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Moral Injury in Brazilian Healthcare Workers: Translation and Psychometric Evaluation of the Moral Injury Symptoms Scale–Health Professional (MISS-HP)

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Abstract

BACKGROUND

Moral injury (MI) refers to the profound psychological distress that may arise after perpetrating, witnessing, or feeling complicit in events that violate deeply held moral values. Common symptoms include guilt, shame, anger, self-condemnation, loss of meaning, and spiritual distress. Healthcare workers (HCWs) are frequently exposed to morally challenging situations, which were intensified in many settings during the COVID-19 pandemic. In Brazil, longstanding healthcare system challenges were further exacerbated during the pandemic. Despite these circumstances, no psychometric study of MI instruments has been conducted in Brazil to date. The Moral Injury Symptoms Scale–Health Professional (MISS-HP) is a brief self-report scale designed to assess MI symptoms among HCWs. We aimed to translate and investigate the psychometric properties of the MISS-HP in a national sample of Brazilian HCWs.

METHODS

We recruited HCWs actively involved in patient care through an online survey. We randomly divided participants into two groups and conducted parallel analysis and exploratory factor analysis (EFA) in the first group, followed by confirmatory factor analysis (CFA) in the second. Additionally, we generated 1,000 bootstrap samples to examine model stability. We assessed internal consistency using McDonald's omega and construct validity using Spearman correlations with measures of psychological distress. Finally, we performed receiver operating characteristic (ROC) analysis to identify a cut-off score for the MISS-HP.

RESULTS

We included 509 HCWs (mean age = 43.3 years, SD = 12.4), of whom 76.4% were women and 43.0% were physicians. EFA supported a two-factor, seven-item version of the MISS-HP. CFA confirmed the two-factor solution and demonstrated good model fit (CFI = 0.972, TLI = 0.955, RMSEA = 0.060, SRMR = 0.042). Bootstrap analyses supported model stability. Internal consistency was satisfactory (ω = 0.79). Construct validity was supported by positive associations with depression, anxiety, suicidal ideation, burnout, and secondary traumatic stress, and by a negative association with compassion satisfaction. ROC analysis indicated good discriminative ability and supported a cut-off score of ≥ 29 for significant MI symptoms.

CONCLUSIONS

The Brazilian seven-item MISS-HP demonstrated satisfactory psychometric properties and provides a valid instrument for assessing MI symptoms among Brazilian HCWs.

1. Introduction

Healthcare workers (HCWs) are routinely exposed to workplace adversities such as violence and hostility, excessive workload, low wages, and organizational pressures [1–3]. HCWs are also frequently exposed to morally and emotionally challenging situations in clinical practice, particularly when caring for severely ill patients under stressful working conditions [4]. The COVID-19 pandemic further intensified these challenges due to the unprecedented strain placed on healthcare systems, including resource scarcity and increased exposure to severe patient suffering and death [5]. Additionally, the pandemic may have introduced new stressors in many settings, including difficult triage and resource-allocation decisions, as well as tensions surrounding public health measures such as lockdowns and vaccination policies [6]. In some cases, these experiences may have contributed to the development of moral injury among HCWs [7].

Moral injury (MI) refers to the profound psychological distress that arises after perpetrating, witnessing, failing to prevent, or feeling complicit in moral transgressions that violate individuals' deeply held moral values and ethical beliefs [8–10]. It may also involve experiences of betrayal by figures regarded as legitimate authorities, particularly when individuals feel abandoned, unsupported, or placed in situations that conflict with their deeply held values due to institutional failures or inadequate leadership [11]. MI was originally conceptualized in military contexts, in which exposure to morally conflicting situations, such as killing, may produce profound emotional, existential and spiritual suffering [12–14]. Such experiences can lead individuals to perceive these transgressions as irreparable, resulting in intense feelings of guilt, shame, anger, hopelessness, demoralization, and loss of spirituality [15–17].

Although MI has long been studied among veterans and related phenomena such as moral distress had already been described among HCWs [18], only more recently was MI recognized as a phenomenon that could also affect HCWs [19]. Among HCWs, MI has been described as emerging in situations where professionals are unable to act according to what they believe is ethically appropriate [20]. This may occur due to institutional constraints, systemic failures, lack of resources, or organizational pressures that compromise patient care [21]. It may also arise from experiences in which HCWs feel responsible for causing, witnessing, or failing to prevent harm to patients [22]. Consequently, interest in MI among HCWs expanded considerably during and after the COVID-19 pandemic [23]. Studies conducted during this period reported that MI was highly prevalent among HCWs [24, 25]. MI was also associated with burnout [26], posttraumatic stress [27], and health professionals' perceptions of disconnection or lack of support from individuals in positions of leadership [28], potentially placing HCWs at risk for long-term mental health consequences [29].

In Brazil, the COVID-19 pandemic was particularly severe, accounting for approximately 700,000 deaths [30]. Institutional mismanagement and political negligence contributed to the collapse of healthcare

systems across several regions of the country, often leaving HCWs without adequate conditions to provide patient care [31]. Although the COVID-19 crisis posed unprecedented challenges, Brazil has historically faced chronic underfunding in its public healthcare sector, despite having one of the largest and most complex healthcare systems in the world [32]. As a result, delays in patient care, shortages of equipment and medication, and substantial burden on HCWs are common [33]. The combination of structural resource scarcity, the severe impact of the COVID-19 pandemic, and the inherent ethical challenges involved in patient care may make Brazil a particularly relevant context for the study of MI among HCWs [27]. However, to date, there is no published evidence on MI among Brazilian HCWs, and no validated instrument assessing MI is currently available in Brazilian Portuguese.

