

Analysis of the World Health Organization Quality of Life Instrument's Psychometric Properties among Malaysian University Students

Chua Bee Seok¹, Walton Wider², Jasmine Adela Mutang¹, Shazia Iqbal Hashmi³, & Murnizam Haji Halik¹

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¹Faculty of Psychology and Education, Universiti Malaysia Sabah.

²Faculty of Business and Communications, INTI International University

³Central Connecticut State University

*Corresponding author: walton.wider@newinti.edu.my

Abstract

Introduction: While the World Health Organization Quality of Life (WHOQOL-BREF) scale has proven reliable in a multitude of psychological investigations, a comprehensive psychometric analysis has not been performed within the Malaysian context, particularly among university students.

Objectives: This research intended to appraise the psychometric characteristics of the WHOQOL-BREF in a university student demographic within Malaysia.

Methods: Utilizing snowball sampling, data was amassed from a sample size of 586 university students, hailing from varied regions in Malaysia.

Results: The application of confirmatory factor analysis unveiled that the initial WHOQOL-BREF measurement model fell short of certain proposed model fitness benchmarks. However, through covariance analysis and the removal of three items possessing high covariance issues, the modified measurement model showcased an enhanced fit. It preserved a total of 21 items and fulfilled all recommended fitness indicators. Despite indicating satisfactory reliability, the study's outcomes suggest possible issues regarding the scale's convergent and discriminant validity.

Conclusions: Further psychometric scrutiny is necessary to verify the appropriateness of the WHOQOL-BREF for Malaysian university students. Suggestions for prospective research were also considered.

Keywords: WHOQOL-BREF; university students; psychometric properties; validation; human and health.

1. Introduction

The concept of "quality of life" (QoL) refers to an individual's perspective on their current situation in light of prevalent cultural norms and values. This judgment encompasses a person's objectives, expectations, standards, and concerns (The WHOQOL Group, 1995). College students, regarding mental health and overall well-being, are frequently identified as a vulnerable demographic. Challenges such as adapting to new environments, forming new relationships, and dealing with separation from established support networks are common experiences for university students during their transition to adulthood. These factors significantly affect their psychological welfare and overall QoL (Tsitsas et al., 2019). Current research on psychological well-being suggests a rising trend in mental health issues among university students (Kaur et al., 2022; Lipson et al., 2019; Xiou et al., 2017; Storrie et al., 2010), inclusive of those in Malaysia (Lipson et al., 2019). Reports from Kotera et al. (2021) highlight that over a span of less than a decade, the occurrence of mental health issues among Malaysian students has doubled. This increase in mental health problems can potentially affect their overall QoL (Kotera et al., 2021). Therefore, QoL is a critical determinant of general health and has emerged as a vital measure for gauging outcomes in psychological research.

The World Health Organization conducted an intensive cross-cultural validation process for the WHOQOL-BREF, ensuring its credibility as a measurement tool. The process included 18 countries and made the document

available in 19 languages (World Health Organization, 1996). The WHOQOL-BREF comprises 26 items, covering physical, psychological, social, and environmental health. As a versatile instrument, it can be utilized in both clinical and non-clinical population studies, marking it as a useful tool for assessing QoL across different research domains and cultural contexts (Skevington et al., 2004).

The WHOQOL-BREF has been translated and validated across numerous languages and contexts (Cheung et al., 2019; Kalfoss et al., 2021; Kim et al., 2013; Lucas-Carrasco, 2012; Skevington & Epton, 2018; Vo et al., 2020; Xia et al., 2012). The Malay version of WHOQOL-BREF was field-tested for reliability and validity among a mixed population of 200 individuals, including healthy controls and patients with various conditions, at a public university teaching hospital in Malaysia (Hasanah et al., 2003). The tool was also tailored for the diverse Singaporean population, incorporating English, Chinese, and Malay languages and was applied to both general population and clinic samples (Cheung et al., 2017). Additionally, Bandar et al. (2014) translated the WHOQOL-BREF into Malay and evaluated its psychometric properties among disabled Malaysian college students. However, its psychological features have not been investigated across the whole Malaysian student population, creating a knowledge gap on the applicability of the WHOQOL-BREF instrument and the overall QoL among Malaysian university students. Furthermore, despite various psychometric studies reporting satisfactory results for the WHOQOL-BREF, some have failed to replicate the original four-domain model (Chung et al., 2012; Jikamo et al., 2021; Ohaeri et al., 2004; Oliveira et al., 2016).

