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Exploratory factor analysis of Kenny Music Performance Anxiety Inventory (K-MPAI) in a Brazilian musician sample

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Abstract

Background: The Kenny Music Performance Anxiety Inventory (K-MPAI) is very significant among the available instruments which measures Musical Performance Anxiety (MPA). Objective: The aim of this study is to find evidence of validity of the Kenny Music Performance Anxiety Inventory (K-MPAI), in its translated and adapted Brazilian version, through the study of its factor structure. Methods: A convenience sample of 230 amateur musicians completed the K-MPAI. Results: The initial factor analysis yielded eight factors, explaining 62.4% of variance. However, due to the factors’ composition and internal consistency values lower than 0.50, the number of factors was later set at three, considering the internal consistency of those, the theoretical propositions and symptomatology aspects that supported the construction of scale. They were named “Worries and insecurity” (α = 0.77) and “Early parental relationships” (α = 0.57). Discussion/Conclusions: These results point to the scale’s construct validity, since they support the theoretical basis used for the development of the K-MPAI and the clinical manifestations of the MPA.

Barbar AEM et al. / Arch Clin Psychiatry. 2015;42(5):113-6

Keywords: Music, anxiety, scaling, test validity, factor analysis.

Introduction

Reading a text, dancing, singing a song, engaging in sports activities or even calculating in public can cause immense anxiety in some individuals. When this suffering represents a persistent and distressing apprehension towards public performance, it is characterized as an impairing disorder called Performance Anxiety. When anxiety is specifically related to musical performance of any nature, it is described as Musical Performance Anxiety (MPA), which may be, in some cases, considered a Social Anxiety Disorder subtype1.

MPA is a multidimensional phenomenon that often affects professional musicians and music students during their music performances and that can have strongly impact not just on an isolated performance, but also on the career and mental health of the affected one.2 It has, until recently, been conceptualized as a unidimensional phenomenon with career stress at the low end and stage fright at the high end.3 However, Kenny1 has argued for a typology of MPA, with three relatively distinct forms of the condition. However, the field is in need of studies that can link assessment and diagnostic factors of MPA, using validated psychometrical instruments in clinical use.

Burguès and Kenny conducted literature reviews of the available instruments to assess MPA, as well as their instruments’ published psychometrical parameters. Both authors observed that most of the instruments were either inadequate or not assessed for their psychometrical qualities. Their studies concluded that there is lack of adequate instruments to assess MPA disorder and it renders the meaningful conduct of epidemiological studies even more challenging. Further, such instruments do not provide robust reference parameters for clinical use and MPA treatment.

The Kenny Music Performance Anxiety Inventory (K-MPAI) is very significant among the available instruments. This scale takes the anxiety model proposed by Barlow as reference. According to this model three facets make individuals more or less susceptible to anxiety: a) vulnerability/biological inheritance; b) general psychological vulnerability, based on the development of primary experiences and; c) specific psychological vulnerability, associated with learning processes.

The K-MPAI is composed of 26 items and is used to evaluate symptoms of anxiety expression, tension, memory alterations and negative cognitions due to MPA. It also seeks to assess MPA through elements related to individual history, especially regarding the history of parent-child relationships and the attention received from parents during childhood (primary experiences during development, according to Barlow3).

In the original study presented by Kenny et al., the K-MPAI was tested for its internal consistency and demonstrated 0.94 Cronbach’s alpha. It also presented positive and significant correlations with the state and trait subscales of the STAI (State-Trait Anxiety Inventory) – which is a general anxiety assessment instrument – and with the Cox & Kenardy MPA Scale (CK-MPA) – which is a specific instrument to assess MPA. All these correlations were higher than 0.80 and it attests to the concurrent validity of the K-MPAI.

Kenny subsequently suggested an expanded version of this instrument with 40 items: the K-MPAI-R. She conducted two exploratory factor analyses using this version: one with professional musicians and another with tertiary level music students. It has also been the object of research by Rocha et al. in Brazil. Nevertheless, the current study aimed to conduct a cross-cultural validation in order to validate the initial version of the scale adapted to the Brazilian context. This validation was based on version’s adequate psychometric properties and on its smaller number of items. Both aspects were essential for screening. The current article presents evidence of K-MPAI validity by analyzing its internal structure.

Methods

Participants

The current study used a convenience sample composed of 230 adult musicians (mean age 39.17 years – SD = 16.48). The musicians had different school levels (graduates or undergraduates were the majority: 53.9%), most of them were women (58.3%) and most of them classified themselves as amateur musicians (61.3%). All of the participants signed the Free and Informed Consent Term adopted by the present study. The inclusion criterion was the participation in frequent public musical performances and the exclusion criterion was the incorrect filling of the instruments and psychiatric disorders. Approximately 41.6% of the participants had voice as their main musical instrument, and it was followed by chords (18%) and keyboard instruments (10.8%).

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Instruments

The following instruments were used to achieve the current study aims:
- Kenny Music Performance Anxiety Inventory (K-MPAI) – instrument proposed by Kenny et al.; translated and adapted to Brazilian Portuguese by Barbar et al. She used bilingual independent translators and her version was evaluated by a specialist committee which analyzed the back-translation and the pilot study, according to the recommendations of Beaton et al. The instrument is composed of 26 items to be punctuated according to the likert scale, which ranges from "strongly disagree" (-3) to "strongly agree" (+3);
- Identification Form – was developed for the present study and composed of 12 items used to obtain a social-demographic description of the sample.

Procedure

Data collection: An initial inquiry was conducted to contact many of the musical groups and active schools in Ribeirão Preto County where potential participants could be found. The instruments were individually completed by musicians gathered in groups. There were always two previously trained researchers assisting the groups. They were in charge of conducting the procedure.

Data analysis: The sample's clinical and social-demographic data were analyzed by means of descriptive statistics. An exploratory factorial analysis was carried out to investigate data related to the K-MPAI construct validity using the components analysis by varimax rotation, after the promax rotation analysis showed that the factors were not correlated with each other (following parameters suggested by Fabrigar et al.). The criteria used to compose the factors were: Kaiser-Meyer-Olkin (KMO) index above 0.60; significant Bartlett’s test, self-values above 1; minimum variance accounted by factors of approximately 60%; and minimum load factor of approximately 0.40.

Ethical considerations: The current study was approved by the Local Ethics Committee, according to process 12206/2009.

Results

The KMO was calculated to test the habituation of the sample before the factorial analysis and the outcome was favorable (0.81). Bartlett’s test was also significant ($\chi^2 = 1364.43$, $p < 0.001$). Kaiser’s criteria – which considers all factors with self-values above 1 – were used to determine the number of factors: eight factors were found, as show in table 1.

All of the eight factors found on this analysis and presented on table 1 account for 62% of the variance, and Factor 1 contributes to more than 23% of the variance, whereas the other factors are responsible for less than 10% each. The same eight principal components were extracted by varimax rotation. Therefore, a new factorial matrix was created and it dealt with individual items of the scale that were related to the factors. However, the result seemed unsatisfactory, since the alpha values were lower than 0.50 for some factors.

Hence, due to the theoretical structure on which this instrument was developed, other exploratory analyses were carried out by a priori fixing the factor number. Initially, different and random variable arrangements were tested. Finally, the models with three, four and five factors were preserved. After each model was qualitatively investigated, the content and the internal consistency indicators were analyzed. The present research team concluded that models 5 and 4 were inadequate due to the abovementioned with respect to the 8-factor model.

On the other hand, the same parameters showed that the 3-factor model was the most appropriate in view of the theoretical propositions and symptomatology used by the author by the time this assessment scale was developed. Table 2 shows the values of the rotated matrix of the K-MPAI components and it took a varimax rotation under consideration in the pre-fixed 3-factors model.

| Item | 1 | 2 | 3 |
|------|---|---|---|
| k20  | 0.720 | 0.152 | -0.002 |
| k12  | 0.679 | 0.162 | 0.133 |
| k10  | 0.661 | 0.092 | -0.055 |
| k13  | 0.624 | 0.215 | -0.212 |
| k22  | 0.624 | 0.283 | 0.094 |
| k18  | 0.624 | 0.133 | -0.237 |
| k15  | 0.600 | 0.168 | 0.025 |
| k17  | 0.544 | 0.247 | -0.113 |
| k25  | 0.544 | 0.190 | -0.197 |
| k14  | 0.448 | -0.022 | 0.324 |
| k7   | 0.352 | 0.214 | 0.140 |
| k11  | 0.192 | 0.697 | 0.015 |
| k23  | 0.290 | 0.678 | 0.038 |
| k4   | 0.195 | 0.860 | -0.004 |
| k1   | 0.110 | 0.077 | 0.077 |
| k6   | 0.247 | 0.604 | -0.030 |
| k5   | 0.018 | 0.545 | 0.124 |
| k3   | 0.139 | 0.537 | 0.067 |
| k21  | 0.142 | 0.477 | -0.078 |
| k16  | 0.221 | 0.458 | -0.247 |
| k24  | 0.010 | 0.229 | 0.718 |
| k19  | -0.008 | 0.106 | 0.687 |
| k9   | -0.129 | 0.206 | 0.544 |
| k26  | 0.322 | -0.087 | 0.428 |
| k2   | -0.031 | -0.207 | 0.285 |
| k8   | 0.071 | 0.129 | -0.215 |

Table 1: Exploratory factor analysis of K-MPAI: self-values description and variance proportion explained by each factor (in percentage)

| Factor | Self-value | % of variance |
|--------|------------|--------------|
| 1      | 6.003      | 23.090       |
| 2      | 2.212      | 8.510        |
| 3      | 1.783      | 6.856        |
| 4      | 1.487      | 5.721        |
| 5      | 1.376      | 5.292        |
| 6      | 1.187      | 4.565        |
| 7      | 1.146      | 4.409        |
| 8      | 1.027      | 3.950        |
| 9      | 0.978      | 3.763        |
| 10     | 0.832      | 3.198        |
| 11     | 0.810      | 3.117        |
| 12     | 0.773      | 2.973        |
| 13     | 0.740      | 2.847        |
| 14     | 0.686      | 2.640        |
| 15     | 0.618      | 2.376        |
| 16     | 0.537      | 2.067        |
| 17     | 0.496      | 1.909        |
| 18     | 0.478      | 1.840        |
| 19     | 0.458      | 1.763        |
| 20     | 0.429      | 1.649        |
| 21     | 0.402      | 1.546        |
| 22     | 0.367      | 1.410        |
| 23     | 0.330      | 1.267        |
| 24     | 0.309      | 1.190        |
| 25     | 0.277      | 1.066        |
| 26     | 0.256      | 0.986        |

Table 2: Factor matrix to each K-MPAI item, considering a three-factor model and varimax rotation.
As for the 3-factors model, it was observed that Factor 1 had ten items with loads ranging from 0.72 to 0.45. After the qualitative analysis, this factor was called "Worries and Insecurity", with 0.82 alpha. Factor 2 was composed by nine items, with 0.77 alpha. This factor was called "Depression and Hopelessness" due to the item content. Finally, Factor 3 was the one with the lowest number of items and it was composed of four items and 0.57 alpha. This factor was named "Early Parental Relationships", since these items mention the early experiences between musicians and their parents in childhood. Items 2, 7 and 8 were excluded from the factor arrangement because they didn't show significant load in any of the three factors. Table 3 presents the final factor composition suggested by the present analysis.

### Discussion

The current article focused on the study of K-MPAI's construct validity, by means of an exploratory factor analysis of this scale. After testing different factor arrangements it was observed that the model with three factors ("Worries and Insecurity", "Depression and Hopelessness" and "Early Parental Relationships") was the most consistent one. These factors are closely bounded to some of the theoretical aspects pointed out in the literature as important etiological determinants of a clinical case in MPA. Some dimensions of the clinical framework in this disorder are also found on the following factors: the presence of strong negative cognition, feelings of insecurity and hopelessness.

The factors are associated not only with the theoretical principles proposed by the author when the scale was developed based on Barlow's theory, but also with the main expressions of the disorder. That being said, it can be observed that Factor 1 ("Worries and Insecurity") and Factor 2 ("Depression and Hopelessness") overlap with some of the symptoms of anxiety, depression and dysthymia within the MPA construct; especially when there is lack of trust in oneself and hopelessness regarding resources and cure likelihood. Such factors are closely related to biological inherited and learned vulnerability aspects, and it strengthens the multiaxial theories that describe MPA.

However, Factor 3 ("Early Parental Relationships") gathers items with weaker item-total correlation, as well as with internal consistency lower than that of the acceptable parameters. This factor maintains a direct association with the psychological vulnerability ideas based on early experiences, as it was highlighted by Barlow and Kenny et al. An important discussion regarding the lower scores presented by this factor concerns the aspects related to parental relationships that are not seen as part of MPA development or maintenance processes. These aspects are not even mentioned in the theoretical framework proposed by Papageorgi et al. as a relevant element to understand MPA. Therefore, the weak item-total correlation in Factor 3 and the consistency may pinpoint weaker correlations between the historical aspects of the individual and the MPA disorder development (and other possible comorbidities). It points towards the diminished importance of early experiences to MPA onset. It should be taken into account that Factor 3 had the smallest number of items and it has a negative effect on the alpha value.

The elements related to professional and environmental events associated with MPA and mentioned by Kenny et al. and Papageorgi et al., Lamont, Kenny, Ryan and Andrews, Yoshie et al. and Taborsky, are not taken under consideration in the K-MPAI's items. This could be a limitation for the scale, since these variables are considered relevant in the literature and to the experience of MPA. On the other hand, responses to professional and environmental events such as solo vs ensemble performance, adjudicated vs non-adjudicated performances, or rehearsals vs performances show considerable uniformity of response among musicians, since most of them reported that auditions are the most stressful performance types, and rehearsals and private practice the least stressful ones. The K-MPAI is primarily focused on the psychological factors related to MPA, which are more poorly understood than these other factors.

The current study presents some guidelines to fulfill the absence of previous studies on the composition of the K-MPAI factors. However, the study used a convenience amateur musician sample from a specific Brazilian region.

Therefore, further studies must test this factor arrangement through confirmatory factor analysis to corroborate K-MPAI validity. The search for evidence of validity and reliability is also important in order to substantiate the psychometric properties of this scale and to stimulate its clinical use, as an assessment instrument for this impairing and underdiagnosed disorder. Thus, it could open doors for the musicians seeking treatment to finally perform with success and reach the best of their musical careers.

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**Table 3.** Final result of the exploratory factor analysis of K-MPAI considering the three-factor model and varimax rotation

| Factor                  | Alpha | Items in factor                                                                 |
|-------------------------|-------|---------------------------------------------------------------------------------|
| 1. Worries and Insecurity | 0.82  | 10 – I never know before a concert whether I will perform well                   |
|                         |       | 12 – During a performance I find myself thinking about whether I’ll even get through it |
|                         |       | 13 – Thinking about the evaluation I may get interferes with my performance     |
|                         |       | 14 – Even in the most stressful performance situations, I am confident that I will perform well |
|                         |       | 15 – I am often concerned about a negative reaction from the audience          |
|                         |       | 17 – From the beginning of my music studies, I remember being anxious about performing |
|                         |       | 18 – I worry that one bad performance will ruin my career                      |
|                         |       | 20 – I give up worthwhile performance opportunities due to anxiety             |
|                         |       | 22 – I often prepare for a concert with a sense of dread and impending disaster |
|                         |       | 25 – I worry so much before a performance, I cannot sleep                      |
| 2. Depression and Hopelessness | 0.77  | 1 – Sometimes I feel depressed without knowing why                                |
|                         |       | 3 – I rarely feel in control of my life                                         |
|                         |       | 4 – I often find it difficult to work up the energy to do things                |
|                         |       | 5 – Excessive worrying is a characteristic of my family                        |
|                         |       | 6 – I often feel that life has not much to offer me                             |
|                         |       | 11 – I often feel that I am not worth much as a person                          |
|                         |       | 16 – Sometimes I feel anxious for no particular reason                         |
|                         |       | 21 – As a child, I often felt sad                                              |
|                         |       | 23 – I often feel that I have nothing to look forward to                        |
| 3. Early Parental Relationships | 0.57  | 9 – My parents were mostly responsive to my needs                                |
|                         |       | 15 – My parents almost always listened to me                                    |
|                         |       | 24 – My parents encouraged me to try new things                                 |
|                         |       | 26 – My memory is usually very reliable                                         |
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Induction and comparison of craving for tobacco, marijuana and crack

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Abstract

Background: The literature findings report that use of multiple substances can produce adverse clinical and behavioral effects, which may affect craving and the results of drug treatment. Also, the understanding of craving construct and its interaction in the use of smoked substances is underexplored. Objectives: To induce and compare craving for tobacco, marijuana and crack-cocaine on hospitalized dependents whose drug of choice is crack-cocaine. Methods: Quasi-experimental study with a convenience sample consisting of 210 males divided into 3 equal groups (Group-1: craving induced by crack; Group-2: craving induced by tobacco; and Group-3: craving induced by marijuana). All participants met ICD-10 dependence criteria for cocaine/crack, marijuana and tobacco, were aged between 18 and 65 and had used these substances for at least one year. Photos were used to induce craving and self-report instruments to evaluate possible alterations. Results: This study showed that craving for tobacco was more intense than for marijuana and crack, when the groups were compared byVAS. Using specific scales, both craving for tobacco and craving for marijuana were more intense than craving for crack. Discussion: These results would imply interventions at the initial stages of abstinence with cognitive-behavioural techniques and pharmacotherapy in order to reduce craving.

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Keywords: Craving, tobacco, marijuana, crack cocaine, multiple dependence.

Craving is an important concept in the area of drug dependence and has been discussed for more than a century; Merck’s Manual of the Materia Medica1 had, in 1899, already proposed that cocaine be used to relieve craving for alcohol, demonstrating one of the first attempts to “medicate” craving. In 1954, at a meeting of experts from the World Health Organization1, Jellinek, among others, concluded that the term “craving” was scientifically inaccurate, as it referred only to an urgent and intense desire. The group therefore decided to replace “craving” for physical dependence – in cases of craving related to withdrawal symptoms – and pathological desire – in cases of desire occurring after a longer period of abstinence1. Isbell1 emphasized that craving was very difficult to define as it could mean different things to different people.

Currently, different concepts of craving can be verified. These range from the best known “intense desire to consume a particular substance”3 to one that encompasses not only the desire but also “the expectation of a positive effect, the relief of withdrawal symptoms and negative affect and the intention to use the drug”4. Rankin et al.8 argued that craving is a multi-dimensional construction and must therefore involve physiological, psychological and behavioural aspects.

Despite the importance of this issue, there is little research analysing and comparing craving for psychoactive substances. Tiffany et al.3 considered, for example, that craving for cocaine was related to a different area than that experienced by tobacco: the lack of control; however no research was conducted to prove this difference. On the other hand some studies have demonstrated evidence that craving for tobacco and smoked cocaine (crack) are associated8 and that exposure to nicotine can increase cocaine self-administration11 as well as trigger its craving, especially among crack users2.

Regarding craving for marijuana, on one hand, one study13 verified that 93% of marijuana dependents reported only a mild craving for the substance whereas, another research14 observed that dependents reported a more intense craving than cocaine dependents. Budney et al.15 when comparing craving for marijuana and tobacco, found that craving for tobacco was slightly more intense.

The literature findings report that cocaine/crack dependents have a history of other psychoactive substances use16 and that such use of multiple drugs can produce adverse clinical and behavioural effects, cumulative and synergistic, via interaction between the substances, which may affect craving and the results of drug treatment16. Because of the need to better understand the craving construct and its interaction in the use of smoked substances, the purpose of this article is to induce and compare craving for tobacco, marijuana and cocaine (crack) on hospitalized dependents whose drug of choice is crack.

Methods

Design

This is a quasi-experimental study.

Participants

The subjects were chosen “by convenience” which is defined17 as a means of selecting data on which there is a no statistical randomness but a value judgment, for example, subjects’ accessibility as a criterion. The sample consisted of 210 male subjects, admitted to the specialized chemical dependency unit of the São Pedro Psychiatric Hospital (Porto Alegre – RS), divided into 3 groups each comprising 70 subjects. Group 1 (induced craving for crack), group 2 (induced craving for tobacco) and group 3 (induced craving for marijuana).

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Inclusion criteria
Fulfil ICD-10 dependence criteria for cocaine/crack, marijuana and tobacco. Been using these substances for at least one year, with a minimum education level of fifth-grade elementary school and aged between 18 and 65 years old. Participants must have been abstinent for a period of 7-21 days. All were undergoing Nicotine Replacement Therapy (transdermal 21 mg) – which is part of the inpatient unit treatment protocol – and were using psychiatric medication. The inclusion of the subject in the study was only done if cocaine/crack was their “drug of choice” (favourite), since it is difficult to observe cocaine/crack dependents that do not use other substances. This criterion had already been used in previous studies\textsuperscript{9-19}.

Exclusion criteria
Presenting psychotic symptoms, acute symptoms of mood disorder (assessed by the SRQ-20; Mari & Williams, 1986), being dependent on other substances or having cognitive impairments that altered performance in the tests according to the Mini-Mental State Examination\textsuperscript{20}.

Instruments

Demographics and substance use
Form with socio-demographic data and information related to pattern of psychotrophic substance consumption.

Cognitive level
Mini-Mental State Examination (MMSE)\textsuperscript{20} – screening test to assess cognitive level at the time of the interview. 25/30 points suggests commitment, and < 20 points indicates, with certainty, that there is cognitive impairment\textsuperscript{21}. For this research a cut-off point below 25 points was used to exclude patients with cognitive impairment from the sample group.

Presence of psychotic symptoms
SRQ-20 – A scale previously validated in Brazil\textsuperscript{22}, which screened the general population and classified adults either as neurotic (> 7), who could participate in the study, or psychotic (> 1), who were excluded.

Severity of dependence
Severity of Tobacco, Cocaine/Crack and Marijuana dependence – as there are no validated instruments to assess the severity of dependence on Cocaine/Crack and Marijuana, only on tobacco, in order to standardize the assessment of the severity in all groups, their weekly consumption was taken as a parameter.

Anxiety symptoms
Beck Anxiety Inventory (BAI)\textsuperscript{32}: this is a scale that measures the severity of anxiety symptoms. It consists of 21 questions in which the subject must grade on a four point scale. The total score is obtained by summing the individual scores of each question. The cut-offs for psychiatric patients, according to the norms of the Portuguese version, are: 0-10 = minimal, 11-19 = mild, 20-30 = moderate and 31-63 = severe\textsuperscript{34}. This will be administered to the three groups of participants.

Depression symptoms
Beck Depression Inventory (BDI)\textsuperscript{34}: is designed for measuring the severity of depression, both in psychiatric patients and in the general population. It consists of 21 multiple-choice questions, each with four alternatives; the subject must choose the most applicable feeling at that moment. The total score is the sum of the points. The cut-offs for psychiatric patients were published in 2001 along with the Portuguese version by Cunha: 0-10 = minimal, 11-19 = mild, 20-35 = moderate and 36-63 = severe\textsuperscript{34}.

Craving intensity
Visual Analogue Scale (VAS) – to assess craving this will be administered to all three groups, the individual will be asked to give their craving a grade, where 0 (zero) is the minimum grade (has no craving) and 10 the maximum (presents a very strong craving), this value is marked on a 10 cm scale. Several authors have used the Visual Analogue Scale to assess craving in their research\textsuperscript{26-30}.

Cocaine craving
Cocaine Craving Questionnaire Brief (CCQ-Brief)\textsuperscript{19}: 10 scale statements compiled from the 45 statements Cocaine Craving Questionnaire – Now. The CCQ-Brief is a Likert 7-point scale ranging from "strongly disagree" to "strongly agree". The CCQ-Brief and its version adapted for crack were validated in Brazil\textsuperscript{30-31}. The score of the CCQ-Brief – Adapted Brazilian version for Crack is obtained from the total sum of the points (with the statements 4 and 7 reversed should be added to the other); from Factor 1 (points) – on the craving itself (the sum of all issues except 4 and 7) and Factor 2 – associated with lack of control of crack use (sum of questions 4 and 7 inverted). The cut-offs in the Brazilian version, for the total scale points, are: 0-11 points, minimum craving; 12 to 16, mild; 17-22, moderate; and 23 or more points, intense craving. This questionnaire will only be applied to Group 1.

Tobacco craving
Questionnaire of Smoking Urges Brief – Brazilian Version – QSU-B\textsuperscript{32} – is an abbreviated scale developed by Cox et al.\textsuperscript{33} from the Questionnaire of Smoking Urges (QSU)\textsuperscript{7} used to assess craving for tobacco. It is comprised of 10 affirmative statements, to which the individual must state their position using a Likert 7-point scale ranging from "strongly disagree" to "strongly agree". The QSU-B in its Brazilian validation\textsuperscript{34} can be analysed by the sum total of points and by the points of factor 1 related to craving for the positive reinforcing properties of tobacco (statements 1, 3, 7 and 10) and by factor 2 related to craving of the negative reinforcing properties of this substance (statements 4, 8 and 9). The cut-offs in the Brazilian version for the scale points total are: 0-13 points, minimum craving; 14-26, light; 27-42, moderate; and 43 or more points, intense craving. This questionnaire will only be applied to Group 2.

Marijuana craving
Marijuana Craving Questionnaire – Short Form – MCQ-SF\textsuperscript{34} – It is a self-reporting scale of 12 items, using Likert 7 points ranging from “strongly disagree” to “strongly agree”. It is an abbreviated version of the MCQ\textsuperscript{19}, a multidimensional scale of 47 items. In Brazil, the semantic validation was made by Pedroso et al.\textsuperscript{35}. In his psychometric\textsuperscript{35} the MCQ-SF was divided into three factors: Emotionality (questions 1, 9 and 11), Intentionality (questions 3 and 10) and Compulsivity (questions 2 and 7) and may be analysed in addition to the method of the points in each factor by the sum of the total points (of 12 questions). The cut-offs points in the Brazilian version for the total of the scale points are: 0-23 points, minimum craving; 24-38, light; 39-53, moderate; and 54 or more points, intense craving. This will only be applied to Group 3.

Materials to induce craving
\textsuperscript{1/4} A4 size images of marijuana, crack cocaine and tobacco. Before being employed in this research the photos were considered faithful substance representations, with the potential to elicit craving, by a group of 20 hospitalized patients.
Ethical aspects
Data collection was only initiated after the research project had been approved by the Research Ethics Board of São Pedro Psychiatric Hospital. Before participants were accepted to be part of the research project its purpose was explained to them and they were provided with a written informed consent, which was read with the individual and any possible doubts clarified. The signing of this form was a precondition for the participant to be included in the sample. This research was also conducted in accordance with the Helsinki Declaration as revised 1989.

Procedures for data collection
Each participant who fulfilled the inclusion criteria was sent individually to a room where an assessment interview was conducted and a record containing socio-demographic data and pattern of psychoactive substance consumption was completed. The SRQ-20, on how they felt at that moment was administered its diagnosis evaluated using ICD-10. During the experimental study, we recorded the period of abstinence from the last crack, tobacco or marijuana consumption, which determined whether the participant would be part of Group 1, 2 or 3 (if evaluated to be part of the marijuana group they would go there, if possible, if not they would go to another group with priority given to the group with less participants).

After deciding into which group the participant would be placed, they were individually shown, for 3 minutes, a photo of the desired craving (crack, tobacco or marijuana) related to their group after which other evaluation instruments were administered in the following order: CCQ-Brief (only for patients in Group 1), QSU-B (only for patients in Group 2), MCQ-SF (only for patients in Group 3), VAS, BAI and BDI (for all groups).

Data analysis
The data collected was processed in the SPSS statistics software (v.20; SPSS Inc., Chicago, IL). Exploratory data analysis consisted of descriptive and frequency tests. The inferential analysis employed the tests: Chi-squared and Analysis of Variance (ANOVA) with Tukey’s test. As the QSU-B and CCQ-Brief scales have ten statements each but the MCQ-SF has twelve, the following calculation: “Total points MCQ-SF/12 x 10” was used to allow different substance craving results to be compared. The result of this calculation and the raw scores of the QSU-B and CCQ-Brief will be presented in table 1. The significance level used as a parameter was 5%.

Results
Each of the three groups was composed of 70 participants, regarding marital status, in accordance with the chi-squared test, there was no significant difference between groups ($\chi^2 = 8.217; p = 0.223$) with a prevalence of singles: 74.3% ($n = 52$) in the Crack Group, 80.0% ($n = 56$) in the Marijuana Group and 67.1% ($n = 47$) in the Tobacco Group. Group comparison regarding other socio-demographic variables, patterns of substance use and symptoms of depression and anxiety can be seen in table 2. The comparison of craving in the three groups via the Visual Analogical Scale and other Scales to assess craving (CCQ-Brief, QSU-B and MCQ-SF), can be seen in table 1. In both tables, ANOVA with Tukey’s test was used.

Table 3 shows the severity of craving according to the analysis of the total of points from the scales and according to the points of its factors considering its cut-offs, which were published in their respective psychometric validation.

Discussion
When analysing the results of this study, it was observed that the marijuana group was younger, had first begun by using alcohol (earlier than the tobacco group), had used crack and inhaled cocaine (earlier than the other two groups) and had spent less time without using inhaled cocaine (compared to the tobacco group) and without using marijuana (than either of the other two groups). In addition, they used an extreme amount of marijuana (about 30 joints per week), independent of this variable there didn’t appear a significant difference in the three groups. Such findings may be due to the convenience sample since most patients stopped using marijuana for a period greater than 21 days and before hospital admission (an inclusion criteria). Those who remain using marijuana seem to have a more serious drug use profile, which may have interfered with the craving. This result associated with the interruption of marijuana use, well before hospitalization, had already been highlighted in previous studies, while researching crack addicts hospitalized for detoxification.

The Tobacco group was hospitalized for some time, but this difference did not affect the results, since the controlled variable was time in abstinence and not length of hospitalization and the, tendency of smokers to continue using tobacco. The Crack group used higher amounts of inhaled cocaine than the tobacco group, however, patients tended to be abstinent from this form of cocaine use during hospitalization, which cannot be taken as an intervening variable when comparing craving in the three groups. The interruption of inhaled cocaine when given crack was discussed by Balbinot and Araujo.18

The abstinence period of marijuana, however, may have affected the intensity of craving, but this variable cannot be controlled because of the characteristic of the sample, who had – as observed in other studies39–40 – a longer period abstinent from marijuana. However, the association between the length of abstinence of marijuana and craving was not found in a previous study37.

There was no significant difference in the three groups for symptoms of depression and anxiety, mental states that could have interfered with craving, as already highlighted in other studies31,32,40,41. When comparing craving using the Visual Analogue Scale, the tobacco group demonstrated a more intense craving than the other groups; however when the specific assessing scales for craving were used, the tobacco and marijuana groups had a more intense craving than the crack group. That the craving result for marijuana is more intense than for crack resembles the one found by McRae et al.14, however, with respect to inhaled cocaine it contrasts with another study12 which didn’t find an intense craving for marijuana.

The more intense tobacco craving, than that for other substances, might be associated with the fact that many patients – contrary to what occurs with crack – are not motivated to stop using this substance, this association had already been emphasized11. Haller et al.44 also observed this phenomenon while researching the motivation for change in female smokers, however, it should be noted that other studies found no correlation between craving and motivation for change in smokers32,40,41, which means this would be just one of the aspects to explain this finding, since dependence, abstinence and all corresponding phenomena with craving have multifactorial etiology.

Analysing craving for the three substances from their sub-factors, adding the rates of moderate and severe degrees, it can be observed that factor 2 of craving for crack (which refers to uncontrolled crack use), the emotionality factor craving for marijuana and factor 2 (negative reinforcing capacity) the craving for tobacco had higher scores. These results demonstrate that craving associated with the use of the substance for the relief of negative affect (such as anxiety and depression) or withdrawal symptoms was more intense than that for obtaining pleasure (positive reinforcement). The relevance, in this sample, of emotional aspects and negative reinforcing potential of substances to induce craving had already been verified in research concerning the craving for tobacco43,44, and marijuana37.

