
| (P-value)           | (0.17)  |     | (0.95)   |     | (0.47)   |     | (0.47)  |     | (0.11)       |     |
| General life satisfaction |   |     |          |     |          |     |         |     |              |     |
| Yes                 | 32.22   | 4.07| 34.62    | 4.24| 30.05    | 3.47| 23.69   | 3.68| 120.59       | 13.46|
| No                  | 31.40   | 3.71| 33.97    | 3.64| 28.19    | 3.64| 22.28   | 3.48| 114.84       | 12.20|
| Student's t-test:   | 1.83    |     | 3.48     |     | 4.73     |     | 3.47    |     | 3.91         |     |
| (P-value)           | (0.06)  |     | (0.00)   |     | (0.00)   |     | (0.00)  |     | (0.00)       |     |

EP: Emotion Perception, MSE: Management of self Emotions, MOE: Managing Others’ Emotions, UE: Utilizing Emotion

Table (3) reveals the mean scores of EI domains according to presence of depression, anxiety, and stress traits (diagnosed by DASS scale) and the leadership capacity. The mean overall EI score was lower among students who had depression (117.24 ± 12.47) compared to others (121.20 ± 17.38), with a statistically significant difference (Student’s t-test = -2.64, P < 0.01). In addition, depressed students had a significantly lower score of MSE (33.62 ± 4.08) compared to others (34.96 ± 4.84), with a highly statistically significant difference (P<0.01). The same picture was seen regarding MOE & UE domains. Regarding anxiety, there are no statistically significant associations between it and different EI domains of pharmacy students (P > 0.05). Concerning stress, students diagnosed with it had a lower overall EI score (116.87± 1191) compared to non-stressed students (120.51 ± 16.63), with a highly statistically significant difference (Student’s t-test = - 2.51, P < 0.01). Similarly, non-stressed students had a significantly (P<0.001) better mean UE score (24.36 ± 5.15) compared to the stressed colleagues (22.49 ± 3.54). A similar figure was also observed regarding MOE domain. Regarding overall leadership score, the same table illustrates that pharmacy students who had high leadership score (>48) had significantly (P < 0.001) much better scores in almost all EI domains except UE compared to others. The mean EP score was 32.41 ± 3.61 among those who had a high overall leadership score compared to only 26.0 ± 4.74 among those who had low leadership capacity.

A negative significant correlation (R = - 0.129, P < 0.05) was found between the EI score and DASS among pharmacy students. On the other hand, there was a strong positive correlation between the total leadership capacity score and EI score, with a highly statistically significant association were present (r = 0.72, P < 0.001).
Table 2. Mean scores of emotional intelligence domains according to the habits and lifestyle of pharmacy students at Umm Al-Qura University

