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Propriedades psicométricas da versão brasileira da Factors Influencing Adherence to Standard Precautions Scale

Propiedades psicométricas de la versión brasileña de la Factors Influencing Adherence to Standard Precautions Scale

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ABSTRACT

Objective: To evaluate the psychometric properties of the Brazilian version of the Factors Influencing Adherence to Standard Precautions Scale.

Method: Psychometric study, conducted in a hospital in Minas Gerais, with 407 nursing professionals. Data collection took place between August 2022 and September 2023 using a

sociodemographic questionnaire and the Brazilian version of the scale. To characterize the sample, measures of central tendency and dispersion were used. Regarding the psychometric properties of the instrument, validity evidence methods based on the internal structure were adopted, using confirmatory factor analysis and reliability, through test-retest and internal consistency.
Results: The confirmatory factor analysis revealed a model that was adequately fit to the dimensional structure. The domains showed factor loadings ranging from 0.31 to 0.73 for leadership, 0.345 to 0.83 for justification, 0.12 to 0.69 for organizational culture and practice, 0.37 to 0.84 for contextual cues, and 0.52 to 0.80 for judgment. Regarding reliability, good correlation was observed for the instrument's domains, with an intraclass correlation range (0.48 to 0.95) and internal consistency (0.52 to 0.80).
Conclusion: The Brazilian version of the scale revealed a model adjusted to the dimensional structure proposed by the Australian authors, proving to be valid, stable and reliable to identify the factors that influence adherence to standard precautions among nursing professionals.
Descriptors: Nursing; Nursing Team; Validation Study; Universal Precautions; Psychometrics.

RESUMO

Objetivo: Avaliar as propriedades psicométricas da versão brasileira da *Factors Influencing Adherence to Standard Precautions Scale*.
Método: Estudo psicométrico envolvendo 407 profissionais de enfermagem de um hospital de Minas Gerais, Brasil. A coleta de dados ocorreu entre agosto de 2022 e setembro de 2023, por meio de um questionário sociodemográfico e da versão brasileira da referida escala. Para análise das propriedades psicométricas do instrumento, foram adotadas a validade baseada na estrutura interna, utilizando-se a análise fatorial confirmatória; e a fidedignidade, por meio do teste-reteste e da consistência interna.
Resultados: A análise fatorial confirmatória revelou um modelo adequadamente ajustado à estrutura dimensional. Os domínios apresentaram cargas fatoriais variando de 0,31 a 0,73 para liderança, 0,345 a 0,83 para justificativa, 0,12 a 0,69 para cultura e prática organizacional, 0,37 a 0,84 para dicas contextuais e 0,52 a 0,80 para julgamento. No que se refere à fidedignidade, observou-se boa correlação quanto aos domínios do instrumento, com intervalo de correlação intraclasse (0,48 a 0,95) e consistência interna (0,52 a 0,80).
Conclusão: A versão brasileira da escala revelou um modelo ajustado à estrutura dimensional proposta pelos autores australianos, o qual se apresentou válido, estável e fidedigno para identificar os fatores que influenciam a adesão às precauções-padrão de profissionais de enfermagem.
Descritores: Enfermagem; Equipe de enfermagem; Estudos de validação; Precauções universais; Psicometria.

RESUMEN

Objetivo: Evaluar las propiedades psicométricas de la versión brasileña de la *Factors Influencing Adherence to Standard Precautions Scale*.
Método: Estudio psicométrico, realizado en un hospital de Minas Gerais, con 407 profesionales de enfermería. La recolección de datos se realizó entre agosto de 2022 y septiembre de 2023 mediante un cuestionario sociodemográfico y la versión brasileña de la escala. Para caracterizar la muestra se utilizaron medidas de tendencia central y de dispersión. En cuanto a las propiedades psicométricas del instrumento, se adoptaron métodos de evidencia de validez basados en la estructura interna, utilizando análisis factorial confirmatorio y confiabilidad, mediante test-retest y consistencia interna.

Resultados: El análisis factorial confirmatorio reveló un modelo adecuadamente ajustado a la estructura dimensional. Los dominios presentaron cargas factoriales que variaron de 0,31 a 0,73 para liderazgo, de 0,345 a 0,83 para justificación, de 0,12 a 0,69 para cultura y práctica organizacional, de 0,37 a 0,84 para señales contextuales y de 0,52 a 0,80 para juicio. En cuanto a la confiabilidad, se observó buena correlación entre los dominios del instrumento, con un rango de correlación intraclase (0,48 a 0,95) y consistencia interna (0,52 a 0,80).
Conclusión: La versión brasileña de la escala reveló un modelo ajustado a la estructura dimensional propuesta por los autores australianos, demostrando ser válido, estable y confiable para identificar los factores que influyen en la adhesión a las precauciones estándar en profesionales de enfermería.
Descriptores: Enfermería; Grupo de Enfermería; Estudio de Validación; Precauciones Universales; Psicometría.

