

Pain-induced depression in the elderly: Validation of psychometric properties of the Brazilian version of the “Geriatric Emotional Assessment of Pain” – GEAP-b

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SUMMARY

Objective: In order to introduce an instrument within our midst that allows a comprehensive clinical evaluation of pain-induced depression in the elderly, we proposed the translation, cross-cultural adaptation into Brazilian Portuguese, and study of the psychometric properties of the “Geriatric Psychosocial Assessment of Pain-induced Depression” (GEAP) scale. This instrument was especially developed for the screening of depression associated with chronic pain in the elderly.

Method: We performed translation and cross-cultural adaptation of the GEAP scale, whose psychometric properties were analyzed in a sample of 48 elderly individuals. Sociodemographic data and information related to chronic pain were ascertained, as well as those related to depression. The GEAP-b scale was applied at three different times on the same day by two different interviewers (I1 and I2), and after 15 days by one of those interviewers (I3).

Results: The GEAP-b proved to be an easy-to-apply instrument with a high internal consistency value, according to the Cronbach’s alpha coefficient (0.835). The reproducibility of the instrument was optimal, achieving intraclass correlations of 98.5 and 92% for interobserver and intraobserver, respectively. There was “considerable” agreement (between 0.419 and 1.0) for each GEAP-b item, except for item 19, according to the kappa statistic. As for the validity of the GEAP-b criterion, positive and statistically significant correlations were obtained for pain, according to GPM-p ($r=49.5\%$, $p<0.001$), and depression, according to GDS ($r=59\%$, $p<0.001$), both values being considered regular (between 40-60%).

Conclusion: The GEAP-b scale has proven to be reliable and valid in the screening of pain-related depression in the elderly.

Keywords: elderly, chronic pain, depression, cross-cultural comparison, validation studies.

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INTRODUCTION

About 50% of the community’s elderly and 80% of those living in long-term care facilities experience chronic pain.¹ These individuals are more likely to suffer from depression, and therefore are more at risk of increased intensity, frequency and duration of pain.² This direct relation was demonstrated in a study in which patients with multiple pain symptoms were three to five times more likely to have depression, while those with a “single” symptom of pain were twice as likely to have this mood disorder.²

Elderly individuals with depression and chronic pain, compared to those with depressed mood only, have more

suicidal ideation, sleep disorders and personality disorders, in addition to longer hospitalizations and greater use of the health system.³ A vicious cycle takes place that interferes with the adequate treatment of both comorbidities.⁴ Thus, adequate diagnosis of pain-induced depression cannot be established unless depression and pain are examined concomitantly rather than through separate assessment tools.⁵

Studies with individuals with chronic pain and depression have shown that less than half of those with depression were correctly diagnosed, with consequent treatment impairment.² The “Geriatric Emotional Assess-

ment of Pain” – GEAP scale was developed to identify the level of depression induced by pain, which in turn is defined as depression triggered by chronic pain mainly due to beliefs about pain that are formed around the socialized meaning of convictions about pain by older adults at two levels: catastrophization and perceived deficiency.⁵ We attempted to test a biopsychosocial multidimensional assessment basis and to identify the level of pain-induced depression in elderly people with chronic pain, thus improving pain management in those individuals.

The GEAP scale is a tool to evaluate pain-related depression in the elderly,⁵ and its use by health professionals in Brazil would enable a more consistent assessment of pain-induced depression in the aging population. This resource would allow early action, and less functional, social, psychological and health damages in the elderly with pain.

METHOD

This was a methodological, descriptive and analytical study, approved by the Ethics Committee of the Federal University of São Paulo in 2014 (CEP No. 528,139).

For translation and cross-cultural adaptation of the GEAP scale, we followed the methodology by Guillemin et al.⁶ First, the text of the questionnaire in English was translated into Portuguese by two independent Brazilian translators, qualified and aware of the translation objectives. The translations obtained were compared to one another, originating a version that was back translated into English. This version was compared with the original in English by two native English-speaking translators with knowledge of the Portuguese language, unaware of the proposed objectives.