Limitations of this study are related to their possible interference with craving. They are: the large average amount of marijuana used by the three groups, the length of marijuana abstinence (which is higher in the marijuana group), the fact that psychiatric medication was not controlled42 and the motivation to change addictive behaviour not being assessed; which mainly may have affected the tobacco craving values42,43, which most patients did not intend to stop after hospitalization.
### Table 1. Comparison of the averages in the three groups of scores on the craving scales

| Variable | Total Sample | Group 1 – Crack | Group 2 – Marijuana | Group 3 – Tobacco | ANOVA |
|----------|--------------|----------------|--------------------|--------------------|-------|
| Craving according to Visual Analogic Scale | 3.41 (3.39) | 0.71 (1.20) | 0.71 (1.20) | 0.71 (1.20) | 28.91 (7.52) | 18 | 48 | 10 | 21 | 4.671 < 0.001 |
| Craving according to specifics scales for each group | 26.60 (17.31) | 16.30 (9.60) | 16.30 (9.60) | 16.30 (9.60) | 33.70 (20.12) | 10 | 70 | 4.003 < 0.001 |

M: means; SD: standard deviation; Min: minimum; Max: maximum; *: means significant differences according to the Tukey's test; F: F-ratio test.

### Table 2. Sample characteristics regarding sociodemographic variables, pattern of use of substances and symptoms of depression and anxiety

| Variable | Total Sample | Group 1 – Crack | Group 2 – Marijuana | Group 3 – Tobacco | ANOVA |
|----------|--------------|----------------|--------------------|--------------------|-------|
| Age      | 28.02 (7.41) | 29.35 (7.75) | 28.89 (7.73) | 25.89 (7.25) | 4.671 0.010 |
| Years of Education | 7.93 (2.37) | 8.04 (3.79) | 8.04 (3.79) | 8.04 (3.79) | 0.621 0.538 |
| Days of hospitalization | 8.04 (3.79) | 22.94 (6.58) | 19.15 (5.31) | 22.09 (6.65) | 3.345 0.037 |
| Age at first use of crack | 22.94 (6.58) | 19.15 (5.31) | 22.09 (6.65) | 22.09 (6.65) | 6.864 0.001 |
| Amount of crack use (in rocks)/week | 19.04 (22.67) | 23.02 (27.37) | 24.97 (30.66) | 25.03 (28.10) | 1.060 0.348 |
| Last use of crack (days) | 55.87 (303.96) | 38.58 (129.45) | 38.58 (129.45) | 38.58 (129.45) | 2.639 0.074 |
| Age at first cocaine use | 17.05 (2.41) | 17.53 (4.22) | 17.42 (3.94) | 17.42 (3.94) | 5.236 0.006 |
| Amount of cocaine grams/week | 11.67 (20.12) | 9.54 (2.79) | 9.74 (2.79) | 9.74 (2.79) | 3.953 0.021 |
| Last use of cocaine/days | 576.14 (1208.89) | 36.58 (129.45) | 36.58 (129.45) | 36.58 (129.45) | 7.822 < 0.001 |
| Age at first use of marijuana | 15.46 (3.51) | 15.46 (3.51) | 15.46 (3.51) | 15.46 (3.51) | 2.452 0.089 |
| Amount of marijuana cigarettes/week | 24.35 (28.71) | 24.97 (30.66) | 25.03 (28.10) | 25.03 (28.10) | 2.365 0.097 |
| Last use of marijuana (days) | 8.64 (3.49) | 8.31 (3.20) | 8.73 (4.01) | 8.73 (4.01) | 0.343 0.710 |
| Age at first alcohol use | 13.58 (3.24) | 13.58 (3.24) | 13.58 (3.24) | 13.58 (3.24) | 3.158 0.045 |
| Units of alcohol* use/week | 63.66 (100.82) | 63.66 (100.82) | 63.66 (100.82) | 63.66 (100.82) | 0.026 0.974 |
| Last use of alcohol (days) | 89.22 (355.85) | 40.03 (100.11) | 40.03 (100.11) | 40.03 (100.11) | 1.392 0.252 |
| BDI total | 15.93 (11.10) | 14.23 (8.83) | 17.82 (12.48) | 17.82 (12.48) | 1.898 0.152 |
| BAI total | 10.95 (10.43) | 9.70 (9.79) | 11.54 (10.96) | 11.54 (10.96) | 0.743 0.477 |

M: means; SD: standard deviation; Min: minimum; Max: maximum; * Unit of alcohol: 10 grams of alcohol; #: means significant differences according to the Tukey's test; F: F-ratio test.

### Table 3. Levels of craving for crack, marijuana and tobacco

| Variable | CCQ-Brief Total | MCQ-SF Total | QSU-B Total |
|----------|-----------------|--------------|-------------|
| Minimum | Mild | Moderate | Severe |
| n | % | n | % | n | % | n | % |
| CCQ-Brief Total | 23 | 32.9 | 14 | 20 | 15 | 21.4 | 20 | 25.7 |
| Craving | 0 | 0 | 38 | 54.3 | 6 | 8.6 | 26 | 37.1 |
| Lack of control | 27 | 38.6 | 5 | 7.1 | 4 | 5.7 | 14 | 20 |
| MCQ-SF Total | 22 | 31.4 | 13 | 18.6 | 21 | 30 | 14 | 20 |
| Emotionality | 15 | 21.4 | 19 | 27.1 | 18 | 25.7 | 18 | 25.7 |
| Compulsivity | 0 | 0 | 50 | 71.4 | 6 | 8.6 | 14 | 20 |
| Intentionality | 0 | 0 | 50 | 71.4 | 7 | 10 | 13 | 18.6 |
| GSU-B Total | 14 | 20 | 17 | 24.3 | 15 | 21.4 | 24 | 34.3 |
| Craving positive reinforcing | 16 | 22.9 | 18 | 25.7 | 12 | 17.1 | 24 | 34.3 |
| Craving negative reinforcing | 0 | 0 | 23 | 32.9 | 23 | 32.9 | 24 | 34.3 |

CCQ-Brief: Cocaine Craving Questionnaire-Brief; MCQ-SF: Marijuana Craving Questionnaire-Short Form; QSU-B: Questionnaire of Smoking Urges-Brief.
Crack, marijuana and tobacco dependent patients have proven to have a more intense craving for tobacco measured by generic scale (Visual Analogue Scale), and for tobacco and marijuana measured by specific scales. Craving has been associated with relief of negative emotional symptoms (such as anxiety and depression). Thus, taking into account the patient’s suffering in the initial phase of treatment – acute period of abstinence – and the high rates of emotional episodes, it is important to link the cognitive-behavioural techniques with pharmacotherapy to relieve craving.

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Conflicts of interest
The authors declare that there are no conflicts of interest regarding this manuscript.

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A psychiatric perspective view of bariatric surgery patients

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Abstract

Background: Bariatric surgery is the only procedure that has significant results in weight loss and improvements in medical comorbidities in morbid obese patients. Severely obese patients are also associated with a higher prevalence of psychiatric disorders and poor quality of life. Objective: To evaluate specific areas of psychopathology in individuals undergoing bariatric surgery. Methods: A review of the literature was conducted from January 2002 to March 2014 by searching PubMed database using the following query: "morbid AND obesity AND bariatric AND surgery AND (psychiatry OR psychology)". Results: Overall improvements in eating behaviors, mood disorders and body image are reported after bariatric surgery, and the mechanism is not enlightened. Risk of suicide and consumption of substances of abuse, after gastric bypass surgery are problems that clinicians must be aware. Discussion: Bariatric patients should be monitored after surgery to identify who did not show the expected benefits postoperatively and the ones who develop psychiatric symptoms after an initial positive response.

Keywords: Morbid obesity, bariatric surgery, psychiatry, psychology.

Introduction

Obesity is associated with increased risk of medical complications. Morbid obesity (MO) is defined as having a body mass index (BMI) ≥ 40 kg/m². In the United States, between 2000 and 2010, the prevalence of a BMI > 40 kg/m² increased by 70%, whereas the prevalence of BMI > 50 kg/m² increased even faster.

Pharmacological treatment, diet regimens and lifestyle alterations do not seem to be effective in morbibly obese patients. Therefore, bariatric surgery is considered the most effective treatment in severe obesity, yielding more enduring weight loss. Several surgical procedures are performed: Roux-en-Y gastric bypass (RYGB), sleeve gastrectomy, laparoscopic adjustable gastric banding (LAGB), vertical banded gastroplasty and biliopancreatic diversion.

Psychiatric problems are also common among morbibly obese patients and bariatric surgery may often contribute to improve it. The Swedish obese subjects (SOS) intervention study compared several psychosocial variables between a surgical group and a conventional group treated with diet and exercise counseling over ten years of follow-up. A significantly better outcome in depression, health perception, social interaction and psychosocial functioning was achieved by the surgical group whereas no significant differences were found in overall anxiety. Furthermore, patients submitted to surgery lose significantly more weight than non-operated patients.

Several studies have reported a higher prevalence of psychiatric disorders in patients seeking bariatric surgery compared to general population, as seen in other medical diseases, such as cancer. Preoperative studies demonstrated that 20%-50% had a current psychiatric diagnosis. Furthermore, at least one Axis I disorder was reported by 37%-43% of patients. Recently, one study stated social phobia as the most prevalent Axis I disorder, in contrast to previous studies, where major depressive disorder was the most common. In addition, studies reported preoperative prevalence rates of 15%-33% for mood disorders and of 24%-30% for anxiety disorders. High incidences of somatization, hypochondria and obsessive compulsive disorder were also found in bariatric patients. Moreover, the prevalence of binge eating behaviors and binge eating disorder (BED) is variable with a range from 4%-40%.

A large number of published studies have shown an overall improvement in mental health and psychosocial factors related to metabolic improvement and weight loss in most individuals undergoing weight loss surgery. Additionally, a greater appreciation of life, greater sense of inner strength and improvement of interpersonal capabilities were experienced: This alleviation of psychological, psychosocial and psychiatric status led to the suggestion that the negative psychological features result from the condition, the patient’s severe obesity, and not the underlying character of the individual. On the other hand, improvements in psychological functioning were observed even though some patients remained obese after surgery when only a small amount of weight was lost. Therefore, greater optimism, higher self-esteem and taking an active role in life, leads to a better outcome.

However, not all studies have demonstrated a positive impact of bariatric surgery and a growing body of evidence has suggested that some of the stated benefits seem to be limited to the first years following weight loss surgery. For instance, Scholtz et al. reported that nearly half of the sample developed a psychiatric disorder five years after bariatric surgery and those with a past of a psychiatric disturbance being significantly more at risk. Furthermore, postoperative psychiatric disorder predicted a lower probability of achieving a good outcome.

It has been reported that despite limited weight loss or side effects following bariatric surgery, most patients were satisfied with the results and did not regret the surgical option. However, up to 20% appeared to be dissatisfied and the reasons pointed were psychosocial problems, surgical complications and not fulfilling their weight expectations.

Therefore, weight loss and improvement in medical comorbidities should be seen as successful factors after bariatric surgery, but the amelioration of psychiatric symptoms, eating behavior, psychosocial variables and quality of life are important outcomes to consider. Thus, the aim of this review is to evaluate specific areas of psychopathology in individuals with morbid obesity underwent to bariatric surgery, such as, eating behaviors, mood disorders, body image, suicide and substances of abuse.
This is relevant because psychological aspects potentially due to the postoperatively dramatic effects observed in weight loss, metabolic and behavior changes may be easily forgotten.

Methods

The relevant literature was identified by searching in PubMed database. Some limits were established prior to be searched, such as, publication date from January of 2002 to June of 2015, studies in humans and articles written in English. The query used was: “morbid” AND “obesity” AND “bariatric” AND “surgery” AND (“psychiatry” OR “psychology”). A total of 422 articles were found. After eliminating the duplicates, 416 articles remained.

From the initial group of articles identified, 286 were excluded after abstract reading phase. The following exclusion criteria were used: studies in children or adolescents (n = 33); preoperative studies (n = 88); evaluating other aspects postoperatively that not psychiatric symptoms or disorders (n = 48); specific population studies (n = 7); non-morbid obese patients (n = 2); description of surgical procedures (n = 14); studies for analyze of psychological questionnaires (n = 15); studies related to medical comorbidities (n = 25); studies related to plastic surgery (n = 15); non-surgical studies (n = 13); studies with no available abstract (n = 12); clinical cases or opinion pieces (n = 14).

From the 130 articles of interest, the full-text of 20 articles remained inaccessible and 110 full-texts were read. The following inclusion criteria were used: studies which evaluated post-operative eating behaviors, post-operative weight loss, mood disorders, suicide, body image and substance use. Therefore, a total of 75 articles were included from the research. Further articles were included after inspection of references list from relevant articles.

Results

Eating behaviors

Eating patterns such as binge eating, night eating syndrome, “grazing” and excessive fluid intake are common in bariatric seeking population. Assessing postsurgical data regarding eating behavior is considered difficult and one of the pointed drawbacks is the difference in definitions of binge eating employed by different studies. Binge eating disorder (BED) is characterized by recurring episodes of eating significantly more food in a short period of time than most people would eat under similar circumstances, with episodes marked by feelings of lack of control. It is associated with marked distress, physical and psychological problems and occurs, on average, at least once a week every three months.

Despite the inconsistencies, the majority of studies report a decrease in binge eating and an improvement in eating behavior after bariatric surgery. Moreover, most patients report a smaller decrease of the stomach size or a reduction of the amount of calories absorbed by bypassing portions of the intestine also. A study compared psychopathological differences between BE and NBE after vertical banded gastropasty in which the BE group reported higher scores for symptoms of eating disturbances, depression, alcohol dependence and personality disorders than NBE. Furthermore, the BE group lost less weight than the non-binge eating. In other study in patients undergoing Roux-en-Y gastric bypass the authors found a less successful outcome for the BE patients compared with NBE in psychological wellbeing and quality of life.

Although the ingestion of large amounts of food becomes nearly impossible after gastrointestinal changes due to bariatric surgery, several maladaptive eating behaviors have been reported postoperatively. The frequency of these behaviors help to predict poorer weight loss, weight regain and postoperative complications, such as inability to control food urges, increased well-being, concerns over addictive behaviors (alcohol and substance abuse), lack of self-monitoring and fewer postoperative follow-up visits. Several studies have demonstrated that a subgroup of patients after surgery will develop subjective binge or “loss of control” over eating. “Grazing” is characterized by continual ingestion of small amounts of food over extended time with feelings of loss of control and some authors have suggested that it is a manifestation of binge eating behavior postoperatively. According to Zunker et al., bariatric surgery patients seem to interpret “grazing” as a healthy eating behavior characterized by mindful food choices that are consumed in small amounts frequently throughout the day. However, the result is a greater intake of food which often ends in weight regain. Emotional/stress eaters have difficulty in dealing with negative emotions and food may provide a transient shelter to avoid confronting difficult feelings. The type of food usually consumed during these episodes, such as, candies or fast food have negative gastrointestinal symptoms, for example, nausea, vomiting or dumping syndrome. However, some patients persist in their attempts to eat in response to stress or emotional events. Instead of the large amount they used to ingest before surgery, patients consume high-fat and sugar content food in smaller amounts or drink sugar-sweetened beverages, so they will experience minimal gastrointestinal adverse symptoms. Snacking post-surgery has been associated with poor weight loss.

Night eating syndrome (NES) is characterized by recurrent episodes of evening hyperphagia, poor sleep onset or maintenance, morning anorexia and a habit of getting up to eat during nocturnal awakenings. Additionally, the night eating has to be associated with significant distress. A few studies have investigated this disorder after bariatric surgery. Latner et al. have reported that postoperative nocturnal eating is associated with greater postsurgical BMI and less treatment satisfaction. On the other hand, Morrow et al. have shown no differences in weight loss after RYGB between the night eaters group and control group. However, diagnostic criteria are inconsistent between studies which make it difficult to establish comparisons and draw conclusions. Therefore, NES definition should be revised and an agreement on the behavioral features and diagnostic criteria should be established. Furthermore, more studies evaluating this disorder in the severely obese population and the impact on bariatric surgery outcomes are required.

Symptoms such as vomiting, constipation and decreasing appetite are often seen after bariatric surgery. However, these symptoms may also be reported by patients with eating disorders. Therefore, it may be difficult for the clinician to distinguish if these symptoms are due to an eating problem or a surgical consequence. Patients may vomit in response to intolerable food or non-compliance to the dietary regimen imposed by bariatric surgery. However, De Zwaan et al. have interviewed 59 patients 2 years after RYGB about a range of eating behaviors. Vomiting was reported by over 60% of the participants and self-induced vomiting with the goal of influencing weight or dissatisfaction with body image secondary to hanging skin, excessive preoccupation with weight and the use of restricting and purging behaviors have been referred by bariatric patients. Furthermore, it was suggested that other postoperative undesirable events, such as “plugging” (problems with the small opening of the stomach becoming plugged with food) and dumping syndrome (intense discomfort after sweet ingestions accompanied by nausea, vomiting, bloating, cramping, diarrhea, dizziness, fatigue, weakness and sweating), may lead patients to engage in compensatory or restrictive behaviors. The reasons for this are the uncomfortable feeling of having overeaten or having consumed food that is difficult to tolerate after surgery. Therefore, when examining postoperative
eating patterns it is essential to investigate the motivation for them, especially because a postoperative eating disorder, such as bulimia nervosa can be easily confused with physical consequences of the surgical procedure.

All the postoperative inconsistent results make eating behavior a controversial area. Long-term research and standardized means of evaluation and diagnosis should be used in order to create clinical guidelines to ameliorate bariatric surgery follow-up and facilitate the early diagnosis of eating disorders after surgery.

**Mood disorders**

The majority of studies have reported a decrease in depression and depressive symptoms after bariatric surgery. Women seem to show a more marked decline than men. Some studies have stated significantly reduced levels of depression symptoms 1, 2, and 10 years after bariatric surgery in comparison with the preoperative period. Other findings indicate an initial improvement in the first years postoperatively followed by the reappearance or worsening of depressive symptoms which seem to be associated with weight regain or weight stabilization. Studies have reported increased levels of depression after 5 years when compared to the first year following bariatric surgery.

Considering anxiety symptoms, an overall improvement is observed after bariatric surgery; however, it is smaller when compared to depression symptomatology. On the contrary, other studies reveal no significant changes in anxiety measurements postoperatively.

It has been suggested that a larger weight loss after surgery is associated with a more significant decrease in depressive and anxiety symptoms. Additionally, a significant long-term relationship was found between depression and greater weight loss but the same did not happen for anxiety symptomology. Moreover, some studies have demonstrated that bariatric patients may achieve normal scores of depression and anxiety following bariatric surgery.

De Zwaan et al. have examined the course and prognostic significance of anxiety and depressive disorders in a sample of 107 bariatric patients using face-to-face interviews conducted prior to surgery and two times postoperatively (6-12 months and 24-36 months). They have reported that preoperative depression predicted postoperative disorder 24-36 months after surgery whereas preoperative anxiety significantly predicted postoperative anxiety disorders at both follow-up time points. In addition, postoperative depressive disorder was significantly associated with less weight loss whilst postoperative anxiety disorder was not associated with the degree of weight loss at any follow-up time point.

Nevertheless, some studies do not report the expected improvement in depression and anxiety symptoms. These inconsistent results may imply the presence of confounding factors. A prior trauma has been suggested as a possible candidate. Bariatric patients with a traumatic background may present psychiatric complaints that are not fundamentally weight-related. Thus, traumatic histories might mediate the relationship between poorer postoperative weight loss and the maintenance of psychiatric symptoms. Another implicated factor was the patient’s expectations after surgery that may have a negative impact if the expected results are not obtained. Furthermore, it may be difficult to cope with the persistence of pre-surgical problems or new negative life events which were attributed to obesity in the past. Regarding psychiatric medication, some studies showed a decrease in their overall usage following bariatric surgery. Although, one study has reported no cases of symptomatic depression postoperatively, 32% of patients were taking antidepressant medication to maintain the level of symptomatic control. Analyzing antidepressant medication specifically, a study has stated that the number of patients being treated for anxiety and depression did not change during the 2 years period of follow-up. Moreover, in a retrospective study, Cunningham et al. have studied the changes in the use of antidepressants medication after RYGB in a sample of 439 patients. These authors have observed that 23% of patients had an increase in their antidepressant use, 40% continued to require the same dose of antidepressant, 18% had a change in antidepressant medication and only 16% of patients had a decrease or discontinued the antidepressant therapy. In addition, in a sample of 67 bariatric patients with high level of depressive symptomology was found that 30% used antidepressants preoperatively and 24% were on antidepressants after bariatric surgery.

As the anatomy of the gastrointestinal tract is altered following bariatric surgery, drugs will not be absorbed as well. Beyond the absorption, distribution and elimination are pharmacokinetic processes we must consider. Each of these processes may be impacted by RYGB. With adjustable gastric banding the majority of these issues do not apply.

Roerig et al. have evaluated the changes in pharmacokinetics of the antidepressant sertraline after RYGB. There was a significantly smaller area under the plasma concentration/time curve in the postoperative group compared to the nonsurgical control group, which suggests an altered exposure to sertraline. Despite the increasing numbers of bariatric surgeries performed, there is no accepted consensus regarding to antidepressant dosages after the different forms of bariatric surgery. Other aspect of concern is the choice of antidepressant taking into account the weight gain and the metabolic chances that may occur during the treatment with antidepressants. Depressed patients are encouraged to receive pharmacologic treatment. Attempts should be made to place the patient on weight-neutral medications, avoiding medication such a tricyclic antidepressants or mirtazapine, which are known to cause weight gain. For these reasons, postoperative monitoring of patients taking psychopharmacological medication is recommended. More knowledge needs to be acquired in the area of psychotropic medication pharmacokinetics in order to create clinical practice directives for the best care of bariatric patients.

Three studies were found analyzing bipolar disorder (BD) and bariatric surgery. BD is considered in some bariatric programs as a definite contradiction to surgery while others consider BD with controlled symptom a possible contraindication. Nevertheless, not a large number of studies were found that can confirm or refute these assumptions. Interestingly, one study has reported that patients with a lifetime mood disorder diagnosis had a significant lower weight loss than patients without a psychiatric disorder, however, after removing the patients with BD no significant differences were found in weight loss. Some explanations were elaborated, for example the impulsivity, which is characteristic of this disorder, might make difficult to adhere to behavioral modification imposed by the surgery. Furthermore, lithium, a medication which can be used in the treatment of BD, has been shown to have a negative effect on memory and cognitive processing. Moreover, mood stabilizers are associated with an increased risk for several physical diseases, including obesity, dyslipidemia, diabetes mellitus. On the contrary, another study has showed that patients with BD achieved positive weight loss outcomes at 12 months which were not significantly different from the patients with other psychiatric diagnosis or with no psychiatric disorder. Additional research is needed regarding BD and bariatric surgery outcomes.

**Body image**

Body image dissatisfaction is more common in women and is associated with higher incidence of depression, low self-esteem and perfectionism. A great psychological stress is observed due to stigmatization of obesity.

Several studies demonstrated that body image impairment, attractiveness and lack of familiarity with the body improved after bariatric surgery. Additionally, less body shape and weight concerns were reported. However, most studies have only investigated changes in the first and second year after surgery.

Although an overall improvement was found in body image after surgery, some studies have demonstrated poor results when
compared to general population samples or non-obese populations. Other authors have stated that body image-related concerns reached normal values postoperatively despite the fact that most patients continued to be overweight or obese.

Nevertheless, residual body image dissatisfaction due to increasing and/or sagging skin has been reported following weight loss surgery. Recently, it has been established a correlation between the amount of excess skin and the degree of body image discomfort of bariatric patients. Kinzl et al. have observed that 70% of obese patients who achieved a severe weight loss complained about flabby skin in their upper arms and thighs, abdominal flap and pendulous breasts. The authors have also stated that patients who were satisfied with their physical appearance lost less weight. On the other hand, other studies have suggested that patients who had lost more weight were more satisfied with their image.

The skin excess resulting from bariatric surgery is a common cause of functional and esthetical impairment which increases the desire and search for cosmetic surgery. Pecori et al. have demonstrated in a small sample that patients who underwent aesthetic surgery had similar results in body image improvements in a 2-year follow-up when compared to patients who were only submitted to bariatric surgery. In addition, the authors have reported that individuals who sought aesthetic surgery had similar values of body uneasiness and dissatisfaction to those of severely obese patients.

Therefore, bariatric surgeons must be advised to counsel their patients before surgery regarding body changes that they may experience postoperatively in order to prevent the psychological distress caused.

Inconsistent results were found relating body image and weight loss. Some studies have demonstrated that body image dissatisfaction did not correlate with weight loss or marginally correlated, whereas, other authors have showed a more positive body image when the patient loses a greater amount of weight. As a result, more studies are needed to elucidate the relationship between body image satisfaction and weight loss. Additionally, mediating variables that affect body image, such as self-esteem, appearance investment, social support and expectations of weight loss should be investigated.

Interestingly, one study was found in which body image satisfaction was compared between a night eaters group (NE) and control group (C) 5 months after RYGB. The two groups did not differ in weight loss or reductions in waist circumference. However, reported body image perceptions improved less in NE than C, the NE individuals saw themselves as heavier than they were.

Suicide

Severely obese people may have an increased mortality by suicide as stated Mirabelli et al., in an Italian cohort study. Other study which has evaluated the long-term mortality after bariatric surgery in a series of patients has reported a greater number of suicides in the surgical group compared to the controls. Tindle et al. have studied bariatric patients over a 10-year period and compared their suicide data to the U.S. and Pennsylvania populations. They have reported an increase of suicides in the surgical group. The incidence of suicide in the surgical group was 6.6/10,000, which included 13.7/10,000 for men and 5.2/10,000 for women. These results were compared to the US population suicide rates (2.4/10,000 for men and 0.7/10,000 for women). The majority of the deceased were Caucasian women. The reported average time to death was about 3 years after surgery (10% in the first year, 29% in the second and 68% in the third). Furthermore, suicides were categorized by modes of death (drug overdose, gunshot wound, carbon monoxide poisoning and hanging).

One study has been recently published comparing the reported suicide data after bariatric surgery with the Tindle et al. study and World Health Organization (WHO) data. Using 28 studies, they estimated a suicide rate after weight loss surgery of 4.1/10,000, which was significantly lower than the one reported by Tindle et al. Nevertheless, they report a four times higher probability of suicide patients commit suicide when compared with WHO latest data (1.0/10,000). Regarding time frame, suicides occur between 18 months and 5 years after surgery.

In this important problem of the suicide we must account with the multiple factors like the disinhibition and potential impulsivity secondary to changes in the alcohol absorption, the recurrence of medical comorbidities after bariatric surgery, the effect of malnutrition on the brain, the metabolic or pharmacokinetic changes that may affect the absorption of psychiatric medications, all of these can happen after bariatric surgery. Furthermore, we can not to have a superficial look with the association between suicide and the fact of have been submitted to a bariatric surgery. Recently, in a review, possible risk factors for increased suicide following bariatric surgery were addressed which included disappointment with the amount of weight loss, unresolved or recurrent medical conditions, and continued or recurrent physical mobility restrictions. Unrealistic expectations about the outcomes of surgery, the distress with the limitations in the diet and the diverse care applied postoperatively, are potential factors attached to suicide risk in post-surgery period. Patients need more intensive postoperative care, particularly medical, nutritional or psychotherapeutic care. A special aim of a multidisciplinary program must be to identify those patients who need specific interventions. Postoperative follow-up in multidisciplinary regimen (surgeon, endocrinologist, psychiatrist or psychologist and nutritionist) is of great importance.

Although studies refer an increased rate of suicide, there is a significant variation in the characteristics of the studies and length of follow-up. Therefore, it is difficult to establish corrective comparisons between patients after bariatric surgery and the general population.

Substance use

A prospective investigation of alcohol use disorders (AUD) before and after bariatric surgery found a significantly higher prevalence of AUD in the second postoperative year, overall, and specifically post-RYGB, compared to the years immediately before and following surgery. Ertelt et al. have reported that a small percentage of the sample developed an AUD after gastric bypass, despite not having a previous dependence. Moreover, one study has reported a higher frequency of alcohol abuse after RYGB than LAGB.

Studies have reported that individuals submitted to bariatric surgery noticed that they became more intoxicated after consuming less alcohol and that there is a more rapid onset of intoxication effects comparing to the preoperative period. Some studies showed that alcohol metabolism was significantly different between the postgastric bypass and control subjects. Within minutes after consumption of a beverage containing a modest amount of alcohol, post-RYGB patients achieve disproportionately high blood alcohol concentrations. Considering alcohol pharmacokinetics, ethanol is metabolized primarily in the stomach by the gastric alcohol dehydrogenase enzyme. RYGB limits the first step of metabolism and, consequently, higher serum levels of ethanol are obtained.

Conason et al. have found a significant increase in alcohol use, recreational drug use and cigarette smoking 24 months after bariatric surgery. In another study, 24 bariatric patients in an inpatient substance abuse treatment program were interviewed. Half of the sample stated that they had never experienced any alcohol or substance addiction prior to surgery.

In a study conducted to determine opioid use following bariatric surgery in patients using opioids chronically for pain control prior to their surgery, 77% of them continued chronic opioid use in the year following surgery and the amount of opioid substance was greater postoperatively than preoperatively. One possible explanation is that some patients likely had pain unresponsive to weight loss but potentially responsive to opioids. Multiple factors likely contribute to increasing chronic opioid use over time. Obese individuals demonstrate more pain sensitivity and lower pain detection thresholds than those who are not obese and altered pain processing persists after...
bariatric surgery. Contributing factors not unique to the bariatric surgery population include long-term opioid use possibly leading to tolerance, with need to take higher dosages to achieve equianalgesia and escalating dosages possibly increasing pain sensitivity, even when the initial cause has resolved.

According to Weingarten et al., opioid consumption after bariatric surgery is greater among patients who are younger, men, and have been previously hospitalized because of psychiatric disorders. Additionally, they have reported that tobacco users tend to require more opioids and the current usage of psychotropic medications was not associated with greater opioid consumption or episodes of severe pain.

A small amount of published data address this issue but it seems that despite detailed preoperative screening individuals can develop unforeseen substance addiction. More studies evaluating substance abuse postoperatively are necessary to assist in the understanding of this area.

Conclusions
Psychiatric disorders such as depressive, anxiety and binge eating disorders are prevalent among bariatric surgery candidates and an overall improvement in this psychopathology is observed after bariatric surgery. Nevertheless, depending on the specificity of the problem, the kind of comorbidity, the metabolic evolution and the motivation and treatment compliance, patients may or may not present psychopathological benefits postoperatively.

In addition it is important for clinicians to be aware of vomiting and other maladaptive behaviors because an eating disorder may be misdiagnosed.

Regarding body image, one increasing concern is the excessive skin that appears after substantial weight loss. A growing concern indicates a possible increased risk of suicide and substances abuse, especially alcohol, after bariatric surgery. However, suicide and use of substances of abuse remain relatively undeveloped topics since a small number of studies were found and different methodologies were used.

Further research is warranted for a more complete understanding of psychopathological areas in bariatric surgery patients. Furthermore, long-term studies are needed to elucidate the decline in improvements with time that is reported in some studies. This knowledge will allow a better preoperative selection, but above all, a more efficient follow-up.

Conflict of interest
None of the authors has conflict of interest.