INTRODUCTION

Standard Precautions (SP) represent a set of universally adopted measures, with the aim of protecting healthcare professionals from biological risks arising from their work activities[1]. SP are also responsible for ensuring patient safety, since their adherence by professionals reduces Healthcare-Associated Infections (HAIs)[2,3], thus providing safer care.

SP encompass essential practices, which include Hand Hygiene (HH), Use of Personal Protective Equipment (PPE), correct disposal of sharps, cleaning and disinfection of surfaces, safe injection practices and cough etiquette, and should be adopted by all individuals, regardless of suspected or confirmed diagnosis of infectious diseases[4,5]. However, even after more than 20 years of their publication, studies reveals that healthcare professionals still show lack of knowledge, undervaluation and low adherence to SP[6-8].

Studies in the literature indicate that overconfidence, personal beliefs, excessive workload and unsatisfactory knowledge can be barriers to the use of these compliance measures[6,9]. However, authors of a systematic review presented facilitating strategies related to increased adherence to SP, such as management support, culture in the workplace, training, communication, physical space, desire to provide quality patient care to and confidence in the use of PPE[10].

Despite the knowledge of these aspects, there is still a need for better analysis and deeper understanding of these phenomena, based on the diagnosis in different work contexts[11]. To measure the adherence of healthcare professionals to these measures, several instruments have been developed and validated for other languages and cultures[12,13], including Brazilian Portuguese[12-14].

Considering that most of these instruments address fulfilling of compliance measures[13,14], the Factors Influencing Adherence to Standard Precautions Scale (FIASPS) was created in Australia in 2019, with the aim of assessing the factors that influence the

Nursing team to follow the SP guidelines, addressing the concepts of leadership, justification, organizational culture and practice, contextual and judgment recommendations[15].

For its creation and validation, the Australian authors used techniques recommended in the literature including content validity based on the internal structure[16], therefore being a psychometrically robust instrument[15]. Due to its consistent metric, other authors also applied the scale to a sample of healthcare professionals from a university hospital in the Palpa district, Nepal[17].

Furthermore, understanding the scarcity of tools that assess the factors that influence adherence to SP specifically in nursing student populations, the FIASPS-SV was developed, becoming an instrument with good to acceptable internal reliability and adequate psychometric properties[18]. Subsequently, this version for students was also applied to a sample in the city of Ras Al Khaimah, in the UAE[19].

In this context, considering its robustness and stability, the instrument was adapted to Brazilian Portuguese, being called "*Escala dos fatores que influenciam na adesão às Precauções-Padrão*" (FIASPS-Brazilian version)[20], but it still requires assessment of its psychometric properties. Given the importance of the validity and reliability of measurement instruments, validating this scale will allow not only to assess the factors that influence non-compliance with SP, but also guide safety programs, promote the prevention of occupational accidents involving biological material and improve patient safety.

Therefore, the objective of this study was to evaluate the psychometric properties of the Brazilian version of the Factors Influencing Adherence to Standard Precautions Scale.

METHOD

This is a psychometric, cross-sectional, and quantitative study, conducted in a public teaching hospital in a city in the state of Minas Gerais, Brazil. This institution has 302 beds and is a reference in medium and high complexity care for 27 municipalities, with outpatient, inpatient, emergency and urgent care services, regulation, diagnostic and therapeutic support, mobile clinics, and health surveillance.

This research was conducted from August 2022 to September 2023, and the sample was obtained by stratified selection involving professionals from the Nursing team. For the sample calculation, five to ten respondents were considered for each parameter estimated in the Confirmatory Factor Analysis (CFA) of the instrument. These parameters are part of the CFA calculation and aim to analyze whether the statistical model can reproduce the correlations observed in the original scale[21].

The healthcare institution has 851 nursing professionals, and a minimum number of 407 participants was considered necessary to the study sample. At the time of data collection, there were 40 refusals, all of which were replaced by other professionals.

For the sample calculation in the test-retest reliability analysis, an Intraclass Correlation Coefficient (ICC) = 0.9 was considered between the scale scores, assuming that this coefficient is not lower than 0.7 for a power of 90%, in which a significance level of $\alpha = 0.05$ was considered. When using the PASS application, version 24, with these *a priori* values, a minimum sample size of n = 22 participants was obtained.