For cross-cultural adaptation, some equivalences were obtained: 1) Semantic equivalence, based on the comparison of grammatical and vocabulary aspects, refers to the fact that many words in a language may not have equivalents in other languages; 2) Idiomatic equivalence, which involves a vast research of dictionaries, refers to the difficulty of translating certain idiomatic expressions as the meaning of words is sometimes neither fixed nor stable; 3) Transcultural or experimental equivalence, that is, the cross-cultural context of the original expressions must have “content validity” in Brazilian Portuguese and meaning for the Brazilian population, always having in mind that the original version of the instrument will be used in a different country; 4) Conceptual equivalence, refers to the idea that some words can be semantically equivalent without presenting “concept equivalence.” In this last stage, we assembled a committee of five special-

ists from different areas who were experienced in the elderly: a geriatrician, a physiotherapist, a psychologist, an occupational therapist and a nurse. Thus, the final version of the instrument was obtained: the GEAP-b (Chart 1).

The instrument comprised 25 yes or no questions, structured into three different social levels of pain: eight questions about beliefs about pain, eight about perceived deficiency, and nine questions about pain interference in cognition. The total GEAP score is obtained by summing

CHART 1 GEAP-b – Translated version, adapted transculturally to Brazil.

GEAP-b	Yes	No
1. Did the pain leave you physically disabled?		
2. Because of the pain, did you isolate yourself from others?		
3. Is the pain treatment too expensive for you?		
4. Has the pain changed your sleeping habits?		
5. Has the pain affected your appetite?		
6. Does pain keep you from doing the activities you enjoy doing?		
7. Does pain prevent you from relaxing?		
8. Do you believe that your pain has no solution?		
9. Does being physically active only cause you more pain?		
10. Does the pain make you feel like you cannot go on living?		
11. Does pain prevent you from planning the future?		
12. Does pain make you feel worthless?		
13. Is pain a punishment for bad things you have done to others in the past?		
14. Does pain lead to bad things in your life?		
15. Will the pain prevent you from ever being happy again?		
16. Does pain make you not control how you feel?		
17. Is it true that you will never be able to do anything for yourself because of the pain?		
18. Do you constantly complain of pain?		
19. Does telling the doctor about your pain only make things worse?		
20. Do you deal with the pain just by lying in bed?		
21. Do you stop doing everything when you feel pain?		
22. Is it true that you will never understand what causes your pain?		
23. Does your family tell you that with pain it is difficult to live with you?		
24. Have your parents ever talked about physical pain?		
25. Do you talk to your friends about your pain?		

the number of affirmative answers. The classification is given as follows: 0-5 points, little or no pain-induced depression; 5-9 points, moderate pain-induced depression; and 10 or more points, severe pain-induced depression.¹

For the study of the psychometric properties of the newly created instrument, elderly individuals aged 80 years or older, participants of the "Longevos Project" of the Division of Geriatrics and Gerontology (DIGG) of the Federal University of São Paulo (Unifesp) were selected between May 2014 and January 2015.⁷ This project refers to a longitudinal epidemiological study that includes long-lived individuals of both sexes, residents of the community, who are able to walk without assistance (but can use walking aids). Those with cognitive impairment diagnosed after clinical evaluation and/or cognitive tests; severe acute or chronic decompensated acute disease; under current treatment with dialysis, chemo or radiotherapy; hospitalized in the past 3 months; with sequelae from stroke or myocardial vascular accident; with impaired visual or auditory deficits; and those who were totally dependent on others for basic daily activities were excluded.

Thus, our population was composed of a convenience sample, obtained from a non-probabilistic sampling method dependent on the collection of data from members of the population that were conveniently available to participate in the study. Individuals with chronic pain lasting six months or longer, as defined by the International Association for the Study of Pain (IASP),⁸ and with pain intensity greater than or equal to 3, according to a visual numeric scale (VNS) of pain,⁹⁻¹² were included. All participants signed a free and informed consent form.