This study aimed to examine the psychometric properties of the WHOQOL-BREF among a representative sample of Malaysian university students from both West and East Malaysian universities. This study aimed to ensure that the psychometric analysis of the WHOQOL-BREF is valid across Malaysia's multiracial population. Providing evidence of the instrument's convergent and discriminant validity, as well as conducting a confirmatory factor analysis, were the primary focuses of this paper.

2. Methods

Participants

The research involved 586 college students from various regions of Malaysia. Of these participants, 404 were females, making up 69.1% of the total, while 181 were males, accounting for 31.0%. The participants' ages ranged from 18 to 25 years, with an average age of 21.64 years and a standard deviation of 0.94 years. The study included participants from diverse ethnic backgrounds, such as Malay (19.8%), Chinese (9.9%), Indian (7.0%), Indigenous Sabah (52.1%), Indigenous Sarawak (8.9%), and others (2.2%). Islam comprises 56.2% of the population, followed by Buddhism at 7.5%, Hinduism at 6.3%, Christianity at 28.4%, and other religions at 1.5%. 54.4% of participants resided in urban areas, while the remaining 45.5% lived in rural areas. Over 50% of the participants belonged to families classified as having a Bottom 40% (B40) income, while 32.8% belonged to the Middle 40% (M40) income group, and only 4.4% belonged to the Top 20% (T20) income group. To ensure broad representation of university students across Malaysia, we employed the snowball sampling technique to conduct our survey online.

Instrument

The World Health Organization's Quality of Life (WHOQOL-BREF) questionnaire, developed in 1996, comprises 24 items designed to evaluate an individual's perceived quality of life. This self-administered tool assesses four domains: physical health, psychological health, social relationships, and environmental health. In addition, the WHOQOL-BREF contains two items that assess a person's general feelings regarding their health and quality of life overall. In this study, the quality of life was measured on a scale ranging from 1 to 5, with 1 representing "very poor" and 5 representing "very good". Similarly, participants rated their overall health on a 5-point scale, where 1 suggested "very dissatisfied" and 5 suggested "very satisfied." Items QoL3, QoL4, and QoL26 on the Quality of Life scale must be reversed before proceeding with scoring, as outlined in Table 2. These metrics provide an exhaustive overview of the participant's self-perception across multiple life domains, thereby creating a holistic picture of the participant's quality of life and overall health satisfaction. The WHOQOL-BREF provides a multidimensional approach to assessing individual well-being and quality of life by recognizing the complex interaction of physical, psychological, social, and environmental factors.

Statistical Analysis

For data analysis in this study, the IBM SPSS Statistics Program and the AMOS 23 Program were utilized. We employed a confirmatory factor analysis (CFA) to verify the WHOQOL-BREF model. Using the method of maximum likelihood, the WHOQOL-BREF model was estimated. Using the Root Mean Square Error of Approximation (RMSEA), the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), and the Chi-Square Statistical Value (CMIN/DF), the accuracy of the model was evaluated. According to Hu and Bentler (1998), the optimal values for RMSEA and CMIN/DF are less than 0.08, while CFI and TLI are greater than 0.90. Joreskog and Sorbom (1986) also employed the Goodness-of-Fit Index (GFI) and the Adjusted Goodness-of-Fit Index (AGFI). To indicate a successful model fit, these indices should ideally be larger than 0.90 for GFI and greater than 0.80 for AGFI. Reliability, convergent validity, and discriminant validity of the WHOQOL-BREF were also evaluated. Reliability is a measure of the consistency of the results produced by a test. Convergent validity assesses whether items that are theoretically supposed to be related are indeed related. Discriminant validity, on the other hand, checks if constructs that are not supposed to be related are actually unrelated. These assessments help in ensuring the quality and accuracy of the instrument in measuring the construct of interest.