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Mediumship: review of quantitatives studies published in the 21st century

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Abstract

Background: Mediumship can be defined as the alleged ability to communicate with deceased persons. The last decade has been particularly productive for this field of study, and the ensuing mass media can help the understanding of the medium-brain relationship and provide objective data to the scientific community and to the general population. Objective: The aim of this review is to summarize and discuss the results found on recent studies investigating mediumship. Furthermore, we aim to discuss the psychophysiology underlying mediumship and future perspectives for this study topic. Methods: A literature search for articles in English, Portuguese and Spanish published from January 2000 up to June 2015 was conducted using three electronic databases (PubMed, Lilacs and Web of Science). Review articles, qualitative studies and studies investigating altered states of consciousness caused by psychoactive substances were excluded. The original search returned 150 articles, but the application of exclusion criteria resulted in the inclusion of 19 articles for final analysis. Results: The general findings were: (1) an association of mediumship with good mental health, predominantly in experienced mediums, (2) heterogeneous findings regarding the ability of mediums to provide accurate information what may be due to different study methodologies and (3) incipient studies assessing psychophysiological correlations during mediumistic communications (i.e. hyperventilation of brain regions responsible for cognitive processing and writing planning during psychography compared to a control task; electroencephalographic (EEG) changes and a slight predominance of the sympathetic nervous system). Discussion: There is a paucity of empirical data available in this controversial research field. New studies employing rigorous design (e.g. triple-blind protocols to test accuracy of mediumistic communications), and sensitive methods are required.

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Keywords: Mediumship, after-death communication, spiritual experiences, mental health, psychophysiology.

Introduction

Although there is no formal consensus on the definition of mediumship, it could be roughly defined as the alleged ability to communicate with deceased personalities on a regular basis, or as a set of experiences in which an individual, alleged “medium”, maintains regular contact or stays under the control of someone else who has already died or of another immaterial being.

At different times and among different cultures in human history there were reports of experiences that could be interpreted as mediumistic phenomena, for example the reception of the Ten Commandments by Moses at the Mount Sinai (Christianity and Judaism) and the reception of information and advice from superior and protector beings (dharmapalas) by Tibetan Buddhist monks.

During the 19th century and in the early 20th century, many pioneers of modern Psychology and Psychiatry have studied cases of alleged mediums. This was the case of William James, who for many years studied the medium Leonora Piper; Pierre Janet, who wrote a book about the “psychological automatism”; Carl G. Jung, who received his doctorate degree after studying his cousin (S.W.), an alleged medium, among others. At that time, other renowned scientists also dedicated their time and effort to study mediumistic phenomena, such as William Crookes and Charles Richet.

Talking to “spirits” or being possessed by “spirits” are cultural phenomena found in almost every society worldwide and their relationship with mental illness has been the topic of extensive investigations in the fields of cross-cultural psychiatry and anthropology. Observational studies demonstrate a high prevalence (around 80 percent) of individuals who believe in the survival of the soul after death in general population, and this finding is congruent with the significant popularity that many cultural products covering this topic have (e.g.: books, films, novels, TV series).

At present, mediumship is considered to be a form of dissociation. Dissociation can be defined as “the occurrence of experiences and behaviors that are thought to exist apart from, or to have been disconnected from, the mainstream of one's conscious awareness, behavioral repertoire, and/or self-concept”. The majority of culture-bound dissociation is considered normal, does not lead to distress or impairment, it often arises in willing individuals in appropriate (frequently religious) contexts, and is usually experienced as beneficial. In subjects with pathologic dissociation, the experiences occur in an unsolicited, unruled and socially not tolerated manner, causing considerable distress, with adverse effects on occupational activities and other impairments.

Many societies where culture-bound dissociation is observed are characterized by an authoritarian male hierarchy, being oppressive for women and children. Some scholars affirm that in many of these societies, the dissociative experiences are more common in women and they propose that dissociation would be a psychological mechanism with an emotion-regulatory role. This is seen as a socially sanctioned (and even valued) behavior that would allow cathartic expression of forbidden and disowned feelings by individuals living under characteristically oppressive conditions.

Self-hypnosis is one of the proposed psychophysiological mechanisms involved in dissociation. After carefully analyzing mediumship in the context of Candomblé, an Afro-Brazilian religion, Seligman (2005) concluded that mediums would be individuals with a psychophysiological tendency to somatization and to dissociation that, submitted to emotional distress, find in the religion system (and in the assumption of a new social role as mediums) a way for a positive transformation of their identities, leading to a moderation of their somatic and emotional afflications and to a global therapeutic effect.

Much of the controversy surrounding mediumship research derives from the fact that it stresses the “mind-brain problem”. The explanation for how the human brain generates mind is one of the
greatest philosophical and scientific challenges of the past, the present, and probably of the future. The French seventeenth century philosopher René Descartes put forth the theory of Substance Dualism, supporting the idea that mind (subjective) and body (objective) are different natural substances and that it is the bond of mind to the brain that allows it to think. Mind and brain being independent entities, consciousness could continue to exist (and perhaps communicate) despite the death of the physical body. On the other hand, the dominant materialist perspective argues that consciousness is a byproduct of brain activity, being extinguished with the death of the physical body. A better understanding of mind could only be possible through an increase in the knowledge about brain functioning.

Contemporary dualist philosophers and scientists sustain that materialism has left a range of questions unanswered, as, for example, how human subjective and affective experiences exert such a decisive influence over body functions. For many dualist and post-materialist scientists the evidences stemming from high quality studies about near-death experiences and about mediumistic communication are strong indicators that consciousness has a non-local character and could survive the death of the physical body.

Currently, the three most common explanations for mediumship are: (1) fraud (conscious or unconscious), (2) after-death communication, and (3) telepathy. The first, the materialist model, excludes the possibility that any aspect of the personality can survive physical death and rejects extra-sensory perceptions (ESP) in general. Thus, if a mediumistic information seems accurate this can only result from deliberate fraud, coincidence or “cold reading” (fishing of information) by the medium. The second explanation, the spiritualist model, argues that the mind (or soul) of the medium communicates with the mind (or soul) of the deceased person through some form of telepathy, obtaining information. From the third perspective, generally defended by investigators of ESP, when an alleged medium is asked to communicate with a deceased person, the medium’s answers are given based on clairvoyant access to physical traits of the deceased personality and on telepathic access to the knowledge of the consultant (super-psi hypothesis). The supporters of this explanation, in general, also consider the survival of a plausibly so-called “mediumistic personality” via other common means or via fishing of information.

In fact, the last decade has been particularly productive for this field of research and the study of mediumship can help the understanding of the human mind-brain relationship and provide objective data to the scientific community and to the general population. Within this context, the aim of this review is to summarize and discuss the recent results found on studies investigating mediumship. Furthermore, we aim to discuss the psychophysiology underlying mediumship and future perspectives for this study topic.

**Methods**

**Literature review and selection of studies**

The Literature search strategy was carried out in three phases, as described below.

**Phase 1** (primary Literature search): two researchers (MAVBJ and IHSO) independently screened the list of citations (full text were retrieved for further analysis whenever necessary) to exclude studies that did not address the issue at hand. Any disagreement between the researchers were discussed with a third reviewer (GL), and resolved by reaching a consensus.

Articles in English, Portuguese and Spanish dealing with quantitative investigation of mediumship, published within the time range from January 1st, 2000 up to June 10th, 2015, were selected – hence focusing only on the contemporary scientific aspects of the topic.

Review articles, qualitative studies (either anthropological, theological or ethnographic), studies investigating altered states of consciousness caused by psychoactive substances and letters to the editor were excluded. Regarding the studies testing accuracy of mediumistic information, works that have not applied rigorous designs aiming to eliminate information leakage (i.e. those not strictly adhering to protocols that minimize as much as possible the probability of the alleged medium having access to information about the deceased personality via other common means or via fishing of information) were also excluded. Regarding psychophysiological correlates of alleged mediumship, due to extreme paucity of available data, case reports were not included. All articles not fulfilling the inclusion criteria and which met the exclusion criteria were omitted from the final analysis.

The following databases were evaluated: Web of Science, PubMed and Lilacs. For the Web of Science database, filters were used to limit the search to fields of Psychiatry, Psychology, Neurosciences/Neurology, Religion and General Internal Medicine, as this database also indexes citations in arts and humanities, which are beyond the scope of this review.

The keywords used were: “mediumship”, “mediumistic” and “after-death communication”. Although a few important concepts and theories accrued from anthropological and ethnographic studies about Possession Trance are cited, this is not the focus of this review.

**Phase 2** (secondary Literature search): with the aim of identifying studies that could have been missed in the primary search, references lists of initially included articles were screened and the same three keywords were evaluated in Google Scholar. Only the first 100 references from Google Scholar were evaluated. The same inclusion and exclusion criteria were applied in both phase 1 and phase 2.

**Phase 3** (critical review of studies): the included articles were evaluated regarding number of participants, methods applied, comparisons and main findings. The studies were grouped in the following three categories based on their methodology and type of outcomes evaluated: (1) mediumship and psychopathology, (2) testing the accuracy of information provided by mediums and (3) psychophysiological correlates of mediumship. These categories were adopted based on the classification proposed by Jinks (2013) for quantitative research on mediumship.

Table 1 and figure 1 summarize the search and selection strategy.

The last section of this review consist of future perspectives for the study of alleged mediumship, especially in its psychophysiological aspects, and due to paucity of available empirical data on this field, it was based on authors’ opinions and on recent reviews dealing with other dissociative and spiritual experiences.

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**Figure 1. PRISMA (The Preferred Reporting Items for Systematic Reviews and Meta-Analysis) flow diagram.**
Table 1. Selection of studies – phase 1

| Term                        | N° of articles found | N° of articles excluded | Reasons for exclusion | N° of articles included in final analysis |
|-----------------------------|----------------------|-------------------------|-----------------------|------------------------------------------|
| **Electronic database: Web of Science** |          |                      |                       |                                          |
| "Mediumship"                | 40                   | 32                      | 9 ethnographic studies | 8                                        |
|                             |                      |                         | 8 literature reviews   |                                          |
|                             |                      |                         | 8 historical perspective articles |                          |
|                             |                      |                         | 7 other reasons        |                                          |
| "Mediumistic"               | 17                   | 16                      | 5 historical perspective articles | 1                                        |
|                             |                      |                         | 4 literature reviews   |                                          |
|                             |                      |                         | 4 ethnographic studies |                                          |
|                             |                      |                         | 3 other reasons        |                                          |
| "After-death communication" | 4                    | 4                       | 2 qualitative studies  | 0                                        |
|                             |                      |                         | 1 literature review    |                                          |
|                             |                      |                         | 1 ethnographic study   |                                          |
| **Electronic database: PubMed** |          |                      |                       |                                          |
| "Mediumship"                | 21                   | 13                      | 6 historical perspective articles | 8                                        |
|                             |                      |                         | 2 ethnographic studies |                                          |
|                             |                      |                         | 2 literature reviews   |                                          |
|                             |                      |                         | 3 other reasons        |                                          |
| "Mediumistic"               | 12                   | 10                      | 2 ethnographic studies | 2                                        |
|                             |                      |                         | 2 historical perspective articles |                          |
|                             |                      |                         | 6 other reasons        |                                          |
| "After-death communication" | 5                    | 5                       | 3 qualitative studies  | 0                                        |
|                             |                      |                         | 1 literature review    |                                          |
|                             |                      |                         | 1 letter to editor     |                                          |
| **Electronic database: Lilacs** |        |                      |                       |                                          |
| "Mediumship"                | 30                   | 21                      | 8 historical perspective articles | 9                                        |
|                             |                      |                         | 6 literature reviews   |                                          |
|                             |                      |                         | 4 ethnographic studies |                                          |
|                             |                      |                         | 3 other reasons        |                                          |
| "Mediumistic"               | 17                   | 15                      | 5 historical perspective articles | 2                                        |
|                             |                      |                         | 3 literature reviews   |                                          |
|                             |                      |                         | 2 ethnographic studies |                                          |
|                             |                      |                         | 5 other reasons        |                                          |
| "After-death communication" | 4                    | 4                       | 2 qualitative studies  | 0                                        |
|                             |                      |                         | 1 literature review    |                                          |
|                             |                      |                         | 1 letter to editor     |                                          |
| **All Databases**           |          |                      |                       |                                          |
|                             | 150                  | 140                     | 20 Duplicated articles among those included | 10*                                     |

* The phase 2 of the search led to the inclusion of 9 additional articles totaling 19 articles for the final analysis.

Results and discussion

The phase 1 (primary Literature search) of the search led to the retrieval of a total of 150 articles. The application of the exclusion criteria resulted in the exclusion of 140 articles and the inclusion of 10 articles in this phase. As shown in table 1, the most frequent reasons for excluding articles, in descending order, were: historical perspective studies (34 articles), literature reviews (25 articles) and ethnographic studies (24 articles).

In phase 2 (secondary Literature search) of the search, screening of references lists and evaluating the keywords in Google Scholar led to the inclusion of 9 additional articles.

In phase 3 (critical review of studies), all 19 studies found were evaluated in terms of number of participants, methods applied, comparisons and main findings.

Tables 2, 3 and 4 briefly describe the 19 included studies. The main results are as follows:

1. Mediumship and psychopathology (Table 2)

Most studies suggest that mediums have good mental health, are socially well adapted and occupationally active. However, one must notice that all but one study took place in Brazil, so caution is necessary when trying to extrapolate these conclusions to other countries, since mediums have an established social role in Brazil, which may not be the case in other societies. It is known that a society’s dominant ideas about questions like the dualism, the soul and paranormality influences the way dissociative experiences are viewed and whether they are tolerated or not.

Our findings corroborate with the theory proposed by Seligman that affirms that mediumship has a therapeutic role to certain individuals under psychological distress, who find in the religious system a way for a positive transformation of their identities. The scores of mental health and control of the dissociative experiences are clearly different if the individuals are beginning to participate in the religion, as in the studies of Menezes Jr. et al. and Alminhana et al., or if they have many years of practice as socially sanctioned mediums, as it was the case in all the other studies, being significantly worse in the former case.

However, the psychosocial stressors theory may not fully explain the Brazilian Spiritist participants, since this group has one of the country’s best socioeconomic status and best education level among all the other religious groups. For instance, in the study of Moreira-Almeida (2004), the financial situation of Spiritist mediums was not different from mentally healthy control participants, highlighting that other possible explanation for this phenomenon may be considered.
| Study                          | Participants                                      | Method                                      | Comparisons                                                                 | Findings                                                                 |
|-------------------------------|--------------------------------------------------|---------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Negro et al. (2002)           | 110 experienced Kardecists mediums (for 21 years on average) | Self-report questionnaires (SRQs) evaluating personality traits (happiness, sociability, religiosity, temper, mediumship) and dissociative experiences (Dissociative Experiences Scale – DES) | Correlation analysis between dissociation scores and sociability and adaptation scores. Correlation analysis between training in mediumship and control of dissociative experiences. | Sociability and adaptation scores compatible with normality despite high dissociation scores. Majority (94%) considered to have control over the mediumistic experience. Positive correlation between formal training in mediumship and control of dissociative experiences. |
| Moreira-Almeida (2004)        | 115 Kardecist active mediums (16 years on average) and 34 subjects without previous or current mental disorder | Semi-structured interviews and self-report questionnaires assessing socio-demographic data, mental health and phenomenology of dissociative experiences | Comparison of prevalence of hallucinatory experiences between groups. Correlation analysis between dissociative symptoms scores and intensity of mediumistic activity with mental health scores and social adequacy. | Higher prevalence of hallucinatory experiences in mediums, with normal levels of social adequacy. There was no correlation between the intensity of mediumistic activity and mental health scores and social adequacy. |
| Seligman (2005)               | Five groups: – 11 female Candomblé mediums; – 10 non-medium initiates; – 20 uninitiated religious frequenters; – 20 control participants from outside the religion, matched for socio-economic status; – 10 control participants from outside the religion and from a higher socio-economic status | – Instrument to screen for anxiety and depression (QMPA); – State Trait Anxiety Inventory (STAI); – Dissociative Experiences Scale (DES); – Semi-structured interviews | Comparison between mediums and nonmediums with varying degrees of proximity to Candomblé and the mediumship role. | Group from higher socioeconomic status with significantly lower levels of anxiety and depression (QMPA). Significantly higher number of somatic symptoms reported by mediums. No difference between groups for STAI scores. DES scores higher in the 3 religious groups (none above clinical cut-off). No correlation between mediumship and DES score. |
| Moreira-Almeida et al. (2008) | 24 Kardecist active mediums, being 12 mediums with (+) scores in the screening for mental disorders in primary care (SRQ +) and 12 mediums with (−) scores (SRQ −) 166 patients with Dissociative Identity Disorder – DID (data from this group was extracted from literature) | Self-report questionnaire assessing social adequacy, psychotic symptoms and structured interviews with mediums to evaluate diagnostic criteria for DID | Comparison between subgroups of mediums. Comparison between mediums and patients with DID | From the mediums, no one met criteria for DID. The only difference observed among the subgroups of mediums was social adaptation (slightly worse in SRQ +). No difference between the group of mediums and DID group for psychotic symptoms, but better mental health and social adjustment in mediums. |
| Roxburgh & Roe (2011)         | 80 British spiritualist mediums and 79 control subjects (nonmediums, attended the same religion, without any diagnosed mental disorder) | Self-report questionnaires assessing personality traits and mental health indicators | Comparison between mediums and control group (healthy individuals from the same socio-cultural context) | Mediums scored significantly higher in well-being and lower in psychological stress. There were no significant differences among groups regarding dissociation or personality traits that could indicate psychopathology or proneness to fantasize. |
| Menezes Jr. et al. (2012)     | 115 individuals seeking help in spiritual centers due to their so-called mediumistic experiences | Semi-structured interview with a psychologist to evaluate socio-demographic data, mental health history and dissociative experiences | Qualitative exploration to assess the presence or not of nine criteria considered suggestive of non-pathological anomalous experiences (AEs) | The most frequent AEs were visual (63%) and hearing (54%) hallucinations and “perception of spirit” (53%). For most of mediums, AE did not bring socio-occupational losses, were brief, episodic and benign; but 59.2% related them with emotional distress and 54.8% did not present control over experiences. |
| Alminhana et al. (2013)       | 115 individuals seeking help in spiritual centers due to their so-called mediumistic experiences | Self-report questionnaires to assess personality traits, quality of life and religiosity | Comparison between experimental group, general population and individuals with mental disorders (data of control groups extracted from literature) | Individuals with AE presented intermediate scores on personality traits, religiosity and quality of life when compared with general population and individuals with mental disorders. Authors hypothesized that mediums may be a population at higher risk for mental disorders. |
(2) Accuracy of information provided by mediums (Table 3)

Quantitative research on alleged mediums has been done for more than a hundred years, and meanwhile the designs of studies have been progressively improved as to eliminate information leakage and telepathy as explanations for the reception of accurate information by mediums. Research protocols reproduce the habitual situation of a friend or relative (the named “sitters”) of a deceased person consulting a claimed medium looking for postmortem information about this person, but they apply a “triple blind” design. That is, mediums are blind to the identities of the consultant (“sitter”) and of his/her related-deceased person; the researcher interacting with the mediums (acting as a proxy for the consultant) also remains blind to the identities of the consultants and his/her related-deceased person; and consultants who score the accuracy of the “readings” remain blind about the information source (reading really intended for him/her vs decoy reading).

In the present review, only studies considered to have sufficient control against information leakage (i.e. which strictly adhered to triple-blind protocols) were included. Hence the works of Roy & Robertson and Schwartz et al., although consist of important contributions as exploratory methods, were excluded (they applied methods where mediums had direct contact and talked to the consultants, among other shortcomings). Data from experiment 2 of the study of Kelly & Arrangé was also excluded from this review because of lack of strict adherence to triple-blind protocol (mediums received pictures from the deceased individuals, many of the sitters were colleagues or friends of one of the investigators, and this investigator knew some of the deceased individuals). Altogether the results of the well-controlled studies included in this review show: (a) in two studies (totaling 28 mediums and 102 readings) the sitters’ accuracy ratings of specific information from target readings were statistically higher than for decoy readings; and (b) in three studies (totaling 10 mediums and 44 readings) there was no statistical difference in the fit scores assigned by sitters for the target or decoy readings.

Interestingly, the “triple-blind” design was used in all these studies, but there were slight methodological differences between them that can have influenced the outcomes. For example, in the studies with positive results, the sitters were asked to decide which was the fittest between only two readings, while in “negative studies” the sitters needed to decide among three to seven readings. Moreover, “positive” but not “negative” studies have used a pairing procedure of the deceased persons to optimize differences (in categories like age at passing, hobbies, physical description, cause of death). Hence, it seems that, for methodological reasons, choosing the target reading was less difficult for sitters of the “positive” than for “negative” studies.

Different from the others, the study of Rocha et al. did not use a controlled design, choosing a retrospective approach. Authors screened published and unpublished letters that were psychographed (allegedly written under the influence of a spirit) by a Brazilian medium, Chico Xavier, who died in 2002. Then, a set of 13 letters was selected because these letters contained much specific and objective information about a deceased person, and living relatives and friends of this person agreed to participate in interviews with the investigators to verify the fit and accuracy of the mediumistic information conveyed. Among 71 items of specific information extracted from the letters, a high percentage (97.2%) was scored as having a “clear and precise fit”. As authors acknowledge, one significant limitation of this type of study is that the scoring may have been subject to memory bias, as letters were written more than forty years before. However, three “drop-in” communications (“situations where allegedly a deceased personality communicates via the medium without the request of relatives or friends”) were identified in the letters. Pieces of specific information from these communications were objectively verified, and they proved to be true.

(3) Psychophysiological correlates of mediumship (Table 4)

The most common findings concerning psychophysiological correlates of mediumship were: increased noradrenalin levels during possession trance in a controlled study, increased muscle tone in a case report, increased heart rate and increased spectral power in various EEG frequency bands during mediumistic communication and possession trance. None of the studies included in this review has demonstrated an ictal pattern on EEG during the experience. These results could point to a state of mental and physical arousal during the phenomena.

On the other hand, the only study using functional neuroimaging, in this case a Single Positron Emission Tomography (SPECT), showed a reduction of cerebral blood flow (CBF) in left culmen, left hippocampus, left inferior occipital gyrus, left anterior cingulated cortex, right superior temporal gyrus and right pre-central gyrus (brain areas associated with memory, language and writing planning) during mediumistic communication (psychography) as compared to a control task. There was also a surprising negative correlation between the CBF in these areas and the linguistic complexity of the written text produced during psychography. Taken together with the case series report of a slowing of background EEG activity in some mediums during psychophony (allegedly speaking under the influence of a spirit) and psychography these data could suggest the activation of fewer neuronal populations during the dissociative experience.

Considering the dominant current psychobiological explanation for the possession trance and mediumship, there is a number of authors, which propose the role of self-hypnosis. Hypnosis is seen as a state of focused attention and concentration, inner absorption and a relative suspension of external awareness. There is evidence for a correlation between hypnotizability and number of dissociative symptoms and that patients with dissociative disorders have higher rate of hypnotizability. Although differences occur according to the phase of hypnotic procedure (relaxation – induction – suggestion – waking up) and to which actions are suggested to the individual, many studies show increased theta power during hypnosis, indicating an intensification of attention processes. Regarding functional neuroimaging, the most characteristic finding of the hypnotic state is the hypoelectricity of the “extrinsic brain network”, which encompasses lateral fronto-parietal regions and which has been linked to cognitive processes of external sensory input. The reduced activity of this network can reflect a blocking of the sensorial systems to receive stimulus. A structural Magnetic Resonance study has shown neuro-anatomical differences between high and low hypnotizable individuals: larger (32%) rostrum of the corpus callosum in highs than in lows. This area is involved in the information transfer between pre-frontal cortices and in attention allocation. The authors suggest that high hypnotizables subjects would have more efficient frontal attentional systems, with greater ability to monitor performance and to inhibit undesirable stimulus for conscious awareness.

Although it is not possible to say that spontaneous dissociative symptoms, like mediumship, share strictly the same neurophysiological processes of hypnosis, evidence suggest that many parallels can be drawn between them. There are already some reports of research groups using hypnosis on healthy individuals to “model” dissociative symptoms (e.g. “automatic writing”) and more easily study them in the neurophysiology and neuroimaging lab of the authors, which propose the role of self-hypnosis. Hypnosis is seen as a state of focused attention and concentration, inner absorption and a relative suspension of external awareness. These results could point to a state of mental and physical arousal during the phenomena.

Future perspectives

Mediumship is a controversial research topic with ongoing experiments. Regarding its relation to psychopathology, in practical terms, it is important to avoid the risk of a “category fallacy”. In other words, here both risks exist and should be avoided: pathologizing normal religious experiences and considering potentially dangerous clinical conditions as a common religious/spiritual experience. Thus, if such cases of mediumship and possession come to medical attention, besides a comprehensive assessment of the sociocultural implications and of the possible secondary gains for the individual, a standard psychiatric evaluation should not be neglected. In this evaluation, not only the patient but also family and community
members should be interviewed, so that the extent of impairment of daily life by the dissociative experiences can be inferred. Possible psychiatric comorbidities should also be sought. The most commonly used type of therapy for possession disorders is psychotherapy, and some scholars advise it should focus on the stressing factors that can initiate the dissociative phenomena.60,61.

Concerning studies on the accuracy of information provided by mediums, their design must reach a balance between control against information leakage and the provision of a research environment that optimizes the phenomenon for both the medium and for the mediums, their design must reach a balance between control against the reviewed studies, the protocol proposed by Beischel is the most successful in meeting these conditions, and it requires replication by other research groups to broaden the database and to eventually demonstrate or not the scientific evidence of mediumship. Notwithstanding, some investigators affirm that even accurate results of mediumship studies do not prove the postmortem survival hypothesis and that the best explanation would still be some form of telepathy between the medium and other “living agent psi.”53.

Studies evaluating physiological correlations during mediumistic communications are still very incipient. Here, as for other types of psychophysiologic studies, the employment of a process-based approach is recommended. Before initiating any data collection, a detailed definition of the phenomenon, based on systematic observation, is necessary. This should include a definition, as precise as possible, of when the mediumistic communication begins and when it ends. Proper initial definitions about the process under investigation are necessary if one aims to obtain valid physiological research data about it.

Table 3. Studies on the accuracy of mediumistic information

| Study                         | Participants | Method                                         | Comparison                                                                 | Findings                                                                 |
|-------------------------------|--------------|-----------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------|
| O'Keefe & Wiseman (2005)*22    | 5 professional mediums and 5 consultants (“sitters”) | Triple-blind study, properly executed. Five “readings” were itemized, grouped and sent to consultants for “blind” scoring of items for accuracy and applicability | Comparison between scores of “readings” really intended for the consultant and the scores of readings made for other consultants | There was no significant difference between scores. In only one occasion the consultant assigned higher scores to the “reading” that was directed to him. |
| Beischel & Schwartz (2007)*22  | 8 mediums (who had previously demonstrated ability to provide mediumistic information with accuracy, according to the authors) and 8 consultants (highly motivated to receive information from deceased relatives) | Triple-blind study, properly executed. Each “blind” consultant received two “readings” to score accuracy and choose which of them better applied to his/her deceased family member | Comparison between “reading” scores that supposedly came from the deceased family member and “reading” scores that were directed to other consultants | The consultants chose the correct “reading” (directed to them) in 81% of cases (13/16). The “reading” scores from messages directed to them were significantly higher than control “reading” scores |
| Jensen & Carderína (2009)*22   | 1 professional experienced medium and 7 consultants (“sitters”) | Triple-blind study, properly executed. Seven “readings” were itemized, grouped and sent to consultants for “blind” scoring of items for accuracy and applicability | Comparison between scores of 7 “readings” (one reading really intended for the consultant and 6 other decoy readings”) | Scores assigned by the consultants for neither global nor specific information from “target readings” were significantly better than expected by chance. No sitter chose his target reading as the most applicable. Measures of paranormal belief of sitters positively correlated with rating of reading |
| Kelly & Arcangel (2011)*23     | Experiment 1: 4 mediums and 12 consultants | Triple-blind study adequately performed only in experiment 1 | Comparison between “reading” scores that supposedly came from the deceased family member and “reading” scores that were directed to other consultants | Experiment 1: only 2 of 12 consultants were able to identify the “reading” directed to them (3 hits would be expected to occur by chance) |
|                               | Experiment 2: 9 mediums and 40 consultants | In experiment 2: methodological weaknesses substantially increased the likelihood of “fishing” or information leakage | Note: consultants chose one reading among three in experiment 1 and chose one reading among 6 in experiment 2 | Experiment 2: 14 of 38 consultants chose the correct “reading” and 30 consultants positioned the “reading” directed to them among the three first places in the accuracy rank |
| Rocha et al. (2014)*27        | 5 relatives and friends of a deceased personality (JP), who is the alleged spiritual author of 13 psychographed letters (by the spiritist medium Chico Xavier) | Verifiable items were extracted from the letters. Interviews with participants to assess items’ fit and accuracy and probability of information leakage. Based on the interviews, three researchers scored each item | Comparison of types of verifiable information. Comparison of scores of fit and of information leakage probability between the items from the first letter and the subsequent letters | The percentage of “clear and precise fit” among the 71 verified items was 97.2%. Considering the first letter (written 40 days after JP’s death), 100% of the items were scored as “very unlikely leakage”. For subsequent letters, 53% of the items were scored as “unlikely leakage” |
| Beischel et al. (2015)*24     | Experiment 1: 14 mediums and 28 consultants | Experiment 1 & 2: Triple-blind study, properly executed. Each “blind” consultant received two “readings” to score accuracy and choose which of them better applied to his/her deceased family member | Comparison between “reading” scores that supposedly came from the deceased family member and “reading” scores that were directed to other consultants | The scores assigned by the consultants for both global and specific information from “target readings” were significantly higher than for “decoy readings”. Significantly higher percentage accuracy of “target reading” items |
| Study                  | Participants                                                                 | Method                                                                 | Comparison                                                                 | Findings                                                                                       |
|-----------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| Kawai et al. (2001)   | 15 subjects presenting an alleged possession trance while participating in a religious ritual and 9 subjects participating in the same religious ritual but not presenting a possession trance | Analysis of norepinephrine, dopamine and beta-endorphin levels in blood samples. Assessment of heart rate and blood pressure | Comparison of plasma levels of the analytes and of its variation (Δ) at baseline and immediately after the possession trance. Comparison of the trance and control groups | The increase in plasma levels of norepinephrine, dopamine and beta-endorphin was significantly higher in the group presenting a possession trance. There was no significant difference among the groups regarding blood pressure and heart rate |
| Ohashi et al. (2002)  | One subject during an alleged possession trance while participating in a religious ritual and two subjects participating in the same religious ritual but not presenting a possession trance | Electroencephalography (EEG)                                          | Spectral power analysis for each EEG frequency band comparing baseline vs trance vs recovery in the subject who went into a trance compared with the other two | An ictal EEG pattern was not observed. In the individual who went into a trance, it was observed an intense and significant increase of theta and alpha power during the trance state, when compared with the pre-trance. These changes persisted in the post-trance period. In the 2 control subjects, no significant changes in spectral power were observed among the periods |
| Krippner et al. (2008) | 2 mediums (1 spiritist presenting psychography and 1 from Camundombi presenting psychography) and 1 control (no mediumship, same socio-cultural environment) | Electroencephalography (EEG)                                          | Comparison of the percent time in which each EEG frequency band was observed during: baseline vs mediumistic communication (MC) vs recovery | Spiritist medium: increase in the percentage of alpha and beta waves during MC when compared with baseline. This pattern persisted during recovery Camundombi medium: increase in the percentage of theta waves during MC when compared with baseline Control subject: increase in the percentage of alpha waves during control task |
|                      | 9 mediums (6 presenting psychography and 3 presenting psychography)          | Electroencephalography (EEG)                                          | Analysis of EEG record looking for the presence of epileptic discharge during baseline vs mediumistic communication (MC) vs recovery | In mediums, there was an increase in muscle tone and slight increase in heart rate during MC when compared with baseline. In recovery phase, there was a decrease in muscle tone and heart rate. There was a reduction of the mean skin conductance during the MC in one medium and an increase in the other medium. In the control subject there was no significant change in any of these parameters at the different periods |
| Peres et al. (2012)   | 10 spiritist mediums (allocated in 2 groups: 5 more experienced and 5 less experienced) | Functional neuroimaging (SPECT). Evaluation of linguistic complexity of texts written under controlled conditions | Comparison of regional cerebral blood flow (CBF) during automatic writing (psychography) and during control task (writing a text in the usual state of consciousness). Correlation analysis between neuroimaging findings and linguistic complexity of the texts | Hypoactivation of brain regions responsible for cognitive processing and writing planning during psychography Inverse correlation trend: increasing levels of linguistic complexity of the texts produced during psychography associated with gradual reduction in CBF in brain regions responsible for cognitive processing and writing planning |
| Delorme et al. (2013) | 6 professional mental mediums                                                 | Experiment 1: triple-blind design to investigate accuracy of the information provided by mediums + Electroencephalography (EEG) | Experiment 1: correlational analysis between the accuracy of mediumistic information provided and the EEG spectral power on each frequency band during MC | Experiment 1: significant correlation was observed in 2 mediums (in one medium theta power was negatively correlated with accuracy and in the other alpha power was positively correlated with accuracy) Experiment 2: The most significant difference occurred between mediumistic communication and the mental task of perception Gamma and beta were the frequency bands in which there were more electrodes revealing significant differences during the diverse mental tasks |
Moreover, because spiritual and religious experiences are complex and multidimensional, and because mediums usually describe them in terms of changes in perception, cognition and affect\textsuperscript{62}, the measurement of the subjective elements of the phenomena is highly advisable. Posteriorly, a possible correlation among these psychological, affective and cognitive elements with specific brain regions and brain functions can be explored\textsuperscript{56,57}. Some examples of instruments that can be used for this purpose are: the Phenomenology of Consciousness Inventory (PCI)\textsuperscript{56}, the Assessment Scale for Altered States of Consciousness (ASASC)\textsuperscript{59} and Hartmann's Boundary Questionnaire\textsuperscript{60}, among many others. These questionnaires quantify different phenomenological elements of consciousness and can be useful for helping to distinguish qualitatively different ASC\textsuperscript{60}. Likewise, considering that mediumistic phenomena usually involve dissociative experiences, it is also advisable to conduct a baseline assessment of the personality trait absorption. For this purpose, questionnaires such as the Tellegen Absorption Scale\textsuperscript{61} or the Harvard Group Scale of Hypnotic Susceptibility\textsuperscript{62} could be used. Evidence suggests that individual differences in these characteristics are associated with significant differences in neurological findings\textsuperscript{56-64}.