Sociodemographic characteristics were obtained, as well as the medications used for pain and depression, and data on chronic pain, which was measured unidimensionally based on VNS, and multidimensionally according to the Geriatric Pain Measure (GPM-p).¹³ Depressive symptoms were tracked according to the Geriatric Depression Scale (GDS), short version.^{14,15}

The GEAP-b was applied by two independent interviewers (I1 and I2) on the same day and after 15 days without any intervention during the period, followed by a third evaluation by one of the interviewers (I3). This was done in order to obtain reliability and validity, as recommended by methodological studies on measurement instruments.¹⁶ Reliability was analyzed based on internal consistency (correlations between items) and reproducibility (test-retest and inter-observer analysis).

During the validation process some methods are proposed, including "face validity" (if the instrument measures what is supposed to be measured) and "content validity"

(if the object of measurement is representative), both obtained in the transcultural adaptation process.¹⁷ "Construct validity" (evaluates previously operationalized constructs using empirical data) was also proposed, but not obtained due to the absence of an instrument considered gold standard for measurement of depression in patients with chronic pain. Then, we obtained the "criterion validity", which assessed the degree of efficacy in the prediction of pain-induced depression¹⁸ based on the correlation between the GEAP-p score and the assessments of depression and pain using GDS and GPM, respectively.

For statistical analysis, we used SPSS version 17 and Microsoft Excel 2010. For the characterization of the distribution and the frequency of qualitative variables, we adopted the Equivalence Test for Two Proportions, for the Internal Consistency we used Cronbach's Alpha Coefficient, and for reproducibility Student's t-test, Intraclass Correlation Coefficient (ICC) and Kappa Concordance Index. Also, the Pearson correlation was used for validation. The significance level was set at 5%.

RESULTS

The sample consisted of 48 elderly individuals with mean age of 87.5±4.1 years (81-99 years). The participants were predominantly female (79.2%), white (79.2%), widows/widowers (58.3%) and presented low formal education (60.4% studied for 1 to 4 years).

Most used pain medications regularly (64.6%), either classic analgesics (56.3%) or drugs with adjuvant action on pain (31.3%). Antidepressants were used by 45.8% of the sample.

Chronic pain had a mean duration of 9.26 years and intensity was mainly moderate (35.4%) or severe (54.2%), according to VNS. In the multidimensional analysis (GPM-p), it was considered mainly moderate (68.8%). Regarding the nature of pain, there was a predominance of nociceptive (79.2%), mainly in the joints (81.3%).

Depression was identified in 39.6% of the elderly according to the GDS scale. The prevalence among participants of moderate pain-induced depression was 33.3% and severe in 20.8%. 45.8% of the sample had mild or no depression.

In the evaluation of the psychometric properties of the GEAP-p, starting with the reliability according to its internal consistency, high values of Cronbach's alpha were obtained: 0.835 for I1, 0.834 for I2 and 0.795 for I3. For reproducibility, three analyzes were performed. According to the paired Student's t-test, no significant inter-observer (I1 and I2) and intraobserver (I1 and I3) differences were observed, with a coefficient of variation greater than 50% indicating heterogeneity (Table 1). The

ICC showed excellent results, with 98.5% interobserver correlation (I1 and I2) and 92% intraobserver correlation (I1 and I3). According to the analysis of agreement between the interviewers for each item of the instrument in question, using Kappa statistics, statistically significant concordances were obtained between I1 and I2 and I1 and I3, which were considered good, with a single exception for item 19 (I1 and I3) (Table 2).

TABLE 1 GEAP reproducibility, according to paired Student's t-test.

