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Luis Afonso Bataglin Cabral, Wagner de Lara Machado, Elton Luiz Ferlin, John P. Hirdes, Luiz Carlos Porcello Marrone, Alice Hirdes

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VALIDITY OF THE INSTRUMENT *interRAI* EMERGENCY SCREENER FOR PSYCHIATRY FOR THE BRAZILIAN CONTEXT

Luis Afonso Bataglin Cabral¹

<https://orcid.org/0000-0002-9223-9937>

Wagner de Lara Machado²

<https://orcid.org/0000-0001-5555-5116>

Elton Luiz Ferlin³

<https://orcid.org/0000-0002-4278-1031>

John P. Hirdes⁴

<https://orcid.org/0000-0001-9619-6543>

Luiz Carlos Porcello Marrone⁵

<https://orcid.org/0000-0002-8071-813X>

Alice Hirdes⁶

<https://orcid.org/0000-0003-3318-0514>

1. Health Promotion, Society and Development Graduate Program, Universidade Luterana do Brasil, Brazil.
2. Psychology Graduate Program, Pontifícia Universidade Católica do Rio Grande do Sul, Brazil.
3. Research Graduate Program, Hospital de Clínicas de Porto Alegre, Brazil.
4. School of Public Health and Health Systems, Waterloo University, Canada.
5. Health Promotion, Society and Development Graduate Program, Universidade Luterana do Brasil, Brazil.
6. Health Promotion, Society and Development Graduate Program, Universidade Luterana do Brasil, Brazil.

Corresponding Author:

Alice Hirdes

Health Promotion, Society and Development Graduate Program

Universidade Luterana do Brasil

E-mail: alice.hirdes@ulbra.br

ABSTRACT

Objective: The aim of this study was to carry out the translation and present the evidence of validity of the Brazilian version of the *interRAI Emergency Screener for Psychiatry (ESP)*.

Method: this is a cross-sectional study conducted in a municipal hospital in the metropolitan region of Porto Alegre, Rio Grande do Sul. A total of 161 patients were evaluated in the first 24 hours of emergency arrival using ESP. Exploratory factor analyses of the sections of the instrument and reliability analyses were conducted using Cronbach's alpha and McDonald's Omega. **Results:** the analyses suggested an appropriate structure to the purpose of the instrument, two sections containing two factors instead of the expected one-dimensional structure. However, sections with two factors have interpretability and theoretical consistency. The factors presented internal consistency. **Conclusion:** the Brazilian version of the *interRAI Emergency Screener for Psychiatry (ESP)* demonstrates adequate psychometric properties through the internal structure of the instrument. Future studies should investigate the relationship of the scores produced by the instrument with clinical diagnosis and with covariates relevant to mental health outcomes.

Keywords: Emergency hospital service; Diagnosis; Psychometrics; Validation studies; Mental disorders; General hospitals.

RESUMO

Objetivo: O objetivo do estudo foi realizar a tradução e apresentar as evidências de validade do *interRAI Emergency Screener for Psychiatry (ESP)*. **Método:** trata-se de uma pesquisa transversal realizada em um hospital municipal da região metropolitana de Porto Alegre, Rio Grande do Sul. Foram avaliados 161 pacientes nas primeiras 24 hs da chegada a emergência utilizando o ESP. Foram conduzidas análises fatoriais exploratórias das seções do instrumento e análises de fidedignidade por meio do alfa de Cronbach e Ômega de McDonald.

Resultados: as análises sugeriram uma estrutura adequada ao propósito do instrumento, sendo duas seções contendo dois fatores ao invés da estrutura unidimensional esperada. Contudo, as seções com dois fatores possuem interpretabilidade e consistência teórica. Os fatores apresentaram consistência interna. **Conclusão:** a versão brasileira do *interRAI Emergency Screener for Psychiatry* (ESP) demonstra adequadas propriedades psicométricas por meio da estrutura interna do instrumento. Estudos futuros deverão investigar a relação dos escores produzidos pelo instrumento com diagnóstico clínico e com covariáveis relevantes para os desfechos de saúde mental.

