Brief Symptom Inventory: reporting Brazilian populational parameters during COVID-19 pandemics

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Abstract

Background: The Brief Symptoms Inventory is a valid and reliable instrument, and one of the most often used tools to assess mental health. Despite its translation to Brazilian Portuguese, there are no normative parameters for interpretation of its scores. **Objective:** This study provides a normative parameter for interpretation of the performance of a large sample of adults by using a version of BSI adapted to Brazilian Portuguese. **Method:** We assessed 2127 adults (57% female) from all of the Brazilian regions. Normative data and Internal consistencies and performance data were calculated for the general score index and the nine factors. **Results:** The associations between gender and BSI scores present a significant effect size. Therefore, we provided a percentile rank parameter for the different BSI subscores, considering the whole sample and gender division. Internal consistency varies from omega equal .87 – .98 and alpha equal .86-.98, which suggests that both GSI and the nine factors have excellent reliability. **Discussion:** Our results support the use of the Brazilian adaptation of BSI in different regions of the country to measure mental health and its specific factors. During the pandemic of COVID-19, the establishment of normative parameters is of utmost relevance. The stability of the parameters reported here should be addressed in future studies.

Introduction

Mental Health is an essential target in clinical practices during COVID-19 pandemics[1]. The outburst of psychiatric symptoms was reported since the beginning of the pandemics. For example, Wang et al[2] reported the immediate impact of pandemics on Chinese subjects' mental health, with the increased symptoms of internalizing symptoms and stress perception. Similar data were reported in a Germany sample suggesting that symptoms of generalized anxiety and major depression increased during pandemics[3]. The impact of pandemics in lifestyle promotes changes in how people deal with work, education, social relationships, nutrition, physical activities, and general health. The impact of life change and fear of disease reinforces the need to monitor population mental health during this period.

The Brief Symptoms Inventory[4] is a screening tool used in mental health practices to assess symptoms of depression, anxiety, somatization, obsession-compulsion, interpersonal sensitivity, phobic anxiety, hostility paranoid ideation, and psychoticism. Moreover, BSI reports a Global Severity Index (GSI) composed of all symptoms assessed by the scale. The scale presents some alternative versions composed of specific items, and in some studies, its specific subscales are used to assess some of the mental health constructs. For example, during COVID-19 pandemics Wang et al.,[5] used the BSI hostility scale to assess mental health in cancer patients. In another study, Ellis et al.,[6] used BSI depression items to

assess depressive symptoms in adolescents and its relationship with the distress induced by social distancing measures adopted during pandemics.

During Covid-19 pandemics, mental health assessment scales have been used to assess many people. This strategy provides an economical and efficient resource in monitoring mental health throughout time and providing an opportunity for mental health guidelines to professionals, policymakers, and general population[6-7]. For example, Tian et al.,[7] using the SLC-90 scale (which measures the same constructs assessed by BSI) during pandemics, found an increase of obsessive-compulsive symptoms, phobic anxiety, and psychoticism. In this paper, authors provide specific suggestions derived from the scales results, considering age, educational level, and specificities concerning risk groups.

BSI was translated to Portuguese, but there is no normative data to interpretation of its scores considering Brazilian populational parameters. This lack of norms hinder its potential to use by clinicians and policymakers to use the scale for screening and monitoring population mental health throughout COVID-19 pandemic. This study provides BSI normative data for the adult Brazilian population.

Methods

An online questionnaire was used, and the data was collected from May to June 2020. Participants were recruited by online advertisements in social media of the Brazilian Association of Psychiatry, Brazilian Association of Dual Pathology and by the Universidade Federal de Minas Gerais. We included only those participants from 20-80 years old. The questionnaire was delivered by the SurveyMonkey platform. The participants agreed with the informed consent before starting to answer the questionnaire. The procedures have been approved by the National Commission on Ethics in Research under the process number CAAE: 30823620.6.0000.5149.

Participants

The participants are 6130 Brazilian adults, with a mean of 42.2 (SD = 13.2, Min = 20, Max = 90) years old, from all Brazilian regions. From that, 82% are female, and around 50% had a university degree and are married or have a stable relationship. In terms of social class, 71% are in class B2 or superior, according to the Brazilian Economic Classification Criteria (BECC), and 55% reported never having been diagnosed with a mental disorder. This initial sample was submitted to a resampling procedure considering several criteria. The procedure is detailed in the "data preparation" session below.