As selection criteria, nurses, nursing technicians or assistants who worked in direct care during the data collection period were chosen. Professionals who were on indefinite leave or held management positions were excluded.

Data collection was conducted by the researcher, who holds a nursing degree, a master's degree in health sciences and, at the time of the research, was a doctoral student in the postgraduate program of a Higher Education Institution (HEI), and by three students of the undergraduate Nursing course at the same HEI. All students were trained by the researcher through an in-person meeting to present the instrument, detail the approach to the participant, privacy and clarification of possible doubts regarding the instruments. A list was then obtained from the Human Resources Department with a list of all Nursing professionals at the hospital under study. After, the randomly selected participants were approached in person during their work shift, in a private location, where they were invited to participate in the research. The last 22 respondents were informed that they would be invited again to participate in the study in the retest stage, respecting the minimum interval of four weeks.

Professionals who refused to participate in the retest were replaced, also by random selection, by other colleagues. Those who agreed to participate answered the instrument at the time of the approach or at another time previously scheduled by the data collection team. After clarification regarding the objectives, confidentiality, anonymity and acceptance to participate in the study, all participants signed the Informed Consent Form (ICF), the scale and the sociodemographic questionnaire (sex, age, marital status, professional category, workplace, experience in the role, qualification and training regarding SP).

The Brazilian version of the FIASPS was self-administered at the workplace, in a private room, with an average response time of 15 minutes for each participant.

The applied scale is a Likert-type instrument of Australian origin, which was cross-culturally adapted to Brazilian Portuguese[20]. The instrument includes 29 items, with five response options ranging from zero (not at all), one (a little), two (somewhat), three (quite a

bit) and four (very much), distributed across five domains: leadership (6 items), judgment (5 items), organizational culture and practice (5 items), contextual cues (6 items) and justification (7 items)[20].

As for the domains, leadership refers to items that encompass how professionals deal with other colleagues who did not adhere to the SP. Judgment is related to the attitudes of nurses who feel capable of deciding when to use PPE, based on the clinical risks to them[15].

Organizational culture and practice refer to issues within the institution itself that hinder the use of SP. The contextual cues domain is related to items that can assist in the action, such as the proximity of PPE, which can be a suggestion for its use; and, finally, justification, which concerns the fact that the professional justifies the reason for non-adherence to SP[15].

The instrument does not have a cut-off point, as pointed out by the Australian authors[15], with its score varying according to each domain, that is, for leadership (0 to 24), contextual cues (0 to 24), organizational culture and practice (0 to 20), justification (0 to 28) and judgment (0 to 20). Thus, higher scores are expected for the first three domains and lower scores for the rest.

Descriptive statistics with measures of central tendency (mean, median) and dispersion (standard deviation) were used for sample characterization. The current proposed model was adopted to analyze the psychometric properties of the instrument[16].

Initially, to obtain a consistent model with satisfactory psychometric properties that maintained the structure of the original instrument, the CFA technique was used, with evidence of validity based on internal structure.

Regarding the CFA, the model fit indices were evaluated and accepted using the absolute and incremental fit coefficients. These are: Chi-square test; Root Mean Square Error of Approximation (RMSEA), considering values between 0.05 and 0.08 as adequate(22); Goodness of Fit Index (GFI), ranging from 0 (no fit) to 1 (perfect fit), with no cutoff point; Tucker Lewis Index (TLI); and Comparative Fit Index (CFI), considering values above 0.9 for each index[21].

The reliability of the scale was assessed through test-retest and internal consistency, using the ICC and Cronbach's alpha, respectively[23]. The interval between the application of the test and the retest was four weeks, respecting the time taken by the authors of the original instrument.

Data collected were double entered into an Excel spreadsheet, and possible typing errors were checked. They were then analyzed using the Statistical Package for the Social Sciences (IBM® SPSS) version 23.0 and AMOS version 24.0 software.

Regarding ethical aspects, authorization for validation of the FIASPS was obtained from the authors of the original instrument. The study was approved by the Research Ethics Committee of the proposing Institution, under Opinion number 5,536,112. Participants were informed about their voluntary consent to take part in the research and all ethical aspects were respected.