Descritores: Serviço hospitalar de emergência; Diagnóstico; Psicometria; Estudos de validação; Transtornos mentais; Hospitais Gerais.

RESUMEN:

Objetivo: El objetivo de este estudio era realizar la traducción y presentar la evidencia de validez del *examinador de emergencia interRAI para psiquiatría* (ESP). **Método:** se trata de una encuesta transversal realizada en un hospital municipal de la región metropolitana de Porto Alegre, Rio Grande do Sul. Un total de 161 pacientes fueron evaluados en las primeras 24 horas de llegada de emergencia utilizando ESP. Los análisis exploratorios de factores de las secciones del instrumento y los análisis de fiabilidad se llevaron a cabo utilizando Cronbach's alpha y McDonald's Omega. **Resultados:** los análisis sugirieron una estructura adecuada a los propósitos del instrumento, dos secciones que contienen dos factores en lugar de la estructura unidimensional esperada. Sin embargo, las secciones con dos factores tienen interpretabilidad y consistencia teórica. Los factores presentaron consistencia interna. **Conclusión:** la versión brasileña del *Examinador de Emergencia InterRAI para Psiquiatría* (ESP) demuestra propiedades psicométricas adecuadas a través de la estructura interna del instrumento. Los estudios futuros deben investigar la relación de las puntuaciones

producidas por el instrumento con el diagnóstico clínico y con covariables relevantes para los resultados de salud mental.

Descritores: Serviço de urgência em hospital; Diagnóstico; Psicometria; Estudos de validación; Transtornos Mentales; Hospitales generales.

Introduction

Emergency services in general hospitals are part of the Psychosocial Care Network (Brasil 2011) supported by the Psychiatric Reform Law (Brasil, 2001) and Ordinance MS/GM N° 2048, November 5, 2002 (Brasil, 2002) which specify that psychiatric emergency care is the responsibility of emergency rooms (ER) in general hospitals. The search occurs spontaneously or by referral of other psychosocial care services to attend crises, anxiety disorders, mental disorders and intoxication or withdrawal of psychoactive substances. Patients with primary complaints of mental health issues represent a substantial proportion of people seeking emergency services. A study (Moulin, Evans, Xing, Melnikow, 2018) conducted between 2009 and 2014 showed that 28.2% of the demand for care in emergency departments (ER) in California, United States were frequent users of mental health units, thus deeming those who seek ER more than four times in the period of one year. Another survey (Matsumoto, O'Driscoll, Lawrance, Jakubow, Madden, Kelly, 2017) conducted at a hospital in Ontario, Canada showed that mental disorders and additions account for 10.3% of emergency room, 8.7% of admissions and 20% of inter-hospital transfers. The research identified that respiratory problems, mental disorders and abdominal/pelvic complaints are the three most common diagnostic groups in RE.

Patients with substance use disorders, suicidal ideation, or those who have attempted suicide are the most common users of mental health emergency services. The next most frequent are those with psychosis, altered mental status and acute anxiety disorders. Suicide

attempts require in-depth screening, evaluation and recommendations on subsequent follow-up (Hashmi, Czelusta, Jabbar, Siddiqui, Shah, 2018). National data from the Canadian Institute for Health Information (Canadian Institute for Health Information, 2017) show that 32% of people seeking emergency departments (ER) are for mental health issues only (e.g., anxiety and mood disorders), 18% are due to substance use disorders and 50% seek care for both mental health disorders and addictions. In 2017-2018, 81% of patients admitted to general hospitals with mental disorders and addictions occurred through emergency departments (Canadian Institute for Health Information, 2019). However, emergency physicians spend relatively little time during residency training learning to evaluate and manage psychiatric patients in general, and especially suicide cases. Reasons include prioritizing more medically severe patients, not feeling comfortable with psychiatric complaints, and prejudice (Williams, Shepherd, 2000). Among the different reasons, the stigma of non-specialist professionals in general hospitals is evidenced in the literature (Noblett, Lawrence, Smith, 2015; Giandinoto, Stephenson, Edward, 2018; Staton et al., 2018; Wu et al., 2020).