Concerning the possibility of studying mediumship through functional neuroimaging technique, one important aspect is the selection of the control task. Usually the participant acts as his/her own control, being asked to perform two similar tasks, one with and another without spiritual (mediumistic in this case) connotation. This allows the control task to be comparable to mediumistic practice with respect to a range of elements (open or closed eyes, talking or not talking, listening or not listening) and potentially optimizes de identification of characteristic neurophysiological correlates of the mediumistic experience\textsuperscript{56}. The decision of which specific method to use depends on availability and financial possibilities\textsuperscript{56} but SPECT (Single-Photon Emission Computed Tomography) and PET (Positron Emission Tomography) techniques are usually preferred because images can be captured after the completion of the event under investigation (not simultaneously as it is necessary for functional Magnetic Resonance Imaging [MRI]). In addition, the noise during MRI may disturb mediums, interfering with the phenomenon\textsuperscript{56}.

The electroencephalography (EEG) can also offer important information about the degree of brain activation during the mediumistic practice, particularly of cortical regions. Unlike neuroimaging techniques, which provide excellent spatial location of cerebral functioning but less precise timing information, the EEG provides greater time precision (accuracy of milliseconds, in real time) with much lesser spatial accuracy\textsuperscript{56}. However, because EEG recording requires stillness to avoid muscle artifacts, and as mediumship usually involves talking and moving, there might be some technical difficulties.

The objective measurement of physiological parameters that may vary according to the emotions experienced (e.g. heart rate variability – HRV)\textsuperscript{56,65} could also bring relevant contributions to this research field. These parameters can be correlated with subjective self-reports and with neuroimaging findings, bringing to sight a more global physiological picture of the mediumistic phenomenon\textsuperscript{56}.

Measurements related to the immune and endocrine systems may also contribute to broaden this understanding\textsuperscript{54,66}.

Finally, it should be taken into account that different mediumistic modalities may require different study designs. Psychography and psychopictography (allegedly painting under the influence of a spirit) may adapt more easily to an experimental protocol employing functional neuroimaging. In regard of psychophony, although it may represent a larger universe of potential research participants (great prevalence of “spirit release therapy” sessions employing psychophonic mediums in countries such as Brazil\textsuperscript{57,67} and Puerto Rico\textsuperscript{57}), it offers obstacles to neuroimaging studies as it usually requires team work. In these cases, protocols involving EEG and ECG may be preferred as they allow researchers to record the event “in loco” using portable equipment.

**Limitations**

The present study has some limitations, which should be highlighted. First, the searches were limited to English, Spanish and Portuguese; therefore potentially relevant articles published in other languages were not included. Second, although the terms searched are the most frequently used ones, and although three databases were used, potentially relevant articles not indexed in these databases or described with other terms may have been missed.

**Conclusions**

The evidence analyzed in this review suggests: (1) mediumship seems to be associated with good mental health, mainly when individuals have many years of work as socially sanctioned mediums (2) there was heterogeneous evidence regarding the accuracy of information provided by alleged mediums, what may be due to different study methodologies, and (3) there is a paucity of studies investigating the physiologic correlates of mediumship. These results emphasize the need for more studies in this field to further elucidate mediumistic experiences, what could broaden the understanding of the mind-brain relationship.

**Conflicts of interest**

None of the authors have any conflicts of interest related to writing this review.

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An updated review on the neuropsychological profile of subjects with bipolar disorder

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Abstract

Background: In recent years, growing interest in the neuropsychology of bipolar disorder has emerged, giving rise to the accumulation of a robust body of evidence on this topic and to several related questions. Objective: To provide a state-of-the-art overview of the neuropsychological profile of bipolar disorder. Method: A thorough literature search was performed. Published research evidence was summarized and organized along three key pathways: findings from cross-sectional studies of cognition in bipolar patients, cognitive heterogeneity among affected subjects, and trajectory of neuropsychological deficits. Results: At least two thirds of bipolar patients display neuropsychological deficits, even in euthymia. Although bipolar disorder was found to be associated with an increased risk of dementia, data from elderly subjects and longitudinal research do not support a worsening of cognitive performance over time. Discussion: Cognitive dysfunctions are part of the clinical conceptualization of bipolar illness. However, they may not be present in all affected subjects and their course appears to be stable in most cases. Available evidence may be highlighting the fact that bipolar disorder is characterized by remarkable heterogeneity regarding cognitive outcomes. Different variables may be related to such heterogeneity and should be the focus of therapeutic approaches and further research. Szmulewicz AG et al. / Arch Clin Psychiatry. 2015;42(5):139-46

Keywords: Bipolar disorder, neuropsychological functioning, heterogeneity, evolution.

Introduction

Bipolar disorder (BD) is a complex chronic illness that affects mood and biological rhythms, causing suble to severe distortions of normal behavior. BD is associated with significant functional impairment, even when appropriately treated and after symptomatic recovery is achieved1,2.

Poor functional outcomes have been shown to be strongly associated with persistent neuropsychological deficits3-5, which are currently acknowledged as an important feature of BD. Indeed, during the last decade, the long-held assumption of cognitive indemnity of BD was debunked as a result of compelling evidence for conspicuous cognitive deficits in a significant percentage of affected subjects, even during periods of euthymia6. Notwithstanding the release of copious amounts of research reports on this topic, the neuropsychological profile of the disorder remains unclear, and several related questions have arisen in the last few years.

The aim of this study was to integrate the pieces of evidence gathered at present in order to provide an updated review on cognitive functioning in BD. The most controversial issues related to this subject were discussed, and targets for forthcoming research were highlighted.

Methods

First, an extensive computerized literature search was performed. Articles available with an abstract in English were retrieved from electronic databases (PubMed, PsychINFO, SciELO, and Lilacs), covering the period from January 1990 to August 2015. Afterwards, a narrative review was conducted, giving special consideration to large studies, systematic reviews, and, particularly, to meta-analyses, as the last allow for more precise estimates of effect magnitude than data derived from primary studies. In order to provide a comprehensive framework, the currently available evidence on neuropsychological functioning in BD was summarized and organized around three key topics: 1) neuropsychological profile of BD patients; 2) cognitive heterogeneity among bipolar subjects; and 3) longitudinal trajectory of cognitive deficits in BD.

Results

Neuropsychological profile of BD

In order to characterize a BD profile of neuropsychological performance, findings from both subjects in the premorbid phase of the disorder and patients with established illness are exhibited (Table 1). Among the latter, the findings of studies on subjects belonging to different age groups are reviewed.

Findings in the premorbid phase of BD

Neurocognitive functioning in the premorbid phase of the illness has been appraised by means of three methodologies: prospective conscript studies, evidence from birth cohorts and at-risk subjects followed longitudinally. Martino et al.7 reviewed the findings from these approaches and reported that with the exception of one study8, which showed that poor performance on visuospatial reasoning and increased performance on the arithmetic subtest were associated with BD, studies failed to find any differences between people who were subsequently diagnosed with BD and healthy controls on measures of general intelligence9-11. In keeping, Trotta et al.12, in a meta-analysis of four prospective cohort studies, yielded a nonsignificant overall effect size for premorbid IQ in BD.

However, these studies assessed general intellectual function and not specific cognitive domains. Findings regarding the latter are scant so far. Meyer et al.13 used data from a 23-year longitudinal prospective study of offspring of mothers with BD, unipolar depression or no history of BD (n = 74). They were evaluated from 8 to 15 years with general intelligence tests, from 11 to 19 years with executive functions measures and as young adults with psychopathology measures (SCID-I). Offspring who were later diagnosed with BD during adulthood (n = 9) had lower performance than healthy controls on
measures of executive functions with moderate-large effect sizes ($d = 0.58-1.34$) at age 11-19, although they had comparable IQ when they were 8-15 years old. Ratheesh et al. followed a cohort of 413 children who were at ultra-high risk for psychosis for a mean period of 8.2 years. Children who were later diagnosed with BD showed lower performance than healthy controls on measures of global intelligence, visuospatial ability and executive function with large effect sizes ($d = 1.35-1.56$). In keeping, Klimes-Dougan et al. conducted an extensive neuropsychological assessment of adolescent children of mothers with a history of BD ($n = 43$) or major depressive disorder ($n = 72$). They found that offspring of mothers with BD had poorer performance on the Wisconsin Card Sorting Test, which remained significant after adjusting for IQ and depressive/manic symptoms.

**Findings in pediatric and adolescent patients**

A systematic review on cognitive performance in pediatric BD patients reported that significant deficits in verbal/visual-spatial memory, processing speed, working memory and social cognition were found quite consistently across the primary studies included. Furthermore, two previous meta-analyses showed moderate deficits ($d = 0.5-0.8$) in verbal memory, attention, processing speed and executive domains among pediatric and adolescent patients.

However, most of the primary studies included in these reviews were performed during affective episodes. Data on euthymic BD pediatric patients are very scant so far. At the primary study level, the largest study evaluating cognitive impairments in pediatric bipolar patients included 28 unmedicated patients during manic episode, medicated euthymic patients ($n = 28$) and healthy individuals ($n = 28$). Both patient groups (mean age = 11.74, SD = 2.99) showed large ($d \geq 0.8$) impairments in domains of attention, executive functions, working memory and verbal memory compared to healthy controls. However, half of the patients in each group had comorbid ADHD, which made it difficult to identify deficits specific to pediatric BD.

**Findings in young and middle-aged adults**

Aggregate data meta-analyses of neurocognitive functioning in young and middle-aged adults have reported moderate ($d = 0.5-0.8$) and large ($d \geq 0.8$) deficits across executive functions, verbal memory, attention and processing speed. However, the only individual patient data meta-analysis of cognition in BD ($n = 2876$) conducted at present showed small-to-moderate deficits ($d = 0.26-0.63$) in most neurocognitive domains after controlling for age, premorbid IQ and gender. Furthermore, this study reported a large degree of heterogeneity across studies, which may explain some differences observed in the effect sizes yielded by previous meta-analyses.

Kurtz and Geyer performed a meta-analysis evaluating the profile of neurocognitive impairment of BD patients and the impact of clinical episodes on those measures. The study combined results from 42 studies conducted in euthymic patients, 13 studies in manic/mixed phase and 5 studies of patients in a depressed state, suggesting that, although present during euthymia, a subset of these neurocognitive impairments would worsen during periods of acute affective episodes.

With regard to social cognitive domains, evidence for impaired emotion recognition and theory of mind in the three phases of BD is rather consistent across studies. A recent meta-analysis of social cognition in euthymic bipolar patients showed no significant patient-control differences for the recognition of three basic emotions (happiness, sadness, and anger) whereas small but significant effect sizes favoring healthy controls ($d < 0.5$) were noted for emotional intelligence, the Hinting Task, the Eyes Test, and the recognition of fear, disgust, and surprise. Furthermore, this study showed a medium effect size of impairment ($d = 0.58$) for the Faux Pas Test. However, it is not yet clear whether these social cognitive flaws are epiphenomena of neurocognitive deficits. Finally, the only meta-analysis of studies assessing decision-making in samples composed exclusively of euthymic subjects reported no significant differences between controls and patients in the total net score of the Iowa Gambling Task. In contrast, primary studies of subjects during acute episodes revealed suboptimal task performance particularly during mania, suggesting that decision-making impairments are state-dependent in BD patients.

**Findings in elderly adults**

The only meta-analysis of neurocognition in late-life BD revealed moderate impairments for the cognitive variables analyzed, except for phonemic fluency ($d = 0.80$) and cognitive flexibility ($d = 0.88$). This report took into account the fact that older adults with BD constitute a heterogeneous population composed by both people with early-onset BD (EOBD), who developed their illness during adolescence/young adulthood, and people with late-onset BD (LOBD), who experienced their first affective episode at the age of 40 or over. These two subgroups may have different features. Typically, patients with LOBD show a weaker family history of affective disorders, higher frequency of neurological comorbidities, higher cardiovascular risk burden and worst neuropsychological performance on almost all measures, suggesting a high influence of non-genetic etiological factors on this subgroup of patients. So, when meta-analysis was performed after removing the data from LOBD subjects and overall effect sizes were recalculated, estimates became much smaller. A subsequent study showed that euthymic, non-demented elderly patients with BD performed worse than healthy controls on a verbal fluency test (semantic fluency-animal naming) with a large magnitude of impairment ($d = 0.86$). Furthermore, this study revealed that demented BD subjects had a significantly worse performance on the Clock Drawing Test as compared with patients with dementia due to Alzheimer's disease.

**Cognitive heterogeneity among subjects with BD**

A recent study by Martino et al. showed that 30% of a sample of 100 BD patients was indistinguishable from healthy subjects in terms of cognitive functioning, whereas another 30% displayed more severe cognitive deficits than usually reported in the literature ($d = 1.13$). These findings are in keeping with other studies indicating that the prevalence of patients without clinically significant cognitive impairment fluctuates between 43% and 70%. Such results may be suggesting that primary studies and meta-analyses reporting mean values of neurocognitive functioning in BD patients might be failing to recognize that a subgroup of patients is demonstrating most of the impairment: while some patients might have a neurocognitive functioning within normal limits, others might show poorer performance than usually reported.

**Longitudinal course of cognitive deficits in BD**

In order to evaluate longitudinal trajectories of cognitive deficits in patients with BD, four strategies were considered: studies of cognitive performance after first affective episode, longitudinal follow-up studies of cognitive functioning, data from patients with long illness duration, and evolution to dementia in subjects with BD (Table 2).

**Cognitive functioning in the first episode of BD**

Martino et al. reviewed 14 studies of cognitive performance in first-episode patients, and reported that impairments in verbal memory, attention, and executive functions tended to be present during and after the first episode of the disorder. Considering only studies that evaluated patients during euthymia, after recovery of their first manic episode, Neha et al. found impairments in IQ, executive functions, verbal memory and attention with large effect sizes for all measures. Torres et al. reported that patients with BD did not differ from controls with regard to premorbid IQ and attention, while moderate effect size impairments in executive functions, working
memory and visual reasoning were found. Finally, López-Jaramillo et al.\textsuperscript{47} showed that patients with BD performed worse than healthy controls on a measure of working memory with moderate effect size, without between-group differences for IQ, verbal memory, attention, processing speed and executive functions. These results are in line with two recent meta-analyses of cognitive functioning in BD patients after their first affective episode\textsuperscript{48,49}, which showed widespread impairment. According to these quantitative reviews, the severity of impairment was generally comparable to that found in studies with patients after recurring episodes, with medium effect sizes for most neuropsychological variables.

However, another systematic review\textsuperscript{46} reported that BD patients in remission immediately after first manic episode did not display deficits in non-verbal memory and verbal fluency, whereas evidence for impairments in other neurocognitive domains was inconsistent across reports, with most studies revealing negative findings, except for working memory.

### Longitudinal studies

The only meta-analysis summarizing the results of longitudinal studies of euthymic adults with BD did not show any significant differences between BD patients’ performance at baseline and healthy controls after a mean follow-up period of 4.62 years for 14 cognitive variables\textsuperscript{50}. In this line, a recent study analyzed the one-year trajectory of cognitive deficits in recently diagnosed BD and reported an improvement in processing speed and executive functions\textsuperscript{51}. Similarly, Santos et al.\textsuperscript{51} found no differences in neuropsychological trajectory

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Table 1. Meta-analyses of cognitive functioning in BD

| Meta-analysis                        | Study population             | Mood state                  | Resultsa |
|--------------------------------------|------------------------------|-----------------------------|----------|
| Arts et al. (2008)\textsuperscript{20} | Adult patients and FDR       | Euthymia                    | BD: Large effect sizes for executive functions and verbal memory. Medium effect sizes for processing speed and sustained attention. Small effect sizes for visuo-perception. FDR: small, but significant, effect sizes across cognitive domains. |
| Bora et al. (2009)\textsuperscript{23} | Adult patients and FDR       | Euthymia                    | BD: Moderate-to-large effect sizes for executive functions, sustained attention and verbal memory. FDR: small, but significant, effect sizes across cognitive domains. |
| Bora et al. (2011)\textsuperscript{24} | Adult patients               | Euthymia and depression     | Small-to-moderate effect sizes across all domains (BD II-only vs. controls). BD II less impaired than BD I on memory measures. |
| Bora and Pantelis (2015)\textsuperscript{26} | FEBD                         | Euthymia and mood episodes  | Moderate effect sizes for attention, processing speed, verbal and visual memory. Small effect sizes for most executive domains. |
| Bourne et al. (2013)\textsuperscript{27} | Adult patients               | Euthymia                    | Small-to-moderate effect sizes for verbal memory, executive functions and sustained attention. |
| Garcia Nieto and Castellanos (2011)\textsuperscript{28} | Pediatric patients           | Euthymia and mood episodes  | Moderate effect sizes for verbal memory, executive functions and sustained attention. |
| Joseph et al. (2008)\textsuperscript{29}  | Pediatric patients           | Euthymia and mood episodes  | Moderate-to-large effects for verbal memory, attention, executive functions, working memory and verbal fluency. Small effects for IQ and motor speed. |
| Kurtz and Gerraty (2009)\textsuperscript{30} | Adult patients               | Euthymia                    | Euthymia: moderate effect sizes for attention, delayed memory and executive functions. Large effect sizes for verbal learning. Depressive and manic episodes: more severe impairment in verbal learning and phonemic fluency. |
| Lee et al. (2014)\textsuperscript{31}     | FEBD                         | Euthymia and manic episode  | Medium-to-large deficits for psychomotor speed, attention, working memory and cognitive flexibility. Small deficits for verbal learning and attention, attentional switching, and verbal fluency. Medium-to-large deficit for response inhibition only detected in non-euthymic cases. |
| Mann-Wrobel et al. (2011)\textsuperscript{32} | Adult patients               | Euthymia                    | Moderate-to-large effect sizes across all domains. |
| Robinson et al. (2006)\textsuperscript{33} | Adult patients               | Euthymia                    | Large effect sizes for executive function and verbal learning. Medium effect sizes for delayed recall, set-shifting, processing speed, sustained attention and response inhibition. Small effect sizes for verbal fluency. |
| Torres et al. (2007)\textsuperscript{34}  | Adult patients               | Euthymia                    | Medium-to-large impairment for executive functions, attention, processing speed and episodic memory. |
| Trotta et al. (2015)\textsuperscript{35}  | Subjects in the premorbid stage of illness | Euthymia                    | Non-significant overall effect size for IQ between subjects who subsequently developed BD and those who did not develop any disorder. |
| Samamé et al. (2012)\textsuperscript{36}  | Adult patients               | Euthymia                    | Non-significant overall effect size for decision-making (Iowa Gambling Task). Small effect size for facial emotion recognition. Moderate effect sizes for mentalizing domains. |
| Samamé et al. (2013)\textsuperscript{37}  | Elderly patients             | Euthymia                    | Non-significant differences for the MMSE and CDT. Moderate effect sizes for sustained attention, digit span, delayed recall, verbal fluency and cognitive flexibility. |
| Samamé et al. (2015)\textsuperscript{38}  | Adult patients               | Euthymia                    | Medium effect size for the Faux-Pas test. Non-significant differences for the recognition of three emotions (happiness, anger and sadness). Small effect size for the recognition of surprise, fear and disgust, emotional intelligence and the Hinting task. |

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\textsuperscript{a}All effect sizes favor healthy controls.

BD: bipolar disorder; FDR: first degree relatives; FEBD: first episode bipolar disorder; MMSE: Mini-Mental State Examination; CDT: Clock Drawing Test.
between patients and healthy controls after 5 years follow-up of a large sample of BD subjects. Another recent study followed prospectively a cohort of 71 major depressive disorder, 61 BD and 35 schizophrenia patients, evaluated at baseline and after a mean of 20.6 months. The authors reported that, as a group, BD displayed stable cognitive functioning and even improved on a measure of verbal memory. However, there are a number of limitations to be considered when analyzing these data. First, follow-up periods were relatively short in most studies and it should not be assumed that no cognitive decline occurred after this period. Another important limitation was that not all studies controlled for mood symptomatology at baseline and during follow-up. Therefore, changes in mood state could have influenced the results. Finally, longitudinal studies available at present only explored the trajectory of cognitive functioning in full-blown BD, whereas the course of cognition in the period comprised between the premorbid stage of the disorder and the onset of mood symptoms remains unexplored.

Patients with long illness duration

Studies of cognitive performance in elderly patients with BD tended to find the same pattern of cognitive deficits both in terms of domain affected and magnitude reported in younger patients, suggesting indirectly no neurocognitive progression of the illness. In order to assess the potential effect of illness progression on neurocognition, a study compared neurocognitive functioning between patients aged 40 years or younger (Y-BD) and patients aged 60 years or older (E-BD). Despite E-BD patients having illness duration almost four times longer than Y-BD patients, no significant differences in neurocognitive functioning were found between these two groups.

A possible limitation of these studies is selection bias in samples of elderly BD patients, since those who developed dementia or severe cognitive impairment, might have been institutionalized or dead and therefore under-represented.

Evolution to dementia

Some small pioneering studies of non-euthymic bipolar elders found that a high percentage of them scored positively on screening tests for dementia. In accordance with these findings, evidence from population-based studies showed that the diagnosis of BD was significantly associated with an increased risk of dementia. These results indicate that overall, there seems to be a percentage of people with BD that will develop dementia. However, this outcome may be present in around 6-9% of BD patients included. Taking this into account, dementia might be an infrequent outcome rather than the average evolution of BD.

Discussion

In this study, the available evidence on the neuropsychological profile of BD was reviewed in order to address some of the controversies regarding this matter. Our findings indicate that cognitive deficits are present in a significant percentage of affected subjects, even during euthymia periods and that they seem to exacerbate during acute mood episodes. Such impairments could be present prior to illness onset, and are evident in BD patients belonging to different age groups. Furthermore, some findings suggest that the magnitude of these deficits would be similar in young and elderly patients. These results are in line with preliminary findings from longitudinal studies, which do not reveal any changes in the neuropsychological performance of BD subjects over time.

At present, there appears to be a certain degree of agreement in the fact that neuropsychological performance is a major determinant of functional outcomes in BD patients. As shown in this review, although it is widely acknowledged that bipolar subjects exhibit neurocognitive impairments in domains of verbal memory, attention and executive functions, among others, the notion of cognitive impairment may not be applicable to all patients. This cognitive heterogeneity might be explained by a number of environmental and genetic causes reported in the literature to alter normal cognitive functioning in BD patients such as obstetric complications, genetic polymorphisms, childhood trauma, infection with Herpes Simplex virus type 1, comorbidity with anxiety disorder, organic abuse, age at onset, subclinical hypothyroidism and exposure to antipsychotics.

Beyond the well-documented relationship between cognitive and functional outcomes in BD, another variable that has been traditionally associated with cognitive performance is the number of previous episodes, especially manic ones. This finding has led some authors to suggest a progressively deteriorating nature of cognitive deficits in BD. However, these data derive from cross-sectional studies, and therefore, the direction of causality cannot be ascertained. In fact, a recent prospective study found that patients with clinically significant cognitive deficits had an increased risk of suffering any recurrence and suggested that severe cognitive impairment may be the cause, rather than the consequence, of a poorer course of illness, thus providing an alternative explanation to this relationship. This result may also be suggesting that the subgroups of patients with better clinical outcomes and with preserved cognitive function might overlap. Hence, the importance of this finding lies in the fact that cognitive heterogeneity might be a clue to explain the variability seen in areas like global functioning and course of illness, although the mechanisms underlying these associations are a matter of speculation nowadays. For example, patients with poor cognitive functioning might have poorer treatment adherence, poorer response to antipsychotics.

Table 2. Main approaches to the study of the longitudinal course of cognitive deficits in BD

| Methodological approach                  | Results                                                                 | Main limitations                                           |
|-----------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------|
| Cognitive functioning in first-episode BD | Inconsistent findings. Both impaired and preserved cognitive outcomes have been reported | Small sample sizes, Results potentially confounded by mood symptomatology |
| Longitudinal research                    | Longitudinal meta-analysis does not show any test-retest differences for neurocognitive variables | Short follow-up periods, Few data on healthy controls, Dropout bias |
| Cognitive functioning in long-standing BD | Meta-analysis of cognition in E-BD subjects shows a pattern and magnitude of impairment similar to those reported for young adult patients | Small sample sizes, Few studies performed on E-BD, BD patients with poor outcomes (dementia, institutionalized) probably not included in E-BD samples |
| Population-based studies                | An association between BD and an increased risk of dementia is supported by available data | These studies reflect the outcome of a minority of BD patients (6%-9%) |

BD: bipolar disorder; E-BD: elderly BD patients (aged 60 years or above); Y-BD: young BD patients (aged 40 years or under).
psychoeducation programs and psychotherapeutic interventions leading to poorer disease evolution and global functioning. Indeed, a previous study noted that cognition was probably a major source of uncontrolled variance regarding response to treatment.

Despite these considerations, the aforementioned relationship between number of episodes and cognitive functioning, together with several recent reports showing a tendency towards episode acceleration and the evidence of an increased risk of suffering dementia in bipolar subjects, has given rise to the notion of BD as a progressively deteriorating condition and the application of staging models to this group of disorders. In the context of the utilization of staging conceptualizations for the appraisal of severe psychiatric conditions, the term ‘neuroprogression’ has been coined to refer to a pathological reorganization of the central nervous system that would occur along the course of these illnesses. Applied to BDs, the hypothesis of neuroprogression suggests that different characteristics of the disorder follow a progressive path from prodromic to more severe and refractory presentations. However, it has not been adequately validated so far and several artifacts must be considered when interpreting the evidence often thought of as being ‘in support’ of this notion. What is more, recent reports have emphatically stated that cognitive deficits are progressive in BD on the basis of the findings of cross-sectional studies. According to these investigations, patients in later stages have worse functional outcome/higher number of episodes than subjects in early stages, who display better outcomes. Given the strong correlation between functional outcomes and cognitive functioning, the finding of a worse neuropsychological performance in late-stage patients as defined on the basis of poor global functioning is predictable. However, it is not possible to infer neuroprogression from this, given that no longitudinal study at present has proved that the different presentations of BD are moments in the development of the disorder as the utilization of the word “stage” would necessarily imply. In fact, taken together, findings evaluating long-term evolution of cognitive deficits in BD do not support the hypothesis that cognitive deficits tend to worsen over the course of illness. Rather, it would be more sensible to conclude in the light of the currently available evidence that there are different subgroups within the disorder that may have different cognitive trajectories. Indeed, a meta-analysis by our group, revealed that elderly BD subjects, with the disorder that may have different cognitive trajectories. Indeed, a long-term evolution of cognitive deficits in BD do not support the latter notion. Second, large longitudinal studies, with long follow-up periods, assessing specific cognitive domains in BD patients are clearly needed as well as studies of cognitive performance in the same subjects both after and before the onset of mood episodes in order to ascertain whether neuropsychological deficits worsen over time, and if so, to determine the moment in which cognitive decline would occur. Third, a number of variables found to be related to poorer cognitive outcomes should be studied more deeply. In addition, the relationship between mood episodes and cognitive dysfunction (i.e., as inducers of cognitive impairments or exacerbating existing cognitive dysfunctions) should be further assessed. Insights into cognitive subgroups in BD might also be useful. For example, prospective studies evaluating clinical course/functional outcomes in newly diagnosed patients (i.e., after recovery of their first manic episode) or high-risk BD, divided by their cognitive performance might be useful in determining whether cognitive performance determines poor clinical outcomes or vice versa.

Therapeutic implications of cognitive impairment in BD

As neuropsychological impairment is currently acknowledged as an important target for therapeutic efforts, it is important that clinicians are aware of a number of variables that may affect cognitive outcomes. At present, preclinical findings have suggested that lithium might have beneficial effect on cognition. Although no direct evidence for a beneficial effect of this drug on cognitive impairment exists, preliminary findings report an association between the use of lithium and more preserved cognitive functioning. For instance, Nunes et al. compared the prevalence of Alzheimer’s disease between a group of BD subjects treated chronically with lithium therapy and another group of patients without recent lithium therapy. They found that lithium-treated BD patients had lower prevalence of Alzheimer’s disease and suggested that lithium treatment reduced the prevalence of Alzheimer’s disease (AD) in BD patients to levels found in general elderly population. In keeping, a recent population-based cohort study evaluated dementia risk among BD adults on lithium therapy. Compared with non-use, a year of lithium treatment was associated with significantly reduced dementia risk. Moreover, there is preliminary evidence of improved white matter integrity in BD patients. However, contradictory results exist when evaluating literature on cognitive performance in specific domains in subjects under treatment with lithium. Recent studies compared the neuropsychological performance of patients treated with and without lithium and found significant differences favoring the former. On the other hand, prolonged administration of lithium has also been associated with discrete negative effects in learning, surveillance, alert and short-term memory. In keeping, a meta-analysis comparing healthy volunteers and affective disorder patients reported that lithium had a small, but significant, deleterious effect on immediate verbal learning, memory and creativity, with no significant effect on other measures. Taken together, these findings point towards a modest, if any, effect of lithium on traditional neuropsychological measures.

On the other hand, there is evidence from healthy subjects, BD and other clinical populations suggesting that exposure to different psychotropic agents commonly prescribed to bipolar patients is
associated with impaired cognition\textsuperscript{72,100-104}. In the same line, obesity and metabolic syndrome induced by atypical antipsychotics may further influence cognitive functioning\textsuperscript{102,103}. Thus, it is also possible that patients responding to lithium treatment are less exposed to antipsychotics and better cognitive outcomes are a reflection of that.

