Emotional intelligence, workplace conflict and job burn-out among critical care physicians: a mediation analysis with a cross-sectional study design in Egypt

Zeinab A Kasemy,1 Asmaa Fady Sharif,2 Nadia M Bahgat,3 Shimaa Abdelsattar,4 Asmaa A Abdel Latif1

ABSTRACT

Objectives This study aimed to examine the association between the effect of emotional intelligence on job burn-out and the mediating effect of workplace conflict management among critical care physicians.

Design and setting A cross-sectional study design was deployed.

Participants The studied sample comprised 144 critical care physicians working at two Egyptian tertiary care public hospitals.

Measures The participants’ responses to three questionnaires were studied, including the Maslach Burnout Inventory, the Emotional Intelligence Questionnaire and the Conflict Management Formative Questionnaire, in addition to assessing coenzyme Q10 (CoQ10) levels.

Results Among the anaesthesiologists and critical care specialists examined, burn-out was reported by 63.9% of them. The findings of this study indicated that emotional intelligence played a notable role in predicting job burn-out, with a negative impact. Further analysis revealed that workplace conflict management acted as a mediator between emotional intelligence and the three components of job burn-out. Additionally, age and years of experience were found to have a negative correlation with burn-out and a positive correlation with conflict management.

Furthermore, CoQ10 levels showed a negative correlation with burn-out, while displaying positive correlations with emotional intelligence and conflict management.

Conclusion Conflict management acted as a mediator in reducing burn-out by demonstrating a significant negative relationship between emotional intelligence and burn-out. Initial findings indicated that possessing good emotional intelligence and conflict management skills had a positive influence on the immune system, as evidenced by higher CoQ10 levels. However, burn-out had the opposite effect, depleting the body’s CoQ10 stores and negatively impacting immune-protective mechanisms. Therefore, it is crucial to implement emotional management educational programmes and update educational policies and pedagogical practices to enhance the emotional capabilities of healthcare providers, especially in demanding fields like critical care, to effectively address conflicts.

INTRODUCTION

The workplace is a privileged setting for health promotion.1 The rapid shift in work and employment over the past few decades has influenced organisational structures and procedures, which in turn has an impact on employee health and well-being in their job roles and life responsibilities.2 Occupational health psychology provides health protection and health promotion of the workers, which is associated with improving the quality of work life. The concept of ‘health protection’ means the ability to reduce workplace toxicity and employee complaints that negatively impact their health.3
Intelligence is a broad spectrum of mental abilities that enable humans to recognise, memorise and resonate with a particular information set. Emotional intelligence (EI) was first defined by Mayer and Salovey as ‘the ability to perceive accurately, appraise and express emotion; the ability to access and/or generate feelings when they facilitate thought; the ability to understand emotion and emotional knowledge; and the ability to regulate emotions to promote emotional and intellectual growth’. EI encompasses a range of qualities such as motivation, resilience, enjoyment and self-esteem, which enable individuals to comprehend, identify, manage and regulate their emotions when faced with adverse circumstances.

The concept of EI is built on various theoretical and pedagogical backgrounds. Positive emotions promote decision-making and motivate creativity in various contexts. Proper emotional reasoning, appraisal, understanding, expression and self-management are other crucial abilities described in individuals with high EI. Another pedagogical approach explaining EI is the integrative model approach, which views EI as a coherent unit by creating a state where different skills and abilities are combined to achieve an overall sense of a situation. This model evaluates the individual’s general knowledge, learning aptitude and adaptability in unfamiliar scenarios. The four-branch model of EI is an integrative framework that highlights four specific abilities: precise perception of emotions, leveraging emotions to enhance cognitive processes, comprehending emotions and effectively managing emotions.

EI and burn-out
Burn-out is described as a state of inadequate negative emotional response in the form of emotional exhaustion (EE), depersonalisation and lower achievement. Burn-out was acknowledged to be adversely connected with EI and associated with adverse health effects and changes in specific stress biomarkers, including cortisol and coenzyme Q10 (CoQ10) levels.