| EI domains | EP Variables | EP | MSE | MOE | UE | Total EI |
|------------|--------------|----|-----|-----|----|----------|
|            | Mean  | SD   | Mean | SD  | Mean | SD  | Mean  | SD   | Mean  | SD   |
| Smoking    | Yes     | 31.54 | 4.58 | 33.90 | 5.01 | 28.40 | 4.27 | 22.47 | 4.58 | 116.33 | 16.46 |
|            | No      | 32.04 | 3.92 | 34.20 | 4.21 | 29.68 | 3.52 | 23.55 | 4.55 | 119.38 | 14.36 |
| Student’s t-test: | (P-value ) | -0.800 | (0.42) | -0.442 | (0.65) | -2.13 | (0.03) | -1.46 | (0.15) | -1.12 | (0.26) |
| Physical Activity | Yes | 32.55 | 4.07 | 34.94 | 4.14 | 29.95 | 3.68 | 23.82 | 3.72 | 121.29 | 13.62 |
|            | No      | 31.61 | 3.93 | 33.61 | 4.32 | 29.25 | 3.54 | 22.92 | 3.60 | 117.41 | 12.99 |
| Student’s t-test: | (P-value ) | 2.05 | (0.04) | 3.07 | (0.02) | 1.97 | (0.05) | 2.59 | (0.01) | 2.85 | (0.005) |
| Types of physical activity | Aerobic | 33.28 | 3.91 | 35.71 | 3.82 | 30.43 | 2.37 | 23.28 | 3.35 | 122.71 | 9.41 |
|            | Walking | 32.34 | 2.22 | 34.77 | 4.11 | 30.02 | 3.65 | 23.75 | 3.55 | 120.89 | 13.26 |
|            | Others  | 32.84 | 3.96 | 35.28 | 4.81 | 29.79 | 4.24 | 23.97 | 4.49 | 121.89 | 16.56 |
|            | Multiple types | 34.12 | 4.64 | 35.12 | 3.39 | 29.75 | 2.49 | 23.50 | 4.28 | 122.50 | 9.12 |
|            | Not practice | 31.61 | 2.99 | 33.63 | 4.28 | 29.26 | 3.54 | 22.97 | 3.57 | 117.47 | 12.93 |
| ANOVA test F: | (p-value) | 1.94 | (0.10) | 2.49 | (0.04) | 1.01 | (0.40) | 1.22 | (0.30) | 2.07 | (0.08) |
| LSD       | a differs from b & d | a differs from c | a differs from c | a differs from c | a differs from c |
| Number of exercise Days | ≥3 days | 32.78 | 4.17 | 34.97 | 4.29 | 30.14 | 3.69 | 24.00 | 3.86 | 121.90 | 14.04 |
|            | <3 days | 31.49 | 3.62 | 34.80 | 3.84 | 29.37 | 3.67 | 23.14 | 3.41 | 118.80 | 12.29 |
|            | Not practice | 31.66 | 3.93 | 33.63 | 4.30 | 29.25 | 3.53 | 23.93 | 3.56 | 117.49 | 12.95 |
| ANOVA test F: | (p-value) | 3.67 | (0.03) | 4.56 | (0.01) | 2.58 | (0.07) | 3.58 | (0.03) | 4.65 | (0.01) |
| LSD       | a differs from c | a differs from c | a differs from c | a differs from c | a differs from c |
| Duration of exercising | ≥ 30 min. /day | 32.51 | 4.14 | 34.88 | 4.27 | 29.97 | 3.76 | 23.97 | 3.80 | 121.34 | 13.91 |
|            | < 30 min. /day | 32.33 | 3.65 | 34.80 | 3.55 | 29.87 | 3.46 | 23.03 | 3.67 | 120.03 | 12.57 |
|            | Not practice | 31.64 | 3.92 | 33.67 | 4.34 | 29.25 | 3.53 | 22.95 | 3.57 | 117.52 | 12.99 |
| ANOVA test F: | (p-value) | 1.75 | (0.17) | 2.84 | (0.06) | 1.66 | (0.19) | 4.31 | (0.01) | 3.22 | (0.04) |
| LSD       | a differs from c | a differs from c | a differs from c | a differs from c | a differs from c |
After controlling confounding factors in multiple-linear regression analyses, Table (4) displays that predictors of overall EI score were students' high leadership score (>48), general life satisfaction, and physical activity. Overall high leadership score (>48) was a significant predictor to all EI domains, and to overall EI (B=25.94; 95% CI: 21.47: 30.41). The table also shows that practicing physical activity was a significant predictor of EP (B=0.77; 95% CI: 0.04:1.50), MSE (B=1.19; 95% CI: 0.45: 1.95), MSE (B=0.70; 95% CI: 0.06: 1.34) & overall EI (B=3.40; 95% CI: 1.12: 5.68). Furthermore, general life satisfaction was a predictor of UE (B=1.79; 95% CI: 0.90: 2.69), and overall EI (B=3.91; 95% CI: 1.39: 6.43). GPA was a positive predictor of EP (B=0.84; 95% CI: 0.06:1.62) and MSE (B=1.03; 95% CI: 0.21: 1.84). On the other hand, depression was a negative significant predictor of MSE domain of EI (B= -0.98; 95% CI: -1.75: -0.19), MOE domain of EI (B= -0.78; 95% CI: -1.43: -0.13), and UE (B= -1.11, 95% CI: -2.14: -0.09). Stress was a negative predictor of UE (B= -1.15; 95% CI: -0.48: -2.45). Smoking was a negative significant predictor of MOE domain of EI (B= -1.38; 95% CI: -0.35: -2.40).