The Moral Injury Symptoms Scale–Health Professional (MISS-HP) is a validated measure of MI symptoms specifically developed for HCWs [34]. The original English version comprises 10 items and demonstrated adequate psychometric properties, with a three-factor structure consisting of Guilt/Shame, Spiritual Troubles, and Condemnation. Since its development in the US, translated and psychometrically evaluated versions of the MISS-HP have been published in several languages, including Chinese [35], Czech [36], German [37], Persian [38], Turkish [39], and a Spanish version developed in Peru [40]. However, findings across these studies have been inconsistent. Different psychometric solutions have been reported, including differences in the number of factors (e.g., the Czech version, k = 4), the number of retained items (e.g., the German version, k = 9; the Peruvian Spanish version, k = 7), or the composition of items loading onto each factor, even in studies that retained the same number of factors as the original version [35, 39]. These inconsistencies may reflect cross-cultural differences in healthcare settings [38], the complexity of MI as a construct [41], or even semantic limitations of the MISS-HP itself, particularly as some items have shown unstable psychometric performance across validation studies [40]. Therefore, it is warranted to further investigate the psychometric properties of the MISS-HP, particularly in a context characterized by longstanding adversity among HCWs and the absence of published evidence on MI in Brazil.

In the present study, we aimed to translate and examine the psychometric properties of the MISS-HP in a national sample of Brazilian HCWs actively involved in patient care. Given the lack of validated instruments assessing MI in the Brazilian context, alongside the substantial workload, ethical challenges, and potential long-term mental health consequences faced by HCWs following the COVID-19 pandemic, there is a need to advance research on MI in the country by providing a reliable and psychometrically validated measure in Brazilian Portuguese applicable across different healthcare professions and settings.

2. Methods

2.1. Participants and procedures

We used an online survey to recruit a convenience sample of Brazilian HCWs from across the country between March 17th and June 8th, 2026, using dissemination via social media and university-affiliated

departments. Data were collected using Research Electronic Data Capture (REDCap) tools, a secure web-based platform for data collection, and participation was anonymous. The survey was programmed to require completion of each section before participants could advance, minimizing item-level missing data. Only fully completed questionnaires were included in the analyses. Participation was voluntary, and no monetary compensation or other incentives were offered. Eligible individuals were HCWs actively involved in patient care in hospitals, outpatient services, and other healthcare settings, aged ≥ 18 years, and who provided informed consent. Ethical approval was granted by the Research Ethics Committee of the Federal University of São Paulo (Comitê de Ética em Pesquisa da Universidade Federal de São Paulo – UNIFESP; CAAE: 73753523.9.0000.5505).

2.2. Measures

2.2.1. Sociodemographic measures

Participants provided sociodemographic information, including age, gender, religion, marital status, race, occupation, main work area, and Brazilian state of residence, as well as whether they had provided care to patients with COVID-19 during the pandemic.

2.2.2. Moral Injury Symptom Scale-Health Professional (MISS-HP)

The MISS-HP is a 10-item self-report scale in which each item is rated on a 10-point Likert scale ranging from 1 to 10, reflecting the degree of agreement with each statement. Total scores range from 10 to 100, with higher scores indicating greater severity of MI symptoms. The original version of the MISS-HP comprises items assessing domains such as betrayal, guilt, shame, moral concerns, loss of trust, loss of meaning, unforgiveness, self-condemnation, feeling of being punished by God, and loss of religious faith [34]. Items 5, 6, 7 and 10 are reverse-scored due to positive wording. Scores ≥ 36 are indicative of clinically significant MI symptoms. In addition, a separate item (item 11) assesses the extent to which these symptoms cause distress or impair daily functioning, rated on a 5-point scale ranging from "*not at all*" to "*extremely*".

2.2.3. The Patient Health Questionnaire-9 (PHQ-9)

We used the PHQ-9 to assess depressive symptoms. The PHQ-9 is a 9-item Likert-type scale widely used across diverse populations, including HCWs, and has been validated in Brazil [42]. Total scores range from 0 to 27, with higher scores indicating greater severity of depressive symptoms. In addition, the ninth item of the PHQ-9 was used to assess suicidal ideation, as it has been shown to be a reliable indicator of suicidal ideation [43]. In the present study, the internal consistency of the PHQ-9 was $\alpha = 0.92$.

2.2.4. The Generalized Anxiety Disorder (GAD-7) scale

We evaluated anxiety symptoms using the GAD-7. This 7-item measure uses a Likert-type response format and has been validated in Brazil [44]. Scores range from 0 to 21, with higher values reflecting

greater levels of anxiety. In the present study, the internal consistency of the GAD-7 was α = 0.93.

2.2.5. The Professional Quality of Life (ProQOL) scale

We used the ProQOL to assess professional quality of life among healthcare workers. The ProQOL is a 30-item self-report instrument comprising three subscales: Compassion Satisfaction, Burnout, and Secondary Traumatic Stress. Each subscale consists of 10 items rated on a 5-point Likert scale, with higher scores indicating greater levels of the respective construct [45]. The Brazilian Portuguese version was obtained from the official ProQOL website (www.proqol.org). For the present study, the internal reliability of the ProQOL subscales was α = 0.93 (Compassion Satisfaction), α = 0.79 (Burnout), and α = 0.96 (Secondary Traumatic Stress).

