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Validity evidence of the Brazilian version of the Spirit at Work Scale in nursing workers

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Evidências de validade da versão brasileira da Spirit at Work Scale entre trabalhadores de enfermagem

Evidencia de validez de la versión brasileña de la Spirit at Work Scale entre trabajadores de enfermería

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ABSTRACT

Objective: to evaluate the psychometric properties of the Brazilian version of the Spirit at Work Scale in nursing workers.

Method: cross-sectional study with non-probabilistic sampling. The analysis of the psychometric properties of the Spirit at Work Scale was carried out in three stages: face and content validity (translation and cultural adaptation); validity based on internal structure (exploratory and confirmatory factor analysis, factorial invariance, and reliability analysis); validity based on relations to external measures (convergent analysis of the construct in relation to external measures).

Results: the translated version, adapted for the Brazilian context, was called Spirit at Work Scale-Br. The Brazilian version was validated in a sample of 4,248 nursing professionals, among whom there was a predominance of women (n=3,648; 85.88%), with a mean age of 35.59 years (SD=8.86); most were nurses 47.36% (n=2012) and nursing technicians 47.25% (n=2007). The exploratory factor analysis indicated the single-factor model as the theoretical structure that best adjusted to the data, after the exclusion of items 1, 2 and 12 of the instrument ($\lambda \leq 0.40$). Confirmatory factor analysis validated the single-factor structure of the Spirit at Work Scale-Br, composed by 15 items instead of the 18 in the original model of the instrument. The reliability of the data was also attested.

Conclusion: the Spirit at Work Scale-Br is capable of assessing aspects related to spirituality in the work of Brazilian nursing workers. However, it is considered essential to carry out future studies, including in-depth analyses related to the construct validity of the instrument in different contexts.

Descriptors: Nursing. Occupational Health. Psychometrics. Validation Study. Spirituality.

RESUMO

Objetivo: avaliar as propriedades psicométricas da versão brasileira da *Spirit at Work Scale* entre trabalhadores de enfermagem.

Método: estudo transversal com amostragem não probabilística. A análise das propriedades psicométricas da *Spirit at Work Scale* foi realizada em três etapas: validade de face e conteúdo (tradução e adaptação cultural); validade baseada na estrutura interna (análise fatorial exploratória e confirmatória, invariância fatorial e análise da confiabilidade); validade baseada nas relações com medidas externas (análise convergente do construto em relação a medidas externas).

Resultados: a versão traduzida e adaptada para o contexto brasileiro foi denominada *Spirit at Work Scale*-Br. A validação da versão brasileira ocorreu em uma amostra de 4248 profissionais de enfermagem, entre os quais observou-se o predomínio de mulheres (n=3648;85,88%), com média de idade igual a 35,59 anos (DP=8,86); enfermeiros 47,36% (n=2012) e técnicos de enfermagem 47,25% (n=2007). A análise fatorial exploratória indicou o modelo unifatorial como a estrutura teórica que melhor se ajustou aos dados, após a exclusão dos itens 1, 2 e 12 do instrumento ($\lambda \leq 0,40$). A análise fatorial confirmatória validou a estrutura unifatorial da *Spirit at Work Scale*-Br, composta por 15 itens e não por 18 itens como no modelo original do instrumento. A confiabilidade dos dados também foi atestada.

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Conclusão: a Spirit at Work Scale-Br é capaz de avaliar aspectos relacionados à espiritualidade no trabalho de trabalhadores de enfermagem brasileiros. Entretanto, considera-se fundamental a realização de futuros estudos, contemplando o aprofundamento de análises relacionadas à validade de construto do instrumento em diferentes contextos.
Descritores: Enfermagem. Saúde do Trabalhador. Psicometria. Estudo de Validação. Espiritualidade.

RESUMEN

Objetivo: evaluar las propiedades psicométricas de la versión brasileña del *Spirit at Work Scale* entre trabajadores de enfermería.
Método: estudio transversal con muestreo no probabilístico. El análisis de las propiedades psicométricas del *Spirit at Work Scale* se realizó en tres etapas: validez aparente y de contenido (traducción y adaptación cultural); validez basada en la estructura interna (análisis factorial exploratorio y confirmatorio, invariancia factorial y análisis de confiabilidad); validez basada en relaciones con medidas externas (análisis convergente del constructo en relación con medidas externas).
Resultados: la versión traducida y adaptada para el contexto brasileño se denominó SAWS-Br. La validación del *Spirit at Work Scale*-Br ocurrió en una muestra de 4248 profesionales de enfermería, entre los cuales predominó el sexo femenino (n=3648;85,88%), con edad media de 35,59 años (DT= 8,86); enfermeras 47,36% (n=2012) y técnicos de enfermería 47,25% (n=2007). El análisis factorial exploratorio indicó el modelo unifactorial como la estructura teórica que mejor se ajusta a los datos, luego de excluir del instrumento los ítems 1, 2 y 12 (λ≤0,40). El análisis factorial confirmatorio validó la estructura unifactorial del *Spirit at Work Scale*-Br, compuesto por 15 ítems y no 18 ítems, como en el modelo original del instrumento. También se comprobó la fiabilidad de los datos.
Conclusión: el *Spirit at Work Scale*-Br es capaz de evaluar aspectos relacionados con la espiritualidad en el trabajo de los trabajadores de enfermería brasileños. Sin embargo, se considera fundamental realizar futuros estudios, contemplando análisis en profundidad, relacionados con la validez de constructo del instrumento en diferentes contextos.
Descriptores: Enfermería. Salud Laboral. Psicometría. Estudio de Validación. Espiritualidad.