In the care of patients in emergencies it is necessary to determine whether the cause of the complaint is functional or organic, if there are associated medical comorbidities and whether there is a need for psychiatric evaluation or hospitalization (Williams & Shepherd, 2000). However, there are no interdisciplinary uniform guidelines or algorithms that constitute a clear difference between psychiatry and emergency medicine (Tucci, Siever, Matorin, & Moukaddam, 2015). Prior research (Shepard et al., 2015; Benziger, Roth, & Moran, 2016; World Health Organization, 2013) demonstrates the correlation between mental disorders and organic diseases and the coexistence of these diseases may not be recognized initially in this population.

Evidence indicates that a complete history and physical examination, including vital signs and mental status examination, are the minimum elements needed in the evaluation of psychiatric patients in emergencies (Wilson et al., 2017). On the other hand, there is no screening tool for the release of patients with psychiatric symptoms standardized in emergencies. The validity of a screening algorithm proved to be effective for psychiatric diagnosis as an evaluation method for the exclusion of acute disease. In a study of the application of the Triage Algorithm for Psychiatric Screening (TAPS) no patient received diagnosis or treatment for acute medical disease (Miller et al., 2012).

In hospitals with organized psychiatric services, the need for systematic training of supervisors and resident physicians in diagnostic criteria and structured interviews for greater accuracy of diagnosis, has been defended when performed under indirect supervision (Del-Ben et al., 2005). Other measures include the use of standardized diagnostic instruments, the rational use of complementary tests and a minimum period of observation for the diagnosis of the first psychotic episode (Del-Ben, Rufino, Azevedo-Marques, & Menezes, 2010). Psychiatric emergency services in general hospitals go beyond the need for stabilization of acute psychiatric conditions or referrals for full hospitalization, but are key points in prevention programs, therapeutic improvement and psychosocial interventions (Barros, Tung, & Mari, 2010). However, it is necessary to consider that most general hospitals do not have psychiatrists on duty in their staff in the emergency service. In this sense, a standardized instrument can qualify emergency care and assist professionals in clinical decision-making.

The *interRAI Emergency Screener for Psychiatry* (ESP) is an instrument designed for the use of health and mental health professionals dealing with urgent mental health situations: physicians, psychiatrists, psychologists, nurses, social workers and family physicians (Rabinowitz, Hirdes, Curtin-Telegdi, Martin, & Smith, 2013). The principles of *interRAI*

mental health assessment systems include the evaluation of the person in order to maximize functional capacity and quality of life, identify physical and mental health problems and improve the level of independent functioning (Hirdes et al., 2020; Hirdes et al., 2002; Hirdes, et al., 2009). interRAI is a collaborative network of researchers, clinicians and policy experts in over 35 countries committed to improve care for persons who are disabled or medically complex. The interRAI mental health instruments represents the results of rigorous research and testing to establish the reliability and validity of items, outcome measures, assessment protocols, and quality indicators.

The ESP focuses on acute mental health crises but is designed to articulate with other instruments like the interRAI Community Mental Health, which may be used by mental health case managers. To achieve these objectives there is a need to identify the purpose of the evaluation; the identification of psychiatric, functional, medical and social issues that are considered current problems or that may constitute important problems for the person; the identification of strengths and the integration of what the evaluator sees for accurate coding of the interRAI ESP Assessment (Rabinowitz, Hirdes, Curtin-Telegdi, Martin, & Smith, 2013). Thus, considering the lack of specific instruments developed for the purpose of psychiatric evaluation in general hospital emergencies, the present study aimed to translate and evaluate the use of the interRAI Emergency Screener for Psychiatry instrument in the Brazilian context.