RESULTS

In the evaluation of the psychometric properties of the Brazilian version of the FIASPS, 407 (100.0%) nursing professionals participated in the study, of whom 320 (78.6%) were female, 172 (42.3%) were between 31 and 40 years of age; and 184 (45.2%) were married. The participants were mostly 263 (64.6%) nursing technicians who worked in the wards, including the medical and surgical clinics, maternity and pediatrics units, with 181 participants (44.5%) having 11 to 15 years of service, and 117 (28.8%) with experience in their current role.

When asked whether the institution promoted training or education about SP, most responded yes, 368 (90.4%) and 356 (87.5%), respectively. Table 1 presents the responses of Nursing professionals regarding the scale items, organized by domains.

Table 1 – Frequency distribution of Nursing professionals' responses regarding the items of the FIASPS-Brazilian version. Uberaba, Minas Gerais, Brazil, 2022-2023

Item (Domain)	Not at all		A little		Somewhat		Quite a bit		Very much	
	n	%	n	%	n	%	n	%	n	%
I feel comfortable correcting professionals who do not use Standard Precaution guidelines. (Leadership)	08	2.0	65	16.0	129	31.7	149	36.6	56	13.8
I use situations of non-adherence to Standard Precaution guidelines by other professionals as opportunities to promote educational actions. (Leadership)	25	6.1	54	13.3	99	24.3	151	37.1	78	19.2
I use examples of behavior to encourage the use of Standard Precautions by other professionals. (Leadership)	01	0.2	12	2.9	50	12.3	226	55.5	118	29.0
I feel responsible for encouraging other professionals to protect themselves at work. (Leadership)	04	1.0	19	4.7	64	15.7	207	50.9	113	27.8
I question professionals who do not adhere to Standard Precaution measures. (Leadership)	09	2.2	61	15.0	143	35.1	153	37.6	41	10.1
If professionals see me using Standard Precaution guidelines, they will do the same. (Leadership)	11	2.7	47	11.5	84	20.6	190	46.7	75	18.4
I am the only one at risk for not wearing gloves. (Justification)	236	58.0	140	34.4	04	1.0	17	4.2	10	2.5
I feel clumsy when wearing gloves. (Justification)	218	53.6	148	36.4	19	4.7	20	4.9	02	0.5
Gloves make it difficult to palpate patients' veins. (Justification)	144	35.4	124	30.5	31	7.6	96	23.8	12	2.9
I am less likely to wear gloves because I learned without them. (Justification)	285	70.0	106	26.0	05	1.2	08	2.0	03	0.7
I do not need gloves to perform venipuncture because I have experience. (Justification)	271	66.6	120	29.5	11	2.7	03	0.7	02	0.5
I do not wear gloves because I cannot feel patients' veins. (Justification)	208	51.1	157	8.6	18	4.4	21	5.2	03	0.7
I learned procedures and techniques without using	278	68.3	113	27.8	06	1.5	07	1.7	03	0.7

personal protective equipment and I continue not using them. (Justification)										
Professionals interpret Standard Precaution guidelines in different ways. (Organizational culture and practice)	19	4.7	185	45.5	95	23.3	83	20.4	25	6.1
In some workplaces, it is common to not follow Standard Precaution guidelines. (Organizational culture and practice)	18	4.4	155	38.1	103	25.3	99	24.3	32	7.9
The culture of the institution allows professionals to not follow Standard Precaution guidelines. (Organizational culture and practice)	13	3.2	64	15.7	60	14.7	158	38.8	112	27.5
Most nursing professionals follow Standard Precaution guidelines. (Organizational culture and practice)	17	4.2	94	23.1	72	17.7	190	46.7	34	8.4
Most physicians follow Standard Precaution guidelines. (Organizational culture and practice)	88	21.6	160	39.3	92	22.6	55	13.6	12	2.9
I wear personal protective equipment when I see my colleagues using it. (Contextual cues)	112	27.5	124	30.5	60	14.7	79	19.4	32	7.9
I follow Standard Precautions if I am handling sharp instruments. (Contextual cues)	34	8.4	47	11.5	20	4.9	168	41.3	138	33.9
I am more likely to use personal protective equipment when patients are nearby. (Contextual cues)	87	21.4	137	33.7	59	14.5	87	21.1	37	9.0
I am more careful with patients because I wear personal protective equipment. (Contextual cues)	22	5.4	61	15.0	42	10.3	167	41.0	115	28.3
I follow Standard Precautions more when I am handling needles. (Contextual cues)	60	14.7	114	28.0	40	9.8	121	29.7	72	17.7
Potential exposure will increase my adherence to Standard Precautions. (Contextual cues)	48	11.8	81	19.9	40	9.8	168	41.3	70	17.2
My experience allows me to decide whether to use Standard Precautions. (Judgment)	74	18.2	106	26.0	53	13.0	107	23.6	67	16.5
I evaluate patients before applying Standard Precautions. (Judgment)	54	13.3	93	22.9	54	13.3	140	34.4	66	16.2
I can decide whether to use Standard Precautions. (Judgment)	49	12.0	64	15.7	43	10.6	159	39.1	92	22.6

