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Psychometric Evaluation of the Arabic Version of the Wong and Law Emotional Intelligence Scale (WLEIS) in Medical Sciences Students

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ABSTRACT

Objective: Emotional Intelligence (EI) is recognized as a key factor in modulating psychological states, enhancing therapeutic interactions, and managing stress. It also plays a crucial role in augmenting students' intellectual abilities. The main purpose of this study was to investigate the construct validity, internal consistency, and factorial structure of the Arabic version of the Wong and Law Emotional Intelligence Scale (WLEIS).

Methods and Materials: The psychometric properties of the Arabic WLEIS were examined in a cross-sectional study. Internal consistency was assessed using Cronbach's alpha, while validity was evaluated through face, content, and construct validity assessments. A convenience sample of 630 medical sciences students participated in the study.

Findings: The Cronbach's alpha for the WLEIS was 0.87. All factors with four items each had eigenvalues greater than 1. The factor correlations ranged from 0.58 to 0.75 (p = 0.01), indicating sufficient intercorrelations. The 16 items loaded onto four factors, each consisting of four items. Factor analysis appropriateness was confirmed using the Kaiser–Meyer–Olkin (KMO = 0.857) test and Bartlett's test of sphericity (χ^2 = 4512.837, p<0.001). Overall, these factors explained 66.435% of the variance.

Conclusion: The psychometric analysis indicates that the Arabic version of WLEIS possesses adequate reliability and validity for assessing emotional intelligence in Arabic-speaking populations.

Keywords: Emotional Intelligence, Validity, Reliability, Psychometric testing.

Introduction

Emotional intelligence (EI) is a growing area of interest for researchers and field experts. EI is increasingly studied by experts in psychology, education, and management due to its profound impact on cognitive development, interpersonal relationships, academic achievement, and psychological well-being Wang et al., (2018). Recognized as a strong indicator of mental health, EI involves the ability to effectively comprehend, control, and utilize one's and others' emotions (Acosta-Prado et al., 2022; Zheng et al., 2022). It also includes the capacity to manage emotions constructively, fostering regulation over impulsive responses (Husain et al., 2022, p.221).

It has been demonstrated that emotional intelligence affects cognition and regulates sound choices that might jointly influence patients and medical personnel (Augusto-Landa & Montes-Berges, 2009). Additionally, emotional intelligence has been described as an element that modulates psychological state, stress, and the development of therapeutic interactions. Modern society widely recognizes the importance of understanding and managing emotions in daily life. Mastery of one's emotions can enhance productivity and success in social interactions (Farnia et al., 2017). Individuals adept in emotional management are better equipped to handle daily stressors such as academic exams, workplace conflicts, or health issues (Durosini et al., 2021). For medical sciences students, higher EI correlates with improved patient safety, clinical performance, leadership in nursing, and academic outcomes. Furthermore, EI significantly boosts physicians' empathy, decision-making, spiritual engagement, and patient-centered care (Foster et al., 2017; Lu & Shorey, 2021). Research has demonstrated EI's role in enhancing organizational performance, teamwork, and conflict management (Augusto-Landa & Montes-Berges, 2009; BARKHORDARI & ROSTAMBEYGI, 2013). Alvi et al., (2023) and Turan et al., (2019) also highlight the positive influence of EI on academic performance and intuitive abilities among nursing students.

The Wong and Law Emotional Intelligence Scale (WLEIS), developed in 2002, is an internationally recognized instrument measuring EI as a stable personal trait (Carranza-Esteban et al., 2024; Wong & Law, 2017); It has been adapted into multiple languages,

demonstrating its broad applicability and cultural adaptability e.g., (Aslan & Erkus, 2008; Carvalho et al., 2016; Fukuda et al., 2012; Kong, 2017). Several factors influence the decision to validate the Wong and Law Emotional Intelligence Scale (WLEIS) in Arabic. First of all, research has indicated that the WLEIS has an appropriate factor structure, acceptable reliability, and potential predictive and incremental validity (Acosta-Prado et al., 2022). Secondly, compared to the mixed self-report EI instruments, the WLEIS is built on the idea that EI is a collection of fundamental emotional abilities Wong & Law, (2017). Thirdly, whereas ability-based EI measures seem valuable and credible, some of them have more than 100 items and take an hour or more to complete. The WLEIS, however, has just 16 concise elements, making it more practical when there is a shortage of time. Finally, WLEIS is one of the most popular in the world, with the possibility of being utilized as an EI evaluation instrument as a stable characteristic of the person (Carranza-Esteban et al., 2024). However, existing adaptations, such as the Moroccan Arabic version, have limitations in item count and cultural specificity, necessitating a version tailored for the Western Middle Eastern population (Ghoudani et al., 2018). The current study intends to investigate the internal consistency, construct validity, and factorial structure of the EM scale in an Arabic population, especially medical sciences students.