EI and EE
EE is a mediating factor explaining the relationship between job performance and EI appraisals, optimism and social skills. EE is negatively associated with functioning and job performance. Workers undertaking emotional labour for an extended time are prone to EE. EE appears when the task surpasses the range of one’s emotional resources. Emotional labour is ‘the management of feeling to create a publicly observable facial and bodily display’ in the context of service work. Jobs involving emotional labour such as healthcare services provided in the emergency context, have three main characteristics that include face to face or voice to voice with an audience, requiring the worker to reproduce an emotional state in another person and allowing employers, through training and supervision, to exercise a degree of control over emotional activities of employees. When EI is optimised, it can reduce conflict at the workplace and, as a result, reduce job burn-out.

EI and depersonalisation
Depersonalisation describes the feeling of cynicism and self-detachment as if observing one’s thoughts, feelings and actions from a distance. Two-thirds of healthcare providers reported depersonalisation. EI significantly reduce depersonalisation among surgeons, residents and interns by developing several related coping strategies.

EI and personal achievement
Embracing EI can empower individuals to thrive during significant life transitions including the transition from high school to college and eventually entering the workforce. Students who possess EI exhibit enhanced interpersonal and intrapersonal skills, increased adaptability and superior stress management capabilities. Valente et al concluded that emotionally intelligent teachers create a positive and self-regulating learning environment. Being emotionally intelligent influences job success, particularly for those who wish to pursue a field that requires high emotion-related competence. According to an empirical study on emotional labour, the frequency of profound emotional performance in nursing staff correlates with higher emotional labour and a less optimal condition of mental health. In several healthcare disciplines, a wide range of literature confirmed the association between EI and personal achievement including medical educators, physicians, nurses and residents.

EI and conflict management
Initially, EI was considered a key to conflict management. New research suggests that EI is a unique notion predicting career performance, conflict resolution and life success. Cleary et al discovered that leaders of various healthcare services must recognise the critical role these personality traits of EI programmes play in healthcare delivery. The premise that EI is essential in clinical communication since it allows clinicians to effectively connect with patients and their families.

Conflict management and personal achievement
A conflict is a state of severe disagreement and argument concerning something important to at least one of the persons concerned. Nonetheless, conflict exists whenever one party’s conduct interferes with another party’s goals, needs or actions. Mullins and Christy described the conflict as a behaviour meant to disrupt the achievement of another person’s aims.

Objectives and research problem
A growing body of research has investigated the role of EI in reducing burn-out in various contexts, where it has discovered a strong negative association between EI and burn-out. However, this relationship could be more consistent among different aspects. The studies have reported conflicting results suggesting that employees
with high EI are more vulnerable to burn-out.\textsuperscript{34 35} This study is unusual as it specifies EI as a factor that helps to explain medical professionals’ workplace problems, including burn-out and conflict management.

The mediating role of various coping strategies among healthcare workers involved in stressful specialties, notably those involved in critical care disciplines, has yet to be examined. Hence, the primary objective of this study was to investigate the correlation between EI and job burn-out among critical care physicians. Additionally, the study aimed to explore the mediating role of workplace conflict management in this relationship. The findings of this research provide valuable insights for healthcare organisations and hospital administrators in effectively addressing job burn-out and workplace conflicts within these demanding fields. It is worth noting that this study fills a gap in the existing literature by examining how EI influences conflict management among emergency healthcare providers in various settings, thereby offering novel and significant contributions to the field.

**METHODS**

**Study design, setting and participants’ characteristics**

A cross-sectional study was conducted on 144 critical care physicians working at two Egyptian tertiary care public hospitals with a mean age of 30.11±4.35 years (R=24–45 years), with the male sex constituting high percentage of this specialty (63.2%); married participants constituted 61.1%, 90.3% of the respondents had night shifts with mean working hours (10.83±3.83).

**Sampling and sample size**

A convenience sampling technique was adopted. Based on the study by Kasemy et al, who estimated the association between EE and CoQ10 among a critical specialty group, the sample size was calculated using G power V.3.1 software at a power of 95% and an effect size of 0.88, with a final estimate of 132 participants, therefore, distributed 165 surveys based on an expected drop-out rate of 20%.\textsuperscript{36}

The high drop-out rate was applied due to the known workload and limited availability of these special work categories. A pilot study enrolled 10 participants who were later excluded. The remaining 155 surveys were distributed, 144 of which were returned completed, for an astounding response rate of 92.9%.