2.3. Translation of the MISS-HP

We followed the World Health Organization's four-step procedure to translate the MISS-HP into Brazilian Portuguese [46]. First, the original English version was translated into Brazilian Portuguese by a bilingual expert in MI. Second, the translated version was reviewed by an expert panel to ensure semantic, conceptual, and cultural adequacy. Third, the Brazilian Portuguese version was back-translated into English by an independent bilingual translator, and the back-translated version was evaluated by the original authors of the scale to ensure accuracy. Finally, the pre-final version was pilot-tested with healthcare professionals to assess clarity and comprehensibility, and minor revisions were made to produce the final version of the Brazilian MISS-HP.

2.4. Statistical analyses

We conducted descriptive analyses to summarize participants' sociodemographic characteristics, including age, gender, religion, race, marital status, and profession. We then randomly divided the total sample into two independent subsamples of approximately equal size using a reproducible randomization procedure in R (*set.seed*). One subsample was used to conduct exploratory factor analysis (EFA). Prior to factor extraction, the suitability of the data for factor analysis was assessed using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy, with values above 0.70 considered acceptable, and Bartlett's test of sphericity, with $p < .05$ indicating suitability for factor analysis [47, 48]. Parallel analysis was then used as an additional criterion to guide factor retention. EFA was conducted using the minimum residual (MINRES) extraction method with oblimin rotation.

The factor structure identified in the EFA was subsequently evaluated in the second subsample using confirmatory factor analysis (CFA) estimated using robust maximum likelihood (MLR). An a priori power analysis for the CFA was conducted based on the original MISS-HP structure (10 observed variables and 3 latent factors), considering the model degrees of freedom (df = 32), significance level (α = .05), and statistical power (1 − β = .95), and RMSEA = 0.08. This analysis indicated a minimum required sample size of 179 participants. Model fit was evaluated using the Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). Model fit was considered acceptable when CFI and TLI were ≥ 0.90, and RMSEA and

SRMR were ≤ 0.08 [49]. Model refinement was based on the examination of factor loadings and overall model fit, with alternative models estimated when necessary. When alternative CFA models were estimated, the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) were used to support model selection. Factor loadings were considered acceptable at $\lambda \geq 0.40$, in line with recommendations for achieving a clear factor structure in EFA [50], whereas in CFA, loadings of $\lambda \geq 0.50$ were considered indicative of adequate item–factor relationships [51].

To further examine the stability and robustness of the factor analytic results, we additionally conducted a bootstrap resampling procedure using the full sample. Bootstrap resampling approaches have been used to examine the behavior of model estimates under sampling variability. [52]. Specifically, 1000 bootstrap samples were generated with replacement, and the CFA models were re-estimated in each resampled dataset using the MLR estimator. Mean robust fit indices were extracted across bootstrap iterations to evaluate the consistency of model fit across sampling fluctuations.

To determine an optimal cutoff score for the MISS-HP, receiver operating characteristic (ROC) analysis was conducted. In accordance with the original MISS-HP study [34], functional impairment was assessed using the additional MISS-HP item (item 11), which evaluates the extent to which participants report that their MI symptoms cause distress or impair functioning in daily life. Responses were dichotomized into non-clinically significant impairment ("not at all" or "mild") and clinically significant impairment ("moderate," "very much," or "extremely"). The optimal cutoff was defined as the score that maximized the balance between sensitivity and specificity (Youden index). The area under the curve (AUC) was calculated to evaluate the discriminatory ability of the scale, with values ≥ 0.80 considered indicative of good discrimination [53].

Internal consistency was assessed using McDonald's omega, with values of 0.70 or higher considered indicative of acceptable reliability. Item-level statistics, including inter-item correlations and corrected item–total correlations, were also examined. Evidence for construct validity was examined using Spearman's rank-order correlations, given non-normal score distributions (Shapiro–Wilk tests, all *p*s < .001), between MISS-HP scores and measures of depression (PHQ-9), suicidal ideation (PHQ-9 item 9), anxiety (GAD-7), and the three subscales of the ProQOL: Burnout, Secondary Traumatic Stress, and Compassion Satisfaction. We performed all statistical analyses using the packages *psych, lavaan*, *semPower*, and *pROC* in R version 4.5.2 [54–57].

3. Results

3.1. Participants' characteristics

Table 1 presents the characteristics of the participants and mean scores of the psychological measures. We included 512 HCWs who completed all ten items of the MISS-HP. Three participants were excluded due to invariant response patterns across all MISS-HP items (i.e., identical responses to every item), resulting in a final sample of 509 participants. Participants' mean age was 43.34 years (SD = 12.44). The majority were women (n = 389, 76.42%), married or in a civil relationship (n = 276, 54.22%), Catholic (n =

192, 37.72%), White (n = 391, 76.82%), and medical doctors (n = 219, 43.03%). One-hundred and sixty-five participants (32.42%) reported having provided care for patients with COVID-19 during the pandemic. Of Brazil's 26 states, 18 were represented in the sample as state of residence, in addition to the Federal District (Brasília).