This study aims to analyze the test-retest reliability and internal consistency of the Arabic version of WLEIS to ensure its reliability and assess the construct validity of the Arabic version of WLEIS by examining its factorial structure.

Methods and Materials

A cross-sectional survey was employed. A sample of 630 medical sciences students from Jarash University in Jordan and Tabuk University in Saudi Arabia was included in the study. The students' specialties in both universities included nursing, physiotherapy, medical laboratories, and pharmacy.

The sample was drawn using a convenience sampling approach from each university. According to Myers et al., (2011), a sample size of 200 participants is recommended for confirmatory factor analysis.

Moreover, Comrey & Lee, (2013) state that validation studies with 500–1000 participants are generally satisfactory. Although there are some limitations to the selection of the convenience sampling technique, such as a high risk of sampling bias and making it difficult to generalize findings to the wider population, this technique is a fast and straightforward method for collecting initial data. practical and cost-effective, and Ideal for exploratory studies to gain quick insights or test ideas before launching larger research projects (Polit & Beck, 2020).

All potential participants received the self-administered surveys and a cover letter explaining the goals of the study and each participant's choice to opt out. An estimate of 10 to 20 minutes was given as the typical amount of time needed to complete the questionnaire. It was made clear to those who accepted to take part in the study that they would need to complete the questionnaires independently.

Instrument

The original instrument Wong and Law Emotional Intelligence Scale (WLEIS) was developed by Wong and Law (2002). The 16 exam questions are divided into four subscales: others' emotion evaluation (OEA), use of emotion (UOE), self-emotion appraisal (SEA), and regulation of emotion (ROE). According to the degree of agreement, a five-point Likert scale is used to assess each item, ranging from strongly agree to strongly disagree. Previous investigations had proved the WLEIS's dependability, showing the Cronbach alpha reliabilities of WLEIS subscales ranged from "0.74 to 0.87" (Kong, 2017).

The guidelines of Beaton et al., (2000), Process of Cross-Cultural Adaptation of Self-Report Measures, were followed by WLEIS translation. The Beaton guidelines consist of five stages; in the first stage, WLEIS was translated into Arabic by two independent experts (expert and linguistic). In the second stage, the two translators met to synthesize and reach a consensus on one version. After the translation was complete and accepted, two more independent linguists translated the Arabic version back into English. The fourth stage involved sending the original WLEIS, the Arabic translation, and the two back-translated versions to an expert committee for comparison and synthesis. This resulted in the pre-final version of the questionnaire,

which will later undergo field testing. The committee evaluates the equivalence of the versions, focusing on semantic, idiomatic, experiential, and conceptual aspects. Feedback collected during this phase was essential for further refining the questionnaire. After making necessary adjustments, the final version was prepared for distribution to ensure accurate data collection. A pretest of the intermediate Arabic version, conducted in the fifth phase, involved 40 students from the target audience to assess the readability of the translation version. A professional evaluated the Arabic tool's face validity in its practical use, while a team of professionals examined its content validity. The experts' panel reached high levels of agreement and suggested only minor changes, notably rephrasing for better Arabic translation clarity, which does not affect the structure of items, according to the panel.

Data analysis

The data was analyzed using SPSS software, version 26.0. Sample characteristics and their responses to WLEIS were described using descriptive statistics such as percentages and frequencies. The reliability was evaluated by using Cronbach's alpha. Exploratory factor analysis was used to examine the construct validity of the instrument. Since it simply requires the quantity of items and the item scores, Cronbach's alpha is seen as being more straightforward to apply.

The Kaiser–Meyer–Olkin (KMO) test was utilized to measure the adequacy of the sampling. The obtained results indicated a value of 0.857, signifying that the sample size was sufficient. An adequate KMO value is typically defined as being above 0.5. This statistical test is significant because it evaluates if the data are suitable for factor analysis.