GEAP-b	I1	I2	I3	p-value
Total	48	48	42	
Mean	6.67	6.58	6.86	
Median	6	5.5	6	
Standard deviation	4.62	4.60	4.28	
Coefficient of variation (%)	69	70	62	
Min	0	0	0	
Max	21	21	18	
Confidence interval	1.31	1.30	1.29	
Correlation I1/I2				0.605
Correlation I1/I3				0.360

TABLE 2 Intraobserver and interobserver agreement, according to the Kappa index.

	I1/I2		I1/I3	
	Kappa	p-value	Kappa	p-value
Question 1	0.750	<0.001	0.571	<0.001
Question 2	0.727	<0.001	0.494	0.001
Question 3	0.762	<0.001	0.690	<0.001
Question 4	0.865	<0.001	0.642	<0.001
Question 5	0.735	<0.001	0.690	<0.001
Question 6	0.775	<0.001	0.586	<0.001
Question 7	0.845	<0.001	0.669	<0.001
Question 8	0.787	<0.001	0.561	<0.001
Question 9	0.645	<0.001	0.518	0.001
Question 10	0.833	<0.001	0.876	<0.001
Question 11	0.829	<0.001	0.651	<0.001
Question 12	0.899	<0.001	0.666	<0.001
Question 13	1.000	<0.001	0.482	<0.001
Question 14	0.862	<0.001	0.618	<0.001
Question 15	0.850	<0.001	0.639	<0.001
Question 16	1.000	<0.001	0.659	<0.001
Question 17	0.550	<0.001	0.419	0.006
Question 18	0.858	<0.001	0.654	<0.001
Question 19	0.657	<0.001	-0.050	0.746

(Continues)

TABLE 2 (Cont.) Intraobserver and interobserver agreement, according to the Kappa index.

	I1/I2		I1/I3	
	Kappa	p-value	Kappa	p-value
Question 20	0.644	<0.001	0.641	<0.001
Question 21	0.813	<0.001	0.556	<0.001
Question 22	0.695	<0.001	0.738	<0.001
Question 23	0.897	<0.001	0.540	<0.001
Question 24	0.492	<0.001	0.774	<0.001
Question 25	0.775	<0.001	0.738	<0.001

I1: Interviewer 1; I2: Interviewer 2; I3: Interviewer 3.

As for validation, according to the Pearson statistic, the GEAP-b showed a positive and significant correlation with depression (GDS) and pain (GPM), respectively: $r=59\%$ and $r=49.5\%$, both considered regular (between 40-60%).

DISCUSSION

We obtained an instrument that the elderly were able to understand easily, GEAP-b, which is simple to apply and requires little time (about 5 minutes). We have included a unique long-lived sample, which is the portion of the elderly population that grows the most throughout the world,¹⁹ mostly comprising females (79.2%) and similar to that found in the scientific literature considering the population over 80 years old (feminization of aging).²⁰

Regarding pain, we observed the presence of impacting pain, with a majority of participants referring moderate to severe intensity, a rather prolonged duration (9.26 years), and high impact on the life of the elderly according to the GPM-p (social engagement, pain while walking, pain during vigorous activities, and more). This finding is similar to another Brazilian study conducted in the city of Londrina, which found a higher prevalence of moderate to severe pain (60.4%) among the elderly in the community.²¹

The diagnosis of possible depression, according to GDS, was found in almost 40% of patients, reaching 54% in pain-induced depression. This mood disorder is about two to three times higher among individuals with chronic pain, and there is a vicious cycle of worsening pain in patients with depression and vice versa, leading to losses directly proportional to the intensity of the illnesses.²²⁻²⁵ In population studies, the prevalence of depression in individuals with chronic pain is 18%, and in primary services the incidence reaches 37 to 56%.²² Onder et al. found a 19.5% prevalence of depression in a European population of long-lived patients with chronic pain.²⁶

Analyzing the measurement properties of GEAP-b, firstly referring to its internal consistency, we verified that

it was considered good or excellent. That is, good or excellent reliability was observed for the vast majority of items in this instrument.