**Inclusion and exclusion criteria**

Egyptian critical care practitioners, including intensive care unit physicians, anaesthesiologists and emergency room physicians working as full-time employees with no minimum years of experience, were considered eligible to participate while part-time physicians, those working in other disciplines and those diagnosed with any chronic illnesses in the form of diabetes, hypertension, bronchial asthma or any other long-lasting illness were excluded from the study.

**Data collection tool**

Physicians who provided consent were invited to participate in interviews, during which the study team would elucidate the study objectives and provide a comprehensive overview of the questionnaire, including instructions on how to complete it.

**Completion of the four sections of the self-administered questionnaire**

A. Demographic data: including the participant’s age, sex, marital status, years of experience, daily workload (in hours) and performing night shifts.

B. The Maslach Burnout Inventory (MBI), a 22-item of 0–6 Likert scale (0 for never while 6 for every day) with three large domains: EE (9 items with <17 for low degree, 18–29 for moderate degree and >30 for high degree), depersonalisation (5 items with <5 for low degree, 6–11 for moderate degree and >12 for high degree) and reduced personal achievement (8 items ranging from <33 for low degree, 34–39 for moderate degree and >40 for high degree).\textsuperscript{37}

C. Trait Emotional Intelligence Questionnaire (TEIQ), a 50-item Likert scale in which the respondents indicated how much each statement applied to them using a 5-point score where 1 was given for don’t apply and 5 for always apply. The responses had five subcategories with 10 items for every single category with a range from 1 to 50 for every category: self-awareness (Q1-6), self-regulation (Q7-12), identification with others (Q13-17), social skills (Q18-23) and social motivation (Q24-29) and emotional management (Q30-34).

D. Conflict Management Formative Questionnaire (CMFQ), a 21-item Likert scale with five responses ranging from ‘not very like me’ (score of 1) to ‘very like me’ (score of 5) with R=21–105. Three questions scored negatively, and the questionnaire was subcategorised into three major domains: understanding context (6 items from questions 1 to 9), understanding natural responses (9 items from questions 1 to 9), understanding context (6 items from questions 10 to 15) and applying the approach (6 items from questions 16 to 21).\textsuperscript{38}

**Validation of data collecting instrument**

1. A pilot study had been conducted. Cronbach’s coefficient alpha for the study domains was calculated for each section individually, including the MBI (0.801), CMFQ (0.854) and TEIQ (0.755).

2. Opting for the adopted questionnaires was based on a literature review, and comparable findings were obtained. Several studies supported MBI dependability, such as the three-factor structure and internal reliability. They reported Cronbach alpha ratings of 0.90 for emotional tiredness, 0.76 for depersonalisation and...
0.76 for personal accomplishment, similar to the current study (0.801). 40-41 Additionally, the CMFQ was found to be moderately reliable (21 items: α=0.871) where the understand natural response subscale consisted of 9 items (α=0.787), the understand context subscale consisted of 6 items (α=0.703) and the apply approach subscale consisted of 6 items (α=0.604). When converted to a 100-point scale, the bottom quartile ranged from 29 to 63 and the top quartile ranged from 79 to 100. 39

3. Double anonymisation of all responses was maintained through data collection and analysis processes.

Blood sampling
To evaluate CoQ10 levels, samples were obtained during the early morning hours (06–10 hours) and analysed using an ELISA provided by Sino Gene Clon Biotech. The selected cut-off range for CoQ10 levels spanned from 1.56 ng/mL to 50 ng/mL. 36

Statistical analysis
SPSS V.28 software was employed. The Shapiro-Wilk test was applied to verify the distribution normality of the continuous variables. An independent t-test was used to assess the difference between two means of normally distributed variables. A univariate linear regression and Pearson and Spearman correlation analyses were performed. A mediation analysis using SPSS through the Process V.3.3 Macro (Hayes) was used to estimate the direct and indirect relationships between EI, workplace conflict management and job burn-out. Significant paths were estimated using standardised regression weights. A p<0.05 was set as the level of significance.

Patient and public involvement
Patients and/or the public were neither involved in the design, nor in conducting, reporting or disseminating this research.