Table 1

Sample characteristics

3.2. Factor analytic validity

3.2.1. Exploratory factor analysis

The KMO measure indicated good sampling adequacy (KMO = 0.80), and Bartlett's test of sphericity was statistically significant, $\chi^2(45) = 960.13$, $p < .001$, supporting the suitability of the data for factor analysis. Parallel analysis suggested a three-factor solution for the Brazilian MISS-HP. An exploratory factor analysis (EFA) specifying three factors was therefore performed to further examine the latent structure of the scale. MISS-8, MISS-9 and MISS-10 showed factor loadings below the predefined threshold ($\lambda \leq 0.40$) and were subsequently removed. After re-running the EFA without MISS-8, MISS-9 and MISS-10, one of the factors was defined by only one item (MISS-6) and another factor by two items (MISS-1 and MISS-5), with a marked predominance of MISS-1 ($\lambda = 0.803$) relative to MISS-5 ($\lambda = 0.583$). Therefore, a more parsimonious two-factor solution was subsequently examined.

A two-factor EFA was then conducted using the original 10 items. First, item MISS-10 did not reach the predefined loading threshold and was removed. After re-running the model without MISS-10, MISS-1 and MISS-5 also failed to load adequately, suggesting instability in this intermediate solution. Therefore, MISS-1 and MISS-5 were also removed. Table 2 shows the results of the refined EFA for the seven items. The final seven-item two-factor solution for the EFA showed a clear and interpretable structure, with all items loading above the predefined threshold ($\lambda \geq 0.40$). MISS-2, MISS-3, and MISS-4 loaded on the first factor, whereas MISS-6, MISS-7, MISS-8, and MISS-9 loaded on the second factor. The two factors were moderately correlated ($r = 0.42$), and the model explained 38.6% of the total variance (20.8% and 17.8% explained by the first and second factors, respectively).

Table 2

EFA with factors loadings of the seven-item MISS-HP (first half of the sample, n =254)

3.2.2. Confirmatory factor analysis

Next, we conducted CFA to evaluate the two-factor model of the seven-item MISS-HP in the second half of the sample (n = 255). Model fit indices were good and were as follows: CFI = 0.972, TLI = 0.955, RMSEA = 0.060, and SRMR = 0.042. The two latent factors were highly correlated ($r = 0.76$). Given that this high correlation suggested substantial conceptual overlap between factors, an alternative one-factor

model was also estimated for comparison. However, the one-factor solution showed substantially poorer fit (CFI = 0.916, TLI = 0.874, RMSEA = 0.099, and SRMR = 0.059). In addition, the two-factor model demonstrated lower AIC and BIC values (ΔAIC = 22.86; ΔBIC = 19.32), further supporting its superiority.

Accordingly, the two-factor solution was retained as the preferred model for the Brazilian MISS-HP. Bootstrap resampling analyses further indicated stable model fit across 1,000 resampled datasets. Mean fit indices remained within acceptable ranges (CFI = 0.946, TLI = 0.913, RMSEA = 0.076, SRMR = 0.044), and the mean correlation between the two factors was 0.68, supporting the stability of the two-factor solution[1]. All factor loadings in the seven-item two-factor solution loaded above λ ≥ 0.50 (see Figure 1). Factor 1 comprised items MISS-2, MISS-3, and MISS-4 and was labeled Guilt/Shame. Factor 2 comprised items MISS-6, MISS-7, MISS-8, and MISS-9 and was labeled Self-Condemnation[2]. Table 3 presents all seven items in Brazilian Portuguese alongside the original English versions and their respective factor loadings (the complete and finalized version of the Brazilian MISS-HP-7 is provided in Supplementary Material). The mean total score of the seven-item Brazilian MISS-HP was 25.09 (SD = 12.05). The possible score range is 7 to 70, and observed scores in the present sample ranged from 7 to 66.

Table 3

Confirmatory Factor Analysis with factor loadings in the two-factor model of the 7-item Brazilian MISS-HP (second half of the sample, n =255)

Figure 1. Confirmatory factor analysis model

3.3. Reliability and construct validity

Internal consistency of the seven-item Brazilian MISS-HP was evaluated using McDonald's omega. The total scale demonstrated good reliability (ω = 0.79), with subscale coefficients of ω = 0.72 for Guilt / Shame and ω = 0.67 for Self-Condemnation. Inter-item correlations ranged from 0.16 to 0.50, and corrected item–total correlations ranged from 0.41 to 0.57 indicating satisfactory internal coherence among the items.

Table 4 summarizes the Spearman correlations between the Brazilian MISS-HP total and subscale scores and external measures used to assess construct validity. As expected, MISS-HP scores were positively and significantly associated with measures of psychological distress, whereas a negative association was observed with compassion satisfaction. All correlations were of moderate or large magnitude, supporting the expected pattern of relationships. For a correlation matrix of all psychological measures of the study, see Table S1 in the Supplementary Material.

Table 4

Construct validity (seven-item Brazilian MISS-HP total score and subscale scores)

3.4. Cut-off determination

The receiver operating characteristic (ROC) curve is presented in Figure 2. The area under the curve (AUC) was 0.801, indicating good discriminative ability. Based on Youden's index, the optimal cut-off score for the seven-item Brazilian MISS-HP to identify HCWs with clinically significant MI symptoms was 29 or higher. At this threshold (≥ 29), the sensitivity for detecting MI levels associated with significant functional impairment was 69.2% and the specificity was 77.9%. In our sample, 192 individuals (37.72%) scored above the cut-off of the Brazilian MISS-HP.

