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The Validity of the Ryff Scale as a Measure of Psychological Well-Being in Mexican Medical Residents

La validez de la Escala de Ryff como medida de bienestar psicológico en médicos residentes mexicanos

A validade da Escala de Ryff como medida de bem-estar psicológico em médicos residentes mexicanos

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Carolina Delgado Domínguez
Institute of Public Health, Universidad Veracruzana, México
ORCID: https://orcid.org/0000-0002-0949-4516
Manuel Salvador Luzanía Valerio
Institute of Public Health, Universidad Veracruzana, México
ORCID: https://orcid.org/0000-0002-9377-6291
Roberto Lagunes-Córdoba[a]
Institute of Public Health, Universidad Veracruzana, México
ORCID: https://orcid.org/0000-0003-0650-4085

[a] Correspondence author: rlc.academico@yahoo.com.mx

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ABSTRACT

Background: The Ryff Psychological Well-being Scale is an instrument that has been widely used to evaluate the psychological well-being of health personnel. However, few studies have been conducted on its validity in specific populations of resident physicians, which compromises the interpretation of the results obtained in this population. **Objective**: To assess the validity of the factor structure of the Ryff well-being scale in Mexican resident physicians. **Material and Methods:** An instrumental study was carried out with 396 resident physicians to whom the Ryff Psychological Well-being Scale was applied in its full version (39 items). The data were analyzed using confirmatory factor analysis, comparing three previously reported factor structures. The fit indices and reliability of the three solutions obtained were compared. **Results**: The single-factor structure presents the best fit indices, with a very high reliability (ω = 0.924; α = 0.932). **Conclusion**: The Ryff Psychological Well-being scale has very high reliability and a direct interpretation when the items that are scored positively are used, as integrating a one-factor structure.

Keywords
mental health; medical staff; validation study; psychological well-being.

RESUMEN

Antecedentes: La Escala de Bienestar Psicológico de Ryff es un instrumento que se ha utilizado ampliamente para evaluar el bienestar psicológico del personal de salud; sin embargo, se han realizado pocos estudios sobre su validez y estructura factorial en poblaciones específicas de médicos residentes. **Objetivo**: Comprobar la validez de la estructura factorial de la Escala de Bienestar de Ryff en médicos residentes mexicanos. **Material y métodos**: Estudio instrumental con 396 médicos residentes a quienes se les aplicó la Escala de Bienestar Psicológico de

Ryff. Los datos se analizaron mediante análisis factorial confirmatorio, comparando tres estructuras factoriales previamente reportadas en la literatura. **Resultados**: Se determinó que la estructura de un solo factor presenta los mejores índices de ajuste, con una confiabilidad elevada (ω = 0,924; α = 0,932). **Conclusión**: La escala de Bienestar Psicológico de Ryff tiene elevada confiabilidad y una interpretación práctica directa cuando se utilizan solamente reactivos que se puntúan en positivo, integrados en un solo factor.

Palabras clave
salud mental; médicos residentes; estudio de validación; bienestar psicológico.

RESUMO
Contexto: A Escala de Bem-Estar Psicológico de Ryff é um instrumento amplamente utilizado para avaliar o bem-estar psicológico dos profissionais de saúde. Entretanto, poucos estudos foram conduzidos sobre sua validade e estrutura fatorial em populações específicas de médicos residentes. **Objetivo**: Testar a validade da estrutura fatorial da escala de bem-estar de Ryff em residentes médicos mexicanos. **Material e Métodos**: Foi realizado um estudo instrumental com 396 médicos residentes aos quais foi aplicada a Escala de Bem-Estar Psicológico de Ryff. Os dados foram analisados por meio de análise fatorial confirmatória, comparando três estruturas fatoriais relatadas anteriormente na literatura. **Resultados**: Foi determinado que a estrutura unifatorial apresenta os melhores índices de ajuste, com confiabilidade muito alta (ω = 0,924; α = 0,932). **Conclusão**: A Escala de Bem-Estar Psicológico de Ryff tem confiabilidade muito alta e interpretação prática direta quando utiliza apenas itens com pontuação positiva, integrados em um único fator.

Palavras-chave
saúde mental; residentes médicos; estudo de validação; bem-estar psicológico.