RESULTS
The study enrolled a total of 144 critical care physicians, with a mean age of 30.11±4.35 years, range: 24–45 years. Among the participants, 63.2% were male, and 90.3% reported having night shifts (table 1). The critical care specialists had a mean job burn-out score of 29.39±7.07, range: 24–45, with 63.9% of them experiencing burn-out. The mean of conflict management score was 66.22±12.16, range: 46–92, and the EI score had a mean of 35.93±3.44, and range of 27.40–43.60.

The distribution of the scores regarding the general characteristics revealed that the respondents ≥28 years, the single male respondents, the respondents with 4 or more years of experience and those working <8 hours without nightshifts had significantly high conflict management scores, high EI scores and lower burn-out scores (p<0.05) (table 2).

There were significant negative correlations observed between total burn-out scores and conflict management (r=−0.455, p<0.001), EI (r=−0.350, p<0.001) and CoQ10 levels (r=−0.593, p<0.001). Components of burn-out were also studied where Exhaustion showed correlations as follows: (depersonalisation: r=0.156, p=0.063; reduced personal achievement: r=0.217, p=0.009; conflict management: r=−0.332, p<0.001; EI: r=−0.268, p=0.001 and CoQ10: r=−0.448, p<0.001)), depersonalisation (reduced personal achievement: r=0.633, p<0.001; conflict management: r=−0.370, p<0.001; EI: r=−0.226, p=0.006 and CoQ10: r=−0.375, p<0.001) and reduced personal achievement: (conflict management: r=−0.323, p<0.001; EI: r=−0.271, p=0.001 and CoQ10: r=−0.478, p<0.001)). Additionally, conflict management exhibited positive correlations with EI (r=0.519, p<0.001) and CoQ10 levels (r=0.302, p<0.001) (online supplemental table 1). Age and years of experience demonstrated significant negative correlation with burn-out and positive correlation with conflict management. CoQ10 levels displayed a significantly negative correlation with burn-out and positive correlations with EI and conflict management (figure 1A–C).

The findings of this study revealed that EI could significantly predict job burn-out across various dimensions. EI showed a negative association with EE (β=−0.88, 95% CI −1.41 to −0.35), depersonalisation (β=−0.43, 95% CI −0.74 to −0.12), reduced personal achievement (β=−0.83, 95% CI −1.32 to 0.34) and a positive association with workplace conflict management (β=1.83, 95% CI 1.33 to 2.34). Furthermore, workplace conflict management was found to mediate the relationship between EI and job burn-out dimensions. The indirect effects of conflict management were observed as follows: β=−0.45 (95% CI −0.87 to −0.07)

<table>
<thead>
<tr>
<th>Table 1</th>
<th>General characteristics of critical care specialists’ group</th>
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<tbody>
<tr>
<td>No=144</td>
<td>Means±SD Range</td>
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<tr>
<td>Female</td>
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<td>Marital status, no, %</td>
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<tr>
<td>Single</td>
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<td>Age (years)</td>
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<tr>
<td>Experience years</td>
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</tr>
<tr>
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<td>Night shifts/month</td>
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<td>Yes</td>
<td>130</td>
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<tr>
<td>No</td>
<td>14</td>
</tr>
<tr>
<td>No of night shifts/month</td>
<td>4.31±2.94</td>
</tr>
</tbody>
</table>
for EE, $\beta = -0.34$ (95% CI $-0.57$ to $-0.14$) for depersonalisation and $\beta = -0.35$ (95% CI $-0.57$ to $-0.14$) for reduced personal achievement. Additionally, CoQ10 levels were associated with both EI and conflict management, with $\beta$ values of 0.37 (95% CI 0.05 to 0.69) and 0.16 (95% CI 0.07 to 0.25), respectively. Moreover, CoQ10 levels significantly predicted the burn-out items, with $\beta$ values of $-0.26$ (95% CI $-0.35$ to $-0.17$) for EE, $-0.38$ (95% CI $-0.53$ to $-0.22$) for depersonalisation and $-0.30$ (95% CI $-0.39$ to $-0.21$) for reduced personal achievement (table 3, figure 2).