To further support this, studies comparing cognitive performance between drug-free BD patients during euthymia and healthy controls show less impairment than reported in studies that included treated patients. Joffe et al.\textsuperscript{105} found no differences between drug-free BD patients and healthy controls in measures of attention and verbal memory. Also, no differences were found when comparing drug-free patients with lithium-treated patients. Lópe-Jaramillo et al.\textsuperscript{106} found differences only in measures of verbal, logical and working memory while non-medicated patients performed as well as healthy controls on other traditional neuropsychological measures. The subgroup of BD patients under treatment with lithium performed equally as those without pharmacological treatment on all measures. Finally, Torrent et al.\textsuperscript{2} found no differences in neurocognitive performance between drug-free BD patients and healthy controls except for one test, the TMT-B, which evaluates executive functions. Despite some limitations, like small sample sizes and a possible selection bias of highly selected sample of patients with good outcomes, these results point towards some sort of iatrogenic-pharmacologic effect of medication on cognitive performance affecting treated BD patients usually included in studies\textsuperscript{15}.

Taking together findings from drug-free patients and cognitive heterogeneity in BD, initially, it should not be assumed that cognitive deficits are necessarily present in the course of the disorder. Clinicians should rule out potentially treatable causes of these deficits such as clinical (i.e., hypothyroidism or metabolic syndrome) or psychiatric (i.e., anxiety disorders or abuse/dependence of alcohol) comorbidities among patients with clinically significant cognitive impairments. Likewise, this subgroup of patients may not be candidate for receiving drugs such as benzodiazepines, anticholinergic agents or antipsychotics with a negative impact on cognition\textsuperscript{72,102,105}. On the other hand, the efficacy of psychosocial interventions may be influenced by cognitive status, although this has not been formally studied so far.

In conclusion, cognitive deficits in BD are of paramount importance as they may represent a bridge between symptomatic remission and functional recovery that could be targeted by therapeutic interventions. They may also constitute a useful tool for predicting clinical and functional outcomes to individual patients, a great difficulty that many clinicians acknowledge when treating subjects with BD. Finally, as stated above, cognitive performance and related variables should be taken into account at the time of selecting proper pharmacological treatment to an individual patient.

Conflict of interest

None.

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Brazilian Portuguese transcultural adaptation of Barkley Deficits in Executive Functioning Scale (BDEFS)

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Abstract

Background: Considering the importance of Executive Functions to clinical and nonclinical situations, Barkley proposed a new theory of executive functioning based on an evolutionary neuropsychological perspective and clinical research using large samples of clinical and community identified adults and children as well as children with ADHD followed to adulthood. Objective: The present study aims to adapt the Barkley Deficits in Executive Functions Scales (BDEFS) to Brazilian Portuguese and also assess its construct validity in a sample of normal Brazilian adults. Methods: The original version of scale was adapted to Brazilian Portuguese according to the guideline from the ISPOR Task Force. Results: The original version of scale was adapted to Brazilian Portuguese according to the guideline from the ISPOR Task Force. To assess the semantic equivalence between the original and adapted version, both of them were applied into a sample of 25 Brazilian bilingual adults. Finally, 60 Brazilian adults completed the BDEFS and the Brazilian versions of Barratt Impulsiveness Scale (BIS-11) and Adult Self-Report Scale (ASRS-18) to assess divergent validity. Results: The BDEFS Brazilian Portuguese version has semantic correspondence with the original version indicating that the adaptation procedure was successful. The BDEFS correlated significantly with the impulsivity and attention scores from the BIS-11 and ASRS-18 supporting its construct validity. Cronbach’s alpha (α = 0.961) indicated that the BDEFS translated version has satisfactory internal consistency. Discussion: Together, these findings indicate the successful adaptation of the BDEFS to Brazilian Portuguese and support its utility in that population.

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Keywords: Executives functions, neuropsychology, psychometrics, assessment scales.

Introduction

Executive Functions (EF) are among the most important cognitive processes due to their role in complex cross-temporal behavior, adaptation to novel situations, problem solving, and decision-making. These cognitive processes are some of the most-studied constructs in neurosciences. Several theoretical models have tried to explain both the structure and functioning of EF. These models differ in terms of the number of processes thought to be involved (single or multiple processes) in the construct. Despite some divergence between different models of Executive Function, authors seem to agree that EF processes are pivotal for self-regulation and goal-directed behavior.

Several psychopathologies are associated with impairments in EF processes, such as Attention Deficit Hyperactivity Disorder (ADHD), Bipolar Disorder, Obsessive Compulsive Disorder, and Schizophrenia. In clinical samples, as in ADHD, EF deficits are related to poor functional outcomes, such as educational fields. In non-psychiatric samples, EF seems to be related to others diseases and to everyday activities. Patients with increased severity of type 2 diabetes mellitus have lower performance in a working memory task and in a measure of general EF probably because chronic hyperglycemia may end in neural apoptosis and, as consequence, decreased the cognitive functioning. In addition, EF mediates the diabetes self-care (glucose monitoring, diet, medication administration, etc.). Moreover the executive functioning is related to driving behavior and the probability of traffic accidents and to productivity at work.

Considering the importance of EF to clinical and nonclinical situations, Barkley proposed a new theory of executive functioning based on an evolutionary neuropsychological perspective and clinical research using large samples of clinical and community identified adults and children as well as children with ADHD followed to adulthood. According to Barkley, executive functions could be understood by considering a hierarchic relationship between inhibitory control and other cognitive processes. Barkley argues that three inhibitory processes – (a) inhibition of the prepotent response; (b) stopping of an ongoing response; and (c) interference control – support higher abilities like working memory, internalization of speech, self-regulation of affect-motivation-arousal, reconstitution, and motor-control-fluency-syntax. These cognitive abilities operate as tools for the performance of major activities of daily life since the beginning of humanity. That is because EF is proposed to mediate complex behaviors such as reciprocity and social exchange, social cooperation, vicarious learning, mimesis, and self-regulation for self-defense that underlie the evolutionary process of the human species and the development of our culture.

Despite the plethora of neuropsychological tests designed to assess EF, there is evidence that many of them do not have ecological validity considering their lack of correlation with daily-life activities or observations and ratings of EF in natural settings. In this context, Barkley created the Barkley Deficits in Executive Functioning Scale (BDEFS), which consists of a self-reported questionnaire that assesses different components of executive functioning related to daily-life impairments of psychiatric patients. Since the publication of BDEFS, this scale has accumulated evidence of validity, as well as utility in clinical practice for the assessment of psychiatric patients. The present work presents the adaptation of the BDEFS to Brazilian Portuguese, and provides evidence of its reliability and construct validity in a non-clinical community sample of Brazilian adults.
Materials and methods

Samples

Two convenience samples were recruited through local advertisements and the only exclusion criteria was age (less than 18 years old and more of 89 years old). For the translation phase, 25 bilingual Brazilian adults (n = 25; 17 women) answered the both versions of BDEFS. The participants had an average age of 26.40 years old, with a minimum of 19 years old and a maximum of 41 (Standard Deviation = 5.515). All participants had at least 11 years of formal education.

For the pilot study of psychometric properties of the Portuguese Brazilian version of BDEFS, 60 Brazilian individuals were recruited (n = 60; 21 men), all of whom had at least eight years of formal education. The participants in this phase had an average age of 27.3 years old, with a minimum age of 18 years old and a maximum of 55 years old (Standard Deviation = 12.3 years).

Instruments

Barkley Deficits in Executive Functioning Scale (BDEFS)

The self-report version of the BDEFS-LF is intended for adults ages 18 to 81. The patient completes the scale by indicating the frequency of certain behaviors and thoughts believed to reflect EF deficits. The ascertainment window for this self-assessment is the past six months, which should ensure a more stable measurement and representative sampling of the EF deficits over time than do typically short-duration cognitive tests. Answers to the 89 items comprise a four-point Likert-type scale, as follows: never or rarely (1), sometimes (2), often (3), and very often (4). The factor analysis of the BDEFS revealed a large, single factor along with four smaller factors. These became the five subscales that assess specific domains of EF in daily life: self-management of time (items 1 to 21), self-organization/problem solving (items 22 to 45), self-restraint (items 46 to 64), self-motivation (items 65 to 76), and self-regulation of emotion (items 77 to 89).

The Scoring System involves the computing individual scores of the five subscales; the Total Score across all five subscales; the Executive Functioning Symptom Count which indicates clinical symptoms of deficits in executive functioning (items answered with 3 or 4 are added to obtain this score); and the ADHD-EF Index (items 1, 6, 14, 16, 24, 49, 50, 55, 60, 65 and 69 have their scores added). The ADHD-EF Index is only intended as a predictor of the risk of having ADHD and is not diagnostic of it per se.

Barratt Impulsiveness Scale – Eleventh edition, Brazilian version (BIS-11)

The BIS-11 is a self-report instrument with 30 items for measure impulsivity of the Ernest Barratt model. The respondents have to select the best option based in a four-point Likert-type scale to describe the frequency of certain behaviors and situations linked with impulsivity. The BIS-11 has three subscales: attentional impulsivity (items 6, 5, 9, 11, 20, 24, 26, 28), motor impulsivity (items 2, 3, 4, 16, 17, 19, 21, 22, 23, 25, 30) and non-planning impulsivity (items 1, 7, 8, 10, 12, 13, 14, 15, 18, 27, 29). Furthermore, the BIS-11 has a total score ranges from 30 to 120 points. Higher scores mean that the participant tends to behave impulsively.

Adult Self-Report Scale, Brazilian version (ASRS-18)

The ASRS-18 is a self-report measure of symptoms of the Attention-Deficit Hyperactivity Disorder (ADHD) based in the A diagnostic criteria of the Fourth Edition of the Diagnostic and Statistical Manual (DSM-IV) adapted to adults. The scale was composed by 18 questions: 9 for evaluate the attention-deficit symptoms and 9 for measure the hyperactivity-impulsivity symptoms. To be suspect of having ADHD is necessary at least 6 symptoms in one subscale or 12 symptoms in both (for the combined type). For clinical diagnosis is necessary fill the others criteria.

Procedures

There are two main phases of the present study: (1) the transcultural adaptation and (2) internal consistency and construct validity. First, the BDEFS was translated into and adapted to Brazilian Portuguese, following the principles and steps recommended by the ISPOR Task Force for Translation and Cultural Adaptation. The steps of translation and adaptation were (a) preparation: research design and obtaining authorization from Barkley and Guilford Press to translate and transculturally adapt the scale; (b) forward translation: translation for the Portuguese language; (c) reconciliation: comparison and synthesis of translations into Portuguese; (d) back translation: translation of the Portuguese version back into the English language; (e) review of back translation: comparison of the back-translated version with the original; (f) cognitive debriefing: testing of the translated version with a small sample; (g) review of cognitive debriefing results and finalization: interpretation of the results of cognitive debriefing; (h) proofreading: correction of any type of error; and (i) final report. Only the step of harmonization was not followed, because it is not applicable to this study. The comparison between the original version and the adapted version used the same procedure described in Malloy-Diniz et al. Namely, both original and translated versions of the BDEFS were administered to the sample of 25 bilingual Brazilian participants. The original scale was administered first. After seven days, the translated version was administered, with the time between administrations decreasing the possibility that the participants would remember the order of and their responses to the items.

In a second phase, relationships between the Brazilian versions of the BDEFS, the Adult Self Report Scale (ASRS-18), and the Barratt Impulsiveness Scale (BIS-11) were assessed. The three scales were applied in the sample of 60 Brazilian participants.

Data analysis

SPSS 21.0 software (Statistical Package for Social Sciences, version 21.0) was used to analyze the distribution of each item of the BDEFS Brazilian Portuguese version, finding that all the items did not follow normal distribution (p < 0.05) by the Shapiro-Wilk test (n < 50). This finding is typical of rating scales that assess symptoms or deficits. Accordingly, Spearman correlation was employed between the answers to the translated and the original instruments in order to verify the validity of the construct and the association between items. Finally, to assess the internal consistency of BDEFS Brazilian Portuguese version was calculated the inter-correlation among the items (the coefficient of Cronbach’s Alpha).

A Bland–Altman plot was constructed to analyze the agreement between the two versions of the BDEFS. This statistical method involves a scatter plot that has as the y-axis the difference between the two measures, with the x-axis representing the mean of the two measures. Upper and lower limits are established based on ± 1.96 SD. If the bias has a normal distribution, 95% of the differences will be between the limits. A standard deviation of 1.96 is not clinically representative, so if the differences are within ± 1.96 SD, the two measures correspond and may be used interchangeably.

Results

Thirty items of the scale showed a strong correlation index (0.70 < rho < 1), fifty-five items presented a moderate correlation (0.30 < rho < 0.70), and three items showed a weak correlation (0.1 < rho < 0.3). Only one item showed no correlation between the original and Brazilian versions. All five correlations were strong (0.7 < rho < 1) between the five subscale scores of the translated and the original versions. Finally, the total score, the FE Count Symptoms, and the ADHD Index showed strong correlations (0.7 < rho < 1). These results
point to a good correspondence between the original and translated BDEFS. These correlations are presented in table 1.

Cronbach’s Alpha was calculated in order to measure the internal consistency of the BDEFS Brazilian Portuguese Version for all scales and for each subscale, as done in the validity and normative study of the BDEFS English Version15. For all scales, Cronbach’s Alpha was 0.961 (α = 0.961). For each subscale – self-management of time, self-organization, self-restraint, self-motivation, and self-regulation of emotion – the results of Cronbach’s Alpha (α) were, respectively, 0.925, 0.920, 0.879, 0.790, and 0.970. These results are quite satisfactory and are close to those Barkley found in 2011 (0.949, 0.958, 0.930, 0.914, and 0.946, respectively). These results indicate that the BDEFS translated version has satisfactory internal consistency.

### Table 1. Correlations between the items and indexes of the two versions of BDEFS

| Statements                                                                 | Rho  | P   |
|---------------------------------------------------------------------------|------|-----|
| 1. Procrastinate or put off doing things until the last minute              | 0.82 | 0.01|
| 2. Poor sense of time                                                       | 0.801| 0.01|
| 3. Waste or mismanage my time                                              | 0.782| 0.01|
| 4. Not prepared for work or assigned tasks                                 | 0.433| 0.05|
| 5. Fail to meet deadlines for assignments                                  | 0.521| 0.01|
| 6. Have trouble planning ahead or preparing for upcoming events           | 0.489| 0.05|
| 7. Forget to do things I am supposed to do                                 | 0.812| 0.01|
| 8. Can’t seem to accomplish the goals I set for myself                     | 0.507| 0.01|
| 9. Late for work or scheduled appointments                                 | 0.807| 0.01|
| 10. Can’t seem to hold in mind things I need to remember to do            | 0.566| 0.01|
| 11. Can’t seem to get things done unless there is an immediate deadline   | 0.403| 0.05|
| 12. Have difficulty judging how much time it will take to do something or get somewhere | 0.647| 0.01|
| 13. Have trouble motivating myself to start work                           | 0.702| 0.01|
| 14. Have difficulty motivating myself to stick with my work and get it done | 0.523| 0.01|
| 15. Not motivated to prepare in advance for things I know I am supposed to do | 0.468| 0.05|
| 16. Have trouble completing one activity before starting into a new one   | 0.627| 0.01|
| 17. Have trouble doing what I tell myself to do                            | 0.475| 0.05|
| 18. Poor follow through on promises or commitments I may make to others    | 0.243| 0.05|
| 19. Lack of self-discipline                                                | 0.833| 0.01|
| 20. Have difficulty arranging or doing my work by its priority or importance; can’t “prioritize” well | 0.64  | 0.01|
| 21. Find it hard to get started or get going on things I need to get done | 0.826| 0.01|
| 22. I do not seem to anticipate the future as much or as well as others    | 0.472| 0.05|
| 23. Can’t seem to remember what I previously heard or read about           | 0.671| 0.01|
| 24. I have trouble organizing my thoughts                                   | 0.637| 0.01|
| 25. When I am shown something complicated to do, cannot keep the information in mind so as to imitate or do it correctly | 0.472| 0.05|
| 26. I have trouble considering various options for doing things and weighting their consequences | 0.38 | 0.05|
| 27. Have difficulties saying what I want to say                             | 0.45  | 0.05|
| 28. Unable to come up with or invent as many solutions to problems as others seem to do | 0.51 | 0.01|
| 29. Find myself at a loss for words when I want to explain something to others | 0.838 | 0.01|
| 30. Have trouble putting my thoughts down in writing as well or as quickly as others | 0.585 | 0.01|
| 31. Feel I am not as creative or inventive as others of my level of intelligence | 0.435 | 0.05|
| 32. In trying to accomplish goals or assignments, find I am not able to think of as many ways of doing things as others | 0.38 | 0.05|
| 33. Have trouble learning new or complex activities as well as others      | 0.775| 0.01|
| 34. Have difficulty explaining things in their proper order or sequence    | 0.705| 0.01|
| 35. Can’t seem to get to the point of my explanations as quickly as others | 0.8  | 0.01|
| 36. Have trouble doing things in their proper order or sequence            | 0.512| 0.01|
| 37. Unable to “think on my feet” or respond as effectively as others to unexpected events | 0.564 | 0.01|
| 38. I am slower than others at solving problems I encounter in my daily life | 0.997 | 0.01|
| 39. Easily distracted by irrelevant thoughts when I must concentrate on something | 0.827 | 0.01|
| 40. Not able to comprehend what I read as well as I should be able to do; have to re-read material to get its meaning | 0.704 | 0.01|
| 41. Cannot focus my attention on tasks or work as well as others            | 0.751| 0.01|
| 42. Easily confused                                                         | 0.573| 0.01|
| 43. Can’t seem to sustain my concentration on reading, paperwork, lectures, or work | 0.759 | 0.01|
| 44. Find it hard to focus on what is important from what is not important when I do things | 0.612 | 0.01|
| 45. I don’t seem to process information as quickly or as accurately as others | 0.233 | 0.06|
| 46. Find it difficult to tolerate waiting; impatient                        | 0.674| 0.01|
| 47. Make decisions impulsively                                             | 0.699| 0.01|
| 48. Unable to inhibit my reactions or responses to events or others         | 0.605| 0.01|
| 49. Have difficulty stopping my activities or behavior when I should do so | 0.784| 0.01|

(cont.)
| Statements                                                                 | Rho  | P   |
|---------------------------------------------------------------------------|------|-----|
| 50. Have difficulty changing my behavior when I am given feedback about my mistakes | 0.705 | 0.01 |
| 51. Make impulsive comments to others                                     | 0.649 | 0.01 |
| 52. Likely to do things without considering the consequences for doing them | 0.321 | 0.05 |
| 53. Change my plans at the last minute on a whim or last minute impulse   | 0.642 | 0.01 |
| 54. Fail to consider past relevant events or past personal experiences before responding to situations (I act without thinking) | 0.327 | 0.05 |
| 55. Not aware of things I say or do                                       | 0.482 | 0.05 |
| 56. Have difficulty being objective about things that affect me           | 0.637 | 0.01 |
| 57. Find it hard to take other people’s perspectives about a problem or situation | 0.6  | 0.01 |
| 58. Don’t think about or talk things over with myself before doing something | 0.736 | 0.01 |
| 59. Trouble following the rules in a situation                            | 0.635 | 0.01 |
| 60. More likely to drive a motor vehicle much faster than others (Excessive speeding) | 0.93  | 0.01 |
| 61. Have a low tolerance for frustrating situations                        | 0.397 | 0.05 |
| 62. Cannot inhibit my emotions as well as others                          | 0.604 | 0.01 |
| 63. I don’t look ahead and think about what the future outcomes will be before I do something (I don’t use my foresight) | 0.468 | 0.05 |
| 64. I engage in risk taking activities more than others are likely to do   | 0.778 | 0.01 |
| 65. Likely to take short cuts in my work and not do all that I am supposed to do | 0.409 | 0.05 |
| 66. Likely to skip out on work early if it’s boring or to do               | 0.194 | 0.05 |
| 67. Do not put as much effort into my work as I should or than others are able to do | 0.759 | 0.01 |
| 68. Others tell me I am lazy or unmotivated                                 | 0.889 | 0.01 |
| 69. Have to depend on others to help me get my work done                   | Insignificant | Insignificant |
| 70. Things must have an immediate payoff for me or I do not seem to get them done | 0.511 | 0.01 |
| 71. Have difficulty resisting the urge to do something fun or more interesting when I am supposed to be working | 0.818 | 0.01 |
| 72. Inconsistent in the quality or quantity of my work performance         | 0.683 | 0.01 |
| 73. Unable to work as well as others without supervision or frequent instruction | 0.431 | 0.05 |
| 74. I do not have the willpower or determination that others seem to have | 0.649 | 0.01 |
| 75. I am not able to work toward longer term or delayed rewards as well as others | 0.653 | 0.01 |
| 76. I cannot resist doing things that produce immediate rewards even if they are not good for me in the long run | 0.676 | 0.01 |
| 77. Quick to get angry or become upset                                    | 0.696 | 0.01 |
| 78. Over act emotionally                                                   | 0.609 | 0.01 |
| 79. Easily excitable                                                      | 0.834 | 0.01 |
| 80. Unable to inhibit showing negative or positive emotions                | 0.626 | 0.01 |
| 81. Have trouble calming myself down once I am emotionally upset           | 0.605 | 0.01 |
| 82. Cannot seem to regain emotional control and become more reasonable once I am emotional | 0.925 | 0.01 |
| 83. Cannot seem to distract myself away from whatever is upsetting me emotionally to help calm me down. I can’t refocus my mind to a more positive framework | 0.574 | 0.01 |
| 84. Unable to manage my emotions in order to accomplish my goals successfully or get along well with others | 0.385 | 0.05 |
| 85. I remain emotional or upset longer than others                         | 0.651 | 0.01 |
| 86. Find it difficult to walk from emotionally upsetting encounters with others or leave situations in which I have become very emotional | 0.719 | 0.01 |
| 87. I cannot rechannel or redirect my emotions into more positive ways or outlets when I get upset | 0.44  | 0.05 |
| 88. I am not able to evaluate an emotionally upsetting event more objectively | 0.479 | 0.05 |
| 89. I cannot redefine negative events into more positive viewpoints when I feel strong emotions | 0.424 | 0.05 |
| Total Score                                                               | 0.971 | 0.01 |
| EF Count Symptom                                                          | 0.95  | 0.01 |
| ADHD Index                                                                | 0.833 | 0.01 |
| Self-management to time                                                   | 0.967 | 0.01 |
| Self-organization                                                         | 0.922 | 0.01 |
| Self-restraint                                                            | 0.768 | 0.01 |
| Self-motivation                                                           | 0.889 | 0.01 |
| Self-regulation of emotion                                                | 0.98  | 0.01 |

To build the Bland-Altman plot, the total score of both BDEFS were used to compute the differences and the means for each participant. Next, the standard deviation was calculated for the sample (SD = 9.65091). The mean of differences between the total scores on the BDEFS Brazilian Portuguese Version and the total scores on the BDEFS English Version was -0.16 (m = -0.16), and the maximum differences were -4.1437 and 3.8237. Finally, the SD was multiplied by ±1.96, added to the mean of differences (-0.16), and the upper and down limits were thereby discovered. A strong relationship was expected between the scales because, in theory, they measure exactly the same construct. Based on this statistical information, the Bland-Altman plot (Figure 1) shows that all the results are within the 95% confidence range, indicating that the two versions have good clinical agreement.
The present study reports evidence that our transcultural adaptation of the BDEFS to Brazilian Portuguese was quite satisfactory and successful. Furthermore, the adapted version of the BDEFS showed evidence of concurrent validity when compared with two other instruments (BIS 11 and ASRS 18), which measure different types of impulsive behavior, attention, and hyperactivity. The results also suggested that the internal consistency of the BDEFS Brazilian Portuguese was not only satisfactory, but also straightforward in its relationship to the corresponding data for the BDEFS English version. The subscale “self-regulation of emotion” of the BDEFS Brazilian Portuguese has a Cronbach’s alpha higher than the same statistical procedure for the BDEFS English version. This is also strong evidence of the correspondence and validity between the versions.

To validate the original scale, Barkley and colleagues did two studies (UMASS and Milwaukee Studies; Barkley16) using several neuropsychological tests of executive and other functions. Those studies found a low correlation between the scores of the BDEFS English Version and the scores of these tests, consistent with many other studies. This absence of a strong correlation between ratings and tests reflects a lack of ecological validity of neuropsychological tests. Other studies using the BDEFS English Version have shown similar results17-20,24,25. For example, as found by Vasconcelos et al.14 the BDEFS Brazilian Portuguese Version presents almost non-significant correlations with the Iowa Gambling Task, which support the theoretical and statistical difference between these types of neuropsychological methods. Due to the frequently reported weak correlation between neuropsychological tests and scales, in the present study we opted to use scales measuring similar constructs (i.e., ASRS-18 and BIS-11) and similar methods to assess the convergent validity of BDEFS. Even though the constructs measured by BIS-11 (impulsivity), ASRS-18 (ADHD cardinal symptoms), and BDEFS (executive functioning) are not equivalent, they are hypothesized by Barkley to be substantially related to each other. Poor inhibition (self-restraint) is a major EF component in Barkley’s and others’ theories of EF. Thus Barkley has argued that ADHD is primarily a disorder of EF beyond simply being one of inattention. Supporting these theoretical positions, we found significant correlations between the scores derived from those scales. This result suggests that the Brazilian adaptation of the BDEFS presents evidence of construct validity.

Other studies using the BDEFS English Version have made important contributions regarding the validity and the potential for use of the scale. Delihl26 analyzed the capacity of BDEFS to predict symptoms of ADHD in comparison to a visual-search task in a college population. The results showed that the BDEFS is more predictive of ADHD than the task. Also, the relationship between the two measures was found to be low (just as in the studies of Barkley). Knouse26 used the BDEFS successfully to examine the relationship of EF to understand and predict the mediation of self-regulation in academic performance. That study also showed that the BDEFS could be used to predict depressive symptoms, especially using the self-management of time, self-organization, and problem-solving subscales, in a sample with symptoms of ADHD and depression. Future studies should address the relationship between the Brazilian adaptation of BDEFS and functional outcomes in a Brazilian context.

The results of the present study should be interpreted in the context of its limitations. One such limitation was that we assumed that the factorial structure of the adapted BDEFS was the same as the original version and did not examine that factor structure directly. Because our sample was small, factor analysis could not be performed. This study was executed only for adapt the BDEFS for our culture and, for that objective, the sample could be small. Future studies should assess the factor structure of BDEFS in the Brazilian Population using both confirmatory and exploratory methods. These statistical analysis and the standardization of the BDEFS implies in a recruitment of a larger sample than the one used in the present study.

The null correlation between the item 69 of the both versions of BDEFS probably can be explained for cultural differences. Although,
in the future studies of the standardization of BDEFS Portuguese version, this result needs to be investigated more deeply.

It is important to note that possible clinical use of this adaptation of BDEFS depends on future studies of criterion validity in clinical populations, as well as on factor analytical procedures, and the collection of additional norms for a Brazilian population that is representative of different regions, other important demographic factors, and socioeconomic levels. Yet the evidence found here suggests that such future studies could rely on this adaptation.

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Conflict of interest

None of the authors has any conflict of interest. This research doesn’t have any financial support.

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Multidisciplinary rehabilitation program: effects of a multimodal intervention for patients with Alzheimer’s disease and cognitive impairment without dementia

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Abstract

Background: Non-pharmacological interventions represent an important complement to standard pharmaceutical treatment in dementia. Objective: This study aims to evaluate the effects of a multidisciplinary rehabilitation program on cognitive ability, quality of life and depression symptoms in patients with Alzheimer’s disease (AD) and cognitive impairment without dementia (CIND). Methods: Ninety-seven older adults were recruited to the present study. Of these, 70 patients had mild AD and were allocated into experimental (n = 54) or control (n = 16) groups. Two additional active comparison groups were constituted with patients with moderate AD (n = 13) or with CIND (n = 14) who also received the intervention. The multidisciplinary rehabilitation program lasted for 12 weeks and was composed by sessions of memory training, recreational activities, verbal expression and writing, physical therapy and physical training, delivered in two weekly 6-hour sessions. Results: As compared to controls, mild AD patients who received the intervention had improvements in cognition (p = 0.021) and quality of life (p = 0.003), along with a reduction in depressive symptoms (p < 0.001). As compared to baseline, CIND patients displayed at the end of the intervention improvements in cognition (p = 0.005) and depressive symptoms (p = 0.011). No such benefits were found among patients with moderate AD. Discussion: This multidisciplinary rehabilitation program was beneficial for patients with mild AD and CIND. However, patients with moderate dementia did not benefit from the intervention.

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Keywords: Alzheimer disease, impairment cognitive without dementia, multimodal intervention, multidisciplinary rehabilitation program.

Introduction

Non-pharmacological interventions represent an important complement to standard pharmaceutical treatment in dementia. Cognitive, physical and psychosocial rehabilitation may improve global function, mental state and quality of life. These interventions may further reduce social costs. Different approaches have been proposed such as cognitive rehabilitation, occupational therapy, physical activity, music therapy, art therapy and others interventions.

These non-pharmacological interventions may be delivered separately or in the format of combined, multimodal interventions. Given the complexity of dementia and the multiple needs displayed by patients and caregivers along the distinct phases of the dementing process, interest in multimodal interventions has increased in the past few years. Several studies have been performed addressing the treatment and prevention of cognitive impairment, in samples of older adults with cognitive impairment without dementia (CIND), mild cognitive impairment and dementia.

Multimodal intervention for patients with Alzheimer’s disease (AD) may help in maintaining cognitive function, community independence, reduction of depression symptoms and improving the quality of life of caregivers. In view of the multifactorial causes of AD, multimodal interventions have additive or interactive effects and may prove more effective than single domain interventions.

The aim of this study was to evaluate the effect of a multidisciplinary rehabilitation program on cognitive ability, depression symptoms and quality of life in patients with mild to moderate AD and CIND.

Methods

Study design

The present study was a single-blinded intervention trial conducted at a university-based psychogeriatric clinic (Institute of Psychiatry, University of Sao Paulo, Brazil) to test the efficacy of a clinically oriented multimodal rehabilitation program on global function, cognition and quality of life of elderly patients with cognitive impairment and dementia. Participants were consecutively referred to the rehabilitation unit from the hospital’s outpatient clinic, expecting to receive complementary, non-pharmacological treatment for memory and cognitive disorders. All participants signed informed consent and the study was approved by the local Ethical Committee.

Participants

The total sample consisted of 97 older adults with various degrees of cognitive complaints, ranging from cognitive impairment without dementia (CIND) to mild and moderate dementia due to AD. Participants were assessed upon enrollment by a multidisciplinary team composed by psychiatrists, neurologists, geriatricians, neuropsychologists and occupational therapists. Diagnoses were reached at consensus sessions taking into account all available clinical (medical, neuropsychological and functional) and laboratorial information, including neuroimaging. The diagnosis of probable AD was established according to the NINCDS-ADRSA criteria. The diagnosis of CIND was established to non-demented elders with neuropsychological evidence of subtle cognitive deficits affecting at least one cognitive domain, in the absence of medical or psychiatric abnormalities and other likely causes of cognitive impairment.

AD patients were included in the study if they had 60 years of age or more and were receiving standard pharmacological treatment with anti-dementia drugs, i.e., stable therapeutic daily doses of cholinesterase inhibitors and/or memantine for at least three months. Mild AD patients were expected to have scores of 17 or more in the Mini-Mental State Examination (MMSE) and of 0.5 or 1.0 in the Clinical Dementia Rating Scale (CDR); for patients with moderate AD, MMSE and CDR scores were expectedly >13 and 2.0.

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respectively. CIND patients had CDR scores of 0.5 and MMSE scores above the education-corrected cut-off values that separates cases from controls in the Brazilian population21.