INTRODUCTION

Spirituality is considered to be the fourth dimension of health, with widely studied biopsychosocial effects[1–3]. It is recognized as a human dimension that results from a combination of individual existential elements, as well as those related to sacred mental experiences, human nature, and the tendency to search for knowledge and elevation towards a greater good[4]. Spirituality also refers to the domain of the spirit, the immaterial or extra-physical dimension of existence, being closely tied to the supernatural[5]. It can also represent an energy or vital force that pushes the individual towards their goals, being related to a search for purpose or the meaning of life. Other researchers add that spirituality refers to a connection with other people, with the self, with art, and with nature, encompassing the idea of a connection with a higher or transcendent power[6].

In regard to spirituality at work, specifically in the case of nursing work, evidence has shown the relationship between this construct and the promotion of the well-being of workers, including the reduction of stress, anxiety, and depression[7–8], in addition to reducing bullying and leading to the professional exhaustion of nurses[9]. Thus, health workers can use spirituality as a mechanism to deal with stress[10], and to give new meaning to the suffering they experience daily at their work[11]. Regarding the negative impacts of the COVID-19 pandemic on the physical and mental health of nurses, spirituality and religiosity brought countless benefits to the mental health of individuals[12–13].

In order to evaluate spirituality at work, several instruments were proposed in the last decades, including the Spirit at Work Scale – SAWS[14], elaborated according to the principles of the Ecological Model of Spirit at Work, according to which there is no separation between life and the workplace. Thus, spirituality at work is determined by the interaction between the aspects that involve personality, individual behaviors, and organizational aspects[5,15]. The SAWS includes 18 items divided into four factors: engaging work (EW), sense of community (SC), spiritual connection (SC), and mystical experience (ME). An engaging work is comprised by seven items, representing a deep feeling of well-being and the belief that one's work is meaningful, with a higher purpose; the sense of community is formed by three items, indicating a feeling of connection and a common goal between the individuals; the spiritual connection includes three items, representing the connection of the individual with something bigger than the self; and the mystical experience is formed by five items, characterizing a positive state of energy, vitality, experiences of happiness, and feelings of transcendence[14].

In the last decades, the SAWS has been used in different contexts and countries, such as Germany[16]; Canada[17]; India[18]; Italy[19]; Turkey[20], and Vietnam[21]. As a result, this study aimed to evaluate the psychometric properties of the Brazilian version of the Spirit at Work Scale in nursing workers.

METHOD

This is a cross-sectional study, with a non-probabilistic sampling. The population included nurses, nursing technicians, and nursing assistants, all of whom were registered in the Brazilian Federal Nursing Council (Cofen). To calculate the minimum sample size for the analysis, the principles established by Hair Jr.[22] were used, which highlight the need to have from 10 to 20 respondents per parameter to be estimated in the model. Considering that the SAWS has 46 parameters (18 items, 18 errors, 4 factors, and 6 correlations between the factors), the minimum sample size required to analyze the data was estimated from 460 to 920 participants. The sample included 4248 nursing workers.

Inclusion criteria were: being a nurse, nursing technician, or nursing assistant, registered in the Cofen; having at least one year of professional experience; being active in the profession in the data collection period. Participants who did not answer the measuring instruments in full were excluded.

Data were collected from April to October 2022, entirely on-line, through electronic messages sent to the e-mail of the nurses, technicians, and assistants registered with Cofen. The messages included a link to access an electronic form that included the consent form and the data collection instrument, which was elaborated using the platform Research Electronic Data Capture (REDCap). The total number of emails sent corresponds to total number of email addresses of professionals registered with the Cofen (779,337). Of them, 5979 nursing workers agreed to participate in the study (adherence rate = 0.77%) and 4248 responded with complete questionnaires (response rate = 71.05%), which corresponds to the final sample of this research.

For data collection, the instruments described below were used.

Participant characterization instruments, including questions related to individual data (age, sex, marital status) and occupational data (professional category, time in the profession, and weekly workload).

Spirit at Work Scale – SAWS[14]: used to evaluate participants' spirituality at work. The SAWS was originally developed in English. The original theoretical model of SAWS included 18 items separated into four factors: engaging work (items 1,4,7,9,11,14, and 18); mystical experience (items 2,5,8,12, and 16); spiritual connection (items 6,10, and 15); and sense of community (items 3,13, and 17). The answers are in a six-point Likert scale, varying from strongly disagree (1) to strongly agree (6).