**DISCUSSION**

This study reported a mean job burn-out score of 29.39±7.07, while the mean EI score was 35.93±3.44. Studies have reported a range of mean burn-out scores using the MBI. A lower mean burn-out score of 2.3 was reported among intensive care unit nurses and physicians,\(^42\) while higher mean scores of 64.2 were reported among healthcare workers during the COVID-19 pandemic.\(^43\) This aligns with Cao et al among healthcare workers\(^6\) and Wright et al among faculty physicians.\(^44\) These large variations in distinct contexts are unsurprising. They could be attributed to the differences in job characteristics, environmental factors, inadequate resources and facilities, and upper management support.\(^35\) In the same context, a mean burn-out score of 35.56±13.66 was reported among healthcare workers subjected to violence compared with those not (32.70±12.90).\(^6\)

In this study, a statistically significant association was observed between EI, burn-out, conflict management and CoQ10 levels. The findings indicated that burn-out had negative correlations with all the variables examined, with correlation coefficients of $-0.455$ to $-0.350$ and $-0.593$ for conflict management, EI and CoQ10 level, respectively. Conversely, the other variables exhibited positive and significant intercorrelations ($p<0.001$). Furthermore, EI was found to be a significant predictor of job burn-out across various subscales, including EE, depersonalisation, reduced personal achievement and workplace conflict management. These findings align with a study conducted by Cao et al, which also revealed a negative correlation between EI and the three dimensions of job burn-out.\(^6\) Several studies have reported a noteworthy association between EI and job burn-out among healthcare providers.\(^45-47\)

Our study’s findings support previous research conducted across various professions, including teachers,\(^48\) healthcare providers,\(^50\) university students\(^51\) and other contexts,\(^52\) which also demonstrated a negative
association between burn-out and EI. Individuals with high EI can acknowledge their emotions in response to job demands. Conversely, individuals with low EI attempt to conceal their emotions rather than dealing with them, making them more vulnerable to work-related stress and burn-out.34

Furthermore, this study identified significant associations between demographic characteristics such as age, sex, years of experience and duration, and both EI and job burn-out. The mean EI score was significantly lower among females compared with males (35.15 vs 36.39, respectively). However, it is worth noting that Furnham and Rosen found no statistically significant difference in EI between males and females.34 Other studies have reported higher levels of EI in women compared with men, suggesting that women may have a better perception of other people’s emotions and optimal timing in their reactions.53 54 This difference may be attributed to factors such as the theoretical framework, measurement instruments used during the study and variations in the male-to-female ratio.54 55

There is evidence that cognitive and emotional factors are related to the onset of burn-out and emotional imbalance. Healthcare work is a unique occupation that requires significant emotional skill, and medical activities require full attention and excellent communication between staff. Job burn-out can also lead to neglect of workers’ emotional output, which affects their attitude towards emotional awareness.56 Serious conflicts emerge daily in the context of critical care services. The burden of invasive therapeutic measures and the lack of curative treatment make decision-making challenging. Early conflict recognition and management is associated with better outcomes for patients and healthcare providers.57

Different coping strategies can be used to address emotions. The management of workplace conflicts differs based on age and gender, and individuals with more experience and shorter daily working hours tend to exhibit better conflict management skills. Conflict management encompasses a diverse range of activities, which can be practised individually or in groups. These activities involve effective communication, problem-solving and the ability to comprehend emotions and perspectives.58

Holt and DeVore conveyed similar findings to those of the current study and supported the affective role of cultural, gender and organisational nature on conflict management strategies.59 Weng et al found that the higher the medical EI, the better the doctor–patient relationship, inevitably leading to decreased conflict and fewer violent incidents.25 Başoğlu and Özgür reported a positive correlation between EI and specific conflict management strategies including integration, obliging, dominating and compromising and a negative correlation between avoiding strategy (one of the conflict management strategies) and EI scores.60

Figure 1 (A) Correlation between age and scales of burn-out, emotional intelligence and conflict management. (B) Correlation between years of experience and scales of burn-out, emotional intelligence and conflict management. (C) Correlation between CoQ10 and scales of burn-out, emotional intelligence and conflict management. CoQ10, coenzyme Q10.
This study has successfully investigated the implications of EI, conflict management and burn-out on the human immune system by examining the CoQ10 level, which was found to be positively correlated with EI (r=0.485) and conflict management (r=0.265) and negatively correlated with burn-out (r=−0.408) and burn-out subscale scores (p<0.05). CoQ10 is a mitochondrial enzyme involved in cellular energy production and acts as an antioxidant that improves cell bioenergetics. CoQ10 reduces proinflammatory cytokines and enhances tissue reperfusion.