4. DISCUSSION

Up to the best of our knowledge, the current study may be the first one that determine the emotional intelligence among pharmacy students in Saudi Arabia. The current study revealed that the total EI mean score was 118.72 ± 14.60; which is above the sum of the average score (EI ranging between 90-100). The result of the current study is in line with that reported that a similar finding among medical students from KAU [3].

The findings of the present study revealed the absence of a significant association between gender and EI. This result agrees with the results of Alghamdi from Albaha University, KSA [19]. It coincides also with the findings of a meta-analysis done by Fischer et al., (2017) and found an absence of association between gender and EI [20]. On the other hand, Hassali, et al. (2017) [21] reported that female pharmacy students from Malaysia obtained higher scores of self-awareness and empathy. Similarly, Ibrahim, et al from Saudi Arabia and Miri, et al from Iran also reported that the EI score was significantly higher among female medical students [3, 22]. The discrepancy in the results may be due to the differences between the target populations, the age, or the used tools. The current study found the absence of a statistical association between age and EI. This agrees with the results of Dolev, et al, [23]. On the other hand, many other studies suggested that EI improves with increasing age [24, 25]. This difference may be due to differences in the target populations.

Students enrolled in Pharm-D program in the current study obtained higher scores in all EI domains compared to other programs. However, there is no statistically significant difference. The cause of better scores among Pharm-D students maybe because they are exposed to clinical settings as a part of their hospital rotations which gives the chance to contact patients, apply their knowledge, and improve EI [21].

Regarding marital status, the current study revealed that single students had a significantly higher mean score of the UE domain of EI compared to others. This finding agrees with the results of Khodarahimi from Iran. However, other findings suggested the absence of a statistical association [26].

Regarding academic achievement, our study demonstrated that a higher student’s GPA was associated with better EP and MSE domains of EI. This may be because the high level of student’s EI indicates a high level of coping, self-efficacy, and general good moods which positively affect academic achievement [27]. Students with a higher EI level may deal easily with negative emotions as they tend to manage their emotions in a better way and tend to be more social [28]. This result is consistent with many other previous studies [3,23,29-31]. On the other hand, some studies found no association between EI level and academic achievement [32,19].

The results of the current study found that general life satisfaction was an important predictor for having a good EI score. Good life satisfaction was a predictor of all EI domains except PE. It is also a predictor of the overall EI score. Ruiz-Aranda et al. (2014) conducted a similar study among 264 female healthcare students and they found that high EI correlated with lower stress levels which result in higher life satisfaction and happiness [33,34].
Table 3. Mean scores of emotional intelligence domains according to depression, anxiety and stress (DASS scale) and leadership capacity of pharmacy students at Umm Al-Qura University