After performing Bartlett's test of sphericity, the results showed a chi-squared (X^2) value of 4512.837 with a p-value of less than 0.001. This test justifies the probability that there is a significant correlation among the variables in the given data. This function determines whether there is a substantial difference between an identity matrix and a correlation matrix.

Ethical considerations

Ethical approval was obtained from the appropriate ethical committees at Jarash University and Tabuk

University, with IRB approval numbers (DRJU/110/2/2024). Permission to adopt and translate WLEIS was granted by the principal author. Returning completed surveys ensured confidentiality. The data was stored on paper in a secure filing cabinet and also saved on a personal computer for protection. To maintain participant confidentiality, the questionnaires were numbered, no identifying information was collected, and only the lead investigator had access to the raw data. Participants were informed that they could withdraw from the research at any time without consequences.

They were also told that completing the questionnaire indicated their consent to participate.

Findings and Results

In this study, two-thirds of students were Jordanian, 359 (57%) were male, 263 (41.7%) were nursing students, 304 (48.3%) were fourth-year students, 385 (61.1%) lived with a family composed of 4-8 members (Table 1).

Table 1

Demographic (sample characteristics) (n=630).

Charactoristics	Frequency(%)
Gander	
Male	359(57%)
Female	271 (43%)
Nationality	
Jordanin	418 (66.3%)
Saudi	212 (33.7%)
Education specialty	
Nursing	263 (41.7%)
Physiotherapy	135 (21.5%)
Medical laboratories	72 (11.4%)
Pharmacy	
Year of Education	160 (25.4)
First year	79 (12.5%)
Second year	94 (14.9%)
Third year	153 (24.3%)
Fourth year	304 (48.3%)
GPA	
Excellent	145 (23%)
Very good	270 (42.9%)
Good	182 (28.9%)
Accepted	33 (5.2%)
No. of family members	
Less than 4 persons	
4-8 persons	385 (61.1%)
More than 8	136 (21.6%)

Regarding health-related characteristics, around forty-two percent of the student participants exercised regularly once a week, while 46.2% slept less than 6 hours. 137 (21.7%) reported social issues, 133 (21.1%) reported psychological issues, and 77 (12.2%) reported chronic illnesses (Table 2).

Table 2

Health-Related Characteristics (sample characteristics) (n = 630).

Exercise Training Times	n (%)
Daily	79 (12.5%)
3 Times	92 (14.6)
2 Times	106 (16.8%)
Once	260 (41.3%)
Never	93 (14.8%)
Number of Sleeping Hours.	n (%)
less than 4 hours	56 (8.9%)
4-6 hours	235 (37.3%)
6-8 hours	271 (43%)
more than 8 hrs.	68 (10.8%)
Have Social Problems	n (%)
Yes	137 (21.7)
No	493 (78.3)
Have Psychological Problems	n (%)
Yes	133 (21.1)
No	497 (78.9)
Have Chronic Illnesses	n (%)

| Yes | 77 (12.2) |
| No | 553 (87.8) |

The WLEIS instrument's Cronbach's alpha value of 0.87 confirmed the original tool's internal consistency dependability. Internal consistency reliability was computed for each of the four groups of item subscales that correspond to the four components derived from the factor analysis. Self-emotion appraisal (SEA) subscale: Cronbach's alpha was 0.73; use of emotion (UOE) subscale: Cronbach's alpha was 0.86; others'

emotion appraisal (OEA) subscale: Cronbach's alpha was 0.83; regulation of emotion (ROE) subscale: Cronbach's alpha was 0.84. For the examined scale's internal consistency, a Cronbach's alpha coefficient of at least 70 was deemed sufficient (Polit & Beck, 2020). This translates to solid internal consistency, as indicated by the study's value (Table 3).

Table 3

Internal Consistency (Cronbach's alpha) for the WLEIS sub-scales

No.	Dimension	Cronbach's Alpha
1	Self-Emotion Appraisal (SEA)	0.73
2	Others' Emotion Appraisal (OEA)	0.83
3	Use of emotion (UOE)	0.86
4	Regulation of Emotion (ROE)	0.84
5	Overall Questionnaire	0.87