Depression, Anxiety and Stress Scale – DASS-21[23]: used to analyze the external validity of the SAWS. This scale was firstly developed to evaluate symptoms of depression, anxiety, and stress. It has 21 items, divided into three factors: depression (items 3,5,10,13,16,17, 21); anxiety (items 2,4,7,9,15,19, 20); stress (items 1,6,8,11,12,14, 18). The answers are in a four-point Likert-type scale, from 0 (did not apply at all) to 3 (applied very much or most of the time). In Brazil, the DASS-21 was validated by Vignola and Tucci[24].

Satisfaction with Life Scale – SWLS[25]: used to analyze the external validity of the SAWS. The SWLS was elaborated to evaluate the general perception and the satisfaction of an individual with their own life. This instrument has a single factor, divided into five items. The answers are in a Likert scale, varying from 1 (strongly disagree) to 7 (strongly agree)[25]. It has been adapted to the Brazilian context[26].

To evaluate the psychometric properties of the SAWS, we followed recommendations from the American Educational Research Association[27]. As a result, this study had three stages: 1) face and content validity analysis; 2) internal structure validity analysis; 3) analysis of the validity according to the relations to external measures.

The step of content and face validity was the process of translation and cultural adaptation of the SAWS into the Brazilian context. Methodologically, this stage must include the following steps: 1) translation; 2) synthesis and consensus about the translations; 3) evaluation by a specialist committee; 4) back-translation; 5) pre-test[28].

Thus, as our first step, two independent translations of the original version of the SAWS were carried out, created by two translators who were native to the language (translated versions T1 and T2). A synthesis of the two translations was conducted by a third translator, thus reaching the consensus version (T3). The three translated versions were analyzed by a specialist committee that included: 1) a psychologist, PhD, professor, experienced with teaching and research in the field of religiosity and spirituality in the field of health; 2) a nurse, MS, experienced in the application of psychometric studies; 3) a psychologist, PhD, professor, experienced

with research in the field of religiosity and spirituality; 4) a psychologist, PhD, experienced with research involving spirituality and religiosity; and 5) a nurse, PhD, professor, experienced in teaching and research in the field of worker health.

The participants of the specialist committee were selected considering the information available on the Lattes Platform, using the search for subject and the descriptors in this article. Selection criteria included being an MS or PhD and having experience in the fields of religiosity/spirituality, worker health, or in the validation of psychometric studies. The specialists were invited to participate in the study via e-mail, receiving the following documents: consent form; original version of the SAWS; translations T1, T2, and T3; and an instrument to evaluate the translations. According to the instrument, each item of the translation should be evaluated as inadequate (-1), partially adequate (0), or adequate (+1), as to whether or not the original and translated versions were pertinent and equivalent. Items classified as inadequate or partially adequate were modified according to the suggestions of revision made by the specialists. To determine the agreement between the experts, we used the Content Validity Ratio (CVR), a statistical measure that indicates what is the degree of significance of the content validity, and the acceptable critical CVR value, according to the number of evaluators[29]. For a total of five specialists, CVR values > 0.99 are considered acceptable[30].

After the changes suggested by the experts were implemented, the final consensual version in Portuguese (T4) was produced. This version was back-translated independently, by two translators who were native English speakers. A third translator, also a native speaker, elaborate the final back-translated consensus version in English, which was sent to the original authors of the instrument and approved by them.

The T4 version was applied to a sample of 28 nursing workers from the primary care units of a city inland São Paulo, Brazil. This stage was the pre-test, that is, the last step of the face and content validation. The participants of the pre-test also evaluated the relevance of each item, classifying them as inadequate (-1), partially adequate (0) or adequate (+1), and suggesting pertinent changes. Thus, we reached the final version of the SAWS (T5), translated and adapted into the Brazilian context. It was called Spirit at Work Scale – SAWS-Br.

The internal structure validity of the SAWS-Br was analyzed using factorial, convergent, and divergent construct validity. At first, however, we analyzed the psychometric sensitivity of the items, in order to ascertain their normality. Absolute skewness and kurtosis values were estimated (considered adequate when below three and seven, respectively)[31].

Considering the lack of SAWS validation studies in Brazil, an exploratory factor analysis (EFA) was initially carried out, in order to find the underlying structure of the data matrix and determine the number and nature of latent variables (factors) that better represented the set of variables observed. The software FACTOR 11.04.02[32] was used to conduct the EFA. Considering that we needed different respondents to be able to carry out the EFA and the confirmatory factor analysis (CFA), the sample was randomly divided in sets of approximately 50% (n_1=2118; n_2=2130). The EFA was carried out in the participants of sub-sample 1 (n_1=2118).

To extract the factors, the method Diagonal Weighted Least Square (DWLS) was used, considering the number of points in the response scale of the instrument (six points - polychoric correlation matrix). The fitness of the data correlation matrix was analyzed using the Kaiser-Meyer-Olkin (KMO) index, which was considered appropriate when KMO≥0.80. The significance was evaluated using Bartlett's test of sphericity (adequate if $p<0.05$)[31]. To evaluate factorability, a parallel analysis with an optimized procedure was conducted[33] and a Direct Oblimin rotation of the data matrix, with bootstrap procedures and Monte Carlo simulations for factor retention[33].