I can decide whether to use Standard Precautions based on the risks which I am exposed to. (Judgment)	28	6.9	48	11.8	28	6.9	191	46.9	112	27.5
Educational actions allow us to evaluate the pros and cons of Standard Precaution guidelines. (Judgment)	06	1.5	21	5.2	32	7.9	177	43.5	171	42.0

Source: Prepared by the authors, 2022-2023.

Regarding the five domains of the instrument, Table 2 presents the measures of central tendency and dispersion.

Table 2 – Measures of central tendency and variability for the domains and total score of the FIASPS-Brazilian version. Uberaba, Minas Gerais, Brazil, 2022-2023

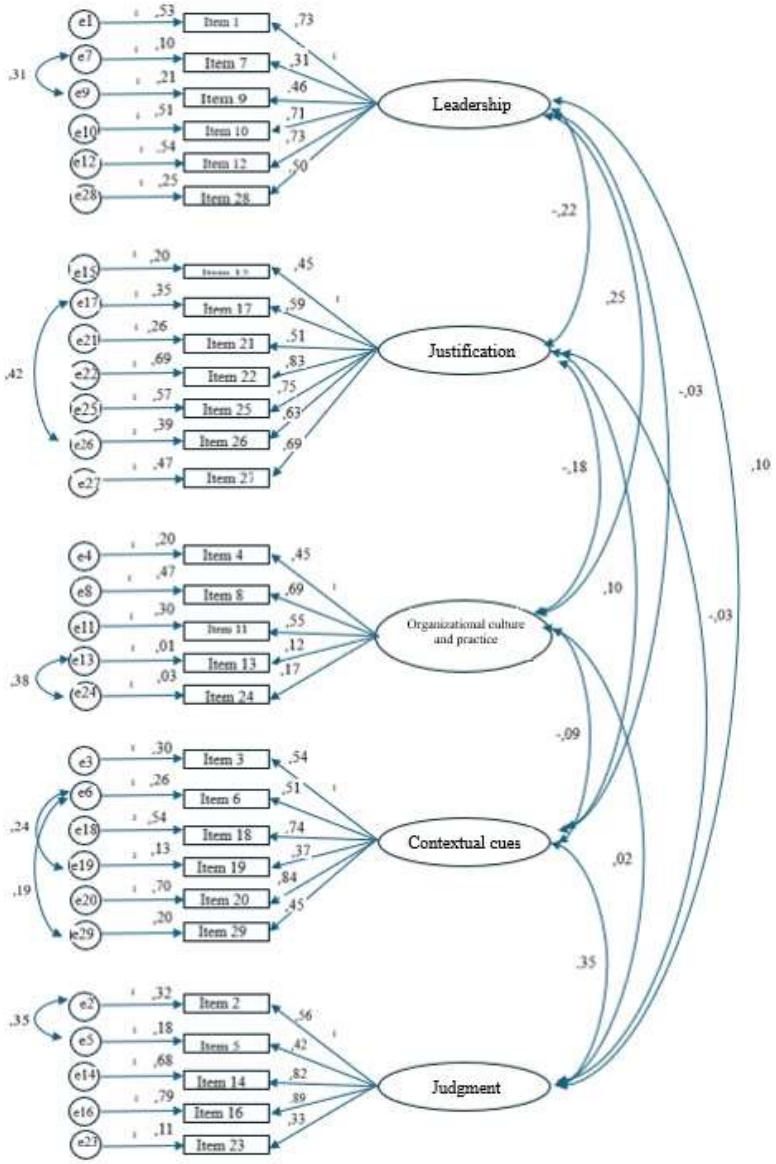
Domain	**x^{2*}**	**(s)†**	**Median**	**Minimum**	**Maximum**
Leadership	7.91	3.76	8.00	0	21
Justification	23.70	5.07	25.00	7	28
Organizational culture and practice	9.88	4.12	10.00	2	19
Contextual cues	10.94	5.21	11.00	0	24
Judgment	7.45	4.40	7.00	0	20
Total Scale Score	59.90	0.54	60.00	35.00	92

Source: Prepared by the authors, 2022-2023.

*Mean; †Standard deviation.