Introduction

Context of Medical Residents in Mexico: Work and Situations That Threaten Their Psychological Well-Being

A medical resident is a healthcare professional who holds a legal degree and whose work is centered in a specific public or private receiving medical unit for residents (UMRR, for its acronym in Spanish), belonging to the National Health System (1). The responsibility of a resident is to combine formal study with supervised practical experiences related to the healthcare discipline they intend to pursue, during the period and according to the requirements established by academic regulations to complete their professional training (1).

In Mexico, medical trainees in healthcare units (including medical residents) are responsible for up to 34% of direct medical care (2). Unlike other professions, the medical profession—starting from its training stage that involves patient care—is exposed to constant human suffering and vulnerability, within a context that enables violence, harassment, bullying, and professional burnout. This situation increases the risk of developing conditions such as anxiety, depression, burnout, substance use, and suicidal ideation, which may result in deteriorated mental health and well-being (3–6).

This deterioration affects the quality of care that a physician with impaired mental health provides to patients. It is reflected in a greater tendency to commit medical errors and in a loss of emotional sensitivity and empathy (7–9). From this perspective, it is worth questioning the extent to which medical education induces deterioration in students' mental health (10–12). Since the essential responsibility of medicine is to improve patients' health, anything that threatens it warrants consideration (13). Hence arises the need to monitor the mental health and psychological well-being of medical students who are in direct contact with patients in healthcare units.

Psychological Well-Being

Psychological well-being (PWB) is considered a positive indicator of mental health, and therefore has been increasingly studied in recent years (14). PWB is understood as a cognitive and affective evaluation of life, from which positive emotions and feelings of self-realization arise, while also reflecting the development of human potential to the fullest extent (15). Carol Ryff proposed a model that has been one of the most widely used in studies on PWB, involving six dimensions: (1) self-acceptance, referring to the degree of satisfaction a person has with

themselves while being aware of their strengths and limitations; it evaluates the positive appraisal of oneself and one's life history; (2) autonomy, indicating the ability to maintain individuality in decision-making and to resist social pressure; (3) positive relations, referring to the extent to which one has intimate, trusting social networks and empathy toward others; (4) environmental mastery, referring to the perception of control and influence that an individual has over their surroundings; (5) purpose in life, related to the goals an individual sets throughout their life, which give it meaning; and (6) personal growth, the effort to continue developing all personal capacities and potential (16).

The theory of PWB integrates key elements of the cognitive–behavioral approach, both regarding the interpretation of personal experience and clinical intervention processes, by focusing on individual perception, meaning-making, and the development of coping and emotional self-regulation skills (16).

Based on this model, Ryff proposed the Psychological Well-Being Scale (PWBS), widely accepted by researchers due to its adequate reliability and validity indicators in the initial populations in which it was applied (17). As a result, this instrument has been used in various contexts, both educational and occupational, including among health professionals. For example, in university students, a positive and significant correlation was observed between PWB and the number of passed courses ($r = 0.18$; $p < 0.001$), as well as with perceiving oneself as a successful student ($r = 0.37$; $p < 0.001$) (18). In a study involving health science students using the PWBS, it was found that 40.6% of participants reported having clarity regarding their purpose in life; 47% showed deficit levels of positive relations; 26.6%, low autonomy; and 25%, low personal growth (19). Among medical residents, a significant positive correlation has been found between PWB and empathy ($r = 0.460$; $p < 0.001$) (20). In another context, among healthcare workers during the COVID-19 pandemic, a negative correlation was reported between perceived risk of contagion and PWB (21). Another study found that PWB influences the quality of medical care provided (22).

However, despite these apparently positive results, the validity of the factorial structure of the PWBS has not received the necessary attention from researchers who use it. This presents a critical issue, since the validity of a scale depends on how it is used, and validity must be determined directly in the population to which it is applied; this affects the use and interpretation of the resulting scores (23).

It is almost never possible to directly interpret scores obtained from a scale, as it is not uncommon for proposed dimensions to fail to replicate in another population, partly due to participants' cultural biases and factors (24). It is also not unusual for one or more items to be irrelevant in a given population and therefore require removal (20). In the case of the PWBS, several studies have shown different factorial structures across different populations, some of which differ from those proposed by Ryff's original theory (20,25,26).