Figure 2. *Receiver Operating Characteristic (ROC) Curve for the seven-item Brazilian MISS-HP*

3.5. Measurement Invariance Across Physicians and Non-Physicians

Given the predominance of physicians in the sample, a *post hoc* measurement invariance analysis was conducted comparing physicians and non-physicians (n = 219 vs n = 290, respectively). Configural, metric, and scalar invariance were evaluated. Following commonly recommended criteria, invariance was supported when changes in CFI (ΔCFI) were ≤ 0.010 and changes in RMSEA (ΔRMSEA) were ≤ 0.015 across increasingly constrained models [58]. Changes in model fit in our sample were below these thresholds (ΔCFImetric = 0.009, ΔCFIscalar = 0.006, ΔRMSEAmetric = 0.001, ΔRMSEAscalar = 0.001). The results support configural, metric, and scalar invariance across physicians and non-physicians, indicating no evidence that the Brazilian seven-item MISS-HP operates differently across these groups.

[1] For comparison, bootstrap estimates for the alternative one-factor model consistently failed to meet the predefined fit criteria (mean CFI = 0.858, mean TLI = 0.787, mean RMSEA = 0.120, mean SRMR = 0.067).

[2] Excluded items: **MISS-1**: Eu me sinto traído(a) por outros profissionais de saúde em quem eu costumava confiar (*I feel betrayed by other health professionals whom I once trusted*); **MISS-5:** A maioria das pessoas com quem eu trabalho como profissional de saúde são confiáveis *(Most people with whom I work as a health professional are trustworthy)*; **MISS-10:** Comparado com antes de passar por essas experiências, a minha fé religiosa ou espiritual se fortaleceu *(Compared to before I went through these experiences, my religious/spiritual faith has strengthened)*.

4. Discussion

In this study, we investigated the psychometric properties of the Brazilian Portuguese version of the MISS-HP in a geographically diverse sample of Brazilian HCWs. Our findings supported a two-factor structure of the MISS-HP – Guilt/Shame and Self-Condemnation – comprising seven of the original ten items, along with acceptable overall internal consistency. The psychometric fit indices indicated good model fit. The cut-off score was ≥ 29, with ROC analysis indicating good discriminative ability. In our sample, 37.72% of individuals scored at or above the proposed threshold, indicating substantial levels of MI. Moreover, we found evidence of construct validity through positive associations with depression,

anxiety, suicidal ideation, burnout, and secondary traumatic stress, and through a negative association with compassion satisfaction. In addition, post hoc measurement invariance analyses provided no evidence that the Brazilian seven-item MISS-HP operates differently across physicians and other healthcare professionals. Together, these findings support the Brazilian seven-item MISS-HP as a reliable and structurally valid instrument for assessing MI among HCWs in the Brazilian context.

The Brazilian MISS-HP could not replicate the original American MISS-HP, nor the psychometric structures reported in previously validated versions published in other languages. These differences may reflect cultural and contextual variations, which are commonly observed in cross-cultural psychometric validation studies [59]. Moreover, this may be particularly relevant in Brazil, given its highly complex and heterogeneous healthcare system, characterized by marked regional disparities and multiple levels of healthcare delivery spanning primary care, outpatient services, emergency care, and hospital-based settings [60]. Furthermore, unlike previous validation studies that focused exclusively on nurses [39], or on samples composed primarily of hospital workers [38], the present study included a national sample of HCWs from diverse healthcare professions involved in direct patient assistance. These included psychologists, social workers, and community health agents working in primary care[3].

Another possible factor explaining the psychometric differences observed in our study compared to previous validation studies may be related to methodological differences. While most previous studies relied on principal component analysis (PCA, [37–39]), a data reduction technique that summarizes data into a smaller number of components [61], we employed EFA using a latent variable approach designed to identify the unobserved factor structure shared among items. Evidence suggests that EFA may be more appropriate than PCA when the objective is to identify latent psychological constructs rather than simply reduce data into components, as EFA explicitly models the shared underlying factor structure among items [62]. In addition, some previous validation studies were conducted with relatively modest sample sizes (<160 participants), which may have influenced the stability and replicability of their psychometric findings [37,39].

We observed poor factor loadings for three items of the Brazilian MISS-HP (MISS-1, MISS-5, and MISS-10), which were subsequently excluded from the final psychometric solution. Overall, our findings were more similar to the Peruvian validation study, which also excluded three items from the final version, although item MISS-7 was excluded instead of item MISS-10 [40]. The authors suggested that items MISS-1 and MISS-5 may present conceptual or semantic difficulties. In particular, MISS-1 may be interpreted differently depending on workplace relationships and perceived personal responsibility, whereas MISS-5 differs from the remaining items by assessing interpersonal trust rather than direct experiences of moral suffering *("Most people with whom I work as a health professional are trustworthy"*). Another possibility is that item MISS-1 may not fully align with betrayal-related conceptualizations of MI, as the item refers to betrayal by other healthcare professionals previously trusted ("*I feel betrayed by other health professionals whom I once trusted"*). In contrast, betrayal-related MI is often conceptualized as originating from legitimate authority figures or institutions, such as hospital administrators or healthcare systems [63,64]. Regarding item MISS-10, our findings are consistent with the German

validation study [37], which suggested that the item may perform poorly among non-religious individuals because it assumes the presence of religious or spiritual beliefs (*"Compared to before I went through these experiences, my religious/spiritual faith has strengthened"*). This may also apply to our sample, in which 26.33% of participants reported having no religion. Moreover, since endorsement of this item may depend on respondents' religious beliefs, its inclusion may present challenges when assessing MI in populations with substantial proportions of secular individuals [65].