Regarding the internal structure of the scale, this measure was assessed using CFA, using the fit indices and reliability measures (test-retest and internal consistency). Figure 1 presents the results of this analysis to obtain the dimensional construct validity of the instrument, demonstrating that the tested model incorporates a five-factor structure containing the latent variables, indicated by the ellipses. The items are presented with rectangles in Figure 1.

Figure 1 – Diagrammatic representation of the confirmatory factor analysis of the FIASPS-Brazilian version. Uberaba, Minas Gerais, Brazil, 2022-2023



This Figure presents the factorial structure of the FIASPS-Brazilian version, conducted using the AMOS application, in which the regression coefficient and factor loadings of the five domains are indicated.

Regarding the factor loadings for leadership, the values were 0.31 to 0.73; justification from 0.45 to 0.83; organizational culture and practice between 0.12 and 0.69; contextual cues from 0.37 to 0.84 and judgment from 0.33 to 0.89. To improve the model's fit, covariances and correlations were included between the five domains and between the 12 errors found. Thus, the intercorrelations between the domains were acceptable (r = 0.04-0.54), thus confirming their independence.

Regarding the model's fit indicators, it is important to highlight: Absolute fit measures: the chi-square value corresponded to 648.13 ($p<0.001$), the RMSEA = 0.04 and the adjusted GFI = 0.882. Regarding the incremental fit measures for the TLI and the CFI, their values corresponded to 0.900 and 0.910, respectively.

Regarding reliability measures, Table 3 presents the test-retest and internal consistency results of the instrument, demonstrating that, for most domains, the scale remained stable over time and the Cronbach's alpha values were also acceptable (≥0.50), which suggests agreement between the professionals' responses.

Table 3 - Mean, standard deviation and intraclass correlation coefficient of the domains of the FIASPS - Brazilian version for the test-retest and Cronbach's alpha. Uberaba, Minas Gerais, Brazil, 2022-2023

Domain	Test x^{2*} (s)†	Retest x^2 (s)	ICC Test-retest	$\alpha^{‡}$
Leadership	15.09 (2.52)	14.63 (3.07)	0.80	0.74
Justification	30.22 (3.93)	30.22 (4.38)	0.95	0.80
Organizational culture and practice	16.13 (2.31)	15.95 (2.47)	0.48	0.52
Contextual cues	17.27 (6.40)	15.90 (6.28)	0.91	0.76
Judgment	12.00 (4.86)	11.45 (4.45)	0.91	0.76
Total scale score	-	-	-	0.72

Source: Prepared by the authors, 2022-2023.
*Mean; †Standard deviation; ICC = Intraclass Correlation Coefficient; and ‡Cronbach's alpha coefficient.

Finally, Chart 1 presents the final version of the instrument validated by these authors for Brazilian Portuguese, covering the five domains mentioned above and distributed in 29 items.

Chart 1- Presentation of FIASPS - Brazilian version validated for Brazilian Portuguese. Uberaba, Minas Gerais, Brazil, 2022-2023

FIASPS Items – Brazilian Version	Not at all	A little	Somewhat	Quite a lot	Very much
Item 1- I feel comfortable correcting professionals who do not use the SP guidelines.					
Item 2- My experience allows me to decide on the use of the SP guidelines.					
Item 3- I use personal protective equipment when I see my colleagues using it.					
Item 4- Professionals interpret the SP guidelines in different ways.					
Item 5- I evaluate patients before applying the SP guidelines.					
Item 6- I follow the SP guidelines if I am handling sharp materials.					
Item 7- I use situations of non-adherence to the SP guidelines of other professionals as an opportunity to promote educational actions.					
Item 8- In some workplaces, it is common not to follow the SP guidelines.					
Item 9- I use examples of behaviors to encourage the use of SP by other professionals.					
Item 10- I feel responsible for encouraging other professionals to protect themselves at work.					
Item 11- The culture of the institution allows professionals not to follow the SP guidelines.					
Item 12- I question professionals who do not adhere to SP measures.					
Item 13- Most nursing professionals follow SP guidelines.					
Item 14- I can decide whether I should use SP guidelines.					
Item 15- Only I am at risk by not wearing gloves.					
Item 16- I can decide whether to use SP measures based on the risks to which I am exposed.					
Item 17- I feel clumsy when wearing gloves.					
Item 18- I am more likely to use personal protective equipment when there are patients nearby.					
Item 19- I am more careful with a patient because I am wearing personal protective equipment.					