Method

Adaptation of the interRAI Emergency Screener for Psychiatry (ESP) to Brazilian Portuguese

For the adaptation of the interRAI Emergency Screener for Psychiatry (ESP) (Rabinowitz, Hirdes, Curtin-Telegdi, Martin, & Smith, 2013) the steps indicated in the

literature were followed (Mocking et al., 2020). After the consent of the authors of the instrument, two independent and bilingual translators did the Brazilian Portuguese version of the instrument. Two authors of this article built a synthesized version of the two translations. Next, back-translation was performed by two bilingual translators with experience in the health area. After that, two professionals with expertise in the area (a psychologist and a psychiatrist) evaluated the versions and suggested modifications that were incorporated into the final version of the back-translated instrument. There were suggested modifications in 44 items of the instrument regarding the semantic aspects and the name of health services in Brazil. The final back-translated version was evaluated and approved by the authors of the original instrument. This version was used by four professionals from different backgrounds (two nurses, a psychologist and an occupational therapist) and there were no problems in understanding the instrument.

Participants

The sample consisted of 161 participants, 67 (42%) men and 94 (68%) women, with a mean age of 39.8 (SD = 16.1) years, all from a medium-sized municipal hospital in the metropolitan region of Rio Grande do Sul State. The exclusion criteria of the sample were patients with moderate to severe impairment at the time of evaluation, namely: acute use of psychoactive substances, impairment of consciousness - delirium, psychomotor agitation and difficulty in controlling aggressiveness, unaccompanied by a family member and/or guardian.

Instrument and procedures

Data were collected using a custom made software with the *Portuguese* version of the interRAI Emergency Screener for Psychiatry (ESP instrument version 9.1 (Rabinowitz,

Hirdes, Curtin-Telegdi, Martin, & Smith, 2013). The instrument has 13 main sections with sub-items and evaluates different mental health indicators such as mood disturbance, anxiety, psychosis, negative symptoms, sleep problems related to hypomania or mania, time since the use of the following substances, use of injectable drugs, tobacco use, withdrawal symptoms, causes of harm to oneself and others, ideation or attempt at self-harm, behavior, cognition and communication, functional status, medications, relationships, support and life events, environmental assessment. In the end, the software provides the results of calculations of specific triggers for risk algorithms (risk to themselves, risk to others and self-care index). Data exportation complies with the internationally coding used by the interRAI research group, allowing the use of this data in multicentric research. The average time to complete the ESP is thirty minutes; however, the acute nature of the disease may be a barrier to completion if other informants are not present (Hirdes et al., 2020).

Data analysis

Descriptive analysis (central tendency and dispersion) were conducted to diagnose the distribution, frequency and summaries of the variables. Subsequently, parallel analysis were conducted in order to identify the number of factors interpreted (Timmerman & Lorenzo-Seva, 2011) by comparing empirical eigenvalues with simulated values. Two data simulation techniques were used, considering a parametric (Monte Carlo) and non-parametric (permutation of sample values) distribution. Then exploratory factor analyses were conducted in order to identify the variance of the items explained by the underlying dimension, through a semiparametric approximation (Shapiro & Berge, 2002), considering the ordinal level of the responses to the instrument. Standardized factor loadings above 0.3 are expected to indicate adjustment between the item and factor. This squared value indicates the correlation between the item and the latent dimension, which must be close to or greater than 10%. For the

analysis of consistency and reliability, Cronbach's Alpha index and the McDonald's omega index (Trizano-Hermosilla & Alvarado, 2016) were used. The alpha index indicates the level of common variance based on the intercorrelations between the items while the omega index performs the same estimate based on the standardized factor loads of the items. For both indexes, values above 0.7 are indicative of reliability. In section K (Summary psychiatric information) only risk indicators were analyzed, totaling four items. Finally, with the factorial scores modeled on each factor, its contribution to the overall ESP score was calculated by means of an analysis of principal components. The componential loads indicate which subscales (sections) are most determinant for the general mental health of the participants.