Brief Symptoms Inventory (BSI)

The Brief Symptom Inventory (BSI) is a 53-item instrument designed to identify relevant psychological symptoms. The BSI is suitable for adolescents until 13 years old, adults and older adults, for both clinical and non-clinical groups. The questionnaire provides scores in nine dimensions, covering several psychiatric symptoms of Somatization, Obsession-Compulsion, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism conditions. It is also possible to calculate three general indexes, the Global Severity Index (GSI), Positive Symptom Distress Index (PSDI), and Positive Symptom Total (PST). The items were answered on a 5-points Likert scale from 0 (not at all) to 4 (extremely), and the alpha reliability ranges from .71 (Psychoticism) to .85 (Depression) according to the original manual. In addition, test-retest reliability was provided by global indices, ranging from .87 (PSDI) to .90 (GSI) and for all dimensions that range from .68 (Somatization) to .91 (Phobic Anxiety).

The nine dimensions plus the GSI index were replicated in a Brazilian sample8, indicating a bifactor structure for the BSI. For that sample, the omega reliability was slightly better, ranging from .83 (Paranoid Ideation) to .94 (Anxiety) for the factors and .98 to GSI.

Procedure

Participants were recruited from the internet by a social media campaign between May and July/2020. The participants had access to the questionnaires by the SurveyMonkey platform and should agree with the informed consent. After that step, they proceed to the tests and questionnaires. This research was approved by the National Commission on Ethics in Research under the process number CAAE: 30823620.6.0000.5149 following the Declaration of Helsinki.

Data preparation

To ensure that the norms meaning should be generalized for the population is necessary to create a norm-referenced group that have a similar variability on the interest variable than the population9. In that study, three variables have been taken into consideration, and the reference representatives were based on populational reports from the Brazilian Institute of Geography and Statistics (IBGE). Then, it is expected for the norm-reference sample the foresee characteristics: sex (50.83% female), geographic region (7.8% North, 26.2% Northeast, 43.4% Southeast, 14.8% South and 7.7% Middle-West) and the presence or absence of self-reported previous mental disorder diagnosis (80% absence). To determine the sample size, we proceed a sample size calculation with an interval of 95% confidence and a sample error of 2%, which resulted in an estimated n of 2401. A random selection was made from the primary dataset, to create the norm-referenced dataset.

Statistical procedures

After the data preparation, the norm-referenced data was exported to Jamovi[10], and the scores were calculated for each of the nine dimensions and for the Global Severity Index. The score was based on the original procedure, with calculates the mean of the answered items that composed each factor or the GSI. The missing items are not used. Five percentiles of interest were calculated, the 5th, 25th, 50th, 75th, and 95th percentile. Due to differences reported for males and females, the norms are also calculated for each group. Finally, internal consistency (omega and alpha) was calculated for GSI and each of the nine factors from the bifactor model with semTools[11] and BifactorIndicesCalculator[12] packages from R software[13].

Results

After the resampling procedure, our final sample was composed of 2127 participants (57% female), mainly with a university degree level of education (49%), residing in the southeast region (48.7%), and married or living a stable relationship (55%). The age ranges from 20 throughout 82 years (42.4 ± 13.6 years old). Considering the presence of a diagnostic of mental health disorder in that sample, 21.8% of the participants self-reported having at least one mental health disorder formally diagnosed, and 75% were on B2 or superior class according to BECC.

The norms are presented in Table 1. In general, the reference scores for females are systematically higher than those for males. Considering the 50th percentile, the dimension with higher reference scores are Obsession-Compulsion, Depression, and Anxiety for the general population; Obsession-Compulsion and Anxiety for females; and Obsession-Compulsion, Depression, and Anxiety for males. For all groups, the lower scores at the

Table 1. Reliability and norming references from a Brazilian sample for BSI.