The final Brazilian MISS-HP was composed of two dimensions: Guilt/Shame and Self-Condemnation. The Guilt/Shame factor comprised MISS-2, MISS-3, and MISS-4, which have consistently clustered together across the original and several validated versions of the MISS-HP [34,37,38,40]. This pattern suggests that guilt- and shame-related reactions to perceived moral transgressions may represent one of the most robust and cross-culturally stable dimensions of MI among HCWs. In contrast to the relative stability of the Guilt/Shame dimension, the Self-Condemnation factor of the Brazilian MISS-HP comprised MISS-6, MISS-7, MISS-8, and MISS-9, a composition that differed from those reported in previous validation studies. Although the specific composition of this factor differed from that reported in the other studies, the included items collectively reflect a pattern of negative self-evaluation and self-directed moral judgments commonly associated with MI symptoms.

This study has some limitations. First, the use of a convenience sample may limit the generalizability of the findings, as participants are selected based on accessibility and willingness to participate rather than probabilistic sampling procedures [66]. Second, the predominance of female participants may limit the generalizability of the findings, particularly given potential gender differences in the experience and expression of moral distress among HCWs [67,68]. Third, although the overall psychometric performance of the final seven-item version was satisfactory, the internal consistency of the Self-Condemnation factor was slightly below commonly recommended thresholds. Research suggests that the small number of items composing a factor may affect consistency estimates [69]. Finally, the final Brazilian MISS-HP did not capture the betrayal-related dimension of MI investigated in the original instrument, focusing instead on guilt, shame, and self-condemnation associated with possible acts of omission or commission.

However, this study also has important strengths. To our knowledge, this is the first psychometric validation study of an MI instrument conducted in Brazil, addressing the absence of published evidence on MI in the Brazilian context. In addition, the study included HCWs from diverse professional backgrounds and healthcare settings across Brazil, allowing the evaluation of the MISS-HP across different contexts of patient care. The use of both EFA and CFA in independent subsamples strengthens the methodological rigor of the findings, while the bootstrap approach also demonstrated the overall stability and consistency of the final seven-item Brazilian MISS-HP solution. Future studies should continue investigating the psychometric properties of the MISS-HP in Brazil, as well as explore other instruments assessing MI. Future research should also investigate whether betrayal-related experiences among Brazilian HCWs were not adequately captured due to semantic specificities of the original scale or whether this dimension may manifest differently in the Brazilian healthcare context. Given the severe

impact of the COVID-19 pandemic in Brazil, the chronic resource limitations faced by many HCWs in the country, and the high proportion of participants in our sample presenting significant levels of MI symptoms, researchers and clinicians should remain attentive to the potential presence of substantial MI among Brazilian healthcare professionals.

In summary, the Brazilian MISS-HP demonstrated adequate psychometric properties in a national sample of Brazilian HCWs, supporting the use of a final seven-item version with a two-factor structure composed of Guilt/Shame and Self-Condemnation dimensions. The findings contribute to the emerging literature on MI among HCWs and introduce the first psychometrically evaluated MI instrument in Brazilian Portuguese. Although some items from the original instrument showed poor psychometric performance, the final version demonstrated satisfactory construct validity and overall stability. The Brazilian MISS-HP may therefore represent a useful instrument for future clinical and research investigations on MI among HCWs in Brazil.

[3] Community health agents *(Agentes Comunitários de Saúde)* are frontline primary care workers integrated into Brazil's public healthcare system who provide community-based health monitoring, prevention, and patient support activities

Abbreviations

AIC
Akaike Information Criterion
AUC
Area Under the Curve
BIC
Bayesian Information Criterion
CFA
Confirmatory Factor Analysis
CFI
Comparative Fit Index
CI
Confidence Interval
EFA
Exploratory Factor Analysis
GAD-7
The Generalized Anxiety Disorder scale
HCWs
Healthcare Workers
KMO
Kaiser-Meyer-Olkin
MI

Moral Injury
MISS-HP
Moral Injury Symptoms Scale–Health Professional
MLR
Robust Maximum Likelihood
MINRES
Minimum Residual
PCA
Principal Component Analysis
PHQ-9
The Patient Health Questionnaire-9
ProQOL
The Professional Quality of Life scale
RMSEA
Root Mean Square Error of Approximation
ROC
Receiver Operating Characteristic
SRMR
Standardized Root Mean Square Residual
TLI
Tucker Lewis Index

Declarations

Conflict of interest

None

Ethics approval and consent to participate

This study was conducted in accordance with the Declaration of Helsinki and was approved by the Research Ethics Committee of the Federal University of São Paulo (Comitê de Ética em Pesquisa da Universidade Federal de São Paulo – UNIFESP; CAAE: 73753523.9.0000.5505). Before participation, all participants received information about the study objectives, procedures, potential risks and benefits, the voluntary nature of participation, and the confidentiality of their responses. Electronic informed consent was obtained from all participants prior to their participation in the study.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author, BMC, upon reasonable request.