The majority of the sample comprised patients with mild AD (n = 70), and therefore only participants in this diagnostic group were evaluated in a randomized-controlled trial (RCT) format with an experimental group compared to a control group. Due to ethical reasons (i.e., need for treatment) the allocation into intervention or control groups was done at a 3:1 ratio, yielding a total of 54 and 16 patients with mild AD respectively in the experimental (intervention) and control (waiting list) groups. The remaining 27 patients of the total sample were diagnosed with moderate AD (n = 13) or with CIND (n = 14). Because these sub-samples of patients were too small to warrant randomization into experimental and control groups, and too different clinically to merge with the former group of mild AD patients, we decided to provide treatment to all of them and regard these sub-samples as active comparison groups, addressing endpoint vs. baseline differences in outcome variables separately.

Outcome variables

All participants were evaluated at baseline and endpoint by a rater who was blind to group assignment. The assessment battery included: MMSE23,24; Geriatric Depression Scale (GDS)27,28 and Quality of Life scale for patients with Alzheimer’s Disease (QoL-AD)29 which the patient evaluates his/her own quality of life (PQoL-AD) and the caregiver/family assesses on the patient’s quality of life (CQoL-AD).

Intervention

The intervention was delivered at the day-hospital facilities in the format of group sessions (10 participants per group) offered twice a week for 12 consecutive weeks. Sessions lasted from 9:00 am to 3:30 pm (lunch and refreshments were provided and lasted 90 minutes), and the 24 sessions resulted in a total of 120 h of intervention (5 h daily). The program consisted of the following activities for patients: cognitive rehabilitation, computer assisted cognitive training, speech therapy, occupational therapy, art therapy, physical training, physical therapy, and cognitive stimulation with reading and logic games. Each one of these activities lasted for 60-90 minutes and was offered once a week. Psycho-educational workshops and psychological support group sessions were offered to caregivers twice a week from 10:00 am to 11:30 am. Detailed information about each activity can be found in a previous publication from our group17.

From the total 54 patients with mild AD allocated to the intervention group, 8 failed to reach the experimental endpoint: three did not comply to all outcome assessment proceedings, two had difficulty arranging participation, one withdrew consent and therefore discontinued intervention, one was diagnosed with a new ill-health condition and one died.

Statistical analysis

Statistical procedures were undertaken with the Statistical Package for the Social Sciences (SPSS), 20.0 version for Windows, and significance level was defined at 5% (p = 0.05). All variables were initially submitted to descriptive analyzes. Categorical variables were shown with numbers and percentages. The Kolmogorov-Smirnov test was used to determine whether study variables followed a normal distribution, which supported the use of parametric tests. Independent-sample t tests were used to compare mean scores at baseline. Paired-sample t tests were used to compare differences (baseline vs. endpoint) in test scores between experimental group and control group. The Chi-square tests were used to compare the categorical variables.

Results

Sixty-two patients with mild AD completed the trial, being 46 in the experimental group and 16 in the control group. The socio-demographic and clinical characteristics of the participants in these two groups are summarized in table 1. There were no significant differences in age, education level, gender, CDR scores and mean psychometric test scores at baseline between mild AD patients in experimental and control groups.

Table 1. Baseline characteristics of experimental and control patients with mild AD

| Characteristics | Experimental (n = 46) | Control (n = 16) | p-value |
|-----------------|----------------------|-----------------|---------|
| Gender          |                       |                 |         |
| Male            | 19 (41.3%)            | 6 (37.5%)       | 0.984*  |
| Female          | 27 (58.7%)            | 10 (62.5%)      |         |
| Age (years)     | 75.7 (±5.6)           | 74.9 (±4.7)     | 0.418** |
| Education (years)| 9.4 (±4.8)         | 11.0 (±5.1)     | 0.325** |
| CDR             | 0.5 = 19 (41.7%)      | 0.5 = 14 (87.5%)| 0.089*  |
| MMSE            | 23.0 (±2.5)           | 23.3 (±3.9)     | 0.959** |
| GDS             | 5.1 (±3.3)            | 4.3 (±2.2)      | 0.568** |
| PQoL-AD         | 34.9 (±6.3)           | 36.1 (±5.8)     | 0.900** |
| CQoL-AD         | 31.5 (±5.4)           | 31.1 (±7.4)     | 0.995** |

Table 2. Psychometric test scores at baseline and after intervention (endpoint) mild AD groups

| Variable | Group | Baseline | Endpoint | p-value* |
|----------|-------|----------|----------|----------|
| MMSE     | EG    | 23.0 (±2.5) | 23.6 (±2.9) | 0.021 |
|          | CG    | 23.3 (±3.9) | 22.4 (±2.8) | 0.150 |
| GDS      | EG    | 5.1 (±3.3)  | 3.7 (±3.0)  | <0.001  |
|          | CG    | 4.3 (±3.2)  | 4.7 (±3.4)  | 0.561    |
| PQoL-AD  | EG    | 34.9 (±6.3) | 36.5 (±5.2) | 0.003 |
|          | CG    | 36.1 (±5.8) | 35.4 (±6.1) | 0.523 |
| CQoL-AD  | EG    | 31.5 (±5.4) | 32.5 (±5.7) | 0.262 |
|          | CG    | 31.1 (±7.4) | 32.7 (±6.6) | 0.330 |

AD: Alzheimer’s disease; CDR: Clinical Dementia Rating Scale; MMSE: Mini-Mental State Examination; GDS: Geriatric Depression Scale; PQoL-AD: Patient’s Quality of Life; CQoL-AD: Caregiver’s Quality of Life. Values given are mean ± standard deviation or % percentage; * Chi-square test; ** Independent-sample t-tests.

In the CIND group (n = 14) and moderate AD group (n = 13), the mean age of the patients were 72.2 and 77 years, and the patients had 10.6 years and 8.1 of schooling, respectively. In both groups there were more females (CIND group, 71.4%; moderate AD group, 77%). All patients in the CIND group had CDR = 0.5 and all patients in the moderate AD group had CDR = 2.0.
There were small but statistically significant differences in the MMSE scores (p = 0.005) and GDS scores (p = 0.011) before and after intervention in CIND group, indicative of improvement. No statistically significant differences in psychometric test scores were apparent among patients with moderate AD (Table 3).

Table 3. Psychometric test scores at baseline and after intervention (endpoint) CIND and moderate AD group

| Variable | Group | Baseline | Endpoint | p-value* |
|----------|-------|----------|----------|----------|
| MMSE     | CIND  | 27.6 (±1.7) | 28.4 (±1.5) | 0.005    |
|          | Moderate AD | 15.7 (±2.1) | 16.0 (±2.8) | 0.613    |
| GDS      | CIND  | 7.7 (±5.0)  | 6.5 (±4.7)  | 0.011    |
|          | Moderate AD | 4.4 (±2.6)  | 3.6 (±3.3)  | 0.249    |
| PSoL-AD  | CIND  | 30.3 (±7.3) | 31.9 (±8.0) | 0.181    |
|          | Moderate AD | 34.7 (±6.0) | 36.1 (±5.7) | 0.370    |
| CCool-AD | CIND  | 30.4 (±5.4) | 33.0 (±6.2) | 0.137    |
|          | Moderate AD | 31.6 (±7.4) | 31.2 (±6.9) | 0.849    |

CIND: Cognitive Impairment Without Dementia; AD: Alzheimer’s disease; MMSE: Mini-Mental State Examination; GDS: Geriatric Depression Scale; PSoL-AD: Patient’s Quality of Life; CCool-AD: Caregiver’s Quality of Life. Values given are mean ± standard deviation. (*) Paired Sample t-test (Baseline vs endpoint).

Discussion

The present study showed that patients with mild AD who received a multimodal experimental rehabilitation intervention (experimental group) had an improvement in global cognitive function and in quality of life, and a reduction in the magnitude of depressive symptoms compared to those in the control group. In the sub-set of patients with CIND, comparing the scores on these tests before and after the intervention, without a proper control group, we observed improvements in the MMSE and GDS scores. No such effects were found among patients with moderate AD.

Our results are in agreement with the findings of previous studies, which have suggested benefits in nonpharmacological intervention in patients with cognitive impairment and mild dementia. One study that evaluated the efficacy of two different treatments to stimulate cognitive functions in patients with mild cognitive impairment and mild dementia comparing baseline and after treatment performance with control group, showed a significant improvement in global cognitive status (MMSE) in patients with mild dementia and a significant reduction of depression symptoms (GDS) in both experimental groups.

Although, in this study no significant statistical difference was observed in moderate AD group, some studies showed benefits for these patients. Other study that evaluated the effect of reminiscence therapy on the cognitive status and depression in patients with mild and moderate AD showed statistically significant the increase in mean MMSE scores and the decrease in GDS scores in the intervention group than control group. In a recent study of the multimodal cognitive intervention for AD patients reported cognitive improvement in the word-list recognition and recall tests scores in experimental group, but no found statistically significant changes in GDS, MMSE and quality of life of patients scores in the experimental group before and after treatment.

Our findings suggest that the multimodal intervention yielded improvement in quality of life, as reported by patients with mild AD compared to controls. Similar results were also noted in the occupational therapy program for patients with mild to moderate dementia, which showed improved the short term physical performance and psychological well-being domain of quality of life, measured by the WHOQOL-BREF. In an earlier study conducted in our group, Machado and colleagues suggested that psychosocial intervention may prove to be an effective strategy to enhance the quality of life of AD patients. In the uncontrolled set of data derived from the CIND group, we found no statistically significant differences between endpoint and baseline scores on quality of life, in accordance with another study made with older adults with mild cognitive impairment. The absence of significant differences in quality of life self-reported by CIND patients could be related with a better stability in the social life, a different situation that that lived by patients with mild AD. Onor and colleagues reported that during the rehabilitation program, AD patients increased their socialization and created a network of alliances and mutual help.

We acknowledge the limitations of the present study. First, the relatively small sample size in the mild AD control group. Second, the difficulties in forming adequate control group to compare CIND and moderate AD. As the focus of our study was older adults with mild AD, but during the recruitment phase older adults with moderate AD and with CIND were also referred to our service, we decided to include these subjects in the rehabilitation program and therefore in the study, but analyzing separately their results. In spite of the lack of a proper control group (i.e., subjects with a similar condition assessed at baseline and endpoint but not receiving the intervention), we believe that this preliminary set of data may help us and other researchers in future studies.

In conclusion, our perception is that the multimodal intervention provided was beneficial for patients with mild AD and those with CIND. In the moderate AD patients, this intervention did not prove beneficial. Future studies with larger samples and rigorous randomization methods may be necessary in this area to determine the value and cost-benefit ratio of this model of intervention.

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Conflict of interest

None.

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Benefits of psychodynamic group therapy on depression, burden and quality of life of family caregivers to Alzheimer’s disease patients

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Abstract

Background: Family members providing continuous care to demented patients suffer from severe burden that impairs quality of life and often evolves to depression. Objective: This study aims to evaluate the effect of psychodynamic group psychotherapy (PGT) compared to body awareness therapy (BAT) on caregiver burden, depressive symptoms, and quality of life among family caregivers to Alzheimer disease (AD) patients. Methods: Thirty-seven healthy family caregivers were randomly allocated to receive PGT (n = 20) or BAT (n = 17). Interventions were administered in the format of 14 weekly group sessions. Outcome measures were: modification of scores on Zarit Burden Scale, Beck Depression Inventory and WHO-QoL. Scale. Results: Participants in the PGT group displayed significant reduction on burden (p = 0.01) and depression scores (p = 0.005), and improved quality of life (p = 0.002), whereas those in the BAT group showed improvements in burden of care (p = 0.001) and quality of life (p = 0.01), but not on depressive symptoms (p = 0.13). Discussion: Psychodynamic psychotherapy was associated with amelioration of depressive symptoms, but overall benefits on burden of care and quality of life were similar irrespective of the type of intervention, i.e., psychologically-oriented or not. We hypothesize that these interventions can be complementary to improve depression and burden of care among family caregivers of AD patients.

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Keywords: dementia, Alzheimer’s disease, caregiver, burden, depression, quality of life, psychodynamic therapy, body awareness therapy.

Introduction

As a consequence of the increasing prevalence of Alzheimer disease (AD) worldwide in the last decades, the number of family caregivers has also increased steadily, particularly in settings where the access to professional caregiving is limited by financial or cultural reasons. This role is well accepted to bear a high-risk for the development of physical and mental health impairments, which are indeed observed in a high proportion of caregivers. This is largely explained by the increased burden generated by the excess of work and responsibilities involved in caring for demented patients, in addition to the emotional implications of having a family member with declining cognitive skills and functional autonomy, in addition to an array of behavioral problems. Therefore, consequences to global health of family caregivers involves physical and psychological symptoms, which in due term may overburden the public healthcare system.

There are two basic types of providers of care to dementia patients, i.e., professional and family caregivers, the latter being much more prone to experience symptoms of stress and burden, both physically and emotionally. The role of the professional caregiver subserves previous training on this particular task, which is regarded as a profession with technical specificities. Therefore, in addition to being paid for, professional caregivers perform their activity on shifts and are entitled to hours of rest and vacations. On the other hand, family caregivers usually have to incorporate this new and highly demanding activity in their routine, without any previous warning or technical preparation. Frequently, this person has another occupation or profession, which he or she may have to abdicate or cutback.

The impact suffered by caregivers to dementia patients seems to be higher than that observed when providing care for patients with physical health problems. In AD, along with disease progression, cognitive and functional deterioration will cause further loss of autonomy and increased dependence to perform basic activities of the daily living. As a consequence of that, caregivers will have not only to dedicate more time caring for the patient, but also perform this activity under more stress. Caregiver burden therefore arises not only from the psychological distress associated with this role, but also from chronic fatigue, derived from long hours of assistance to the family member, seldom without periods of rest and adequate sleep. The nature and quality of the previous relationship that the caregiver has endured with the patient through their previous lives are also determinants of the success of the adaptation to the caregiver’s role. In addition, these coping abilities are critically linked to the caregiver’s personality and emotional state, which are decisive to determine how he or she will deal with the multiple demands that arise in the long and deteriorating course of dementia, in the completion of a role that in not always valued as it should be by other family members. The sum of all these factors is likely to generate anxiety, emotional distress and ultimately depression, which can further impair the caregiver’s capacity to accurately assist the patient with dementia. The preservation of physical and mental health of family caregivers to dementia patients must be understood as an asset to the efficient and ethical fulfillment of this important role. There is an estimate of 46% of increase in the demand for healthcare services for AD patient caregivers. In addition, up to 60% of family caregivers to AD patients may develop physical and/or psychological symptoms, including hypertension, digestive problems, sleep disorders, respiratory diseases, immunologic system deficiency, depression, anxiety and insomnia.

The primary objective of the present study was to assess the benefits of a psychologically oriented intervention (psychodynamic group psychotherapy, PGT) compared to a non-psychologically oriented intervention (body awareness therapy, BAT) for the treatment of caregiver burden among family caregivers of patients with AD. Our secondary objective was to evaluate the effects of these interventions on depressive symptoms and quality of life of these subjects. To the best of our knowledge, there are no controlled studies assessing the impact of the psychodynamic group psychotherapy on depressive symptomatology and burden of care among family caregivers to demented AD patients.
Methods
Participants and study design

The study was conducted at the psychogeriatric clinic of a tertiary hospital in Brazil (Institute of Psychiatry, Faculty of Medicine, University of Sao Paulo) between February and December 2013. Participants were recruited from the hospital catchment area and with the aid of media advertisements. Inclusion criteria were: being a spouse or first-degree relative to a non-institutionalized demented patient with mild or moderate AD; dwelling in the same household as the patient; providing care for at least four hours a day. Exclusion criteria were: impediment or unwillingness to participate in all procedures of the study (baseline and endpoint screening plus intervention); having a psychiatric diagnosis that might preclude group work; current or previous participation (in the previous six months) in any psychoeducational program or AD support group; being less than 35 years old. Thirty-seven cognitively healthy family caregivers were enrolled to the study. All participants signed the informed consent. The study was approved by the local Ethics Committee and conducted under the tenets of the Helsinki declaration.

The study was designed to be a single-blinded, controlled intervention trial, in which the effect of a psychological intervention is compared to a non-psychologically oriented intervention addressing caregiver burden, depressive symptoms and quality of life in a sample of family caregivers to AD patients. After the baseline screening assessment, in which participants underwent evaluation of physical capacity and balance, family caregivers were randomly allocated to intervention groups. Table 1 presents sociodemographic and clinical characteristics of the sample. Subjects in the intervention group (n = 20) received psychodynamic group psychotherapy (Group 1, PGT) and subjects in the comparison group (n = 17) received body awareness therapy (Group 2, BAT). Both interventions were administered once a week in a total of 14 group sessions of 90 minutes of duration each. PGT sessions were administered by two experienced psychologists. The facilitators of BAT sessions were a physical therapist and a psychologist. Outcome measures were the modification (endpoint vs. baseline) of scores on the Zarit Burden Scale, Beck Depression Inventory, and WHO-QoL Scale. Participant in Group 2 were additionally assessed with the Body Awareness Questionnaire. The Clinical Dementia Rating Scale (CDR) was administered to ascertain the degree of impairment of AD patients who were cared for by their relatives.

Interventions

In the PGT group, several aspects of the caregiver roles were dealt with through the intervention program, reinforcing their resilience abilities. The most frequent aspects, usually raised spontaneously by participants (otherwise prompted by facilitators) were: loneliness and helplessness associated with the caregiver’s role, occurrence of family conflicts, and changing roles within the family dynamics. Participants were encouraged by the facilitators to get in contact with their feelings of sadness, frustration, anger and guilt, and to further name and elaborate the feelings they experience when dealing with these situations. In the first moment, the participants were asked to think about their previous relationship with the patient under their care, as it used to be before the onset of dementia, and then to update this notion to the present reality, thus enabling the elaboration of new ways to maintain an affectionate caring relationship with their relative. In a second moment, facilitators of the PGT group worked on other roles that the caregiver used to play in the family dynamics before the onset of the illness, and the necessary adaptations to the present time, particularly due to the necessity of performing unwanted roles and having to abandon (or at least cutback) the engagement in other competing roles. Some effort is dedicated by facilitators to establish and reinforce empathy with the difficulties faced by the subject, discussing strategies to better cope with the various sources of burden of care. Towards the completion of the program, facilitators discuss the lack of recognition of the caregiver’s efforts by other family members and encourage participants to nominate their perceived and unattended rights; this “caregiver declaration of rights” usually warrants them a place of existence and gratefulness for their feelings and concerns.

The BAT intervention was designed according to the “Functional Symbolic Dynamics” methodology, created by Marcia Taques Bittencourt, which has as a major goal to bring the patient to bodily self-awareness. This intervention started with a physical evaluation by the therapist and uses several physiotherapeutic backgrounds such as calatonia, eutonia, feldenkrais, relaxing, somatic experience, spontaneous movements and dance. Petho Sándor established in 1974 the basis for the utilization of soft touches in specific points, which uses the high potential of the skin sensitivity, promoting a multi-sensorial experience, physical and psychological rebalancing, and leading the recipients of the intervention to pay more attention to themselves. Body relaxation is considered a psychophysiological reconditioning method. In eutonia, through attention and self-observation, using auxiliary objects, the individual can get in contact with his/her internal rhythm. The sequence of Feldenkrais slow movements will explore the patterns and limits of the body. During the sessions, some tools were used to awaken new perceptions, such as: bed linen, clay, little balls and drawings.

Table 1. Demographic data of participants in both groups

|                  | Group | p-value |
|------------------|-------|---------|
| Gender           |       |         |
| Men              | 25%   | 30%     | 0.7    |
| Woman            | 75%   | 70%     |        |
| Age (years)      | 62.1 ± 9.9 | 55.7 ± 14.9 | 0.1    |
| Education        |       |         |
| Elementary school| 15%   | 6%      | 0.3    |
| High school or higher | 85%   | 94%     |        |

PGT: Psychodynamic group therapy; BAT: Body awareness therapy.

Statistical analysis

Student’s t test and Chi-squared tests were used to evaluate differences between intervention groups on socio-demographic and clinical variables in the initial evaluation (i.e. pre-intervention). The efficacy of the interventions on the measures of primary and secondary measures was evaluated through repeated measure analysis of variance (ANOVA) using the pre and post-intervention scores in the outcome measures. All statistical analyses were done with the SPSS software (USA).

Results

There were no significant differences on socio-demographic and clinical variables between subjects in the PGT and the BAT (Table 1).

Repeated measure analysis of variance showed that there was a significant improvement in depressive symptoms in the whole sample, regardless of the intervention group (within-subject contrast: F(1,35) = 19.95, p < 0.001; group*factor interaction: F(1,35) = 0.43, p = 0.51). In addition, subjects in both groups improved the perceived caregiver burden (within-subject contrast: F(1,35) = 53.12, p < 0.001; group*factor interaction: F(1,35) = 0.03, p = 0.87) and quality of life (within-subject contrast: F(1,35) = 19.95, p < 0.001; group*factor interaction: F(1,35) = 0.43, p = 0.51), independent of the intervention group. As expected, subjects in the BAT group significantly improved their body self-awareness in contrast to those in the PGT group (within-subject contrast: F(1,35) = 0.09, p < 0.76; group*factor interaction: F(1,35) = 4.83, p = 0.035) (Table 2).
Table 2. Scores on the outcomes assessment scale before and after intervention

|             | PGT | BAT |
|-------------|-----|-----|
| Mean        | SD  | Mean | SD  |
| BDI (baseline) | 15.8 | 6.4 | 19.0 | 10.5 |
| BDI (after intervention) | 9.5 | 4.3 | 14.4 | 9.6  |
| ZBS (baseline) | 35.3 | 12.8 | 48.9 | 15.1 |
| ZBS (after intervention) | 24.0 | 7.7 | 37.1 | 9.8  |
| WHO-QoL (Baseline) | 88.8 | 13.0 | 76.6 | 14.4 |
| WHO-QoL (after intervention) | 102.0 | 13.7 | 86.2 | 14.8 |
| BAD (Baseline) | 32.4 | 7.8 | 31.5 | 6.3  |
| BAD (after intervention) | 29.5 | 7.4 | 33.8 | 6.8  |

PGT: Psychodynamic GROUP THERAPY; BAT: Body Awareness Therapy; BDI: Beck Depression Inventory; ZBS: Zanir Burden Scale; WHO-QoL: Quality of Life Scale; BAQ: Body Awareness Questionnaire.

Discussion

The major goal of the present study was to determine whether two distinct treatment approaches – one psychologically-oriented and the other intended to provide emotional comfort through body awareness therapy – might help attenuate caregiver burden and related symptoms in a sample of family caregivers to mild- and moderately demented AD patients. Our results suggest that both interventions were effective reducing the magnitude of caregiver burden and resulted in a better perception of quality of life, but only participants who received psychodynamic group therapy (PGT) experienced a reduction in depressive symptoms. On the other hand, as expected, recipients of body awareness intervention (BAT) had additional improvement in relation to body awareness. Interventions focused on body awareness have been used as therapeutic alternative in several diseases, including fibromyalgia syndrome, targeting both physical and psychological (largely depressive) symptoms. Such interventions have been shown to be effective in improving quality of life of these patients. To the best of our knowledge, no previous studies published in the literature assessed the efficacy of BAT on caregiver burden.

The multidisciplinary psychogeriatric service in which the present study was conducted is located at a university-based, tertiary hospital that provides healthcare for a substantial catchment area; therefore the high demand for specialized attention to this population reinforces the need to optimize access to treatment through group interventions. In spite of the clinical perception of benefit, there is limited evidence derived from controlled trials of the efficacy of group therapies to attenuate caregiver burden in families of patients with dementia. In the present study, we compared two approaches that have been clinically provided to family caregivers of patients with AD attending our memory clinic, with relative success over the past years.

Among various types of interventions dedicated to deal with caregiver burden, psycho-education approaches are by far the most studied ones. Benefits have been shown by both individual and group interventions, and recent studies suggested that even remote models of attention provided by telephone or web-based interviews may also be efficacious. In a single-blinded randomized controlled trial with 38 family caregivers of persons with dementia, presented benefits of a telephone-based psycho-educational program delivered through twelve sessions. Compared to subjects in the control group, who were given a DVD containing general information about caregiving, recipients of the intervention reported better self-efficacy and lesser degrees of burden. This approach may be particularly useful to provide support for caregivers living in remote areas devoid of proper health facilities, or for those who cannot attend regular support programs offered by memory clinics.

To date, there is limited evidence of effective interventions for reducing stress related to the burden of care among family caregivers. In a recent study, presented the results from a randomized controlled trial with 38 family caregivers to demented patients addressing the efficacy of a mindfulness-based stress reduction program delivered in eight weeks, as compared to standard social support. Participants in the intervention group reported significantly lower levels of perceived stress and mood abnormalities in addition to long-term improvements on several psychosocial outcomes. In another controlled study conducted in Taiwan, addressed the effectiveness of a psychosocial intervention aiming at improving coping abilities in order to reduce caregiver burden in a sample of 57 caregivers of patients with dementia. Participants in the intervention group received, every two weeks, information on general aspects of dementia, availability of social resources, problem-solving and emotional support, whereas participants in the control group received reinforcements to regular clinical management by telephone contacts. Discontinuation rate was high (19.3%); nonetheless, the authors concluded that the psychosocial intervention was effective reducing caregiver burden, helping caregivers to adopt better coping strategies.

Acton and Kang conducted a meta-analysis to address the effect of various interventions on the burden of persons caring for family members with dementia. Among distinct techniques designed to help caregivers cope with the burden of care, the authors identified 27 treatments that could be synthetized as: support group, education, psycho-education, counseling, respite care, and multicomponent. Most of these interventions were individually effective, but with small effect sizes; nevertheless, the meta-analytic analysis showed that, collectively, these interventions yielded very limited overall effects on caregiver burden – except for multicomponent interventions, which more consistently reduced caregiver burden. The authors concluded that better interventions and more precise measures are needed to evaluate the effects of such interventions on caregiver burden. Given the highly emotional nature of the caregiver role and the inevitable interplay with personality factors, resulting in high a prevalence of depression, anxiety, and psychosomatic symptoms, it is reasonable to assume that psychologically-oriented interventions may be more reaching than informative methods based on support, education and counseling. Accordingly, the present set of data suggests that psychologically oriented interventions may be more effective than other types of intervention in the reduction of burden and depressive symptoms of family caregivers to AD patients. Yet, the superiority of this method has to be confirmed by additional controlled trials.

Conclusion

PGT and BAT were efficient in reducing caregiver burden in families of patients with mild- or moderate dementia due to AD. Both interventions yielded better estimates of quality of life. PGT additionally attenuated depressive symptoms. We understand that both interventions may yield complementary benefits to the standard clinical management of dementia due to AD.

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Conflict of interest

None.

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Reliability and validity of the Management of Aggression and Violence Attitude Scale (MAVAS-BR) for use in Brazil

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Abstract

Background: Aggression and violent behavior against health care professionals is a serious problem today and has aroused the interest of researchers and authorities. Objective: The purpose of this study was to examine the reliability and validity of the Management of Aggression and Violence Attitude Scale – Brazil (MAVAS-BR) for use with Brazilian nurses. Method: The MAVAS-BR was applied in a convenience sample of 262 nurses, the data were submitted to an exploratory factor analysis, and reliability was estimated using Cronbach’s alpha. Results: The MAVAS-BR is composed of 23 items distributed among four factors, and the Cronbach’s alpha was α = 0.73. Discussion: The MAVAS-BR is a reliable instrument for measuring the attitudes of Brazilian nurses facing aggression and violent behavior. The scale has shown to possess validity and the recommended reliability criteria; however, additional studies using this scale should be performed to offer further evidence of its validity in the context of Brazilian nursing.

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Keywords: Scales, aggression, validation studies, psychiatric nursing.

Introduction

Aggression and violent behavior against health care professionals is a serious problem today and has aroused the interest of researchers and authorities. Although this problem is not exclusive to mental health services, the likelihood of violent behavior among psychiatric patients is higher than that found among the general population. The workers in these services, particularly nurses, who spend extended periods with these patients, are the professionals most vulnerable to these types of behaviors in their work environment.

A previous study that evaluated the rates of violence suffered by mental health workers showed that nurses and psychiatrists were the healthcare professionals who suffered more aggressions from patients. The comparison of the frequency and the characteristics of the violence suffered by nurses in different healthcare services indicated that 84% of those working in psychiatric services reported having experienced at least one episode of violence in the last three years; among these episodes, 64% occurred in general hospitals, and 54% occurred in emergency units.

A Canadian study revealed that 20% of psychiatric nurses have been physically assaulted, 43% have experienced threats of physical violence, and 55% have been verbally assaulted at least once during a normal working week.

In Brazil, the few published studies on this topic have evaluated the profile of patients treated at psychiatric emergency services. The studies that have evaluated the attitudes of nurses towards the problem are scarce, although this problem has been extensively studied in other countries.

The identification of the attitudes of nurses working in mental health services towards aggression and violent behavior is of utmost importance for the practice of psychiatric nursing. In this respect, there is evidence that their attitudes towards this problem can affect the manner in which they manage these types of behavior, such that positive attitudes may contribute to the development of interpersonal approaches, whereas negative attitudes may contribute to the use of coercive measures and may consequently increase the unnecessary use of physical and chemical restraint. On the other hand, the identification and characterization of the attitudes of health workers towards the management of aggressive behaviors may serve as a strategy to cope with this situation, to promote more humanized care, and to help develop protective measures for their own emotional health.

Considering the need for more studies to identify the attitudes of nurses towards aggression and violent behavior in health care, particularly in mental health services, and the limited availability of psychometric instruments to investigate this problem in Brazil, a scale developed in England, the “Management of Aggression and Violence Attitude Scale (MAVAS)” was translated and culturally adapted for use in Brazil (MAVAS-BR) and presented adequate content validity.

Despite its validity from a cultural point of view, the psychometric properties of the MAVAS-BR have not yet been tested. Therefore, this study aimed to validate the MAVAS-BR.

Management of Aggression and Violence Attitude Scale (MAVAS)

Originally, the MAVAS was developed on the basis of three explanatory models for aggressive behavior: an internal model, an external model, and a situational model. This scale was designed to help improve and train professionals working in services where aggressive behaviors are common and assumes that the knowledge of these professionals on the prediction and management of violent behavior also involves the recognition of their attitudes toward this problem.

Four items in the original version of the MAVAS translated and adapted to Portuguese were excluded during content validation. This revised version consists of 23 items divided into four factors, which correspond to interactional/situational, external, and biological perspectives and the attitudes of these professionals towards the management of patient aggression and violence. Previous studies on the psychometric qualities of the MAVAS showed good reliability indices (r = 0.89).
The MAVAS-BR is a Likert scale with response options that range from 1 to 5, where 1 represents "strongly disagree" and 5 represents "strongly agree." The lower the score, the greater the agreement of the subject with the explanatory model of violent behavior to which each scale item is related.

Method
This methodological study aimed to validate the MAVAS-BR scale, which was translated and culturally adapted for use in Brazil. This study presents the phase subsequent to content validation, represented by the measurement and functional equivalence, i.e., the validity of the construct.

Data collection
Data were collected between July 2012 and April 2013 from health services that provided psychiatric emergency care in four municipalities, two in the state of Paraná and two in the state of São Paulo, Brazil.

Sample
The convenience sample consisted of 262 nurses working in mental health services in the four cities investigated. The respondents were predominantly women (77%), married (44%), with a mean age of 35.4 ± 3.7 years, and with between 5 and 10 years of professional experience (35%). Of these respondents, 78% reported having taken a post-graduation course (lato sensu), and 22% of these individuals studied psychiatric and mental health nursing.

Ethical aspects
The study was approved by the Human Research Ethics Committee of the Municipal Department of Health of São Paulo (Comitê de Ética em Pesquisa com Seres Humanos da Secretaria Municipal de Saúde de São Paulo – CEP-SMS) under protocol number 029/12, and all participants signed an informed consent form.