The test–retest reliability of the questionnaire was assessed using the intraclass correlation coefficient (ICC), which was found to be 0.941 (95% CI: 0.931–0.952). The results indicate that the items loaded onto four factors had eigenvalues greater than 1. The scree

plot supported the notion that four factors recognized the properties of factors within the data set, as seen in Figure 1. Promax Kaiser Normalization was used to rotate these variables.
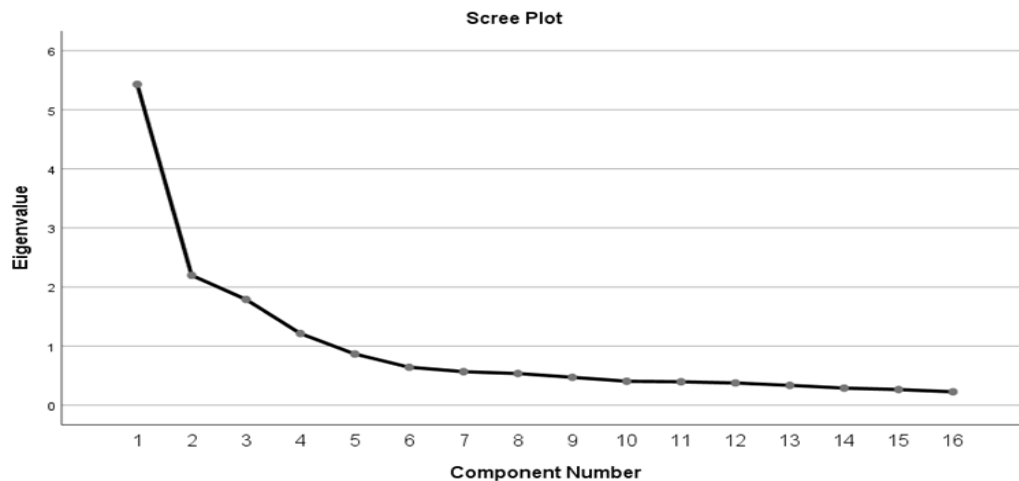

Figure 1

Scree Plot for eigenvalues plotted against principal components

The correlation matrix showed that all items were positively related, with coefficients ranging from r = 0.38 to r = 0.63 (all p < 0.01). These inter-item correlations exceeded the minimum threshold of 0.30, confirming the

suitability of the data for factor analysis. Factor loadings were consistently strong, with all items loading above 0.65 on at least one factor (Table 4). Corrected item–total correlations for all 16 items also surpassed the

recommended cutoff of 0.30, demonstrating that each item contributed meaningfully to its respective subscale. In the rotated factor solution, items aligned well with their intended constructs, with high loadings (≥ 0.65), further supporting the internal consistency and construct validity of the Arabic WLEIS. The instrument retained its four-factor structure, with four items per subscale, accounting for a total of 66.4% of the variance. Specifically, the first and second factors explained 18.0% and 17.1% of the variance, while the third and fourth factors contributed 16.9% and 14.4%, respectively.

Table 4

Loading Items on the rotated factor's structure matrix

Item	First factor	Second factor	Third factor	Fourth factor
Self-emotion assessment				
1 .Most of the time, I can identify the causes of my sentiments.	.694			
2. I am quite aware of my feelings.	.819			
3 .I truly comprehend how I'm feeling .	.876			
4 .Whether I'm pleased or unhappy, I always know.	.724			
Assessing the emotions of others				
5. Through their actions, I can always tell how my buddies are feeling.		.687		
6. I have a keen sense of people's feelings.		.852		
7. I am perceptive of others' emotions and moods.		.848		
8. I am susceptible to the feelings of others around me.		.823		
Use of passion				
9. I consistently set my goals and put a lot of effort into achieving them.			.851	
10. I constantly convince myself that I am a capable individual.			.755	
11. I have strong internal motivation.			.810	
12. I constantly push myself to give it my all.			.911	
Emotion control.				
13. I can control my mood and feelings and deal with difficulties rationally				.759
14. I'm pretty good at managing my emotions.				.800
15. Even when I'm irritated, I can always cool off fast.				.847
16. I can manage my moods and emotions well.				.866

Discussion and Conclusion

These findings demonstrated a high degree of internal consistency in the Arabic version of WLEIS. Cronbach's alpha for the WLEIS instrument in the current study was 0.87, and the subscales varied from 0.73 to 0.86. These findings backed up the Arabic version of the WLEIS's internal consistency and dependability, according to Taber, (2018), Cronbach's alpha coefficient of more than 70 was considered acceptable and adequate. These values suggest high internal consistency (Polit & Beck, 2020). Compared to the initial study, the new study's results had somewhat higher ratings (Wong & Law, 2017). The subscales, however, ranged from 0.80 to 0.89, and the WLEIS Cronbach's alpha was 0.860, according to (Wang et al., 2018). Furthermore, Zhu et al., (2015), internal consistency reliability scores for WLEIS ranged from 69 to 84 in several studies that verified it.