In order to assess the unidimensionality of the matrix underlying the data, the indices Unidimensional Congruence (UniCo), Explained Common Variance (ECV) and Mean of Item Residual Absolute Loadings (MiReal) were used. The values considered to indicate unidimensionality were: UniCo ≥ 0.95, ECV ≥ 0.85, and MiReal ≤ 0.30[32]. The stability of the factors extracted in the EFA was evaluated using the H index (considered adequate if H > 0.80)[32].

The quality of fit of the factorial structure was evaluated using the Comparative Fit Index (CFI); the Tucker-Lewis Index (TLI); the Root Mean Square Error of Approximation (RMSEA), with a 90% confidence interval; and the Weighted Root Mean Square Residual (WRMR), with a 95% confidence interval. The values

considered appropriate were CFI and TLI > 0.90; RMSEA and WRMR < 0.10[31]. Additionally, factorial weights (λ) of the items in the rotated matrix were analyzed, and excluded when they presented values of λ ≤ 0.40 [31].

After the EFA, in order to confirm the theoretical structure of the proposed model, a CFA was carried out with the participants of sub-sample 2 (n_2=2130). In this analysis, the estimation method Weighted Least Squares Means and Variances (WLSMV) was used. The quality of fit of the model was evaluated using the indices CFI, TLI, RMSEA (90% confidence interval) and Standardized Root Mean Square Residual (SRMR), considering values of CFI and TLI > 0.90; RMSEA < 0.10; SRMR < 0.08. In regard to factor weights (λ), λ ≥ 0.40 was considered adequate[31].

The convergent construct validity was estimated using the average variance extracted (AVE) from the factors. It was considered adequate when AVE ≥ 0.50[34]. The discriminant construct validity, in turn, was evaluated through a comparison between the AVE of each factor and the square correlation between factors. The discriminant validity was considered to exist when the AVE of each factor was equal to or higher than the squared correlation between factors (AVEi and AVEj ≥ ρij2)[34].

The factorial invariance of the adjusted model was confirmed through a multigroup analysis and the CFI difference test (ΔCFI). Concerning the latter, we analyzed the CFI values of the configural (M_0), metric (M_1), and scalar (M_2) models (ΔCFI_{M1-M0}; ΔCFI_{M2-M1}) in sample subgroups. To do so, sub-sample 2 was randomly divided into two subgroups (test n=1043; validation n=1087), and divided according to the sex of the participants (male n=273; female n=1847). We considered values of ΔCFI < 0.01 as indicative of factorial invariance[35].

To ensure the reliability of the data, the composite reliability (CR) and the ordinal alpha coefficient (α) of the SWAS factors were estimated, given the ordinal nature of the item response scale[36]. CR and α values ≥ 0.70 were considered adequate[31,34].

The validity of the SAWS-Br as based on external measure was estimated by analyzing the positive and negative convergent validity in regard to the domains of the Depression, Anxiety and Stress Scale (DASS-21)[24] and the Satisfaction with Life Scale (SWLS)[26]. Spirituality at work was expected to show a positive association with the construct general satisfaction with life, and negative associations with symptoms of depression, anxiety, and stress.

The statistical analyses related to internal and external validation were conducted using the software R[37], with the "lavaan" (version 0.6-10) and "SemTools" (version 0.5-5) packages.

This study was conducted after being approved by a Brazilian Research Ethics Committee (CAAE 89678518.9.0000.5393). All participants signed a consent form, and the study followed the guidelines prescribed by the National Council of Research Ethics in Circular Letter No. 1/2021, from March 03, 2021, regarding orientations for procedures in virtual spaces. It also followed Resolution 738/2024, from February 1, 2024, by the National Council of Health, which regulates the use of databases for scientific research involving human beings.

RESULTS

Face and content validity

During the translation of the SAWS, difficulties for the translation of the term "spirit" into the Brazilian context stood out, as it was necessary to exactly express the original meaning given to it by the authors of the instrument: "*...basic feeling of being connected to oneself, with others, and the universe as as whole...*"[8]. After theoretical discussions between the researchers, the term "*espiritualidade*" (spirituality) was chosen, based on concepts that define spirituality as the connection between the self and the universe[6,38]. It is worth noting that the back-translation was analyzed and approved by the authors of the original instrument.

The version that went through a cultural adaptation for the Brazilian context (SAWS-Br) was considered to be adequate by the specialists who participated in the evaluation committee. Specialists also considered that all items in SAWS-Br were adequate (+1), meaning that the total CVR of the instrument was 1.0. Small adjustments in the statements were suggested and implemented. During the pre-test, the SAWS-Br was applied to 28 nursing workers, who did not make any suggestions and considered the items in the instrument to be understandable and appropriate. The final version of the SAWS-Br can be found at the end of this article, as Suplementary Material.

Internal structure validity

The individual and occupational characteristics of the participants can be found in Table 1.

Most participants were women (n=3648; 85.88%), aged between 25 and 44 years (n=3133; 73.75%), with a mean age of 35.59 years (SD=8.86); 50.82% (n=2159) had stable relationships; 47.36% (n=2012) were nurses, and 47.25% (n=2007) nursing technicians; 43.01% (n=1827) had worked in nursing between one and five years.