3. Results

Confirmatory Factor Analysis (CFA)

The results of the Confirmatory Factor Analysis (CFA) for the WHOQOL-BREF in Table 1 revealed that the initial measurement model did not meet all the recommended fit criteria. The fit indices for the original model were as follows: Chi-Square (χ^2) = 180.54, degrees of freedom (df) = 40, $p < .001$, CMIN/DF ratio = 4.327, Comparative Fit Index (CFI) = .865, Tucker-Lewis Index (TLI) = .841, Goodness-of-Fit Index (GFI) = .865, Adjusted Goodness-of-Fit Index (AGFI) = .835, and Root Mean Square Error of Approximation (RMSEA) = .075. The parameter estimates, which indicate the strength of the relationships between observed variables and their respective latent variables, ranged from 0.049 to 0.781 for the physical health subscale, from 0.665 to 0.857 for the social relationship subscale, from 0.429 to 0.799 for the psychological subscale, and from 0.353 to 0.684 for the environmental subscale. These results suggest that the initial measurement model of the WHOQOL-BREF did not fit the data adequately, indicating a need for modifications to improve model fit. This could be accomplished by dropping items with low factor loadings or considering covariance between certain items, based on both statistical considerations and theoretical reasoning.

Table 1. CFA results

Fit Indices	Recommended Fit	Measurement Model	Modified Measurement Model
χ^2 (df)		1064.49 (246)	573.97 (178)
CMIN/DF	CMIN/DF < 5.0	4.327	3.225
CFI	> .90	.858	.927
TLI	> .90	.841	.914
GFI	> .90	.865	.914
AGFI	> .80	.835	.888
RMSEA	.05 - .08	.073	.061

The item with a loading value below .40 and a covariance issue between errors on the same subscale has been adjusted to enhance the fit of the model. We excluded items QoL3 (0.049) and QoL4 (0.094) from the physical health subscale, as well as item QoL14 (0.353) from the environmental subscale, due to their inadequate loadings on the respective latent factors. Covariance analysis was performed on items exhibiting high covariance issues (see Figure 1 and Figure 2).

The new WHOQOL-BREF model, which had 21 questions, showed a better fit to the data in Confirmatory Factor Analysis (CFA) than the original model did. The fit indices for the revised model were as follows: Chi-Square (χ^2) = 573.972, degrees of freedom (df) = 178, $p < .001$, CMIN/DF ratio = 3.225, Comparative Fit Index (CFI) = .927, Tucker-Lewis Index (TLI) = .914, Goodness-of-Fit Index (GFI) = .914, Adjusted Goodness-of-Fit Index (AGFI) = .888, and Root Mean Square Error of Approximation (RMSEA) = .061. The parameter estimates in the

revised model ranged from 0.575 to 0.701 for the physical health subscale, from 0.665 to 0.856 for the social relationship subscale, from 0.428 to 0.806 for the psychological subscale, and from 0.487 to 0.662 for the environmental subscale. These ranges are indicative of a generally stronger relationship between the observed variables and their respective latent variables, compared to the initial model. Table 2 lists the original 24 items along with the 21 items retained in the revised WHOQOL-BREF model, and their corresponding parameter estimates. The adjustments made to the model resulted in a better fit, thus increasing the model's accuracy in measuring the quality of life among university students in Malaysia.