Data analysis
Considering that the instrument model was validated in the context in which it was developed and on the basis of content validation, which maintained the factor distribution of the original instrument, initially, the data were submitted to confirmatory factor analysis (CFA); poor model fit was observed.

On the basis of this result, we verified whether the data met the criteria of normality and sphericity using the Kaiser-Meyer-Olkin test and Bartlett's test of sphericity. Subsequently, the study sample (N = 262) was subjected to exploratory factor analysis (EFA) with principal axis extraction and Oblimin rotation; the latter was calculated because a correlation between the extracted factors was expected.

The latent root criterion was used to calculate the number of factors to be selected to obtain the ideal number of factors for the MAVAS-BR, and this criterion selected only the factors with eigenvalues > 1. Following the same validation criteria of the original version, the items with a factor loading of ≥ 0.30 and did not present a significant loading on more than one item after rotation.

The results of the EFA indicated that three items were assigned to factors different from the original factors. Item 13, "Medication is a valuable approach in the treatment of aggressive and violent behavior", which was initially allocated to factor 4, "Management of aggression and violence", in the original version was allocated to factor 1 in the Brazilian version: "Interactional and situational perspective". Item 23, "In general, the situations cause aggressiveness in patients", which was originally assigned to factor 1, was allocated to factor 2 in the Brazilian version: "External or environmental perspective". Finally, item 15: "Negotiation could be used more efficiently when dealing with aggression and violence", originally allocated to factor 4: "Management of aggression and violence", was allocated to factor 1 in the Brazilian version: "Interactional and situational perspective".

After the completion of the test refinement, the reliability coefficient was calculated using Cronbach's alpha, with the previous verification of whether the exclusion of each of the remaining items negatively affected its value. None of the 23 items jeopardized the reliability coefficient, which was evaluated using Cronbach's alpha for the full scale (α = 0.75) and for each of the four factors individually, and appropriate indices were observed in both cases (Table 2). The hypothesis that the scale factors were correlated with each other was confirmed, and correlations among these factors and between these factors and the full scale were observed (Table 2).

Discussion
The exploratory factor analysis conducted with our data resulted in a distribution of items similar to that of the English version of the MAVAS. Three items (Item 13: "Medication is a valuable approach in the treatment of aggressive and violent behavior", item 15: "Negotiation could be used more efficiently when dealing with aggression and violence", and item 23: "In general, situations cause aggressiveness in patients") had significant loading on factors that were different from those proposed in the original version.

The relocation of these items may be due to the characteristics of the EFA, in which the relocation of items and even factors is expected and may be associated with theoretical and cultural differences that may influence the attitudes of nurses towards violent behavior.

Brazilian nurses sometimes regard the use of medication as an additional resource to be used situationally other than for the management of violence. This approach may be related to the training of psychiatric nurses in emergency care in Brazil, in which verbal approaches are recommended to encourage the cooperation of patients for the use of chemical restraints, i.e., administration of medication, leading these professionals to perceive verbal command as a resource to stimulate medication use.

Originally, the MAVAS consisted of 27 items, of which 13 were related to the causes of aggression and violence and reflected the internal, external, and situational/interactional models of violent behavior, and 14 items represented different approaches to the management of aggression. Owing the results of the content validation that excluded the items 8, 9, 22, and 26, and the relocated another 3 items (13, 15, 23). In the Brazilian version, 14 items are related to the causes of aggression and violence, and nine items address strategies used for the management of these situations.
and could generate bias for the observed indexes. this study because of the sample size, which could limit interpretation reliability. We chose to not use the test-retest reliability technique in version, stability coefficient, which was estimated using test-retest using Cronbach's alpha, was different from that used in the original version, internal consistency analysis, to estimate the reliability in this study, internal consistency indices of at least 0.70 19. When interpreting these values, it is necessary to consider that the technique selected to estimate the reliability in this study, internal consistency analysis, using Cronbach’s alpha, was different from that used in the original version, stability coefficient, which was estimated using test-retest reliability. We chose to not use the test-retest reliability technique in this study because of the sample size, which could limit interpretation and could generate bias for the observed indexes.

It is possible that the observed difference can be attributed not only to the smaller number of items of the Brazilian version but also to the type of test used for its determination14,15. A previous study12 evaluated the confirmatory factor analysis in a population from a forensic psychiatric service and indicated a distinct factor structure, with only three factors. This result is corroborated by the literature17, which supports that an instrument is valid for a specific population.

The explained variance of the MAVAS-BR of 44.2% is considered satisfactory, and the first factor concentrated more than 20% of data variability. It was observed that all of the factors evaluated had statistically significant correlations among them and with the full scale; the correlation coefficients ranged between r = 0.32 (p < 0.01) and r = 0.70 (p < 0.01). The highest correlation coefficient (r = 0.70) was observed between factor 2, “External or environmental perspective”, and the full version of the MAVAS-BR, and the lowest coefficient of correlation was observed between factor 4, ‘Management of aggression and violence’, and the full version (r = 0.32).

The results of this study have important implications for the advancement of knowledge by providing a valid and reliable instrument for use in Brazil to assess the attitudes of nurses facing aggression and aggressive behavior.

The identification of their attitudes towards this problem not only can contribute to the advancement of knowledge and research on this topic, which has been little explored in Brazil, but also can serve as a guide for training and other interventions aimed at the education of nurses to deal with aggressive behavior in psychiatric services.

The continued exposure to any type of violence can result in negative outcomes for the mental and emotional health of nurses. Therefore, among the implications for nursing practice, the MAVAS-BR has the potential for developing protective strategies for professionals, and the assessment of their attitudes can help develop techniques aimed at minimizing the emotional impact of this problem.

### Table 1. Description of the items and factor matrix of the MAVAS-BR scale, São Paulo, Brazil, 2015

| Items                                                                 | Factor 1 | Factor 2 | Factor 3 | Factor 4 |
|----------------------------------------------------------------------|----------|----------|----------|----------|
| Interactional/situational perspective                                | 0.380    | 0.420    | 0.320    | 0.372    |
| 02. Other individuals make patients become aggressive or violent      |          |          |          |          |
| 03. Patients usually become aggressive because employees do not give them enough attention |          |          |          |          |
| 06. Miscommunication with health professionals can make patients aggressive |          |          |          |          |
| 13. Medication is a valuable approach in the treatment of aggressive and violent behavior |          |          |          |          |
| 20. Improvement in the relationship between professionals and patients can reduce the incidence of patient aggression |          |          |          |          |
| 15. Negotiation could be used more efficiently when dealing with aggression and violence |          |          |          | 0.770    |

### Table 2. Correlations between the factors that compose the MAVAS-BR and the psychometric characteristics obtained via exploratory factor analysis. São Paulo, Brazil, 2015

| Correlation of the factors | Factor 1 | Factor 2 | Factor 3 | Factor 4 |
|----------------------------|----------|----------|----------|----------|
| Factor 1                   | 0.77     |          |          |          |
| Factor 2                   | 0.38*    | 0.70     |          |          |
| Factor 3                   | 0.34*    | 0.46     | 0.60     |          |
| Factor 4                   | 0.29*    | 0.48†    | 0.40*    | 0.71     |
| MAVAS-BR                   | 0.65*    | 0.70*    | 0.39*    | 0.32*    |
| Eigenvalue                 | 4.0      | 2.8      | 1.7      | 1.2      |
| % explained variance       | 21.3     | 8.7      | 5.8      | 8.4      |
| % cumulative variance      | 21.3     | 30.0     | 35.8     | 44.2     |

* Significant correlation at the 0.01 level; † Significant correlation at the 0.05 level.

Elements in boldface in the main diagonal of the correlation matrix for the factors correspond to factor reliability.

The correlations between items and factors were positive and ranged between 0.30 and 0.79. The reliability of the full scale, although lower (0.75) than that observed in the English version of the MAVAS (0.89)13,15, can be considered satisfactory, whereas the coefficients observed in the isolated factors ranged from excellent (0.77) to adequate (0.60)19. Only factor 3 did not exceed the recommended criterion for internal consistency indices of at least 0.7019. When interpreting these values, it is necessary to consider that the technique selected to estimate the reliability in this study, internal consistency analysis, using Cronbach’s alpha, was different from that used in the original version, stability coefficient, which was estimated using test-retest reliability. We chose to not use the test-retest reliability technique in this study because of the sample size, which could limit interpretation and could generate bias for the observed indexes.
Ultimately, the recognition of the attitudes of nurses contributes to a safer practice and has institutional benefits because in addition to work absenteeism, higher frequencies of medication errors, and complaints of physical and emotional distress, the high incidence of violence in the workplace contributes to increased staff turnover and the difficulty in keeping nurses in this specialty service.

Conclusion

The results of this study indicate that the MAVAS-BR is a reliable instrument to assess the attitudes of Brazilian nurses towards aggression and violent behavior and that its validity and reliability criteria are adequate; however, future studies using this instrument should be conducted to provide greater evidence of its validity in different contexts of nursing practice in Brazil.

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Patterns of clozapine and other antipsychotics prescriptions in patients with treatment-resistant schizophrenia in community mental health centers in São Paulo, Brazil

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Abstract

Background: Despite of its global underuse, clozapine is still the golden standard antipsychotic for patients with treatment-resistant schizophrenia (TRS). Objective: To evaluate the patterns of clozapine and other antipsychotic drugs prescription in TRS in community mental health centers in São Paulo, Brazil. Methods: A multiple-choice questionnaire was applied to fifteen psychiatrists at five centers inquiring about patients’ clinical condition, adherence to oral treatment and current antipsychotic treatment. History of previous and current antipsychotic treatment was collected through medical chart review. Results: Out of 442 schizophrenia patients, 103 (23.3%) fulfilled the criteria for TRS. Fifty-eight patients (56.3%) were receiving polypharmacy; 30 (29.1%) were on atypical antipsychotic monotherapy, 14 (13.6%) were on typical antipsychotic monotherapy, 25 (24.3%) were taking depot antipsychotic medication and only 22 (21.4%) were receiving clozapine. Discussion: As well as in other parts of the world, many TRS patients (78.6%) receive other drugs instead of clozapine in São Paulo, the best evidence-based medication for patients with TRS. The government should make every effort to provide medical training and the equipment and logistic support to adequately serve those who could benefit from clozapine treatment at the community health centers.

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Keywords: Schizophrenia, drug resistance, drug prescriptions, clozapine, antipsychotic agents.

Introduction

Antipsychotic drugs are the mainstay of the treatment of schizophrenia, but although they are effective in the majority of patients, approximately 30% of this population has little or no benefit from conventional antipsychotic treatment1. These patients have more severe levels of psychopathology, greater number of episodes of illness and hospitalizations, and poorer quality of life compared to those who respond to treatment2-5. Their care also requires a disproportionately high proportion of the total cost of treating schizophrenia6. The term treatment-resistant schizophrenia (TRS) is currently applied to patients with persistence of moderate to severe levels of psychotic symptoms after at least two optimal treatments with different antipsychotic drugs2.

Brazil’s Constitution establishes health as a right for all and a duty of the State, thus in our country most of the patients with TRS are treated in public community mental health centers, named Centros de Atenção Psicossocial (CAPS), (Psychosocial Care Centers). These centers are located nationwide and assist people with the most severe mental disorders, providing intensive and multidisciplinary care, with a focus on medical treatment and social reinsertion through access to labor, civil rights and leisure.

Clozapine, the first atypical antipsychotic agent, is the medication of choice when TRS is confirmed, and many studies have demonstrated its superiority over other antipsychotic compounds in such cases6-8. There are, however, drawbacks to the use of clozapine, foremost the need for regular blood counts, due to the increased risk for agranulocytosis, limiting the prescription of this medication. In fact, studies conducted worldwide have shown that clozapine prescription is less than the actual number of patients resistant to the antipsychotic treatment6. In Brazil, there is no study addressing neither the local population of TRS schizophrenic patients nor the pattern of antipsychotic prescription to these patients.

A Brazilian federal law advocating for the rights and protection of people with mental disorders states that the mentally ill person must be granted to the best treatment available, according to his/her needs10. Since clozapine is the best treatment for TRS patients, the aim of the present study is to investigate whether clozapine is actually and adequately prescribed for patients with TRS as well as to evaluate the patterns of antipsychotic drugs prescription for patients with TRS in the CAPS of São Paulo.

Methods

Study design

A cross-sectional study was conducted in six CAPS of São Paulo.

Study population and assessment

By the time of the study, São Paulo Municipality counted with 20 CAPS specialized in assisting adults with severe mental disorders and six of them entered the research. Although these CAPS’s catchment area did not cover the whole city, the equipments appertained to the five different Regional Health Coordinations areas existing in São Paulo. This choice was made in order to involve the different realities of this megalopolis. The CAPS that entered the study were the first ones from which we had an acceptance to participate on it, which characterizes a convenience sample. We proceeded with the identification of all the patients with diagnoses ranging from F20 to F29 (schizophrenia, schizotypal and delusional disorders), according to the 10th Edition of the International Classification of Diseases.
the same used by Kane on CGI-S, i.e., CGI-S ≥ 4. They were considered poor responders and selected patients rated with a level of severity of at least moderately ill.

There was a total of 171 patients (160 with scores ≥ 4 on CGI-S and 11 taking clozapine with scores < 4 on CGI-S) had their clinical condition. A total of 442 (40.1%) patients had the diagnosis of schizophrenia or schizoaffective disorder without comorbidities like Mental Retardation or Organic Mental Disorder and were investigated in order to determine whether they fulfilled TRS inclusion criteria.

Results

Six CAPS were invited to participate in the study with a total of 2,191 patients: CAPS Pirituba-Jaragua (n = 389); CAPS Ilaí Paulista (n = 976); CAPS Jardim Lídia (n = 45); CAPS Jabaquara (n = 188); CAPS Lapa (n = 192) and CAPS Perdizes (n = 401).

Psychiatrists from the CAPS Ilaí Paulista were not cooperative with the study due to time constraints; therefore we have worked with a total of 1,215 patients (Figure 1). Fifteen out of 16 psychiatrists in the five remaining CAPS agreed to answer the questionnaire. A total of 442 (40.1%) patients had the diagnosis of schizophrenia or schizoaffective disorder without comorbidities like Mental Retardation and Organic Mental Disorder and were investigated in order to determine whether they fulfilled TRS inclusion criteria.

Thirty-six patients were excluded of the study because psychiatrists had not completed the screening questionnaire regarding their clinical condition. A total of 171 patients (160 with scores ≥ 4 on CGI-S and 11 taking clozapine with scores < 4 on CGI-S) had their charts reviewed. Fifteen patients whose last psychiatric evaluations were performed more than 90 days were excluded.

The chart review showed that 53 of the patients not taking clozapine did not fulfill the TRS criteria, due to the fact that 42 had not received adequate antipsychotic drug trials and 11 had an unsatisfactory adherence to oral treatment.

Finally we found that 103 (23.3%) out of the 442 patients from the CAPS fulfilled the TRS inclusion criteria.

The mean age of this group (n = 103) was 41.8 (SD: 12.78) years and 65 (63%) were men, with a mean duration of disease of 17.5 years (SD: 11.02). Schizophrenia was the diagnosis of the great majority (92.2%) of these patients. See table 1.

Figure 2 shows the antipsychotic drugs prescribed for the TRS group. The most frequently prescribed drugs were, in decreasing order, haloperidol (oral = 38, 36.9%; decanoate = 25, 24.3%), olanzapine (n = 32; 31.1%), chlorpromazine (n = 31; 30.1%) and clozapine (n = 22; 21.4%). Fifty-eight patients (56.3%) were taking more than one antipsychotic drug, 8 were taking 3 antipsychotic drugs and 1 was taking 4 antipsychotic drugs; thirty (29.1%) were on atypical antipsychotic monotherapy and 14 (13.6%) were on typical antipsychotic monotherapy. Six patients were taking clozapine in association with 4 antipsychotic drugs; thirty (29.1%) were on atypical antipsychotic monotherapy and 14 (13.6%) were on typical antipsychotic monotherapy.
with another antipsychotic agent. In four cases the other drug was haloperidol, in the others, one was taking quetiapine and one was taking levomepromazine.

Altogether, psychiatrists prescribed 100 typical and 81 atypical drugs. One patient (1.0%) was not taking any antipsychotic drug. The lifetime mean number of antipsychotic trials was 2.66 (SD: 1.69), but this number is probably underestimated, due to the difficulty of tracking antipsychotic prescriptions prior to the CAPS admission.

Nine psychiatrists (60%, n = 15) prescribed clozapine at least for one patient. Table 2 shows main obstacles associated to clozapine prescription according to psychiatrists.

**Table 2. Treatment-resistant schizophrenia patient’s characteristics (n = 103)**

| Variable | Treatment-resistant schizophrenia patients (n = 103) |
|----------|------------------------------------------------------|
| Diagnosis – % (N) | 92.2% (95) Schizophrenia, 7.8% (8) Schizoaffective Disorder |
| Gender – % (N) | 36.9% (38) Female, 63.1% (65) Male |
| Age (Years) – Mean (SD) | 41.84 (12.78) |
| CGI-S – Mean (SD) | 4.44 (1.10) |
| First Episode Age (Years) – Mean (SD) | 24.39 (10.32) |
| Disease Duration (Years) – Mean (SD) | 17.58 (11.02) |
| First Treatment Age (Years) – Mean (SD) | 26.97 (10.00) |
| Delay from First Episode and Treatment Initiation (Years) – Mean (SD) | 2.14 (4.14) |
| Treatment Duration (Years) – Mean (SD) | 15.04 (10.34) |
| Number of Antipsychotic Drugs adequately used through life – Mean (SD) | 2.66 (1.70) |
| CAPS Treatment (Months) – Mean (SD) | 92.18 (97.17) |
| Number of Hospitalizations – Mean (SD) | 4.29 (6.06) |
| Number of Hospitalizations in the Past Year – Mean (SD) | 0.18 (0.50) |

SD: standard deviation; CGI-S: Clinical Global Impression – Severity Scale.

**Figure 2. Antipsychotic drug treatment prescribed to treatment-resistant patients in CAPS.**

**Table 2. Obstacles to prescribe clozapine according to psychiatrists**

| Obstacles to prescribe clozapine | % | N |
|----------------------------------|---|---|
| Patients low adherence to blood counts | 53.33% | 8 |
| Laboratory delay in providing results and/or low reliability | 26.67% | 4 |
| Psychiatrist lack of experience | 13.33% | 2 |
| Difficulty in dose titration | 8.67% | 1 |
| Patients clinical comorbidities | 6.67% | 1 |
| Lack of family support | 6.67% | 1 |

**Figure 1. Study population - from all patients to treatment-resistant patients.**

**Discussion**

In this study, which evaluated the antipsychotic drug prescription to 103 patients who fulfilled criteria for TRS attending community centers in São Paulo, it was found that psychiatrists frequently prescribed antipsychotic polypharmacy for these patients and clozapine was offered for only a small percentage of them. Of these 103 individuals, fifty-eight (56.3%) were on a polypharmacy regimen of treatment. It is well known that combining antipsychotic drugs is a very common therapeutic practice in psychiatry, with some studies showing that the proportions of antipsychotic polypharmacy in United States of America and Canada are as high as 50%.[16,19] Nevertheless, its efficacy is not proven. The Clinical Antipsychotic Trials of Intervention Effectiveness (CATIE) study showed that antipsychotic combination was more prescribed to patients with high levels of symptoms, but in the end, it did not differ in terms of improving efficacy measures.
compared to antipsychotic monotherapy\textsuperscript{21}. Howes et al.\textsuperscript{2} and Alessi-Severini et al.\textsuperscript{3} carried out studies at Mental Health Centers in England and Canada, respectively, and found out that polypharmacy and three or more trials of antipsychotic treatment was a common feature before the initiation of clozapine.

Regarding the patients with TRS, some meta-analyses support combining another antipsychotic with clozapine in patients who do not respond fully to this medication\textsuperscript{12,12,22} but the evidence of efficacy of these augmentation strategies is also scarce\textsuperscript{2}. As a group, atypicals were more prescribed in monotherapy (30%), but typicals were more prescribed in general (100 typical prescriptions against 81 atypical prescriptions at the time of the research), with haloperidol as the most prescribed agent, both in monotherapy and in polypharmacy. Social-economic conditions may play a role in the high prevalence of typical antipsychotic prescription. People who attend CAPS usually have low income, and the low cost of typical antipsychotic drugs makes them more affordable. Moreover, prescribing a typical antipsychotic drug requires minimal paperwork in comparison to atypical agents. In Brazil, the government subsidizes treatment with several existing antipsychotic drugs, but while typical drugs can be obtained for free in public pharmacies, placed in numerous neighborhoods and thus easily accessible to everyone, in exchange of a regular prescription in duplicate, prescribing the atypical medications requires more paperwork because it is also necessary to fulfill a large protocol. These atypical antipsychotic drugs are listed in the Brazilian Program of High Cost Medications and are only available in Special Pharmacies, which exist in a number of two in São Paulo, a city of more than 11 million inhabitants. Therefore, even if the individual cost of the medications does not weigh in the choice of prescribing typical antipsychotics, the paperwork and the scantiness of Special Pharmacies probably contributes to the high prescription rates of haloperidol.

The use of clozapine varies enormously according to different countries and settings, with higher prescription rates in China\textsuperscript{26} and Oceania\textsuperscript{29} and lower in North America\textsuperscript{26,27}. The rates of clozapine prescription for TRS patients found in Brazilian community centers were similar to rates found in studies carried out in the United States\textsuperscript{28,29}, an especially low proportion when compared to other countries\textsuperscript{26,27,30}. Clozapine was only prescribed for 22 individuals, which represents 21.4% of the TRS patients, or 5% of the total number of schizophrenia patients, despite the abundant evidence of clozapine's superior efficacy and effectiveness compared with other antipsychotic drugs in the treatment of TRS patients\textsuperscript{6,7,13,31,32}. Current clinical practice guidelines for the treatment of schizophrenia recommend that a trial of clozapine should be offered after the identification of resistance to antipsychotic treatment\textsuperscript{15,23,33}, which suggests that the major part of the psychiatrists participating in our study do not follow strictly to guideline recommendations, a feature also observed in other parts of the world\textsuperscript{2,17}.

Perhaps this scenario could be even worse in other parts of Brazil, since unlike São Paulo, the country's richest city, many cities do not have Special Pharmacies where people have access to high-cost medications. A generic clozapine formulation exists in Brazil for some years now, which allowed a cost reduction for consumers, but not enough to the very low-income stratum of our society.

There are several obstacles to the use of clozapine that may impact negatively in its prescription rate, some of them related to the patients and their families, like refusal to take blood counts and fear of potential side effects, some of them related to its special treatment regime, since clozapine requires slow dose titration and close monitoring during the initiation phase and careful management of treatment emergent side-effects. However, some studies underline that clinician-related factor are a main contributor to the low rates of clozapine prescription, as consultant psychiatrists may have little knowledge about certain aspects of clozapine, like its capacity to reduce suicide or drug abuse in patients with schizophrenia, and few experience in treating patients with this drug, since a significant number of the psychiatrists interviewed claimed to have had less than five patient on clozapine therapy\textsuperscript{34,35}.

The majority of psychiatrists identified patients' low adherence to blood routines as the main obstacle to prescribing clozapine. Psychiatrists tend to overestimate the patients' annoyance with hematologic control\textsuperscript{29}, which is in contrast with studies that focused on patient's opinion and identified that blood tests are not an usual cause of concern among patients on clozapine\textsuperscript{36,37} and that they feel clinically better and prefer clozapine therapy over previously prescribed antipsychotic drugs\textsuperscript{5,40,41}. It is remarkable that only two of the participating CAPS can run the blood tests in their own facilities, while the other centers refer their patients to primary care units in order for them to obtain hematological exams. Psychiatrists beliefs also interfere since they may think that if the patients have to move to another care unit to get blood routines, this could affect their adherence to treatment.

Problems with the blood tests were also pointed as obstacles to prescribe clozapine. Psychiatrists reveal that there is a long delay from the taking of the blood sample until they receive their results. This delay, which may take one week, could represent the difference between a rapid identification of a mild neutropenia and its adequate management, or a missed neutropenia that progresses into a severe agranulocytosis.

This study has some limitations, mainly regarding the diagnostic of TRS. The number of drug trials was established retrospectively, relying on the information retrieved from medical records. We cannot assure that all of the changes in drug prescription were based on treatment failure, since some medication changes might have had the goal of improving tolerability. However, the pattern of prescription among psychiatrists clearly shows an emphasis on polypharmacy, which, as discussed above, increase concerns about the risk of medication side effects. We believe, therefore, that the psychiatrists participating in our study are not primarily driven by tolerability concerns when prescribing antipsychotic drugs.

In addition to the number of adequate antipsychotic trials, we used the CGI-S to establish the diagnosis of TRS. This scale provides a global judgment of a patient's overall state and it cannot determine what psychopathological aspect, in terms of positive or negative symptoms, the study clinicians were considering while rating their patients and how that influenced their decision on which drug to prescribe. For example, negative symptoms are prevalent throughout the disease\textsuperscript{42} and less responsive to antipsychotic treatment\textsuperscript{43}, thus psychiatrists may consider that there is little advantage in changing antipsychotic drug regimen on the basis of negative symptoms. However, if the use of CGI-S lacks in psychopathological specificity, it allowed us to obtain psychiatrists' opinion about the clinical status of their own patients in routine clinical practice, in a not burdensome or time-consuming manner.

Adherence to treatment was presumed by addressing psychiatrists about their perception. Byerly et al.\textsuperscript{44} demonstrated a drastically underestimated antipsychotic non-adherence by clinicians when comparing antipsychotic adherence rates of outpatients assessed by electronic monitoring and by clinician rating. Therefore, we may also have underestimated non-adherence, leading to some inadequate TRS results.

This study endorses the low-adherence to treatment guidelines also found in other parts of the world. Its results can be potentially helpful in alerting psychiatrists and authorities of the low use of evidence-based treatments in São Paulo, which is demonstrated by the high prevalence of antipsychotic polypharmacy and the enormous gap between the prevalence of TRS in patients ordinarily treated in CAPS and clozapine prescription. Government authorities, legally committed to provide the most appropriate treatment to mentally ill people, should make every effort to supply the CAPS with the necessary equipment and logistic assistance to adequately serve patients who could benefit from Clozapine treatment. They also need to provide organizational and educational support in order to allow clinicians and staff to have the proper expertise for the identification of TRS and for the optimum management of clozapine, including the safest and most efficient monitoring of hematologic status.
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Culture-bound syndromes in Spanish speaking Latin America: the case of Nervios, Susto and Ataques de Nervios

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Abstract

Background: Cultural issues are important for diagnostic validity between different countries; little has been addressed from Latin America and Caribbean countries (L.A.C). Objective: To identify LAC studies on culture-bound syndromes (CBS) and extract potential empirical evidence about Susto, Nervios and Ataques de Nervios. Methods: Search strategies were carried out in Medline, Embase, Lilacs, ISI and PsyCINFO, covering 1992 to 2015. Inclusion criteria: studies on CBS conducted on populations residing in LAC, LAC articles on diagnostic classification and culture, where LAC has been included. Exclusion criteria: studies on CBS conducted on populations residing outside LAC, Content analysis used the system proposed by Guarnaccia and Bogler (1999): epidemiological, ethnographic and socio-demographic data and identification of comorbidities with other psychiatric disorders. Results: Thirty one articles were selected out of 1,090. These CBS were selected out of laphic data and identification of comorbidities with other ps proposed by Guarnaccia diagnostic classification and cun panic disorders and post-traumatic stress disorder and presented more psychosocial vulnerability. Discussion: Analysis showed that Nervios, Susto and Ataques de Nervios are important idioms of distress, associated with socio-economically vulnerable populations and comorbidities with other psychiatric conditions, particularly post-traumatic stress disorder. More studies are needed on their relation with stress and in more LAC countries.

Keywords: Diagnosis, culture, psychiatry, classification, Latin America.

Introduction

In the current major classification systems, DSM-V1 and ICD-102, the concepts of mental disorders are arbitrated by taking into account mainly the number and duration of mental symptoms, as well as impairment in overall functioning, with little or no inclusion of cultural variables.

A new paradigm of classification model is being developed, the Integrated Centered on the Individual Diagnosis3, where cultural components, personal values and the context of the patient are incorporated into the diagnostic process. The social and cultural aspects of mental disorders in different contexts have been widely considered by committees and associations from different countries and cultures1. Since there are no accepted pathophysiological mechanisms or biological markers for mental disorders, diagnostic validity across cultures is questionable. Psychiatric symptoms are not specific, and their understanding and assessment depends on the judgment of the examiner. Examiner bias depends on their own cultural background and theoretical references and it equally depends on the patient’s ability to understand and communicate what they have experienced or is experiencing4. In this sense, the different way cultures express stress in terms of signs and symptoms can be called idioms of distress5,6. Given that the form of expression of a psychological distress is particular to an individual and their culture, this description may or may not have to do with a condition which has been defined elsewhere.

As part of the preparation of DSM-IV7, an international panel of experts in diagnostic classification was created which produced a report to be integrated into the manual concerning the different cultural aspects that could influence the description of mental diseases. It also included the issue of the so-called culture-bound syndromes, sets of psychiatric symptoms and dysfunctional behaviors that are expressed in a particular way in a particular culture and that may or may not be related to other mental disorders already described in other countries/cultures5. However, the final version of the manual was criticized by various members of the panel as it included only a few of the reported cultural aspects and because of the decision to insert culture-bound syndromes only as an appendix to the manuals8,9,12.

DSM-V3, however, has shown improvements in this area adding a cultural glossary which includes the more important Culture Bound Syndromes and a Cultural Formulation Interview to guide users through cultural issues on patient Culture Bound Syndrome. Also some conditions in the main sections, such as in the case of depression, are referenced in the glossary to culturally linked syndromes particular to some groups. Cultural Idioms of Distress, ways of expressing distress which may not be linked to symptoms and syndromes, but are shared ways of experience and communicate individual and social concerns; and Cultural Explanations of Distress or Perceived Distress, labels and characteristics of an explanatory model related to culturally recognized meaning and etiology for symptoms, illness and distress.

In an attempt to improve diagnostic validity across cultures, different initiatives have been undertaken. Among them, different countries/regions have sought to produce local diagnostic manuals, taking into account their particular culture11-14. The Latin American Guide to Psychiatric Diagnoses11,13 is one of these initiatives, in which the Latin American perspective on psychiatric diagnosis and its history is described. In addition the mental disorders belonging to the ICD-10 are discussed in relation to different manifestations that they may have in Latin American culture, and local culture bound syndromes are described.

In LAC, the main culture bound syndromes studied are Nervios, Ataques de Nervios and Susto15. Nervios is described as episodes, usually chronic, of extreme sadness or anxiety associated with somatic symptoms such as headaches and/or muscle pain, nausea, loss of appetite, fatigue, insomnia and decreased reactivity. It is more common in women and associated with stress, emotional imbalance and low self-esteem. Ataques de Nervios are described as culturally acceptable responses to acute stressful experiences, particularly the loss of loved ones and family conflict or threat. It is characterized by tremors, a feeling of heat that starts in the chest and rises to the head, fainting and epileptic episodes. It is also accompanied by a sense of loss of control and may present a significant degree of agitation, suicidal gestures and auditory hallucinations. Ataques de Nervios are generally associated with inducing support from the individual’s...
social network which usually leads to the victim quickly regaining consciousness and previous functioning. *Susto* is described as chronic somatic symptoms attributed to “soul loss” and induced by an episode of intense fear experienced by the individual, usually related to a supernatural perspective. In some cases, *Susto* can be induced by witnessing others who are affected by this illness. Symptoms include fever, diarrhea, loss of appetite, restlessness, insomnia, mental confusion, apathy, depression and introversion.