The analysis of the psychometric sensitivity of the SAWS-Br items confirmed the data normality assumption (asymmetry = -0.86 — 0.10; kurtosis = -0.23 — -1.40). This data is presented as Appendix.

Regarding the EFA carried out in participants of sub-sample 1 (n_1=2118), Table 2 shows the results of the analysis of model suitability, data matrix unidimensionality, factor stability, and quality of fit of the SAWS-Br models to the sample. It stands out that the parallel analysis of the four-factor model indicated that a single factor was retained, explaining the 53.50% variance of the data.

The KMO values were found to prove the suitability of the data matrix in all models. The UniCo, ECV and MiReal indexes attested the underlying unidimensionality of the data, confirming that the retention of a single factor indicated the most appropriate structure of the model to the sample. The H index value proved the replicability/stability of the single-factor structure of the model. It is worth pointing out that the significance value of Bartlett's test of sphericity of the single-factor model, which does not appear on the table, was = 24100.6 (df=105; p<0.001)

The results also showed the goodness of fit of the four-factor and single-factor models to the SAWS-Br in the sample. The analyses of the factor weights showed the need to exclude items 1,2, and 12 (λ<0.40). The slightly higher value of RMSEA in the adjusted single-factor model can be explained by the large sample size, the single-factor structure, and the low degree of freedom of the model (gl=90)[31].

Table 1. Characterization of participants (n=4248). Brazil, 2024.

Variables	n	%
Sex		
Female	3648	85.88
Male	573	13.49
Did not answer	27	0.64
Age (years)		
19 to 24	405	9.53
25 to 34	1650	38.84
35 to 44	1483	34.91
45 to 54	566	13.32
55 to 64	105	2.47
≥ 65	10	0.24
Did not answer	29	0.68

Table 1. Cont.

Variables	n	%
Marital status		
Single	1608	37.85
Stable relationship	2159	50.82
Separated/Widowed	468	11.02
Did not answer	13	0.31
Professional Category		
Nurse	2012	47.36
Nursing technician	2007	47.25
Nursing assistant	214	5.04
Did not answer	15	0.35
Time working in nursing (years)		
1 to 5	1827	43.01
6 to 10	1082	25.47
11 to 15	648	15.25
16 to 20	350	8.24
21 to 25	170	4.00
26 to 30	84	1.98
> 30	43	1.01
Did not answer	44	1.04

Source: Study data, 2024.

Table 2. Exploratory Factor Analysis of the four-factor and single-factor models of SAWS-Br (n=2118). Brazil, 2024.

Indices	Four-Factor Model	Single-Factor Model	Adjusted Single-Factor Model *
Model suitability			
KMO	0.935 [0.923-0.937]	0.935 [0.924-0.937]	0.940 [0.930-0.942]
Unidimensionality			
Single	0.952 [0.918-0.974]	0.952 [0.918-0.973]	0.971 [0.964-0.979]
ECV	0.878 [0.868-0.891]	0.878 [0.868-0.890]	0.882 [0.872-0.893]
MiReal	0.211 [0.194-0.221]	0.211 [0.195-0.222]	0.223 [0.210-0.234]
Stability/replicability			
Índice H	-0.770	0.955	0.955
Quality of fit			
TLI	0.986 [0.983-0.995]	0.969 [0.964-0.974]	0.972 [0.967-0.976]
CFI	0.992 [0.990-0.997]	0.973 [0.968-0.977]	0.976 [0.971-0.980]
RMSEA	0.064 [0.036-0.069]	0.098 [0.088-0.132]	0.112 [0.103-0.118]
WRMR	0.032 [0.029-0.034]	0.082 [0.074-0.086]	0.089 [0.083-0.095]
Factor Weights (λ)			
SAWS1	0.326	0.326	0.770-0.949
SAWS2	0.195	0.191	0.770-0.949
SAWS3	0.556	0.555	0.551
SAWS4	0.727	0.726	0.724
SAWS5	0.766	0.762	0.760
SAWS6	0.774	0.775	0.774
SAWS7	0.830	0.832	0.834
SAWS8	0.826	0.825	0.826
SAWS9	0.834	0.836	0.836
SAWS10	0.601	0.603	0.604

Table 2. Cont.

Indices	Four-Factor Model	Single-Factor Model	Adjusted Single-Factor Model *
SAWS11	0.783	0.781	0.781
SAWS12	0.288	0.289	0.770-0.949
SAWS13	0.738	0.738	0.737
SAWS14	0.834	0.834	0.836
SAWS15	0.654	0.652	0.652
SAWS16	0.750	0.749	0.750
SAWS17	0.748	0.748	0.750
SAWS18	0.696	0.695	0.750

Source: Study data, 2024.
Note: *after excluding items 1,2, and 12 (λ<0,40); KMO: Kaiser-Meyer-Olkin; TLI: *Tukey-Lewis index*; CFI: *comparative fit index*; RMSEA: *root mean square error of approximation*; CI90%: confidence interval 90%; SRMR: *standardized root mean square residual*; UniCo: *Unidimensional Congruence*; EVC: *Explained Common Variance*; MiReal: *Mean of Item Residual Absolute Loadings*.