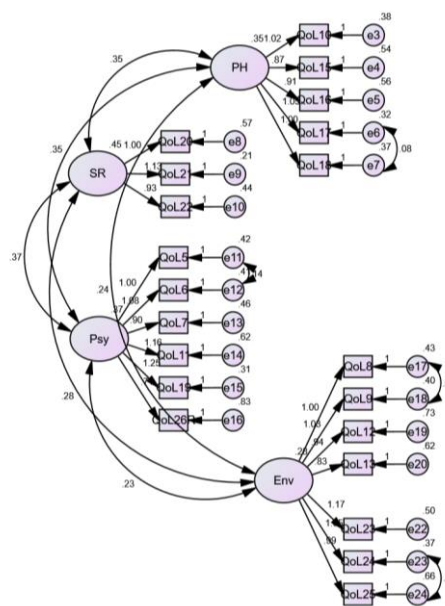
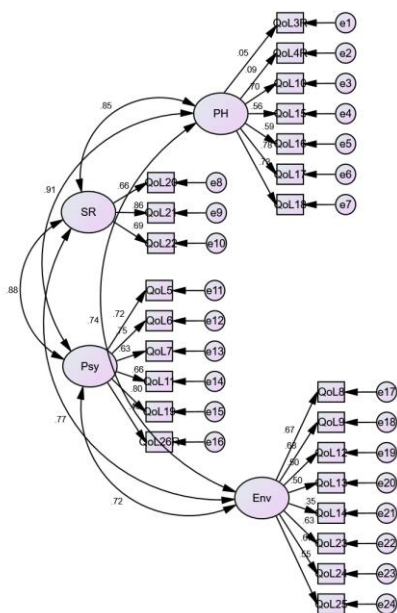


Figure 1. The Measurement Model of WHOQOL-BREF

Figure 2. The Modified Measurement Model of WHOQOL-BREF

Table 2. The Items Parameter Estimates for the Model of WHOQOL-BREF

Measurement Model		Modified Measurement Model	
Scale/Items	Parameter	Scale/Items	Parameter
Physical Health		Physical Health	
QoL3	.049	QoL10	.701
QoL4	.094	QoL15	.575
QoL10	.701	QoL16	.582
QoL15	.558	QoL17	.741
QoL16	.590	QoL18	.699
QoL17	.781		
QoL18	.733		
Social Relationship		Social Relationship	
QoL20	.665	QoL20	.665
QoL21	.857	QoL21	.857
QoL22	.687	QoL22	.686
Psychological		Psychological	
QoL5	.721	QoL5	.685
QoL6	.755	QoL6	.718

QoL7	.632	QoL7	.632
QoL11	.664	QoL11	.670
QoL19	.799	QoL19	.806
QoL26	.429	QoL26	.428
Environmental		Environmental	
QoL8	.666	QoL8	.624
QoL9	.684	QoL9	.648
QoL12	.504	QoL12	.500
QoL13	.498	QoL13	.487
QoL14	.353		
QoL23	.630	QoL23	.656
QoL24	.673	QoL24	.671
QoL25	.549	QoL25	.540

Convergent Validity and Internal Consistency of the WHOQOL-BREF

The concept of convergent validity refers to the extent to which one measure is correlated with other measures that it is theorized to correlate with. The convergent validity of the modified WHOQOL-BREF measurement model was assessed in the context of this study using the Composite Reliability (CR) and Average Variance Extracted (AVE). According to Hair et al. (2006), a CR value should be higher than 0.70 and an AVE value should be higher than 0.50 for satisfactory convergent validity. In the current study, all the subscales of WHOQOL-BREF exhibited a CR value exceeding the threshold of 0.70 (ranging between 0.747 and 0.823), indicating high internal consistency. This suggests that the items within each subscale are cohesively measuring the same underlying concept or construct. However, looking at the AVE, only the social relationships subscale reached the desired benchmark of 0.50, with an AVE value of 0.549. The AVE represents the mean amount of variance in the indicators explained by the latent variable they are designed to measure. An AVE value over 0.50 implies that, on average, the underlying construct accounts for more than half of the variance in its indicators. Thus, these AVE results suggest that while the social relationships subscale exhibits satisfactory convergent validity, the other subscales might be deficient in this aspect. A possible interpretation could be that for these subscales, less than half of the observed variance could be accounted for by the intended construct, pointing to possible issues with how these items align with their respective constructs.