The contributions of Latin America on psychiatric diagnoses and in particular the main local culture bound syndromes *Susto, Nervios* and *Ataques de Nervios*, may contribute to the development of a more comprehensive and valid diagnostic process in Latin America.

## Method

Search strategies were conducted in the main electronic scientific databases: Medline, Embase, Lilacs, ISI and PsychINFO. These strategies (Strategy 1) were performed using descriptors which covered mental disorders, culture, cross-cultural syndromes and Latin America. The searches were limited to human studies in the period 1992 to 2015.

Another set of search strategies (Strategy 2) were the use of the terms *Susto*, *Nervios* and *Ataques de Nervios*, separately and as single words, in the Medline, Lilacs and PsychINFO databases.

Inclusion criteria for articles were: 1) articles related to cross-cultural syndromes that have been conducted in Latin America or by researchers affiliated with a Latin American institution and that have used a local population sample. Despite being an unincorporated territory of the United States, studies from Puerto Rico were included because of its Latin American culture and history; 2) studies that address cultural issues related to diagnostic classifications in which Latin America has been included; 3) articles in English, Spanish, Portuguese, French or Italian.

The following exclusion criteria Latin American studies on immigration and acculturation that included only populations from Latin America living in countries outside Latin America, articles on treatment of cross-cultural syndromes and revisions of these syndromes that do not show empirical data.

The selection of articles was performed by analyses of the abstracts by two independent researchers whose disagreements were discussed until a consensus was found. To measure agreement among the researchers, a calculation of the kappa was conducted.

In addition to these searches strategies, a manual search for articles was conducted through the references cited in the selected articles and through search engines of journals on the subject of medicine and culture, transcultural psychiatry and social medicine machines. The journals surveyed were: Anthropology and Medicine; Culture, Medicine and Psychiatry; Transcultural Psychiatry; Social Psychiatry and Psychiatric Epidemiology; International Journal of Social Psychiatry; Cross Cultural Research; Medical Anthropology Quarterly.

The content analysis of the selected articles was made using a script based on the proposed review of culture bound syndromes by Guarnaccia and Rogler16: a) description of the characteristics of culture bound syndromes based on ethnographic and epidemiological data; b) socio-demographic characterization of those affected by culture bound syndromes; c) identification of comorbidities among individuals affected by culture bound syndromes and other psychiatric disorders.

## Results

Table 1 shows the frequency of articles in databases obtained by Strategy 1. Disagreements between researchers were resolved after discussion. Duplicate articles were removed.

Strategy 1 resulted in 889 references, of which 13 met the inclusion criteria. Two references were excluded because they were duplicated. The resulting 11 articles were equivalent to approximately 1.2% of the total articles obtained by the strategy. The references of two of these articles could not be obtained in full text. Thus, the strategy resulted in 9 articles for analysis, 6 of them obtained through Medline and Embase, equivalent to 67% of the selected articles, 3 obtained from PsychINFO, while Lilacs database did not contribute any study.

Strategy 2 obtained 201 studies, 18 of them fulfilling the inclusion criteria, after excluding duplicate articles.

Overall, both strategies resulted in 1090 references to articles, of which 27 met the inclusion criteria. Four more references were added by a hand search and through references of the selected articles, totaling 31 articles selected for analysis.

These studies are summarized in tables 2, 3 and 4.

Fifty articles were excluded because they were about populations of Latin American migrants in countries outside Latin America, most of them living in the United States. There were 60% more articles published on Latin American populations living outside Latin America than on populations within Latin America itself.

From the selected articles, 23 of them were about *Nervios* and *Ataques de Nervios* and 7 of them about *Susto*. Ten articles studied *Nervios* and nine articles studied *Ataques de Nervios*, equivalent to 61% of the articles (Table 2 and Table 3).

The articles were analyzed using according the following criteria developed by Guarnaccia and Rogler (1999)16:

a. Description of the characteristics of cross-cultural syndromes based on ethnographic data (description of the syndrome from the culture in which it was first described) and epidemiological data

Among the 31 selected references, 23 studies focused on *Ataques de Nervios* and *Nervios* (Table 1). Eight were qualitative studies26,27,28,29 focused on the characterization of the causes, symptoms, and treatments as described by those affected by the conditions. Among the selected references, seven were about *Susto* (Table 3), four of them were qualitative studies26,28,30,31,32,33,34, three focused on the causes, symptoms and treatment of *Susto*26,34,35 and one focused only on the causes of *Susto*25.

a.1) Causes of *Ataques de Nervios*, *Nervios* and *Susto*

Interviews with the affected individuals found that *Ataques de Nervios, Nervios* e *Susto* were related to different types of stress through interviews with the affected individuals24,25,26,27,28,29. *Nervios* was related to exposure to stressful events over a period of years, while *Ataques de Nervios* and *Susto* were related to exposure to specific events triggering the symptoms27,28. The causative stressors of *Ataques de Nervios* and *Nervios* were often described as major threats to significant social relationships19,20,21,22,23,27,28.

a.2) Symptoms of *Ataques de Nervios*, *Nervios* and *Susto*

Regarding *Nervios*, the authors concluded (Table 2) that it was best characterized by somatic disorders such as headaches and muscle aches, sadness, difficulty sleeping, insomnia, decreased reactivity, loss of appetite, fatigue, tension, worry and agitation. *Ataques de Nervios* was characterized as (Table 2) tremors, palpitations, uncontrollable screaming, crying, feeling of heat rising from chest to head, distemper,
| Author                  | Title                                                                 | Country     | Abstract                                                                                   |
|-------------------------|-----------------------------------------------------------------------|-------------|--------------------------------------------------------------------------------------------|
| Baer et al. (2003)17    | A cross cultural approach to the study of the causes of the folk illness nervios | Mexico,   | Four different populations were studied, two North-American, one Mexican, and one Guatemalan A qualitative study that has found concordance in the answers of different country populations on the causes and symptoms of Nervios and Susto. |
| Norris et al. (2001)20  | A qualitative analysis of posttraumatic stress among Mexican victims of disaster | Mexico     | 24 Mexican victims of natural disasters in Mexico and Florida were interviewed. The answers have been analyzed looking for PTSD symptoms. A cluster of Ataques de Nervios symptoms were found. |
| Pineros et al. (1998)19 | An epidemic of collective conversion and dissociation disorder in an indigenous group of Colombia: its relation to cultural change | Colombia    | Nine native Colombians suffering from Ataques de locura were interviewed. The Ataques de locura present symptoms similar to Ataques de Nervios with the exception of visual hallucinations. |
| Guarnaccia et al. (2005)30 | Anna ataques de nervios in Puerto Rican children associated with psychiatric disorder? | Puerto Rico | 2651 children and their caretakers were assessed because they their caretakers were a Ataques de Nervios and other psychiatric diagnoses in relation to their social-demographic profile. Parents with a history of Ataques de Nervios were connected to children with more Ataques, and with higher levels of anxiety disorders, depression, externalized disorders, and greater poverty. |
| Guarnaccia (1993)31     | Ataques de nervios in Puerto Rico: culture-bound syndrome or popular illness? | Porto Rico  | Based on previous epidemiological data on Ataques de Nervios in Puerto Rico, the author stands for the hypothesis that such syndromes must be understood as a popular disease, more than as a cross-cultural syndrome. |
| Cintron et al. (2008)32 | Ataques de nervios in relation to anxiety sensitivity among island Puerto Ricans | Porto Rico  | 177 Puerto Ricans were analyzed in order to study the relation between sensitivity to anxiety symptoms and Ataques de Nervios. Individuals with greater sensitivity presented similar rates of anxiety symptoms and depression compared to individuals with Ataques de Nervios. |
| Ortega et al. (2004)33  | Parental mental health, childhood psychiatric disorders, and asthma attacks in island Puerto Rican youth | Porto Rico  | 1981 Puerto Rican children and their families were assessed to correlate history of asthma attacks and psychiatric history. Parents with history of Ataques de Nervios were linked to greater number of asthma attacks in their children. |
| Weller et al. (2008)34  | Susto and nervios: expressions for stress and depression              | Mexico      | 200 Mexicans were interviewed in order to study stress history, Nervios, Susto, and depressive symptoms. Having Nervios in the past indicated 19 times more chances of having depression in the past. |
| Guarnaccia et al. (1996)35 | The experiences of ataques de nervios: towards an anthropology of emotions in Puerto Rico | Porto Rico  | The author has interviewed 121 Puerto Ricans for Ataques de Nervios characterization, and he has concluded that it encompasses the sensation of a major loss of control closely related to social stressors. |
| Guarnaccia et al. (1993)36 | The prevalence of ataques de nervios in the Puerto Rico disaster study. The role of culture in psychiatric epidemiology | Porto Rico  | In an epidemiological study in Puerto Rico a question on Ataques de Nervios was included. In this study, 16% of the Puerto Rican population referred to have suffered Ataques de Nervios in the past. Such result was linked with a greater frequency of depression, anxiety, female and low educational level. |
| Snyder et al. (2000)37  | The prevalence of nervios and associated symptomatology among inhabitants of Mexican rural communities | Mities      | 942 Mexicans were assessed to know the prevalence of some mental diseases. Fifteen percent of the population referred to have suffered Nervios in the past. |
| Dickson-Gomez (2002)38  | The sound of barking dogs: violence and terror among Salvadoran families in the postwar | El Salvador | Ethnographic study to analyze the cross-generational transmission of psychic trauma after war conflicts, and concluded that Nervios are one of the expressions of suffering. |
| Guarnaccia et al. (2003)39 | Toward a Puerto Rican popular nosology: nervios and ataque de nervios | Porto Rico  | 121 Puerto Ricans were interviewed to explore the Ataques de Nervios experiences, concluding that they are processes accepted by the local population, and not necessarily are linked to a disease. |
| Hinton and Hofmann (2014)40 | Cross-Cultural Aspects of Anxiety Disorders                          | -           | Identify and works the concepts of ethnopsychology and ethnophisiology to study the relation between symptom expression and culture in anxiety disorders. |
| Lopez et al. (2011)41   | Ataques de Nervios and somatic complaints among island and mainland Puerto Rican children | Puerto Rico | Puerto Rican children 1353 living in Puerto Rico and 1138 in New York were compared in relation to Ataques de Nervios, clinical history and risk for injuries. Children with Ataques showed more risks but across sites risks showed to be different. |
| Lopez et al. (2009)42   | Ataques de Nervios and their psychiatric correlates in Puerto Rican children from different contexts | Puerto Rico | 2491 Puerto Rican children from Puerto Rico and New York were analyzed showing showing relation between Ataques de Nervios, global impairment and more exposure to violence. |
| Smith, 2009 (37)        | Ethnomedical syndromes and treatment-seeking behavior among Mayan Refugees in Chiapas, Mexico | Mexico      | 1546 Guatemalan refugees living in Mexico were analyzed through the Rapid Demographic Assessment and ethnomedical syndromes. Fifty-nine percent from the adults showed history of Ataques de Nervios, with association with PTSD. |
| Canino et al. (2014)43  | The role of peers in the relation between hurricane exposure and Ataques de Nervios among Puerto Rican adolescents | Puerto Rico  | 305 adolescents from Puerto Rico were analyzed, 12 to 27 months after a hurricane, where Ataques de Nervios were associated independently with previous peer violence and exposure to the hurricane. |
distress, depression, feeling of suffocation, cold sweat, epileptic episodes, blurred vision, feeling of loss of control, dissociative episodes, hysteria and auditory hallucinations. Susto (Table 3) was described as fever, diarrhea, abdominal pain, loss of appetite, trembling, fear, crying, drowsiness or sleeplessness, feeling weak, tired, pale, nightmares and lack of motivation.

Weller et al.20 and Baer et al.17,20 evaluated the homogeneity of the descriptions of symptoms, causes and treatments of Susto and Nervios between populations from different Latin American countries. The homogeneity of responses was assessed by statistical tests performed using data from the interviews. In the Puerto Rican, Mexican and Guatemalan populations, 40% to 50% homogeneity in the description of Susto and Nervios was found21.

a.3) Epidemiology of Ataques de Nervios, Nervios and Susto

Regarding the epidemiological aspects related to the frequency of these syndromes three articles29,31 were identified. Snyder et al.29 found a frequency of 15% for Nervios in a Mexican sample, measured by personal report of being affected in the past. Guarascia32 added to a Puerto Rican population study the question of being affected by Ataques de Nervios in the past, finding that 16% of the population responded affirmatively, 12% of whom reported severe effects and need for medical care. A similar frequency, 15%, was found by Ortega et al.28,31 in a Puerto Rican sample for Ataques de Nervios.

All studies identified positive cases of Ataques de Nervios and Nervios through dichotomous questions (presence/absence of Ataques de Nervios/Nervios/Susto, with no characterization of symptomatology), directly addressed to the local population.

b. Socio-demographic characterization of the affected by the cross-cultural syndromes

With respect to socio-demographic description, seven studies17,19,23,27,26,33,34 were identified. Four17,19,23,34 showed a higher proportion of female victims of Ataques de Nervios and Nervios. In these studies, 76% to 78% of those affected were female. Psychosocial vulnerability understood as the subjects undergoing major social and

Table 3. Studies on the Culture Bound Syndrome Susto

| Author(s) | Year | Title | Country | Summary |
|-----------|------|-------|---------|---------|
| Logan (1993)1 | | New lines of inquiry on the illness of susto | | Review of the Susto syndrome using information published up to now. |
| Lee and Balick (2003)2 | | Stealing the soul, soumwan en nania and susto; understanding culturally-specific illness, their origins and treatments | | Essay on the literary characteristics utilizing cross-cultural syndromes to mark the importance of inclusion of culture in the study of diseases, mainly the mental diseases. |
| Glazer et al. (2004)20 | | Susto and Soul loss in Mexicans and Mexican Americans | Mexico | 850 Mexicans living in Texas and 50 living in Guadalajara were interviewed on the causes of Susto, wherein a major portion of the interviewed did not recognize n of the intervine in Guadalajara Susto. |
| Weller et al. (2002)20 | | Regional variation in Latino descriptions of susto | Mexico, Guatemala | Populations of Mexicans in Texas and in Mexico, and Guatemalans were studied on the causes, symptoms, risks and treatment of Susto. The three populations presented major homogeneity of answers respecting causes and symptoms of Susto. |
| Flasikurd and Calvillo (2007)20 | | Psyche and soma: susto and diabetes | | Opinion text where the Author endorse the importance of pairing the ideas of psych and soma, clarifying with the difficult of treating diabetes when the individual believes that their diabetes is caused by Susto. |
| Castro and Eroza (1999)27 | | Research notes on social order and subjectivity individuals experience of susto and fallen fontanelle in a rural community in central Mexico | Mxal Mexico | Anthropological study to analyze Susto, Soul loss and Fallen Fontanelle experiences of a Mexican community from a sociological point of view. |
| Quinlan (2010)34 | | Ethnomedicine and ethnobotany of fright, a Caribbean culture-bound psychiatric syndrome | Dominica | Qualitative data were collected with key informants from a village in Dominica about Susto. Susto were highly recognized by the interviews and described as triggered by stressors. |
| Thomas et al. (2009)28 | | Susto etiology and treatment according to Bolivian Trinitario people | Bolivia | Semi structured interviews were used with key informants and household information gathered in two communities from Trinitario, Bolivia. Susto was described almost as important as fever, diarrhea and cough, and more common in children. |

Table 4. Studies on Diagnostic Classification and Culture

| Author(s) | Year | Title | Country | Summary |
|-----------|------|-------|---------|---------|
| Berganza et al. (2002)13 | | Latin American Guide for Psychiatric Diagnosis (GLDP). | | Guide produced by Latin American experts on the theme of Diagnostic Classification in Psychiatry to extend the validity of diagnoses made in the area based on ICD-10. The author presents a diagnostic proposal based on axis. |
| Guarascia and Rogler (1999)14 | | Research on culture-bound syndromes: New directions. | | The Author presents a methodology proposal for the study of cross-cultural syndromes in four steps. |
| Berganza et al. (2001)14 | | The Latin American guide for psychiatric diagnosis. A cultural overview. | | The Author tries to discuss the importance of increasing the diagnosis validity ways of the International Statistical Classifications of Diseases and Related Health Problems, ICD and DSM, highlighting GLDP. |
| Razouk et al. (2011)23 | | The contribution of Latin American and Caribbean countries on culture bound syndromes studies for the ICD-10 revision: key findings from a working in progress. | | A review was realized on the Medline, Embase, Lilacs and PsychINFO databases about cultural issues on psychiatric diagnostic, from Latin America. It points the scarcity of studies in this area and possible reasons for this. |
| Evans et al. (2013)28 | | Psychologists’ perspectives on the diagnostic classification of mental disorders: results from the WHO-IUPSY Global Survey. | | 2155 psychologists from 23 countries contributed answering that 60% of them use routinely a formal diagnostic classification, 51% of them using frequently the ICD-10. However, most of them reported important cultural issues on applicability of the classification, particularly in countries outside USA and Europe. |
economic difficulties, was identified as characteristic of the affected in four studies. In these, Mexicans, Puerto Ricans and Salvadorans affected by Ataques de Nervios were characterized by open interviews as individuals exposed to high stress, responsibility, violence and with lack of social support.

C. Identifications of comorbidities among individuals affected by cross-cultural syndromes and other psychiatric disorders

Four studies showed a relationship between posttraumatic stress disorder (PTSD) and Nervios/Ataques de Nervios. Norris et al. studied Mexican victims of natural disasters, residents of Florida and Mexico itself, encoding the answers through consensus among different raters. Seventy-nine percent of the sample reported one to nine symptoms of PTSD. Fifty percent of the interviewees reported hyper vigilance. Those symptoms not able to be coded in PTSD symptoms were grouped into clusters. One of these clusters was Ataques de Nervios, characterized by hysteria, nervousness and despair, where hysteria to the interviewees meant cry and scream, stress out more, to desperate. Guarnaccia et al. in an epidemiological study in Puerto Rico found that, compared to individuals without a history of Ataques de Nervios, 17% of those who had Ataques de Nervios also had PTSD. In the same study it was also found that individuals with a history of Ataques de Nervios were 5 times more likely to experience PTSD compared with those without a history of Ataques de Nervios.

Dickson-Gomez interviewed a Salvadoran population, victims of conflict in the region. In this study, Ataques de Nervios and PTSD have been found as expressions of stress experienced during the war. In Guatemalan refugees living in Mexico, 34% of the adults reported Ataques de Nervios, 8 times more likely to present also PTSD.

Five studies showed the relationship between depressive disorder and Nervios/Ataques de Nervios. Individuals who reported having Nervios or Ataques de Nervios were also identified as having suffered from depression according to their responses to different mental health questionnaires. Snyder et al. used a questionnaire of symptoms based on the Composite International Diagnostic Interview (CIDI) while Cintron et al. and Weller et al. used the Beck Depression Inventory (BDI). Guarnaccia et al., in an epidemiological study in Puerto Rico, found that individuals who reported Ataques de Nervios were 9 times more likely to have depressive symptoms compared to individuals without a history of Ataques de Nervios. In Guatemalan refugees, based on DSM-IV criteria, adults reporting Ataques de Nervios were 15 times more likely to also have depression history.

Susto was also studied in the same way. Weller et al. studied the correlation between the number of individuals who report Susto with a significant number of depressive symptoms measured using the BDI, Zung and CES-D scales. In this study, individuals who reported having had Susto or Nervios in the past were 19 times more likely to have been affected by depression in the past compared to those who did not report having had Susto or Nervios.

In the Mexican and Puerto Rican populations a correlation was found between anxiety disorders and Nervios/Ataques de Nervios. Individuals who reported having had Nervios or Ataques de Nervios in the past in these populations showed higher levels of anxiety and anticipation of anxiety symptoms. Puerto Ricans with a history of Ataques de Nervios also had 3 times more risk of experiencing generalized anxiety disorder and were 25 times more likely to have panic disorders, when compared with individuals with no history of Ataques de Nervios. Children with parents with a history of Ataques de Nervios showed about 5 times more chance of having anxiety disorders.

Discussion

From the 23 articles on Nervios, Susto and Ataques de Nervios, 56% were qualitative studies. These studies were conducted directly with the local population to ascertain the conception of these syndromes or conducted with people affected by them and describing their symptoms. One study evaluated the homogeneity of the description of Susto and Nervios among populations in Guatemala, Puerto Rico, Mexico and Mexicans living in the U.S. The results were 40%-50% homogenous in regard to the descriptions of symptoms and causes of Nervios and Susto, although the personal descriptions analyzed may have been affected by different research.

With respect to the causes of these syndromes, eight of the analyzed articles described causes identifiable by the respondents, and these were psychosocial stressors, generally described as threats and/or losses in the stability and maintenance of family relationships or physical threats made to or witnessed by the respondent. Nervios was described as linked to stressful events experienced over a continuum of time and Susto and Ataques de Nervios linked to specific, acute and usually identifiable stressors.

In this sense, Susto, Nervios and Ataques de Nervios are concepts of language of distress and are used as culturally acceptable labels for different mental and somatic changes triggered by psychosocial suffering/stressors. In the event of continuous exposure to stress, Nervios might be a culturally constructed way to communicate a vulnerability, or exposure to factors that are difficult to cope with. Other authors approximate the concept of idioms of distress with Susto, Nervios and Ataques de Nervios syndromes in the same way, within the analyzed articles. Guarnaccia et al. proposes, additionally, the creation of a popular nosology for the Puerto Rican population to cope with stressful situations. The author separates designations such as ser nervioso, padecer de los nervios and tener ataques de nervios, based on the cultural construct of stress coping states in Puerto Rico, with different characteristics, severity, ways of seeking help and having symptoms that overlap with different psychiatric syndromes.

The understanding of such syndromes as idioms of distress and the proposal of a popular nosology for stress questions the validity of the formulation of guidelines for psychiatric diagnoses for certain areas/cultures, such as the Guia Latino Americano de Diagnostico Psiquiatrico (Latin American Guide of Psychiatric Diagnosis). As long as regional manuals and guidelines take as their starting point diagnoses which have been defined by other cultural groups, they may perpetuate problems of diagnostic validity and concepts that have little relationship with local forms of psychiatric illness and local cultural variables.

In ICD-10 the diagnoses that allow for a correlation between behavioral and somatic changes caused by stressor events are acute stress reaction, adjustment disorder, and PTSD. Two studies tried to connect Nervios and Ataques de Nervios to PTSD by means of qualitative research. Dickson-Gomez studied victims of war conflicts, while Norris et al. studied victims of natural disasters. Norris et al. looked for PTSD symptoms using open interviews and found symptoms that could not be fitted into the diagnosis currently used for PTSD on DSM-IV. Such symptoms were named by the local population as Nervios/Ataques de Nervios symptoms, composed by hysteria, nervousness and despair. Thus, Nervios/Ataques de Nervios could still be nosological entities different from PTSD, but also could be PTSD with symptoms not yet included in the current PTSD description. This can be connected to the concept of PTSD itself, which could be still flawed or incomplete, or because the pattern of symptoms/behaviors triggered by stress are culturally mediated and PTSD was not originally described in cultures linked to the culture bound syndromes Susto, Nervios and Ataques de Nervios.

Stressor events described for Niervios/Ataque de Niervos and Susto are the same as those described for the diagnosis of PTSD on ICD-10 and on DSM-IV: exposure to situations of real or perceived physical or psychological menace to oneself or to others, for instance; assault, rape, serious accidents, natural disasters, torture, loss of a loved one or witnessing a stressor event. The possibility of loss or breakup of a close relationship is frequently associated with Ataques de Nervios, which could distinguish it from the concept of PTSD, since its description in DSM-IV is more linked with situations.
of higher vulnerability, threat, risk and aggressiveness. However, the literature suggests a broader concept of stress situations which could be connected to PTSD, as the perception of a significant stressor event is individually and culturally mediated\(^{41-44}\). The adoption of this concept could make the PTSD triggering events more like those connected to Susto, Nervios and Ataques de Nervios. In this sense, stressing factors are situations in which the individual perceives an important gap in their control of the situation, in its predictability and relative success in being able to minimize damages to oneself and to others\(^{45}\).

In its recent version, the DSM-V has extended the criteria A1 of PTSD, about trauma description, to include being informed about a traumatic event that happened to someone close and chronic exposure to stressful situations as possible triggers to PTSD. The same situations appear in the descriptions of Ataques de Nervios and Susto, approximating these concepts. However, the DSM-V introduced a glossary about cultural diagnostic formulation where Ataques de Nervios was linked to depression, describing depression as a western cultural language of distress. This is a different understanding about depression compared to that in DSM-IV where depression was described as not linked to triggering situations. Maintaining this concept, and the similarity between triggering events, Ataques de Nervios would be more approximate to PTSD than depression. To clarify this difference more studies on different levels of impairment, symptomatology and different outcomes linked to these syndromes are necessary.

The articles reviewed indicate that the patients reporting having suffered Susto, Nervios or Ataques de Nervios present increased chances of having suffered depression, anxiety, panic disorders and PTSD\(^{19,20,23,28,30,35,47}\). However, the way these articles evaluate this is based on the reports of the individuals about their past, and so it carries the bias of memory and interpretation. This communication contrast cultural differences as well as differences in training, education and world view between the interviewer and the interviewee. Kleinnmann argues this in his book\(^{6}\), giving as an example the case of a Mrs. Lin, a woman of Chinese origin, whose diagnosis, according to North-Americans, would be depression based on the anamnesis of fatigue, feebleness and diffuse somatic symptoms. However, for the patient herself and for the local psychiatrists, the condition of the patient is understood as neurasthenia, taking into consideration other culturally significant aspects such as demoralization, neurasthenia being an accepted and described local diagnosis. The understanding of her case within the local cultural conditions is that a diagnosis of depression only describes part of the patients condition.

However, the higher chances of comorbid conditions occurring during the lifetime of an individual with Nervios, Susto or Ataques de Nervios, compared to individuals with other psychiatric disorders, may indicate significantly increased suffering for these populations. This means that these populations are specifically naming certain mental and somatic complaints, whose correlates would be different psychiatric diagnoses according to the main diagnostic manuals, without necessarily corresponding to the same disease, but indicating a condition of suffering and/or indicating a psychic and somatic vulnerability of these populations.

Other data that corroborate the significance of these conditions are those on the frequency of these syndromes. In the demographic studies of Mexico and Puerto Rico on Ataques de Nervios the frequency of reports of having suffered from this syndrome was between 15% and 16%\(^{19,31}\), similar to the recent 15% in a demographic study on Hispanics living in the USA\(^{46}\).

An individual’s point of view is important from an ethnographic perspective, because the self-perception of one’s condition and its naming and judgment is essential to the understanding of a specific phenomenon, which is different from those experienced in other cultures. However, the personal point of view may cause distortions in the estimation of symptom frequencies, because different symptoms can be named the same way, and counted as being the same. Reviewing the last 25 years of epidemiological studies conducted in Puerto Rico, Canino\(^{41}\), pointed out that the first publications on the subject, in Puerto Rico, in the 1960s and 1970s, showed high levels of mental disease in the Puerto Rican population, and such a result brought criticism from the scientific community due to the low validity of the instruments employed, and to the cultural specificities of the population. In these studies, local expressions of stress were directly linked to psychiatric diagnoses, leaving aside semantic and cultural issues. It was only later that the instruments used for evaluation of psychiatric syndromes began to be translated and validated for local populations with a consequent increase in diagnostic validity, notwithstanding that these diagnostic instrument validations also present problems, as they depend on the interpretation by the interviewer of what is expressed by the patient in a particular culture\(^{47}\), as well as the validation of the diagnostic instrument used depending on the cultural interpretation of those undertaking the diagnostic instrument adaptation\(^{46}\).

Data on vulnerability, besides those on comorbidity and frequency, corroborate the idea of a significant impact on these populations. The analyzed articles link individuals prone to these syndromes to individuals more exposed to stress situations, with more socioeconomic difficulties and with less social support\(^{19,20,23,28,30,35,47}\). Snyder et al.\(^{24}\) found an association, in the Mexican sample studied, between susceptibility to Nervios and being a woman with poor educational levels or a housewife with more than four children under their care. Guarnaccia et al.\(^{19}\), in his analysis of Puerto Ricans also found an association between Nervios and adverse socioeconomic conditions. He suggested that this might be explained by the process of rapid industrialization leading to instability in the social support networks of individuals, with the subsequent feeling of increased vulnerability resulting in the expression of Nervios. However, other factors might confound the analysis of socioeconomic vulnerability, among them the fact that worse socioeconomic indicators are related to a higher prevalence of common mental disorders in low and medium income countries, as most of the LAC countries are\(^{46}\). This review of epidemiological studies of low and medium income countries showed that low education, hunger, housing and financial problems, and socioeconomic status were related to higher rates of common mental diseases, defined as depression, anxiety and somatoform disorders, whose symptoms overlap with those presented by the culture bound syndromes Susto, Nervios and Ataques de Nervios.

Also, Susto, Nervios and Ataques de Nervios were associated with female gender\(^{17,20,33,34}\). However, the vulnerability and social stress experienced by women in the countries studied might be higher than that experienced by men due to the continued existence of the stricter patriarchal frameworks found in those countries. At the same time, woman in general are already linked to a higher incidence of diagnoses of depressive, anxiety and somatoform disorders, whose symptoms, as mentioned before, overlap with those from the culture bound syndromes studied.

As for the symptoms describing the Nervios, Susto and Ataques de Nervios syndromes in the analyzed articles\(^{19,20,23,28,30}\) they do not disagree with those listed in DSM-IV\(^{3}\) and DSM-V\(^{1,3}\) and in the Guia Latino Americano de Diagnos Amer Psiqui Americ\(^{41}\). Thus, Nervios might be described as a somatic disorder with emotional symptoms and impairment in functioning.

In respect of the limitations of this analysis, the selected studies originated from only 5 of the 21 countries belonging to LAC which combines a heterogeneous set of cultures. Another limitation is the narrower inclusion criteria used in this study, in which studies on populations outside the LAC were excluded. However, living in countries outside Latin America introduces specific factors which can influence individuals and change the way they behave and their history of illness. They are exposed to the acculturation phenomenon, changing their patterns of behavior over time and dependent on the kind of relationship established with the culture in which they are inserted. Data on a North American sample of Hispanics indicate that those with higher levels of acculturation showed a higher prevalence of Ataques de Nervios episodes\(^{41}\), which might indicate
the influence of acculturación on culture bound syndromes. There is also no uniformity in the excluded articles about level of acculturación. Moreover, according to Guarnaccia and Rogler16, culture bound syndromes should be described in relation to the cultures where they have originally arisen.

Another limitation to this study is the low scientific production, only 1.0% of the articles in Strategy 1 and 3.5% in Strategy 2 could be included in the analysis. Strategy 1 used database MeSH terms, while Strategy 2 used Nervios, Susto and Ataques de Nervios separately and as single words, in the electronic databases. This difference could indicate limitations in the use of MeSH terms to easily access articles, probably because of difficulties in the classification of these types of articles and lack of specific descriptors on the subject of culture bound syndromes. However, as no articles were found using the Lilacs database, which is a Latin-American database, this can strengthen the hypothesis that the scientific production might be low in Latin American countries. Another hypothesis for the low scientific production might be the potential low interest in this topic, difficulty to get research funding and no academic interest in getting their work published in journals with a lower impact factor or not database-indexed.

Conclusions

The Latin-American studies on Susto, Nervios and Ataques de Nervios published between 1992 and 2015 suggested that these syndromes are important idioms of distress in the Central America region, with a significant rate of comorbidities and are often found in vulnerable populations. These syndromes present significant comorbidity with depressive, anxiety, panic and somatomatological disorders, but may present a stronger correlation with PTSD and other psychiatric diagnosis linked to triggering identifiable stressor events. More studies are needed about psychiatric conditions related to stress, such as PTSD, and the culture bound syndromes Nervios, Susto and Ataques de Nervios, as well as studies about these syndromes in other LAC.

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Conflict of interest

Authors state no personal or financial conflicts in regards with this article.

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