Consistent with the current study, Kasemy et al reported a significant negative correlation between burn-out and CoQ10 levels.12

In terms of practical implications, the findings of this study highlight the importance of conflict negotiation skills for critical care health providers. These professionals should possess the ability to assess and effectively handle their emotions when faced with conflicting situations, both prior to and after encountering them. It is recommended that continuous training programmes be implemented for critical care healthcare workers to enhance their EI. These programmes should focus on developing strong communication skills and providing frameworks for effective conflict management. By addressing negative emotions such as indifference and numbness, these initiatives have the potential to reduce the occurrence of work burn-out among critical care health providers.

Supportive psychological counselling is needed to reduce employees’ burn-out and conflicts, which in turn is expected to improve employees’ physical and emotional health and well-being. EI training is essential for physicians and other healthcare leaders before and during their work and developing specific conflict management strategies. Indeed, improving the working environment, particularly mental and social support, became urgent during crises and pandemics.64 65 It also provides additional insights into attrition/non-completion rates, aiding the recruitment strategies. Incorporate EI assessments into the recruitment and selection process for healthcare managers and provide opportunities for continuing education and professional development to improve their EI and conflict resolution skills; foster an organisational culture that values EI and practical conflict resolution; and develop mentorship and coaching programmes that encourage physicians and managers to employ EI and effective conflict management tactics. Biannual assessment of healthcare providers provides a lasting benefit.69

This study emphasises the importance of incorporating emotional education into educational curricula, particularly in preservice programmes, as a means of effectively addressing conflicts. While this recommendation stems from a pilot study conducted among school teachers,66 it holds potential for extension to medical schools and medical education.

This study provides a new perspective for health organisations and hospital administrators in relieving job burn-out and workplace conflicts. Also, it fills the gap in the literature regarding the association between job burn-out and EI and the mediating effect of workplace conflict management among critical care physicians using international research tools that researchers from other countries used to allow for international comparisons. Nevertheless, we admit a few limitations, including the risk of personal desirability bias due to the used...
tool’s self-reported nature. Besides, the current study was conducted in a single country enrolling one discipline, and it should be replicated in multiple contexts to generalise the obtained results. Potential sample selection bias (convenience sampling) is another limitation in the data collection process.

CONCLUSION
The current study provides evidence supporting the significant effect of EI in reducing burn-out among critical care physicians through conflict management strategies. Men, individuals aged ≥28 years, physicians with >4 years’ experience and those working for <8 hours daily without night shifts presented higher EI and conflict management skills and were less vulnerable to burn-out. EI was a significant negative predictor of burn-out through conflict management, which showed its mediating role in reducing burn-out. Preliminary evidence suggests a positive impact of good EI and conflict management skills on the immune system through presenting high CoQ10 levels, negatively affected by burn-out. An essential step in resolving conflicts is accomplishable through providing emotional management programs and updating educational and pedagogical practices.

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Patient consent for publication Consent obtained directly from patient(s).

Ethics approval This study involves human participants and was approved by the Research Ethics Committee of the National Liver Institute, Menoufia University, Egypt (REC; ID: NLI IRB 00312/2022). Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

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REFERENCES
21 Algrawi AF. The difficulties that expatriate students face for first-year university students which affect their academic performance. 2023.


Table 1: Correlation between different scales:

<table>
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<th>Exhaustion</th>
<th>Depersonalization</th>
<th>Reduced personal achievement</th>
<th>Conflict management</th>
<th>Emotional intelligence</th>
<th>COQ10</th>
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<tr>
<td>• Exhaustion</td>
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<tr>
<td>• Depersonalization</td>
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<td>• Reduced personal achievement</td>
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<td>0.633*</td>
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<tr>
<td>Conflict management</td>
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<td>-0.370*</td>
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<td>-0.268*</td>
<td>-0.226*</td>
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<td>COQ10</td>
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*: significant