This study aimed to develop a reliable Arabic self-report EI scale. Factor analysis, a widely used statistical method, helps identify a few factors that explain the variance among many observed features when data reduction is necessary (Basilevsky, 2009). The four factors accounted for 66.4% of the variance, with the first factor explaining 18.0%, the second 17.1%, the third 16.9%, and the fourth 14.4%. Our results showed that the Arabic version of the WLEIS tool has strong psychometric properties and can be used to assess emotional intelligence in Arabic-speaking individuals. All variables in this study loaded above 0.65. These findings align with Wong & Law, (2017), who identified four factors in the original WLEIS: use of emotion (UOE), self-emotion appraisal (SEA), others' emotion appraisal (OEA), and regulation of emotion (ROE). Additionally, Wang et al., (2018) confirmed that WLEIS demonstrated acceptable specificity and sensitivity in evaluating emotional intelligence and managing negative emotions among nurses. Furthermore, WLEIS showed good psychometric properties regarding internal structure, reliability, and its relationship with other constructs (Iliceto & Fino, 2017). Similarly, psychometric research in several countries has identified four factors, with high reliability levels for the subscales and the overall instrument (Aslan & Erkus, 2008; Carvalho et al., 2016;

Fukuda et al., 2012; Iliceto & Fino, 2017; Karim, 2010; Kong, 2017; Sochos et al., 2021; Wan Sulaiman & Noor, 2015)-/. Nonetheless, current adaptations, including the Moroccan Arabic variant, exhibit limitations in item quantity and cultural relevance, particularly when considering that the Moroccan study sample consisted of immigrants in Spain (Ghoudani et al., 2018). Hence, it requires a version customized for the Western Middle Eastern demographic. This customization would not only enhance the applicability of the items but also ensure that they resonate more deeply with the cultural and social contexts of individuals in these communities.

All items were correlated, as indicated by the correlation matrix (r > 0.40). The inter-item correlations were 0.41 to 0.75 in range. (P = 0.01) The correlations between the variables were determined to be satisfactory. The four main factors had correlations of 0.751, 0.70, 0.67, 0.59, 0.58, and 0.60, respectively. According to Shipley, (2016), these values were deemed to be acceptable. The table is available from the authors but is too long to be included in the manuscript.

The study's limitations and potential areas for future research need to be recognized. Another limitation is the study's cross-sectional design. Future research could consider a longitudinal approach to better understand cause and effect over time. Additionally, the study's reliance on self-reported data, susceptible to various factors, could potentially limit the results. To improve reliability and address these issues, future studies should incorporate objective measures alongside self-reports. Using a mixed-methods approach could offer a more complete understanding of the phenomenon. Furthermore, examining different populations may provide insights that increase the generalizability of the findings. Also, expanding the sample size and diversity could facilitate a more thorough understanding of the phenomena under study.

Despite these limitations, this study provides a good basis for further research in Jordan and the Middle East. A rigorous translation process and a large sample size can enhance the credibility and trustworthiness of your research. Other researchers and peer reviewers are more likely to consider findings reliable and valid if they know that such precautions have been taken. A large sample size provides greater statistical power. With a larger sample, we achieved more precise estimates and made more robust inferences about the population from which the sample was drawn.

The Arabic version of the Wong and Law Emotional Intelligence Scale (WLEIS) has been demonstrated to possess strong psychometric properties, making it a reliable tool for assessing emotional intelligence among Arabic-speaking populations. The instrument confirms its internal consistency with a substantial Cronbach's alpha coefficient of 0.87 and consistent subscale reliability ranging from 0.73 to 0.86. Furthermore, factor analysis confirms that it maintains the four-factor structure of the original, accounting for over 66% of the variance, underscoring its robust construct validity. Additionally, the satisfactory correlations among the factors and the high degree of expert consensus on its face and content validity ensure that this version can effectively measure emotional intelligence in diverse Arabic contexts.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. Ethical considerations in this study were that participation was entirely optional.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

Authors' Contributions

All authors equally contribute to this study.

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