Ethical Considerations

This project was completed in accordance with the guidelines and regulatory standards of research involving human beings and was approved under n°. CAAE 09164119.2.0000.5349. All participants signed the Free and Informed Consent Form. Ethical aspects related to research with human beings were respected, as determined by Resolution n°. 466/2012 (Brasil, 2012) and Declaration of Helsinki (World Medical Association, 1997).

Results

Table 1 summarizes the psychometric parameters of the ESP sections. This Table describes the number of factors suggested by parallel analysis, amplitude of factor loadings, intercorrelations between factors and reliability measures. Parallel analysis and the complete description of the factor loadings of the items in each section can be viewed in an attached supplementary material.

Table 1

ESP Section, Number of Retained Factors, Amplitude of Factor loadings and Reliability Measures of Factors. Rio Grande do Sul, RS, Brazil, 2020.

Section	# of Retained Factors a	Factor loadings - amplitude ^b	Reliability
B - Mental State Indicators	2	Depression: 0.38 to 0.81 Mania: 0.35 to 0.94 Correlation between factors: $r = 0.20$	Depression: $\alpha = 0.91$ Depression: $\omega = 0.94$ Mania: $\alpha = 0.88$ Mania: $\omega = 0.87$
C - Substance Use or Excessive Behavior	1	0.42 to 0.88	$\alpha = 0,88$ $\omega = 0,85$
D - Harm to Self and Others	2	Self-harm: 0.77 to 0.93 Heteroaggression: 0.47 to 0.81 Correlation between factors: $r = -0.01$	Self-aggression: $\alpha = 0.90$ Self-aggression: $\omega = 0.88$ Heteroaggression: $\alpha = 0.79$ Heteroaggression: $\omega = 0.71$
E - Behavior	1	0.30 to 0.95	$\alpha = 0,88$ $\omega = 0,78$
F - Cognition and communication	1	0.32 to 0.81	$\alpha = 0,77$ $\omega = 0,70$
G - Functional Status	1	0.80 to 0.98	$\alpha = 0,94$ $\omega = 0,94$
H - Medications	1	0.32 to 0.97	$\alpha = 0,72$ $\omega = 0,60$
I - Unsettled Relations, Supports, and Life Events	1	0.69 to 0.88	$\alpha = 0,81$ $\omega = 0,90$
K - Summary psychiatric information	1	0.43 to 0.87	$\alpha = 0,72$ $\omega = 0,70$

Note ^a = Number of retained factors as indicated by parallel analysis and Kaiser criterion, b = values in module.

Note ^b = Section J had substantial missing data and was dropped from the analysis process.

Table 2 shows the descriptive data and the componential loads of each subscale in relation to the overall score. Through the principal component analysis technique, a single component was extracted that explained 32% of the total variance of the scores. This main component is nothing more than a general index of mental health problems assessed by ESP. The componential loads, presented in Table 2, indicate the association between the scores of each section or subscale with this general index.

Table 2

Descriptive Statistics and Componential Loads of ESP Sections. Rio Grande do Sul, RS, Brazil, 2020.

Section	Descriptive statistics	Componential loads
B – Mental State Indicators	Depression: Mean (SD) = 10.7 (7.7) Mania: Mean (SD) = 9.6 (6.9)	Depression: 0.24 Mania: 0.79
C – Substance Use or Excessive Behavior	Mean (SD) = 2.9 (4.2)	0,38
D - Harm to Self and Others	Self-aggression: Mean (SD) = 8.4 (5.9) Heteroaggression: Mean (SD) = 4.6 (6.9)	Self-harm: -0.02 Heteroaggression: 0.57
E - Behavior	Mean (SD) = 1.6 (2.5)	0,78
F - Cognition and Communication	Mean (SD) = 3.2 (2.0)	0,75
G - Functional Status	Mean (SD) = 1.4 (2.3)	0,36
H - Medications	Mean (SD) = 1.3 (1.0)	0,42
I - Unsettled Relations, Supports, and Life Events	Mean (SD) = 8.9 (4.6)	0,55
K – Psychiatric Summary Information	Mean (SD) = 11.9 (3.9)	0,78

Note^a = Section J had substantial missing data and was dropped from the analysis process.