Item 20- I follow SP standards more when I am handling needles.					
Item 21- Gloves make it difficult to palpate patients' veins.					
Item 22- I am less likely to use gloves because I learned without them.					
Item 23- Educational activities allow us to evaluate the pros and cons of SP guidelines.					
Item 24- Most physicians follow Standard Precautions guidelines.					
Item 25- I do not need gloves to perform venipuncture, because I have experience.					
Item 26- I do not wear gloves, because I cannot feel the patients' veins.					
Item 27- I learned procedures and techniques without using personal protective equipment and I continue not using them.					
Item 28- If professionals see me using SP guidelines, they will do the same.					
Item 29- Potential exposure will increase my adherence to the use of SP.					

SP = standard precautions

DISCUSSION

The objective of this study was to evaluate the psychometric properties of the Brazilian version of the FIASPS in a sample of nursing professionals from a hospital in Minas Gerais. The study was conducted following the methodological rigor required for this type of research, and as a result, the FIASPS was validated for Brazilian Portuguese, as the instrument proved to be robust, consistent, and reliable for application in other regions of the country.

Regarding sample characterization, a study conducted in Singapore obtained results similar to those found in this study. The authors of this investigation applied the FIASPS to nursing professionals, in which most participants were women, with more than seven years of experience in the profession and who worked in hospital wards[24].

Regarding the mean scores of the domains of the Brazilian scale, initially discussing leadership, it was observed that in this sample the mean was 7.91, being relatively low when compared to two other studies found in the literature, in which the values corresponded to 17.25 and 14.86[15,18].

Leadership reflects the professional's action in leading and confronting coworkers who do not adhere to the SP[15]. In this context, in a study found in the literature, the need for nurses to show themselves willing to have good behavior, being a model for their team and newly graduated professionals was described. It was also emphasized that acting as a leader is essential in promoting a climate of safety in the workplace[24].

Regarding the justification, this domain refers to the fact that the participant justifies the reason for not adhering to the SP guidelines[15]. In the sample, the mean of the participants was 23.70, higher than that of the Australian nurses, which corresponded to 5.12[15]. However, the results of a FIASPS study with Nursing students indicated a mean of 1.46 for this same domain[17].

Lower scores can be seen as a positive characteristic regarding the recognition and importance of adherence to SP in the health environment with this group. Thus, Brazilian professionals tend to justify non-adherence to SP more, becoming more prone to the risks of exposure to biological agents and occurrences of HAIs. These findings can be explained by the cultural difference between the countries and their economic levels, with Brazil being a developing nation that still has high rates of non-adherence to compliance measures.

Regarding organizational culture and practice, the mean score in this study was 9.88, lower than that found in other studies, in which these values corresponded to 12.0 and 12.61,

respectively[15,24].

This domain relates to issues within the institution that either facilitate or hinder the use of SP by professionals[15]. Corroborating this information, a study showed that the greater the perception of a safety climate and the lesser the understanding of obstacles in the work environment to follow the SP, the greater its adherence[11]. Another study pointed out that the lack of material availability, haste, work overload and difficult access to PPE were factors that hindered the implementation of correct practices[25].

In this sense, it is important to highlight that the specific characteristics of each health institution, as well as the cities in which they are located, also interfere in the organizational culture, which may justify the fact that Brazilian professionals presented a lower average than in other countries. Furthermore, in an investigation found in the literature, it was observed that the quality of the materials offered interferes in adherence to the SP[26], that is, it is necessary to emphasize that the application scenarios of the instrument present differences, since in the Brazilian context there is a lack of infrastructure and adequate materials, as well as low health technology, compared to other countries.

Regarding contextual cues, this domain encompasses clues that can be seen in work environments and favor positive professional actions[15]. In this study, the mean was 10.94, which is lower than that found in another study[15], which obtained a mean of 13.01. Justifying these findings, a study conducted in university hospitals in two countries – Brazil and Colombia – showed that the placement of contextual cues, such as notices and posters in the workplace, is a facilitating factor that influences adherence to SP by healthcare professionals[24]. Therefore, it is important that service managers pay attention to the implementation of cues that can favor the provision of safer care, both for the healthcare professional and for the patient.

Regarding the judgment domain, it reflects the assessment made by nursing professionals about the ability to decide whether to adhere to SP standards, depending on the situation or the patient[15]. This fact differs from current recommendations[27], in which all body fluids (except sweat) should be considered potentially contaminated. Therefore, there should be no discrimination or pre-judgments regarding the ability of an individual to have or not an infectious disease, and compliance measures should be applied universally to all.