| EI Domains               | EP (Mean) | EP (SD) | MSE (Mean) | MSE (SD) | MOE (Mean) | MOE (SD) | UE (Mean) | UE (SD) | Total EI (Mean) | Total EI (SD) |
|--------------------------|-----------|---------|------------|----------|------------|----------|-----------|---------|----------------|----------------|
| **Depression (DASS)**    |           |         |            |          |            |          |           |         |                |                |
| Yes                      | 31.67     | 3.88    | 33.62      | 4.08     | 29.16      | 3.42     | 22.80     | 3.55    | 117.24         | 12.46          |
| No                       | 32.46     | 4.25    | 34.96      | 4.84     | 30.15      | 3.88     | 24.52     | 5.66    | 121.20         | 17.38          |
| Student's t-test:        |           |         |            |          |            |          |           |         |                |                |
| (P-value)                | -1.89     | (0.06)  | -2.96      | (0.003)  | -2.66      | (0.01)   | -3.73     | (0.00)  | -2.64          | (0.01)         |
| **Anxiety (DASS)**       |           |         |            |          |            |          |           |         |                |                |
| Yes                      | 32.19     | 3.71    | 34.10      | 4.08     | 29.42      | 3.49     | 23.14     | 3.58    | 118.85         | 12.45          |
| No                       | 31.63     | 4.44    | 34.13      | 4.88     | 29.68      | 3.80     | 23.86     | 5.59    | 118.52         | 17.25          |
| Student's t-test:        |           |         |            |          |            |          |           |         |                |                |
| (P-value)                | 1.36      | (0.17)  | 0.06       | (0.95)   | 0.71       | (0.47)   | 1.58      | (0.11)  | -0.23          | (0.82)         |
| **Stress (DASS)**        |           |         |            |          |            |          |           |         |                |                |
| Yes                      | 31.64     | 3.58    | 33.69      | 3.99     | 29.04      | 3.50     | 22.49     | 3.54    | 116.87         | 11.91          |
| No                       | 32.27     | 4.41    | 34.53      | 4.77     | 30.00      | 3.68     | 24.36     | 5.15    | 120.51         | 16.63          |
| Student's t-test:        |           |         |            |          |            |          |           |         |                |                |
| (P-value)                | -1.55     | (0.12)  | -1.88      | (0.06)   | -2.67      | (0.01)   | -4.22     | (0.00)  | -2.51          | (0.01)         |
| **Total leadership**     |           |         |            |          |            |          |           |         |                |                |
| Low leadership (≤48)     | 26.00     | 4.74    | 26.64      | 7.12     | 23.53      | 5.15     | 19.32     | 12.37   | 90.82          | 26.99          |
| High leadership (>48)    | 32.41     | 3.61    | 34.68      | 3.58     | 29.97      | 3.05     | 23.75     | 3.08    | 120.83         | 10.63          |
| Student's t-test:        |           |         |            |          |            |          |           |         |                |                |
| (P-value)                | -7.01     | (0.00)  | -5.92      | (0.00)   | -6.53      | (0.00)   | -1.19     | (0.07)  | -5.85          | (0.0)          |

EP: Emotion Perception, MSE: Management of self-Emotions, MOE: Managing Others’ Emotions, UE: Utilizing Emotion
### Table 4. Multiple Linear regression analyses of the predictors of emotional intelligent domains among pharmacy students at Umm Al-Qura University

| EI domain Variables            | EP B   | EP CI  | MSE B | MSE CI  | MOE B | MOE CI  | UE B | UE CI  | Total EI B | Total EI CI  |
|--------------------------------|--------|--------|-------|---------|-------|---------|------|--------|-------------|--------------|
| Overall Leadership (>48)       | 6.11   | 4.67,  | 7.54  |         | 5.79, | 8.75    | 6.32 | 7.55   | 4.66        | 3.01, 6.30   |
| Life satisfaction (Yes)        | ------ | ------ | ------ | ------- | ------ | ------- | ---- | ------- | 1.79        | 0.90, 2.69   |
| Physical Activity (Yes)        | 0.77   | 0.04,  | 1.50  | 1.19    | 0.45, | 1.95    | 0.70 | 0.06,  | 1.34        | ------       |
| GPA (≥3.5)                     | 0.84   | 0.06,  | 1.62  | 1.03    | 0.21, | 1.84    | ------| ------- | ------      | ------       |
| Depression (Yes)               | ------ | ------ | ------ | ------- | ------ | ------- | 0.98 | -1.75, | -0.78       | -1.43, -0.13 |
| Stress (Yes)                   | ------ | ------ | ------ | ------- | ------ | ------- | ------| ------- | -1.11       | -2.14, -0.09 |
| Smoking (Yes)                  | ------ | ------ | ------ | ------- | ------ | ------- | ------| ------- | -1.15       | -2.45, -0.48 |
| Constant                       | 20.31  | 17.14, | 22.26 | 18.64   | 17.10 | 13.72   | 16.15| 12.30, | 67.54       | 57.40, 77.68 |

*EP: Standardized regression coefficient; CI: Confidence Interval Significant at < 0.05; EP: Emotion Perception, MSE: Management of self-Emotions, MOE: Managing Others’ Emotions, UE: Utilizing Emotion*
Concerning physical activity, our findings revealed the presence of positive associations between practicing physical activity, and each of the 4 EI domains (PE, MSE, MOE & UE), and the overall EI score. Ibrahim, et al. reported a similar finding as physical activity improved the EI mean scores among medical students from KAU.3 Another systematic review (36 studies) reported similar results among athletic populations [35].