This situation raises the issue of interpreting PWBS scores. If irrelevant items are found in a population, one or more subscales may need to be discarded; otherwise, the obtained scores would be spurious in that population, and their interpretation under the original theoretical framework could also be misleading. For example, Chen et al. (27), based on a bifactor model, have proposed that PWB measured by the PWBS is essentially unidimensional and that item loadings are significantly higher on a general factor than on any specific factor. Thus, PWB can be considered a general measure in which all items contribute.

In the case of medical residents, few studies using the PWBS have been identified, and in most of them the factorial structure of the scale has not been verified. Delgado-Domínguez et al. (20) found a four-factor structure consisting of 30 items, determined through exploratory factor analysis. In contrast, in a study employing rigorous psychometric techniques, Domínguez-Lara et al. (25) found a unidimensional structure in which all reverse-scored items were removed, as well as three others with unacceptable

factor loadings. This study is significant due to its methodological rigor; however, its sample consisted of university students in general, and none were medical residents.

Given the above, the importance of monitoring mental health and PWB in physicians during their training process, and the need to use instruments with valid and reliable indicators tailored to medical resident populations, the aim of the present study was to determine the optimal factorial structure and reliability of the PWBS in a sample of Mexican medical residents.

Method

This study is instrumental, a category that includes all studies aimed at the development of tests and devices, including the design (or adaptation) and the study of their psychometric properties (28).

Participants

A non-random convenience sampling was carried out with medical residents from the first (34.8%), second (33.3%), third (23.5%), and fourth year (8.3%) of various medical specialties at a public university in Mexico. In total, there were 396 participants, with an age range from 24 to 52 years, and a mean of 30.93 (4.09±). The specialty with the highest participation percentage was family medicine (22.5%), followed by emergency medicine (14.6%). The remaining sociodemographic characteristics of the sample are described in Table 1.

Table 1.
Description of Sample Characteristics

Characteristics	Total (n [%])
Gender	
Women	197 (49,7)
Men	199 (50,3)
Marital Status	
Married	63(15,9)
Single	262 (66,2)
Common-law union	65 (16,4)
Separated	6 (1,5)
Year of Residency	
R1	138 (34,8)
R2	132 (33)
R3	93 (23,5)
R4	33 (8,3)
Residency Location	
From outside the city	322 (81,3)
Local	74 (18,7)

Procedure

Participation was voluntary and confidential. The instrument was administered online to medical residents. Invitations to participate, including the informed consent form, were sent to their emails by the institution's coordination office, in collaboration with the heads of education. Once participants signed the informed consent, they were given access to the link to respond to the questionnaire. Data collection took place in August 2022.

Instrument

The Psychological Well-Being Scale (PWBS), proposed by Ryff in 1989 and adapted to Spanish by Díaz et al. (29) in 2006, was used. In its original formulation, the scale consists of 39 items

that evaluate the six factors of Ryff's theory: self-acceptance (7, 19, 31), autonomy (4, 9, 21), positive relationships (2, 8, 26), environmental mastery (5, 11, 22), purpose in life (6, 12, 17, 18, 23), and personal growth (24, 37, 38). It is self-administered with a response format that ranges from 1 (strongly disagree) to 6 (strongly agree), with a possible score range of 39 to 234 points. Items worded negatively (2, 4, 5, 8, 9, 13, 15, 20, 22, 25, 26, 27, 29, 30, 33, 34, 36) are scored reversely (1 = 6; 2 = 5; 3 = 4; 4 = 3; 5 = 2; 6 = 1). A higher score indicates higher levels of PWB. The original formulation reported Cronbach's alpha reliability for the six subscales, ranging from 0.71 to 0.83.

Ethical Considerations

The confidentiality of participants was respected, and specific measures were taken to safeguard electronic records (keys). The study was approved by the Ethics in Research Committee (CEI-ISP-UV-R10/2022) of the Institute of Public Health at the Veracruzana University, with registration number CONBIOÉTICA-30-CEI-001-20190122.

Data Analysis

Since the aim was to determine the factorial structure that best fits the data from the sample, confirmatory factor analysis (CFA) was used. Initially, the discriminative power of all items was tested through a contrasting group analysis, comparing the scores of the first quartile to those of the fourth quartile using the Mann-Whitney U test. All items showed adequate discriminative power ($p < 0.0001$ for all cases).