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Competing interests

The authors declare no competing interests.

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Tables

Table 1 *Sample characteristics*

Characteristic	*n*	%	*Mean (SD)*
Age	509	100	43.33 (12.44)
Gender			
Women	389	76.42	
Men	118	23.18	
Other	2	0.39	
Marital status			
Single	165	32.42	
Married/partnered	276	54.22	
Divorced/separated	59	11.59	
Other	9	1.77	
Religion			
No religion	134	26.33	
Catholic	192	37.72	
Protestant/Evangelical	61	11.98	
Spiritism	55	10.81	
Umbanda/Candomblé	31	6.09	
Other	36	7.07	
Race			
White	391	76.82	
Black	21	4.13	
Mixed	85	16.79	
Other	12	2.26	
Profession			
Physician	219	43.03	
Nurse	67	13.16	
Nurse assistant	50	9.82	
Psychologist	95	18.66	

Social worker	8	1.57	
Community health agent	15	2.95	
Other	55	10.81	
Work area			
Emergence/ER	65	12.77	
ICU	40	7.86	
Outpatient care	183	35.95	
Inpatient care	116	22.79	
Other	105	20.63	
COVID-19 patient care during the pandemic			
Yes	165	32.42	
No	297	58.35	
No response	47	9.23	
Psychological measures			
MISS-HP 10 items	509	100	40.73 (14.86)
MISS-HP 7 items	509	100	25.09 (12.05)
Anxiety	500	98.23	8.74 (6.15)
Depression	494	97.05	9.86 (7.46)
Suicidal ideation	494	97.05	0.32 (0.78)
Burnout	467	91.75	25.64 (6.43)
Compassion satisfaction	466	91.55	38.0 (7.50)
Secondary traumatic stress	466	91.55	23.09 (7.12)

Table 2 *EFA with factors loadings of the seven-item MISS-HP (first half of the sample, n =254)*

	Factor loading	
Brazilian MISS-HP items	Factor 1	Factor 2
MISS-2	0.726	
MISS-3	0.731	
MISS-4	0.464	
MISS-6		0.697
MISS-7		0.502
MISS-8		0.446
MISS-9		0.437

Note. Factor loadings ≥ 0.40 are considered salient

Table 3 *Confirmatory Factor Analysis with factor loadings in the two-factor model of the 7-item Brazilian MISS-HP (second half of the sample, n = 255)*

	Factor loading	
Brazilian MISS-HP items	Factor 1 (Guilt / Shame)	Factor 2 (Self-Condemnation)
2. Eu sinto culpa por não ter conseguido salvar alguém de se machucar seriamente ou morrer (*I feel guilt over failing to save someone from being seriously injured or dying)*	0.634	
3. Eu sinto vergonha de alguma coisa que eu fiz ou deixei de fazer enquanto cuidava dos meus pacientes *(I feel ashamed about what I've done or not done when providing care to my patients)*	0.790	
4. Eu me sinto perturbado(a) por ter agido de forma contrária aos meus princípios ou valores morais *(I am troubled by having acted in ways that violated my own morals or values)*	0.690	
6. Eu tenho uma boa noção no que dá sentido à minha vida trabalhando como profissional de saúde (*I have a good sense of what makes my life meaningful as a health professional)*		0.553
7. Eu me perdoei pelo que aconteceu comigo ou com outras pessoas de quem eu cuidei *(I have forgiven myself for what's happened to me or to others whom I have cared for)*		0.589
8. Em geral, eu tenho a tendência a sentir que eu sou um fracasso em meu trabalho como profissional de saúde *(All in all, I am inclined to feel that I'm a failure in my work as a health professional)*		0.668
9. Às vezes eu sinto que Deus está me punindo pelo que eu fiz ou deixei de fazer enquanto cuidava dos pacientes *(I sometimes feel God is punishing me for what I've done or not done while caring for patients)*		0.556

Note. Factor loadings ≥ 0.50 are considered salient

Table 4 *Construct validity (seven-item Brazilian MISS-HP total score and subscale scores)*

Measures	MISS-HP Total	Guilt / Shame subscale	Self-Condemnation subscale
Construct validity			
Depression (PHQ-9)	0.50	0.35	0.49
Anxiety (GAD-7)	0.47	0.35	0.45
Suicidal ideation (PHQ-9 item 9)	0.38	0.25	0.40
Burnout (PROQOL)	0.59	0.43	0.58
Secondary traumatic stress (ProQOL)	0.49	0.43	0.40
Compassion satisfaction (ProQOL)	-0.57	-0.35	-0.65