Regarding the frequency and duration of exercise, our findings also suggested that pharmacy students who exercise ≥ 3 days/week and ≥ 30 minutes/day tended to be more emotionally intelligent compared to others. This result goes in line with [36].

Regarding smoking, the results of the present study revealed that smokers had lower EI domains compared to non-smokers. Our results could be explained by that the students with higher EI may be more capable to control negative emotions and they are better in dealing with others’ emotions and hence this may link with non-smoking. Evidence supported the same line of the idea which shows that smokers tend to have lower EI in comparison with non-smokers. A systemic review conducted for 36 studies found that lower EI related to more consumption of smoking [37]. Our findings also coincide with the results of Ibrahim, et al. who found that the non-smoker medical students have generally higher EI levels compared to others. [3] In addition, a study done among 550 Malaysian adolescents found that EI served as a protective factor against smoking among adolescents [38].

Regarding DASS, our finding revealed that DASS was negatively correlated with EI. Similarly, the study of Meng and Qi suggested that high EI improved the perceived stress among nursing students [39]. The study of Ibrahim, et al suggested that having higher EI is negatively associated with stress among medical students [3]. Likewise, Foster, et al. (2018) suggested that EI had a significant negative correlation with stress levels among pharmacy and nursing undergraduate students. Similarly, other studies found that health-care students with high EI had lower stress levels [33, 34]. These results could be explained by the presence of a cluster of emotional skills to reduce mental distress such as emotional awareness.

The current study showed the presence of significant associations between EI and authentic leadership skills. This agrees with a study conducted among 235 pharmacy students [1]. Similarly, another study found a significant relationship between EI and transformational leadership behavior [40].

5. CONCLUSIONS

Pharmacy students at UAU had well & above the average EI score. The better students’ academic performance had positive associations with the MSE domain and with the overall EI score. Smokers had a lower MOE competency, and single students showed better UE competency. Students’ high leadership score (>48), having general life satisfaction, and practicing physical activity were the predictors of the high overall EI score. EI can have protective effects against depression and stress among pharmacy students enrolled in the Pharm-D program had higher scores in all EI domains compared to other programs, but with insignificant differences. The duration of exercise is an important factor to decrease anxiety and stress levels. General life satisfaction is an important predictor for decreasing depression, anxiety, and stress levels. Academic stress was an important predictor for decreasing depression, anxiety, and stress levels. Proper training of pharmacy students on EI is required for achieving a better future career. This can be achieved by introducing EI as a subject in the students’ curriculum or through extra-academic activities. These activities can be done through workshops or online seminars for increasing students’ awareness about the benefits of EI that could motivate students to improve their EI competencies. Further researches are needed to assess the effectiveness of teaching EI in the pharmacy curriculum after the application of such programs. Future EI interventional studies are required. Encouragement of the students to be more physically active is needed for achieving better future EI. These activities can be established through facilitating gym memberships at a reduced price and planning for sports competition events between university departments.

CONSENT AND ETHICAL APPROVAL

The study agreed with the ethical standards of the Helsinki Declaration. It was approved by the Institutional Review Board (IRB) of King Abdulaziz University (KAU), with a Reference Number: 151-18. Ethical approval was also obtained from the Ethics Committee Board.
of Pharmacy at UQU, with a project number 14907. Pharmacy students were informed with a brief description of the study. Informed written consent was signed by each accepted student before enrollment in the study. The study confirmed confidentiality and freedom of participation.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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