Subsequently, three factorial structures reported in the literature were tested: Model 1 (M1) replicated the most widely used and documented structure in the literature, as described in the instrument section, consisting of 6 factors and 39 items (28). Model 2 (M2), consisting of 4 factors and 30 items, was determined through exploratory factor analysis and reported in a previous study with medical residents (20). Lastly, Model 3 (M3) was reported by Domínguez-Lara et al. (25), who found a unidimensional structure where all reverse-scored items were removed due to introducing irrelevant variance and method bias, as well as items 10, 14, and 16, which had unacceptable factor loadings (25). This study was conducted with university students and did not include medical residents.

To determine the most appropriate estimation method for CFA, the univariate normality of the data was tested using kurtosis values, skewness, and the Shapiro-Wilk test, and multivariate normality was assessed using the Mardia test (30).

The kurtosis values (from 0.278 to 4.062) and the skewness ratios of the items (from −0.008 to 1.511) suggest proximity to univariate normality. However, the lack of monotonicity in the distributions and the Mardia coefficient greater than 179 indicate the suitability of using polychoric correlations and the robust DWLS estimation procedure (30). The indices used to assess the fit of the models were the CFI (Comparative Fit Index), RMSEA (Root-Mean Squared Error of Approximation), and SRMR (Standardized Root Mean-Square), using the current criteria in the literature (CFI $\geq$ 0.95; RMSEA $\leq$ 0.08, with a 90% confidence upper bound not exceeding 0.08, and SRMR = 0.08) (31).

Additionally, the average variance extracted was determined as a measure of convergent validity, as well as the reliability of the total scale. The analyses were conducted using Mplus 8.6 and JASP 0.18.3.

Results

The three proposed factorial structures revealed adequate fit indices, although the unidimensional structure (Model 3) was the best fit for the data. Table 2 summarizes the factorial structures with their respective fit indices.

Table 2.
Fit Indices of the Proposed Structures for the Psychological Well-Being Scale

Structure	CFI	RMSEA (IC 90)	SRMR	CFC (X(2) > 10)
6 factors, 39 items (28)	0,935	0,072 (0,068-0,075)	0,058	16
4 factors, 30 items (20)	0,919	0,095 (0,091-0,100)	0,055	5
1 factor,, 22 items (25)	1,000	0,000 (0,000-0,003)	0,051	--

CFC: Significant cross-factor loadings, X(2) > 10; CFI: Comparative Fit Index; RMSEA: Root-Mean Squared Error of Approximation; SRMR: Standardized Root Mean-Square.

The modification indices of the 4-factor and 6-factor structures (Models 1 and 2) show the presence of a significant number of cross-factor loadings (5 and 16, respectively), suggesting that although the fit indices of these models could be considered acceptable, the cross-loadings indicate poor model specification. This affects the quality and the precise psychological meaning of the interpretation of the scores obtained when using them.

In this population, the unidimensional structure presented a single unacceptable factor loading related to item 10 ($\lambda = 0.089$), so it was removed. This resulted in the structure shown in Figure 1. The average total score of the sample was 4.79, with a standard deviation of 0.73.

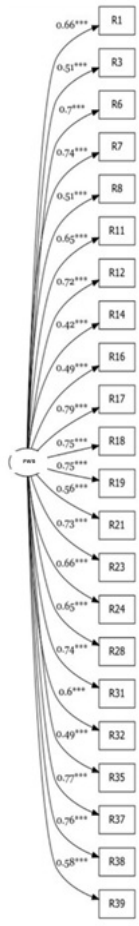

Figure 1.
Unidimensional Model of Ryff's Psychological Well-Being Scale PWB: Psychological Well-Being.

Finally, the unidimensional structure presents high reliability values ($\omega = 0.924$; $\alpha = 0.932$).

Discussion

The nature of the medical profession, constantly exposed to human vulnerability, combined with a formative context where violence, mistreatment, harassment, bullying, excessive workload, and stress prevail, in which medical residents operate, contributes to the deterioration of their PWB (4-6). These situations are reflected in the quality of care provided, with a greater tendency to make medical errors, as well as a loss of human quality and empathy toward patients

(8,9). This underscores the importance of maintaining systematic and constant monitoring of physicians' mental health, enabling decisions that promote the mental health and PWB of medical residents, both by the educational institutions that train them and by the healthcare units that host them during their training period.