Note: all values are Spearman's correlations and significant at the <.001 level

Figures

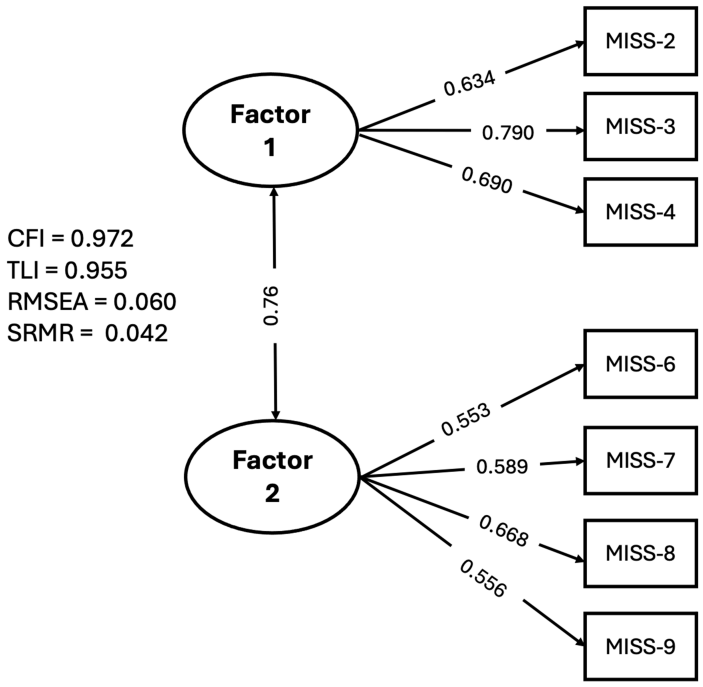

Figure 1

Confirmatory factor analysis model

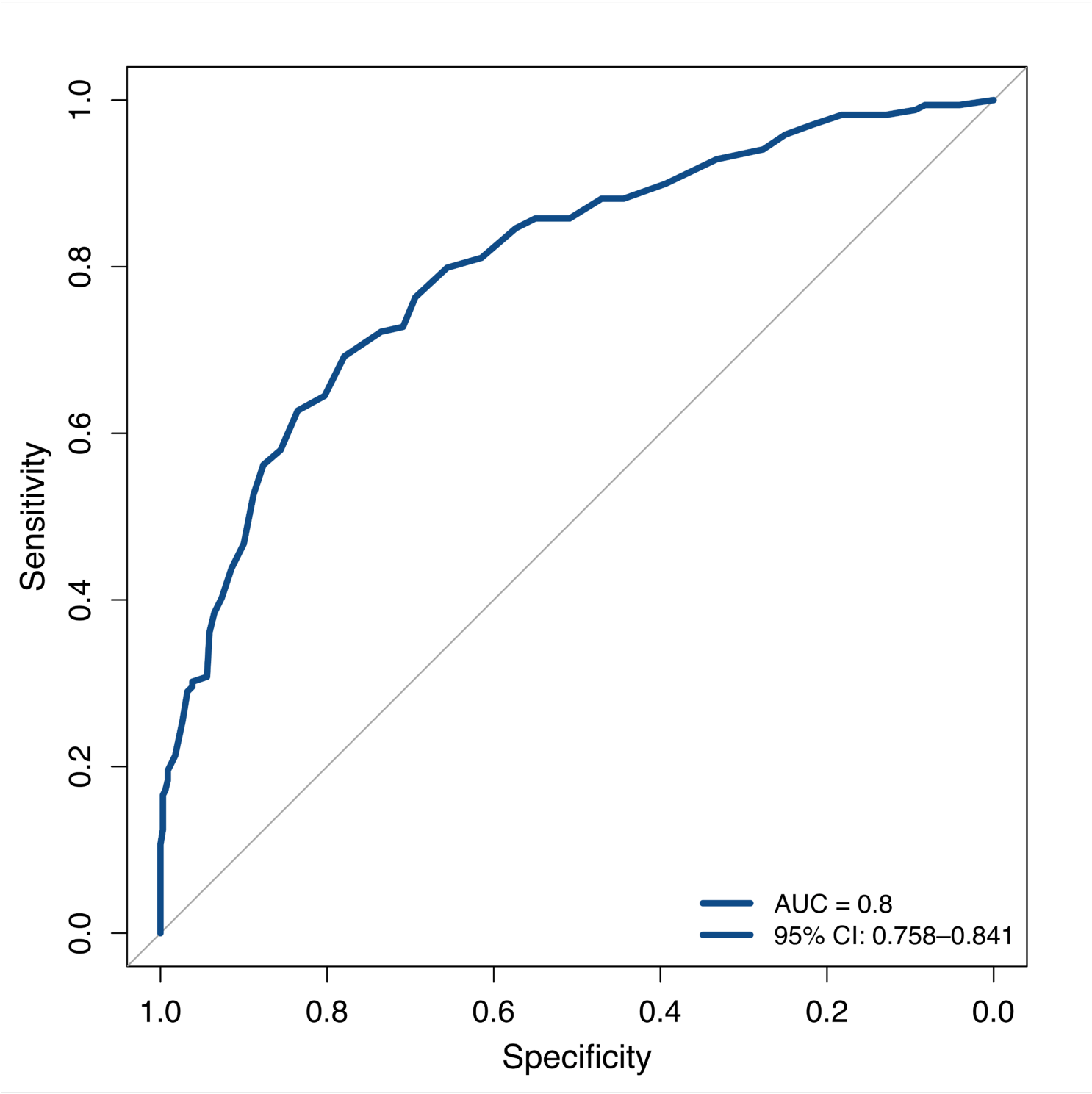

Figure 2

Receiver Operating Characteristic (ROC) Curve for the seven-item Brazilian MISS-HP

Supplementary Files

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