The mean score for this domain was 7.45, which is higher than that found by Australian researchers, which was 6.58 [15]. In contrast, a study conducted in Nepal with healthcare professionals showed a high score of 17.49 for this domain, suggesting that these individuals rationalize their non-adherence to SP[18].

In this context, several authors emphasize the need for adherence to SP regardless of judgments, as these measures are meant to be universally applied to all individuals[1]. A study found in the literature that used the Risk Personality Scale reported moderate scores among participants in terms of taking risks in the workplace and exposing themselves to danger for the sake of thrill[17]. Thus, the differences observed between the studies can be justified by the specificities of the samples, since the individual's personality is an important factor in judging adherence to SP.

Regarding the evidence of validity based on the internal structure of the instrument, the CFA confirms its structural model[28], showing a good fit to the dimensional structure proposed by the Australian authors. Corroborating these findings, the model fit indicators found in this investigation were similar to those observed by the authors of the original instrument, corresponding to: $\chi 2$ (566.24, $p < 0.001$), GFI = 0.907, adjusted GFI = 0.889, incremental adjustment index = 0.923, Tucker–Lewis index = 0.913, CFI = 0.922, root mean square error of approximation = 0.038 and RMSE = 0.054[15].

Regarding reliability, performed through test-retest, it was possible to observe that the domains leadership (ICC = 0.80), justification (ICC = 0.95), contextual cues (ICC = 0.91) and judgment (ICC = 0.91) presented satisfactory results, indicating very good correlation. Regarding the organizational culture and practice domain, the ICC corresponded to 0.48, approaching the 0.50 limit to be acceptable[23]. Comparing these findings to another study, similar results were found for the leadership (ICC = 0.84), justification (ICC = 0.84), contextual cues (ICC = 0.77) and judgment (ICC = 0.69) domains [15]. It is possible to observe that the Brazilian instrument demonstrated greater stability in some domains compared to the Australian scale. Regarding organizational culture and practice, the research data[15] diverged regarding the ICC, in which the value corresponded to 0.80, considered a good correlation.

Therefore, justifying the decision to maintain the organizational culture and practice domain, even with the ICC lower than 0.50, the authors of this research chose to maintain the psychometric structure of the original instrument, respecting the configuration of the Australian scale, as previously agreed with its authors.

Regarding the reliability of the instrument, the result of each domain, except for organizational culture and practice (0.52), indicated good internal consistency, considering the Cronbach's alpha values recommended in the literature[23]. These results were similar to those found by the authors of the original instrument[15], indicating that the items on the scale actually measure the same construct [29]. Another study conducted in Singapore presented values similar to those of this investigation, with leadership ($\alpha = 0.78$), justification ($\alpha =$

0.76), contextual cues (α = 0.62) and judgment (α = 0.67). For the organizational culture and practice domain, Cronbach's alpha was equal to 0.60, being lower compared to the others[24].

Thus, the results of this study corroborate the findings of the Australian instrument, since both studies showed moderate/good correlation across the five domains of the scale. It is also possible to observe that the similar values in the test and retest show that there was agreement between the participants' responses at both times, showing stability over time.

As for the limitations of this study, it is worth highlighting the fact that this research was conducted in a single scenario. Therefore, the sample analyzed here is not representative of the Brazilian population, and it is not possible to state that the factorial structure will behave similarly across the country. Therefore, future applications of the validated instrument in other healthcare institutions are necessary.

CONCLUSION

The FIASPS-Brazilian version presented a model adequately adjusted to the dimensional structure proposed by the Australian authors, confirming its original dimensionality. Items 13 and 24 presented factor loads lower than 0.3; however, the authors of this investigation chose to maintain the psychometric structure of the instrument, enabling future comparisons in other settings. Regarding reliability, the scale proved to be consistent and stable during application at different times, and the data presented corroborated the Australian instrument.

In this sense, the outcomes of this study indicated that the FIASPS - Brazilian version of was adequately validated, strictly following the methodological steps, and is considered a robust and reliable scale to be applied to the Brazilian population. Regarding the domains, the Brazilian sample presented lower scores compared to other countries, which is why more studies on the theme are needed.

Thus, this study presented important implications for clinical practice and health education, considering the relevance of identifying the factors that influence adherence to SP, both for the protection of nursing professionals and for patient safety. Its validation will enable future interventions on individual and modifiable practices in healthcare services, and the Brazilian version of FIASPS can be applied to other settings in Brazil.

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DATA AND MATERIAL AVAILABILITY

Access to the dataset can be obtained upon request to the corresponding author.

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CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest.

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