For reproducibility, and according to the Kappa agreement that evaluates the extent to which the variability represents the mean, very good results (I1-I2 and I1-I3) were obtained, except for agreement in item 19, which did not compromise the reproducibility. Thus, GEAP-b can be considered an instrument of good reliability.

In the validation process, face and content validities were considered adequate, and especially, the criterion validity. For the latter, we observed statistically significant, regular and positive correlations of GEAP-b with "multidomain" depression and pain. In the case of positive correlations, the higher the GEAP-b score, the higher the level of pain-induced depression observed.

The existence of a gold standard evaluation test would certainly help and enrich the GEAP validation process. A larger sample and comparison studies with other instruments for screening and assessing the severity of depression (such as the Hamilton Depression Scale - HAM-D and the Montgomery-Asberg Depression Rating Scale - MADRS) are valuable in enhancing the validity of this instrument.

The GEAP was applied by interviewers, and a self-assessment by most of the study participants is not possible due to their difficulty in reading the questions in the questionnaire, which was probably due to the low educational level (60.4% studied from 1 to 4 years) of the sample, and can be considered another limitation of our study.

Self-application of the GEAP by the patient is feasible and can be performed in the waiting room of the physicians' offices, and also by other health professionals. This measure is relevant, since there is an increase in the interest of researchers in studying aging and its consequences. Chronic pain in the elderly, as well as chronic pain associated with depression, would thus be important in clinical practice, since these conditions are associated with compromising outcomes. Further research is needed, and the cut-off points require additional validation in the Brazilian medical setting.

CONCLUSION

We obtained an instrument of easy applicability and good understanding by the elderly: the GEAP-b. It was appropriately translated and adapted transculturally to Brazil, and after the analysis of its measurement properties, proved to be reliable and valid for the identification of pain-induced depression in the elderly.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

RESUMO

Depressão dor-induzida em idosos: validação das propriedades psicométricas da versão brasileira do "Geriatric Emotional Assessment of Pain" - GEAP-b

Objetivo: A fim de se introduzir no nosso meio um instrumento que permitisse uma avaliação clínica abrangente da depressão dor-induzida em idosos, propôs-se a tradução, adaptação transcultural para o Brasil e estudo das propriedades psicométricas do "Geriatric Psychosocial Assessment of Pain-induced Depression" (GEAP). Esse instrumento foi desenvolvido especialmente para rastreamento da depressão associada à dor em idosos.

Método: Foram realizadas tradução e adaptação transcultural do GEAP, cujas propriedades psicométricas foram analisadas em uma amostra de 48 idosos. Foram apurados dados sociodemográficos e relacionados a dor crônica, além de depressão. O GEAP-b foi aplicado em três momentos distintos, em um mesmo dia por dois entrevistadores diferentes (E1 e E2), e após 15 dias por um daqueles entrevistadores (E3).

Resultados: O instrumento GEAP-b mostrou-se ser de fácil aplicação e alto valor de consistência interna, de acordo com o coeficiente alfa de Cronbach (0,835). Teve reprodutibilidade ótima, segundo as correlações intraclassas: valores de 98,5 e 92%, interobservador e intraobservador, respectivamente. As concordâncias para cada item do GEAP-b foram "consideráveis" (entre 0,419 e 1,0), excetuando-se a concordância para o item 19, segundo a estatística kappa. Para a validade de critério do GEAP-b, correlações positivas e estatisticamente significativas foram obtidas para a dor, segundo o GPM-p ($r=49,5\%$; $p<0,001$), e para a depressão, segundo o GDS ($r=59\%$; $p<0,001$), com ambos os valores considerados regulares (entre 40 e 60%).

Conclusão: O GEAP-b demonstrou ser confiável e válido no rastreamento da depressão associada à dor em idosos.

Palavras-chave: idoso, dor crônica, depressão, comparação transcultural, estudos de validação.

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