The internal consistency of WHOQOL-BREF was evaluated using Cronbach's alpha, a statistical measure of internal consistency. An acceptable Cronbach's alpha falls within the range of 0.70-0.80, while a value between 0.80-0.90 is deemed good. According to this study, the WHOQOL-BREF's environmental, social, and physical health dimensions all had Cronbach's alpha values above 0.75, which indicates satisfactory internal consistency. With a Cronbach's alpha of .825, the psychological dimension demonstrated even greater consistency. These findings suggest that the items within these dimensions cohesively measure their intended constructs.

Table 3. Convergent Validity and Internal Consistency of the WHOQOL-BREF

Subscale	Composite Reliability (CR)	Average Variance Extracted (AVE)	Cronbach's Alpha
Physical Health	0.747	0.427	.796
Social Relationship	0.783	0.549	.773
Psychological	0.823	0.444	.825
Environmental	0.790	0.353	.794

Discriminant Validity

The WHOQOL-BREF's discriminant validity can be evaluated by contrasting the average variance extracted (AVE) with the squared correlation between each pair of constructs, as suggested by Hair et al., (2010). It was noted that the square root of the Average Variance Extracted (AVE) for each subscale was less than the absolute

correlations with the other subscales. Additionally, the average absolute deviation (AVE) for each subscale was found to be lower than the Maximum Shared Squared Variance (MSV). These results, which were obtained from a sample of Malaysian students, suggest that there may be problems with the WHOQOL-BREF's discriminant validity.

Table 4. The WHOQOL-BREF's Discriminant Validity and Convergent Validity

No	Subscale	CR	AVE	MSV	MaxR(H)	1	2	3	4
1	Social Relationship	0.783	0.549	0.801	0.816	0.741			
2	Physical Health	0.795	0.440	0.929	0.896	0.875	0.663		
3	Psychological	0.823	0.444	0.929	0.934	0.895	0.964	0.667	
4	Environmental	0.790	0.353	0.627	0.948	0.792	0.761	0.725	0.594

4. Discussion

The primary objective of this investigation was to appraise the psychometric characteristics of the WHOQOL-BREF questionnaire within a cohort of university students in Malaysia. This evaluation aims to provide Malaysian researchers with a dependable tool for use in varied research environments. The WHOQOL-BREF, a 26-item questionnaire created by the World Health Organization, measures four aspects of quality of life: physical health, psychological well-being, social relationships, and environmental factors. We used a confirmatory factor analysis (CFA) to examine the reliability, convergent and discriminant validity, and structural validity of the questionnaire.

The initial measurement model of the WHOQOL-BREF, assessed via CFA, showed inadequacies in model fit. However, by refining the data and retaining 21 items, the revised measurement model exhibited an improved fit that met all the recommended thresholds. Najafi et al. (2013) reported that the loading pattern of the items in their assessment did not align with the intended structure of the WHOQOL-BREF. They suggested a single-factor model sufficiently explained the quality of life, a finding further supported by the analysis in our study. Notably, Skevington et al. (2004) assert that significant correlations exist among the four domains of the WHOQOL-BREF, a conclusion contrasting with prior findings.

For each subscale, the revised WHOQOL-BREF model demonstrated composite reliability (CR) values exceeding the necessary criteria. This conclusion was drawn based on the composite reliability index meeting or surpassing the specified standards. However, only the social relationships subscale reached the recommended threshold for the average variance extracted (AVE). Cronbach's alpha was used to measure internal consistency and assess the reliability of the WHOQOL-BREF questionnaire. Our study's findings are in line with previous work by Goes et al. (2020) and other scholars. The Cronbach's alpha scores suggested adequate internal consistency for the physical health, social relationships, and environmental subscales, and high reliability for the psychological subscale. Notably, the reliability values for the social relationship domain were comparatively low, likely due to the limited number of items in this domain.