As a result, research and interventions related to positive psychology and PWB have the potential to contribute to the well-being of medical residents and indirectly influence the health of the general population. From a cognitive-behavioral approach (which underpins the practice of positive psychology), interventions could be implemented to identify dysfunctional cognitive patterns and improve emotional self-regulation, resilience, and protective psychological skills in highly demanding clinical contexts, such as medical residency.

Research relies on the use of scales and instruments whose structure and properties are well-known and supported by strong psychometric evidence to uphold their validity. In the case of the PWBS, several studies have shown that in different populations, the originally conceived six-factor structure cannot be supported with psychometric evidence (25,26). As it is a scale that was not constructed using transcultural psychology methods, it is sensitive to cultural and language biases of the population it is intended to be used with (32). However, despite the widespread use of the PWBS, very few studies report validity evidence for the specific population in which it was used (26).

The results of this study show that the six-factor structure is not suitable for our sample of medical residents, as it presents suboptimal fit indices and poor model specification. Specifically, the 16 cross-loadings indicate that several items load onto more than one factor, with some loading onto up to three different factors, making it impossible to make a direct or simple interpretation of the results if based on the six-factor theoretical approach. Furthermore, as Domínguez-Lara et al. (25) have shown, the reverse-scored items in the original version contribute to method variance, which is irrelevant for measuring the construct. In that study, when reverse-scored items were removed and exploratory factor analysis was conducted, the unidimensional structure was obtained and confirmed in their replication sample, which is precisely the structure used as the basis for Model 3 in this study (see Figure 1).

At first glance, the need to interpret the PWBS using a unidimensional theoretical approach, different from the one used to construct it, seems to complicate its use and limit the scope of its interpretation. However, this is not a unique case, nor is it unusual in scales used to measure PWB. For example, the Children's Worlds Psychological Well-Being Scale (CW-PSWBS) was initially constructed based on Ryff's theoretical approach (33). However, subsequent studies conducted in 30 countries have shown that the scale is essentially unidimensional, and this simpler structure helps maintain invariance properties by gender and age across the 30 countries in which it was evaluated.

A unidimensional structure, like the one found in this study, has important advantages for using the scale. It is shorter (22 items), making it more acceptable to participants, especially when part of a larger test battery. Moreover, due to its single-factor structure and the absence of reverse-scored items, it avoids confusion when summing scores and eliminates the possibility of method biases (25).

The unidimensional structure also provides a unitary measure of PWB, which is precisely the construct of interest when using the PWBS. A structure with more factors, although it may seem to offer richer interpretative possibilities at first glance, can lead to erroneous conclusions, as some factors might not exist or may be underrepresented in the population. This situation can lead to overestimated or spurious subscale scores. With a unidimensional measure, such errors are avoided, as all items are summed to give an integrated score for the construct.

The reliability indices found are very high, according to current psychometric standards. This is also a direct consequence of the unidimensional structure, as all items contribute

to the total score, making the scale less sensitive to random and systematic errors (34).

The results of this study should be interpreted within the context of its limitations. First, there is the selection of participants who responded to the questionnaire, as although several invitations were extended to residents from two specific areas, the response rate achieved opens the possibility that the sample may be biased and not representative. Therefore, future research could test the instrument on a larger sample.

Furthermore, the reduction of the scale and the fact that its structure better fits a unidimensional model make the use of Ryff's theoretical approach for interpreting its score inappropriate. In future studies, it would be necessary to analyze the results based on the unidimensional structure, or alternatively, conduct studies using the full version with confirmatory analysis to determine the structure that best fits the studied sample.

Conclusion

The proposed unidimensional structure for the PWBS provides evidence of validity in its 22-item version, with a single-factor structure, without cross-factor loadings that complicate the interpretation of scores, or reverse-scored items that introduce method variance. The scores obtained can be interpreted globally in terms of PWB and show very adequate reliability values. Although further validation studies are needed, this version is simpler to apply, easier to interpret, and potentially useful for investigating the PWB of medical residents.

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