BSI		GSI	Somatization	Obs-Com	Int-Sens	Depression
Reliability (omega; alpha)		.99; .98	.90; .90	.93; .92	.92; .91	.93; .93
5th percentile	General	0,08	0,00	0,00	0,00	0,00
	Female	0,09	0,00	0,00	0,00	0,00
	Male	0,06	0,00	0,00	0,00	0,00
25th percentile	General	0,32	0,00	0,33	0,00	0,33
	Female	0,38	0,14	0,50	0,00	0,33
	Male	0,26	0,00	0,33	0,00	0,33
50th percentile	General	0,67	0,29	0,83	0,50	0,83
	Female	0,76	0,43	1,00	0,50	0,83
	Male	0,57	0,14	0,67	0,50	0,67
75th percentile	General	1,25	0,86	1,67	1,25	1,50
	Female	1,36	1,00	1,83	1,25	1,67
	Male	1,08	0,57	1,50	1,25	1,33
95th percentile	General	2,36	2,00	2,83	3,00	3,17
	Female	2,45	2,14	3,00	3,00	3,17
	Male	2,18	1,71	2,83	2,75	3,15
BSI		Anxiety	Hostility	Phobic Anxiety	Paranoid	Psychoticism
Reliability (omega; alpha)		.95; .94	.93; .91	.90; .87	.87; .87	.89; .86
5th percentile	General	0,00	0,00	0,00	0,00	0,00
	Female	0,00	0,00	0,00	0,00	0,00
	Male	0,00	0,00	0,00	0,00	0,00
25th percentile	General	0,33	0,20	0,20	0,20	0,00
	Female	0,50	0,20	0,20	0,20	0,20
	Male	0,17	0,20	0,00	0,20	0,00
50th percentile	General	0,83	0,60	0,80	0,60	0,40
	Female	1,00	0,60	0,80	0,60	0,40
	Male	0,67	0,60	0,60	0,60	0,40
75th percentile	General	1,50	1,20	1,60	1,20	1,00
	Female	1,67	1,20	1,80	1,20	1,20
	Male	1,17	1,20	1,20	1,20	1,00
95th percentile	General	2,83	2,60	2,80	2,40	2,31
	Female	3,00	2,60	3,00	2,40	2,40
	Male	2,67	2,40	2,80	2,40	2,20

50th percentile were on the Somatization dimension. Internal consistency varies from omega equal 0.87 – 0.98 and alpha equal 0.86-0.98, which suggests that both GSI and the nine factors have excellent reliability.

Discussion

The present data is the first report of Brief Symptoms Inventory parameters scores in a large Brazilian sample from all regions. We reported here populational parameters considering mental health symptoms during the early months of COVID-19 pandemics.

The parameters obtained in this study are different from those suggested in the original BSI manual adopted in Brazil. Both in GSI and the specific scales, we found higher scores in our sample than those reported in Brazilian Manual. Furthermore, comparing our datacom previously reported by Trucato et al.,[14] and we found

the same increasing of mental health symptoms in our sample. Nonetheless, the results reported in this case-control study are more like the reported in the present studies compared to those reported in the BSI manual. Differences between Brazilian and American samples were reported in other mental health screening tools[15]. This could be related to the effect of pandemics due to its effects on everyday life since, as reported by other recent studies, there is an increase in mental health symptoms during COVID-19 pandemics. Future studies should address the stability of this pattern throughout time, assessing if this score represents new normality.

The reliability is good for the Brazilian sample, been slightly better for the norm-referenced sample then the magnitudes found in the first Brazilian study[8]. The omega reliability found in this study is like those reported for the Hungarian[16-17] and Dutch[17] populations, and the alpha reliability is higher than those reported

for Italian[18] and Azerbaijani[19] populations. The cross-cultural evidence about the reliability of BSI may indicate that the scale could be a valuable tool for international comparisons on mental health conditions. However, studies addressing evidence of validity for the meaningful interpretation of the scores considering different contexts and groups, like clinical and non-clinical samples, must be developed to support this intent.

Our results present limitations that should be considered. First, we did not have previous BSI parameters to verify it there is an increase of symptoms presentation during this period. The parameter reported here can be considered because of populational distress during pandemics or even a cultural difference considering the original sample. Nonetheless, the increase of symptoms during this period can require new interpretation parameters since the increase of symptoms does not necessarily represent a disorder, but a mental health load related to new challenges and adaptation. Besides, despite the efforts to adequately represent all the Brazilian regions, some bias remains, especially regarding male participants in the Northeast region. The socioeconomic class was not also eligible as a criterion for the norm-sample reference. Most of the participants came from the superior socioeconomic strata and will not be able to have a suitable representation of the overall population for that characteristic. It should be addressed for future works.

The use of scales assessing mental health symptoms related to traumatic events is important to monitoring people considering clinical, research and public policy targets [20]. Nonetheless, we have a new question to address in future researches. Since this pandemic and its consequences have a probably long duration, new parameters to old screening tasks should be necessary for clinical and public policy decisions.

Acknowledgements

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