Our research revealed inconsistencies regarding the convergent and discriminant validity of the WHOQOL-BREF, which is in contrast to the findings of previous research that shown strong reliability and validity for the Arabic version of the test. Ohaeri and Awadalla's (2009) research also revealed some reservations regarding the convergent and discriminant validity of the WHOQOL-BREF. Furthermore, Yao and Yang (2008) found discrepancies in the content validity of the WHOQOL-BREF in relation to its original structure, with 12 out of 24 items lacking adequate content validity.

Quality of life significantly influences an individual's overall functionality, wellness, and mental and physical health. The link between quality of life and chronic health conditions such as cardiovascular disease (Bahall et al., 2020), diabetes (Aschalew et al., 2020), and cancer (Santiago-Pérez et al., 2022) has been explored in numerous studies. Further investigations have looked into mental health disorders such as anxiety, depression, and schizophrenia, and their impact on quality of life (Barrera & Norton, 2009; Bahall et al., 2020; Eack & Newhill, 2007). Assessing quality of life is critical for understanding the implications of diseases on individuals and evaluating the efficacy of therapeutic treatments.

One limitation of this study is its exclusive focus on undergraduate students, which may constrain the broad applicability of its findings. Future research should aim to validate these findings in non-student populations and explore the questionnaire's utility across diverse Malaysian demographics with differing socioeconomic backgrounds, while also assessing larger population samples and the multiple variables associated with these groups.

Conclusion

The purpose of this study was to evaluate the psychometric properties of the WHOQOL-BREF using confirmatory factor analysis (CFA). The study was carried out within the context of university students in Malaysia, with data collected through the snowball sampling method. Despite observed concerns associated with convergent and discriminant validity, the findings denote a satisfactory level of reliability for the scale. By refining and maintaining 21 items, the revised measurement model demonstrated enhanced suitability and fulfilled all proposed fitness criteria. Based on the psychometric analysis, it is suggested that the WHOQOL-BREF provides an appropriate measure for gauging the well-being of university students in Malaysia.

References

1. Aschalew, A. Y., Yitayal, M., & Minyihun, A. (2020). Health-related quality of life and associated factors among patients with diabetes mellitus at the University of Gondar referral hospital. *Health and quality of life outcomes, 18*(1), 1-8.
2. Bahall, M., Legall, G., & Khan, K. (2020). Quality of life among patients with cardiac disease: the impact of comorbid depression. *Health and quality of life outcomes, 18*, 1-10.
3. Barrera, T. L., & Norton, P. J. (2009). Quality of life impairment in generalized anxiety disorder, social phobia, and panic disorder. *Journal of anxiety disorders, 23*(8), 1086–1090.
4. Benítez-Borrego, S., Mancho-Fora, N., Farràs-Permanyer, L., Urzúa-Morales, A., & Guàrdia-Olmos, J. (2016). Differential Item Functioning of WHOQOL-BREF in nine Iberoamerican countries. *Revista Iberoamericana de Psicología y Salud, 7*(2), 51–59.
5. Browning, M. H. E. M., Larson, L. R., Sharaievska, I., Rigolon, A., McAnirlin, O., Mullenbach, L., Cloutier, S., Vu, T. M., Thomsen, J., Reigner, N., Metcalf, E. C., D'Antonio, A., Helbich, M., Bratman, G. N., & Alvarez, H. O. (2021). Psychological impacts from COVID-19 among university students: Risk factors across seven states in the United States. *PloS One, 16*(1), e0245327. <https://doi.org/10.1371/journal.pone.0245327>
6. Cheung, Y. B., Yeo, K. K., Chong, K. J., Khoo, E. Y. H., & Wee, H. L. (2019). Measurement equivalence of the English, Chinese and Malay versions of the World Health Organization quality of life (WHOQOL-BREF) questionnaires. *Health and quality of life outcomes, 17*(1), 1-6.
7. Cheung, Y. B., Yeo, K. K., Chong, K. J., Khoo, E. Y., & Wee, H. L. (2017). Reliability and validity of the English-, Chinese-and Malay-language versions of the World Health Organization quality of life (WHOQOL-BREF) questionnaire in Singapore. *Ann Acad Med Singap, 46*(12), 461-469.
8. Chung, W. S., Lan, Y. L., & Yang, M. C. (2012). Psychometric testing of the short version of the world health organization quality of life (WHOQOL-BREF) questionnaire among pulmonary tuberculosis patients in Taiwan. *BMC public health, 12*(1), 1-10.
9. Eack, S. M., & Newhill, C. E. (2007). Psychiatric symptoms and quality of life in schizophrenia: a meta-analysis. *Schizophrenia bulletin, 33*(5), 1225-1237.
10. Edgerton, J. D., Roberts, L. W., & von Below, S. (2011). Education and quality of life. *Handbook of social indicators and quality of life research, 265-296*.
11. Goes, M., Lopes, M. J., Marôco, J., Oliveira, H., Fonseca, C., Mónico, L., ... & Guedes de Pinho, L. (2020). The quality of life of older individuals following the world health organization assessment criteria. *Geriatrics, 5*(4), 102.
12. Hasanah, C. I., Naing, L., & Rahman, A. R. (2003). World Health Organization Quality of Life Assessment: brief version in Bahasa Malaysia. *The Medical Journal of Malaysia, 58*(1), 79–88.
13. Jikamo, B., Adefris, M., Azale, T., & Alemu, K. (2021). Cultural adaptation and validation of the Sidamic version of the world Health organization Quality-of-Life-Bref scale measuring the quality of life of