After the EFA, a CFA of the adjusted single-factor model of the SAWS-Br was carried out, involving the participants of sub-sample 2 (n_2=2130), and in different sample subgroups, as Table 3 shows.

The CFA of the single-factor model of the SAWS-Br found factor weights (λ) ≥ 0.57 and appropriate quality of fit indices in all groups being tested. Once again, the fact that the RMSEA values were higher than reference values can be explained by considering the single-factor structure of the model and the large sample size. For this reason, SRMR values were calculated, which confirmed the fitness of the model. The convergent validity of the adjusted single-factor model was also shown in all groups analyzed (AVE>0.50), as well as the reliability of the data (CR>0.953; α>0.948). Given the single-factor nature of the final model, it was not possible to estimate the discriminant validity.

The analysis of the invariance of the single-factor SAWS-Br model showed that there is strict invariance (ΔCFI<0,01) in all groups analyzed: test (n=1043) x validation (n=1087 [CFI models: configural (M_0=0.986); metric (M_1=0.986); scalar (M_2=0.986); strict (M_3=0.986); ΔCFI_{M1-M0}=0.000; ΔCFI_{M2-M1}=0.000; ΔCFI_{M3-M2}=0.000)]; female (n=1847) x male (n=273) [CFI models: configural (M_0=0.986); metric (M_1=0.985); scalar (M_2=0.986); strict (M_3=0.986); ΔCFI_{M1-M0}=-0.001; ΔCFI_{M2-M1}=0.001; ΔCFI_{M3-M2}=0.000)].

Validity based on relations to external measures

The analysis based on external measures confirmed the initial assumptions of the study. Positive correlations were found between spirituality at work and general satisfaction with life (n=3735; r=0.326; p<0.001), while negative correlations were found between spirituality at work and depressive symptoms (n=3735; r=-0.359; p<0.001), anxiety (n=3735; r=-0.225; p<0.001) and stress (n=3735; r=-0.305; p<0.001). No statistically significant correlations were found between spirituality at work and the variables sex, age, and professional category.

The CFA of the DASS-21 and of the SWLS stand out in this stage. The instruments were considered to have a good quality of fit for the sample [(DASS-21: n=3735; **λ**=0.643-0,904; CFI=0.970; TLI=0.967; RMSEA[CI90%]=0.075 [0.073-0.077]; SRMR=0.036); (SWLS: n=3735; **λ**=0.685-0.916; CFI=0.995; TLI=0.990; RMSEA[CI90%]=0.072 [0.061-0.085]; SRMR=0.019)].

Table 3. Confirmatory Factor Analysis and reliability of the SAWS-Br in different groups. Brazil, 2024.

Sample	n	λ	TLI	CFI	RMSEA [CI90%]	SRMR	AVE	CR	α
Total	2130	0.573-0.835	0.983	0.986	0.118 [0.114-0.122]	0.069	0.582	0.954	0.950
Test	1043	0.555-0.849	0.981	0.983	0.128 [0.123-0.133]	0.076	0.578	0.953	0.948
Validation	1087	0.589-0.834	0.986	0.988	0.108 [0.103-0.113]	0.064	0.587	0.955	0.951
Female	1847	0.560-0.838	0.983	0.985	0.119 [0.115-0.123]	0.069	0.578	0.953	0.949
Male	273	0.658-0.883	0.987	0.989	0.117 [0.106-0.128]	0.073	0.612	0.959	0.955

Source: Study data, 2024.
Note: λ: factor weights; TLI: *Tukey-Lewis index*; CFI: *comparative fit index*; RMSEA: *root mean square error of approximation*; CI90%: confidence interval of 90%; SRMR: *standardized root mean square residual*; AVE: average variance extracted; CC: ordinal alpha coefficient.

DISCUSSION

This study aimed to evaluate the psychometric properties of the Brazilian version of the Spirit at Work Scale in nursing workers. The process of translation and cultural adaptation of the SAWS, which corresponded to the face and content validity of the instrument, was conducted using methodological procedures that are internationally recognized, making it possible to achieve the Portuguese version, which was named SAWS-Br.

Regarding the psychometric properties of the SAWS-Br, the validity analysis using the EFA to evaluate the internal structure of the instrument showed that the original four-factor model was not fit to the sample, indicating that a 15-item single-factor model was the best structure for the data. It should be noted, however, that in order to conduct the final modeling of the single-factor structure of the sample, three items from the original version had to be removed. Namely, items 1 ("I feel that the demands of my work are compatible with my values, beliefs and behaviors"), 2 ("Sometimes I have a feeling of euphoria at work"); and 12 ("There are times at work when I have no perception of time or space").

Regarding item 2, the problem may be related to the use of the word "euphoria", which, in Brazilian culture, has meanings associated with intense happiness, well-being, and optimism, feelings which are hardly ever used to describe the context of health work, especially during data collection (during the COVID-19 pandemic). The same reason may have led to the exclusion of item 1, considering that the pandemic brought so much physical and mental suffering to the health and nursing workers, demanding countless changes in their routines and health work environments. Regarding item 12, the statement "losing perception of time and space" may have caused misunderstandings or confusion in participants, since this statement can have a positive or negative meaning, and may have no meaning in the work context.