Discussion

The sections demonstrated, in general, good psychometric properties. With the exception of sections B and D, all the other ones demonstrated evidence of a one-dimensional structure, according to the theoretical expectation of the instrument. Although both sections can be represented in a one-dimensional continuum of mood and aggressiveness changes, the analysis indicate that empirically there is a distinction because of a different pattern of changes in these components. Sections B (mental state indicators) and D (causing damage to oneself and others) demonstrated a structure with two factors, indicating a differentiation between depression and mania, and between self-harm (self-aggression) and damage to others (heteroaggression), respectively. It is important to note that the correlations between the factors of sections B and C are close to zero, indicating that behaviors may or may not occur concomitantly, without a previous expected pattern. Precisely the absence of correlation indicates that any combinations between behaviors are plausible.

The factor loadings of the items were adequate, all with values equal to or greater than 0.30. This indicates that the items are sensitive to detect changes in the latent dimensions indicated by the ESP sections. Even in the sections in which a two-factor solution was observed, the factor loadings of the items in the factors remained within the expected values. The reliability measures were also satisfactory. With the exception of section H (medicines), all measurements are above the expected cut-off point. This means that the answers are consistent, and the presence or absence of one of the indicators correlates with the response to the other items. In section H Cronbach's alpha has acceptable value and McDonald's omega is slightly below expectations, probably due to the small number of items in this section. In this way, you can consider your level of trust appropriate.

The analysis of the main components of the sections (and subsections) of ESP revealed that the areas investigated by the instrument have different weights in the composition of the general mental health index. The most influential sections to designate mental health status were, in order, B (mania), E (Behavior), F (Cognition and Communication) and K (Psychiatric Summary Information). These changes are common to more severe and debilitating disorders, such as bipolar disorders and schizophrenia. In one study of 200,000 people, schizophrenia was significantly correlated with most other disorders, such as bipolar disorders³. Some psychiatrists have put forward a radical hypothesis. If disorders share symptoms, or co-occur, and if many genes are implicated in multiple disorders, then maybe there is a single factor that predisposes people to psychopathology. In 2013, Caspi and Moffitt used data from a long-term study of 1,037 people and found that most of the variation in symptoms could be explained by a single factor called this the '*p* factor' (Marshall, 2020). Others (Lahey, Krueger, Rathouz, Waldman, & Zald, 2017) have proposed that the *p* factor is a general predisposition to psychopathology, but that other factors such as stressful experiences or other gene alterations drives a person towards different symptoms. In

this sense, the use of ESP in large-scale multicenter studies may show evidence of common symptoms in different mental disorders and the correlation between the disorders.

It should be noted that impairments in interpersonal relationships, as indicated in sections D (Harm to Self and Others) and I (Unsettled Relations, Supports, and Life Events) also contribute to the overall worsening in mental health assessment. These results may support shorter and trace versions of ESP. It is noteworthy that the completion of the software provides decision support to the emergency professional on three important scales: Severity of Self-harm Scale; Risk of Harm to Others Scale and Self-Care Index.

Conclusion

The Brazilian version of the interRAI Emergency Screener for Psychiatry (ESP) demonstrates adequate psychometric properties through the internal structure of the instrument. Future studies should investigate the relationship of the scores produced by the instrument with clinical diagnosis and with covariates relevant to mental health outcomes.

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Author contributions:

AH and LABC conceived the study, LABC conducted data collection, WLM conducted the statistical analyses with support from ELF. ELF build the software and managed the database. AH and WLM wrote the first version of the manuscript. JPH reviewed the work, LABC, WLM, ELF, LCPM, JPH and AH have approved the submitted version.

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