- women with severe preeclampsia in southern Ethiopia, 2020. *Health and Quality of Life Outcomes*, 19(1), 1-9.
14. Kalfoss, M. H., Reidunsdatter, R. J., Klöckner, C. A., & Nilsen, M. (2021). Validation of the WHOQOL-Bref: psychometric properties and normative data for the Norwegian general population. *Health and Quality of Life Outcomes*, 19(1), 1–12.
 15. Kaur, W., Balakrishnan, V., Chen, Y. Y., & Periasamy, J. (2022). Mental Health risk factors and coping strategies among students in Asia Pacific during COVID-19 pandemic—A scoping review. *International journal of environmental research and public health*, 19(15), 8894.
 16. Kim, W. H., Hahn, S. J., Im, H. J., & Yang, K. S. (2013). Reliability and validity of the Korean World Health organization quality of life (WHOQOL)-BREF in people with physical impairments. *Annals of Rehabilitation Medicine*, 37(4), 488–497.
 17. Kotera, Y., Ting, S. H., & Neary, S. (2021). Mental health of Malaysian university students: UK comparison, and relationship between negative mental health attitudes, self-compassion, and resilience. *Higher Education*, 81(2), 403–419.
 18. Lipson, S. K., Lattie, E. G., & Eisenberg, D. (2019). Increased rates of mental health service utilization by U.S. College students: 10-year population-level trends (2007-2017). *Psychiatric Services*, 70(1), 60–63.
 19. Lucas-Carrasco, R. (2012). The WHO quality of life (WHOQOL) questionnaire: Spanish development and validation studies. *Quality of Life Research*, 21(1), 161–165.
 20. Najafi, M., Sheikhatvan, M., Montazeri, A., & Sheikhatfollahi, M. (2013). Factor Structure of the World Health Organization's Quality of Life Questionnaire-BREF in Patients with Coronary Artery Disease. *International journal of preventive medicine*, 4(9), 1052–1058.
 21. Nur Fatimah Abdullah Bandar, Rohana Jani, & Mohd Aminul Karim. (2014). Psychometric Properties of the WHOQOL-BREF Questionnaire among Disabled Students in Malaysian Higher Learning Institutions. *Applied Research in Quality of Life*, 9, 469–478.
 22. Ohaeri, J. U., Olusina, A. K., & Al-Abassi, A. H. M. (2004). Factor analytical study of the short version of the World Health Organization Quality of Life Instrument. *Psychopathology*, 37, 242–248.
 23. Ohaeri, J. U., & Awadalla, A. W. (2009). The reliability and validity of the short version of the WHO Quality of Life Instrument in an Arab general population. *Annals of Saudi medicine*, 29(2), 98–104.
 24. Oliveira, S. E. H., Carvalho, H., & Esteves, F. (2016). Toward an understanding of the quality of life construct: Validity and reliability of the WHOQOL-Bref in a psychiatric sample. *Psychiatry Research*, 244, 37–44.
 25. Plakhotnik, M. S., Volkova, N. V., Jiang, C., Yahiaoui, D., Pheiffer, G., McKay, K., Newman, S., & Reißig-Thust, S. (2021). The Perceived Impact of COVID-19 on Student Well-Being and the Mediating Role of the University Support: Evidence From France, Germany, Russia, and the UK. *Frontiers in Psychology*, 12, 2663.
 26. Santiago-Pérez, G. G., Amaya-Ardila, C. P., Umpierre, S. A., & Ortiz-Martinez, A. P. (2023). Effect of chronic comorbidities on quality of life of gynecologic cancer patients in Puerto Rico. *Revista Panamericana de Salud Pública*, 46, e29.
 27. Schwartz, K. D., Exner-Cortens, D., McMorris, C. A., Makarenko, E., Arnold, P., Van Bavel, M., Williams, S., & Canfield, R. (2021). COVID-19 and Student Well-Being: Stress and Mental Health during Return-to-School. *Canadian Journal of School Psychology*, 36(2), 166–185.
 28. Skevington, S M, Lotfy, M., & O'Connell, K. A. (2004). The World Health Organization's WHOQOL-BREF quality of life assessment: Psychometric properties and results of the international field trial. A Report from the WHOQOL Group. *Quality of Life Research*, 13(2), 299–310.
 29. Skevington, S. M., & Epton, T. (2018). How will the sustainable development goals deliver changes in well-being? A systematic review and meta-analysis to investigate whether WHOQOL-BREF scores respond to change. *BMJ Global Health*, 3(Suppl 1), e000609.
 30. Storrie, K., Ahern, K., & Tuckett, A. (2010). A systematic review: Students with mental health problems—A growing problem. *International Journal of Nursing Practice*, 16(1), 1–6.
 31. The WHOQOL Group. (1995). The World Health Organization quality of life assessment (WHOQOL):