Later, the CFA of the SAWS-Br confirmed the single-factor model proposed at EFA, ensuring the convergent validity was suitable and data was reliable. Additionally, the single-factor model of SAWS-Br showed strict invariance in the sample subgroups analyzed. These results showed the internal validity of the instrument for the sample.

Another study carried out in a general hospital in Vietnam also did not confirm the original four-factor model of the SAWS[21]. Its EFA indicated the adjustment of a three-factor model, formed by 14 items of the SAWS, and excluding items 2,8,9, and 11, in addition to the "spiritual connection" factor. On the other hand, the four-factor structure of the instrument was confirmed

in a study with 315 workers from Italian companies[19], and in another, carried out with 417 students from a Turkish private university[20]. In this last study, however, item 18 from the factor "engaging work" had to be moved into the factor "sense of community" during the adjustment of the model.

When comparing the results found according to scientific evidence, there were few validation studies of the SAWS that used robust methods to analyze data, seeing as in most investigations, only the reliability of data was estimated using the Cronbach's alpha coefficient[17–18,39].

The results of the validity analysis, based on the relationships with external measures, gave support to the initial assumptions of this study, showing positive correlations between spirituality at work and general satisfaction with life, and a negative correlation with the symptoms of depression, anxiety, and stress. This suggests that, the lower the spirituality at work, the lower the perception of participants of mental/psychological disease symptoms.

Spiritual aspects are believed to help nursing workers deal with crises and uncertainties, such as those in place during the COVID-19 pandemic [40], in addition to minimizing feelings of fear and sadness[41] and having a positive impact on personal relationships, behaviors, and personal feelings[42]. Thus, spirituality can be understood as a source of resilience, to help dealing with stressful situations, and as protective factor to health. This can be seen in a systematic review and meta-analysis, which showed the role of religiosity and spirituality in preventing and treating symptoms of depression and anxiety in youth, concluding that spiritual well-being can protect against depressive symptoms[43].

Corroborating this data, a study from Saudi Arabia found a negative association between spiritual connections and the likelihood of developing stress and anxiety symptoms, considering that the spiritual connection helped older individuals deal with the fear from COVID-19 in the beginning of the pandemic[44]. It stands out that spirituality, evaluated in the investigation above, was evaluated using the SAWS, and the correlation between variables was weak, which reiterates the need to carry out further research, considering the multiple facets of spirituality, as related to the context of work and the culture analyzed.

Considering these aspects, it is relevant to discuss the elaboration of the SAWS[14] from the Ecological Model of Spirit at Work[15], which was based on the results of previous studies that used the Grounded Theory to identify concepts of spirituality at work, as extracted from the personal experiences reported by 332 professionals from several fields of work in a Canadian university[5]. Thus, the concept of spirituality at work emerged, as well as the definitions of the constructs engaging work, sense of community, spiritual connection, and mystical experience, the factors of the SAWS.

It should be noted that the methods used by the original authors directly reflect the perception/experience of spirituality and the work environment of a sample of Canadian workers. These may be completely different from those in Brazilian culture as related to spirituality and the reality of work, as experienced by nursing workers in Brazil. These differences may be the reason why the participants could not differentiate the constructs and the consequent need to adjust the SAWS-Br into a single-factor structure for the context at hand.

This difference was also found in a study that performed a cultural adaptation of the SAWS into Germany[16], in a process that required replacing terms that were considered to be religious by more "neutral" terms, better reflecting the culture of the population considered. A study in Turkey found that adjusting the four-factor model of SAWS may lead to a higher convergence between the theoretical assumptions of the Ecological Model of Spirit at Work and the cultural aspects connected with spirituality in this context[39].

It is worth repeating that the validation process of the psychometric properties of instruments is carried out to ensure that the instrument can actually measure the construct it was elaborated to measure. These properties are entirely dependent on the context in which the validation was conducted that is, the validity of psychometric constructs is entirely dependent on the context being studied (it depends on the sample and the period anlayzed)[27]. Based on these premises, the analysis based on the internal structure of the SAWS-Br and on its relations to external measures tried to identify whether it is an instrument capable of measuring spirituality at work in contemporary Brazilian nursing workers. In this context, the original

four-factor structure, formed by 18 items, could not be confirmed; SAWS-Br was validated (it was proven that the instrument does measure spirituality at work), but it was found that the single-factor version, with 15 items, was the factor structure that was the best fit for the data. This does not mean that the original structure of the instrument was changed.

Considering the above, further research is essential, addressing in greater depth these analyses related to the validity of construct of SAWS-Br in different contexts and populations.

We recognize, as limitations of this study, the fact that comparing the results is not possible, due to the lack of scientific evidence related to the construct validity of SAWS. However, this does highlight the relevance of the investigation at hand.