- Position paper from the World Health Organization. *Social Science & Medicine*, 41(10), 1403–1409.
32. Tsitsas, G., Nanopoulos, P., & Paschali, A. (2019). Life Satisfaction, and Anxiety Levels among University Students. *Creative Education*, 10(05), 947–961.
 33. Vo, T. Q., Tran, B. T. T., Nguyen, N. T., Nguyen, T. T. H., & Tran, T. P. C. (2020). Psychometric properties of the World Health Organization Quality of life instrument, short form: Validity in the Vietnamese healthcare context. *Systematic Reviews in Pharmacy*, 11(1), 14–22.
 34. World Health Organization. (1996). WHOQOL-BREF: introduction, administration, scoring and generic version of the assessment: field trial version, December. In *World Health Organization* (pp. 1–16). <http://apps.who.int/iris/bitstream/handle/10665/63529/WHOQOL-BREF.pdf?sequence=1&isAllowed=y>
 35. Xia, P., Li, N., Hau, K. T., Liu, C., & Lu, Y. (2012). Quality of life of Chinese urban community residents: A psychometric study of the mainland Chinese version of the WHOQOL-BREF. *BMC Medical Research Methodology*, 12(1), 37.
 36. Xiao, H., Carney, D. M., Youn, S. J., Janis, R. A., Castonguay, L. G., Hayes, J. A., & Locke, B. D. (2017). Are we in crisis? National mental health and treatment trends in college counseling centers. *Psychological services*, 14(4), 407-415.
 37. Yao, G., Wu, C.-H., & Yang, C.-T. (2008). Examining the content validity of the WHOQOL-BREF from respondents' perspective by quantitative methods. *Social Indicators Research*, 85(3), 483–498.