CONCLUSION

This study presented a version of the Spirit at Work Scale adapted to be Brazilian context (SAWS-Br), showing evidence of the validity of the instrument by applying it to a sample of nursing workers and carrying out a validity analysis based on the internal structure (exploratory and confirmatory factor analysis, factor invariance, and reliability analysis), and on the validity as based on its relations to external measures (convergent analysis of the construct in regard to external measures). The analysis proved that the data collected using the SAWS-Br is valid and reliable. The fitness of the theoretical model regarding the sample required the modeling of a single-factor structure with 15 items, as opposed to the 18-item, four-factor structure of the original SAWS. The results showed that the SAWS-Br can measure aspects related to the spirituality at work of Brazilian nursing workers, and can be used as a management tool, helping health service coordinators elaborate workplace health promotion programs.

The influences of the cultural characteristics of Brazil, the aspects related to the Brazilian context of health work and the global health crises that the participants were traversing during data collection in the process of validation of the instrument should also be noted.

It is also worth highlighting how important it is to use robust methods of data analysis when elaborating and validating psychometric instruments, such as the exploratory and confirmatory factor analysis, which are techniques that enable us to find valid and reliable results when measuring psychological phenomena.

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APPENDIX

***Spirit at Work Scale* – SAWS-Br**

Este questionário inclui 18 afirmações sobre experiências no trabalho.
Classifique cada item levando em conta quão verdadeira a afirmação é para você. Selecione o número que melhor se adequa à sua experiência. Por exemplo, se você "concorda totalmente" com a afirmação, escolha 6; ou se você "discorda na maior parte" de uma afirmação, escolha 2.

1	2	3	4	5	6
Discordo totalmente	**Discordo na maior parte**	**Discordo parcialmente**	**Concordo parcialmente**	**Concordo na maior parte**	**Concordo totalmente**
Quanto você concorda com a afirmação?					
1. Eu sinto que as exigências do meu trabalho são compatíveis com meus valores, crenças e comportamentos.				1 2 3 4 5 6	
2. Às vezes, tenho uma sensação de "euforia" no meu trabalho.				1 2 3 4 5 6	
3. Eu tenho uma verdadeira sensação de confiança e conexão pessoal com meus colegas de trabalho.				1 2 3 4 5 6	
4. Eu consigo encontrar sentido ou propósito no trabalho.				1 2 3 4 5 6	
5. Às vezes, sinto um completo estado de alegria e êxtase no trabalho.				1 2 3 4 5 6	
6. Sinto uma conexão com uma força maior, que tem um efeito positivo no meu trabalho.				1 2 3 4 5 6	
7. Eu sou apaixonado(a) pelo meu trabalho.				1 2 3 4 5 6	
8. Às vezes, eu sinto uma energia ou vitalidade no trabalho que é difícil de descrever.				1 2 3 4 5 6	
9. Estou cumprindo meu chamado através do meu trabalho.				1 2 3 4 5 6	
10. Minhas crenças espirituais desempenham um papel importante nas decisões cotidianas que tomo no trabalho.				1 2 3 4 5 6	
11. Eu sinto que tenho uma missão pessoal na vida, que meu trabalho me ajuda a cumprir.				1 2 3 4 5 6	
12. Há momentos no trabalho em que eu não tenho noção de tempo ou espaço.				1 2 3 4 5 6	
13. Eu compartilho uma forte sensação de propósito e sentido com meus colegas sobre nosso trabalho.				1 2 3 4 5 6	

14. Sinto-me grato(a) por estar envolvido(a) em um trabalho como o meu.	1 2 3 4 5 6
15. Eu recebo inspiração ou orientação de um Poder Superior sobre o meu trabalho.	1 2 3 4 5 6
16. Experimento momentos no meu trabalho em que tudo é felicidade.	1 2 3 4 5 6
17. Sinto que faço parte de "uma comunidade" no trabalho.	1 2 3 4 5 6
18. No momento, eu estou exatamente onde quero estar no trabalho.	1 2 3 4 5 6

Sensibilidade psicométrica dos itens da SAWS-Br (n=4248)

Itens	Mínimo	Máximo	Média	Desvio padrão	Assimetria	Curtose
SAW1	1	6	2,55	1,62	-0,15	-1,11
SAW2	1	6	2,14	1,63	0,05	-1,19
SAW3	1	6	2,60	1,52	-0,20	-0,93
SAW4	1	6	3,09	1,53	-0,53	-0,65
SAW5	1	6	2,59	1,61	-0,19	-1,06
SAW6	1	6	2,87	1,64	-0,36	-0,99
SAW7	1	6	3,37	1,62	-0,73	-0,59
SAW8	1	6	2,58	1,66	-0,15	-1,14
SAW9	1	6	3,03	1,70	-0,48	-0,97
SAW10	1	6	3,13	1,70	-0,58	-0,89
SAW11	1	6	3,17	1,69	-0,60	-0,82
SAW12	1	6	2,31	1,79	0,03	-1,35
SAW13	1	6	2,39	1,61	-0,04	-1,09
SAW14	1	6	3,49	1,53	-0,86	-0,23
SAW15	1	6	2,46	1,82	-0,05	-1,37
SAW16	1	6	2,20	1,67	0,13	-1,18
SAW17	1	6	2,33	1,68	0,01	-1,20
SAW18	1	6	2,31	1,85	0,10	-1,40

Data and material availability

The dataset may be accessed upon request to the corresponding author.

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