Beck Depression Inventory-II in Mexican Sign Language. Reliability and factorial data.

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ABSTRACT

The main objective of this study is to present a version of the BDI-II (Beck, Steer & Brown, 1996) adapted to Mexican sign language, providing preliminary information about validity and reliability. The instrument was called BDI-IIASM (Adaptation to Mexican Deaf People). Furthermore, the objective is also to provide a preliminary profile of depressive symptoms in Mexican Deaf people using Mexican Sign Language (MSL) on their communication. The sample consisted of 100 profoundly prelingually deaf people living in the Monterrey metropolitan area (Nuevo Leon), Puebla (Puebla) and Nogales (Sonora), with a mean age of 30.63 years old, from which 52% were women and 48% men. Statistical analysis showed that intensity levels of depression symptoms in this population are high, with an average score of 17.51. The analysis reveals a significant difference between these scores and those reported by general hearing population (Sanz, Perdigon & Vazquez, 2003; Estrada, Delgado Landero & Gonzalez, 2012) that use the same BDI-II version (Beck, Steer & Brown, 1996), indicating also higher depressive symptoms in both Mexican Deaf people and Spanish Deaf people (Estrada, Delgado & Beyebach, 2010). Furthermore, contrary to reports from hearing population with depression, no significant correlations were found between levels of depression and sociodemographic variables, neither significant differences between the scores of men and women, which is consistent with the results reported in previous studies. Reliability of the instrument was α = .90, with a good correlation among items. Exploratory factor analysis indicated that BDI-IIASM measures a general dimension of depression composed of two factors, one is somatic and the other one, cognitive-motivational. However, unlike what happens in hearing population, somatic-motivational dimension was located in the first factor, explaining 42% of variance. We conclude that BDI-IIASM is a valid and reliable instrument to measure symptoms of depression in Mexican profoundly prelingually Deaf people, who have a symptom profile characterized by somatic and motivational nature.

KEYWORDS

mental health, deafness, sign language, depression, BDI-IIASM

Introduction

Currently, Deaf Mexican people represent a minority in constant risk of being socially ignored and as is similar to most minority groups, their fundamental rights, including the opportunity to have a basic bilingual education, or access to information and health services in their own language, are dangerously neglected.

In this paper we refer to Deaf people with Capital “D” to talk about those who were born deaf, lose their audition before first three years old, live with profoundly bilateral deafness, use sign language to communicate and identify themselves as a Deaf person in the deaf community.
In our country, people with limited hearing are equivalent to 498,640 people\(^2\), which represents 12.1\% of people with disabilities. From the foregoing, it is vital to increasingly recognize the need to study and to examine the characteristics of this section of the population, which also represents an enormous challenge regarding education and health access. Therefore, it is important to consider the social and psychological effects of hearing loss, since such effects are - and not deafness itself- the ones that may make development of this population more vulnerable.

In this regard, previous studies warn about the fact that some Deaf people may be more susceptible to a psychological disorder, and these disorders occur in a more prolonged way and with more intensity\(^3,4\), since most of Deaf people needing help, normally do not have therapeutic intervention.

When referring to specific psychological disorders, this study and others\(^5-7\) found high levels of depression in this population. Even differences were found between the symptomatological profile of Deaf people and hearing population\(^7,9\).

However, it is difficult to assess the prevalence of depression among the deaf population. One reason is that there is more depression in this community than that referred to mental health services, and also because maybe many Deaf people with depression do not look for help in mental health professional services\(^8\). Additionally, the lack of epidemiological research in Mexico has prevented the collation of conclusive data, concerning hard numbers about this population’s mental health.

Despite these limitations, the study of differences between depressive profiles and depression prevalence in Deaf and hearing people has been found among research topics since the 80s\(^3,4,5,7,9,10,11,12,13\). Some of these studies have used a Beck Depression Inventory (BDI) version, and all have showed differences in average score of depression regarding general hearing population in several countries, and only one\(^7\) shows a difference in depression profile with a factorial analysis, by using the same BDI version in this study, but in Spanish sign language.

In 1981, Altshuler and Abdullah showed that in the deaf population, we can often find symptoms related to irritability, dysphoria and agitation, somatic complaints, apprehensive attributions to problems and substance abuse behaviors. More recent studies have found that Deaf people with these symptoms are characterized by agitation with hostile and aggressive feelings\(^14\), accompanied by a resistance to manifest their symptoms in front of the physician or psychologist\(^15\). This is largely due to ignorance concerning mental health care.

There is also evidence of increased prevalence of depression symptoms in Deaf young people whose parents are hearing\(^11\) or non-signers\(^16\), when compared with young Deaf children of Deaf or hearing parents who know sign language (LS). There is a greater depression in young Deaf people who cannot communicate with their parents and family members due to the incompatibility of language (first, sign language and then oral language). However, there is less prevalence of depression symptoms in Deaf children who communicate with parents through sign language.

All of these results lead us to conclude that probably most Deaf people think, live and see depression in a different way. Proof of this is the research from Estrada, Delgado & Beyebach\(^7\) in Spanish Deaf population, which shows that evaluated individuals obtained an average score higher than those from hearing population. Furthermore, it was found that some BDI-II items like: agitation, loss of energy, loss of interest, irritability, tiredness or fatigue, loss of sexual interest, difficulty in concentrating, changes in sleep patterns, indecisiveness, changes in appetite and loss of pleasure had a greater statistical weight, indicating these symptoms are a characteristic of Deaf people suffering depression. These eleven items could be representing somatic-motivational factor for depression.
Further evidence of discrepancy between depressive profile of Deaf and hearing population can be found regarding gender. In the general population, it is recognized that women are clinically more depressed than men\(^{17}\). Recent studies with Deaf people did not find significant differences between the scores of women and men\(^{7,5}\).

From our perspective, the implications of depression in a Deaf person can be divided into two groups: a) specific implications of depression, which can be generalized to the entire population; b) implications that can only be related to the Deaf population because of isolation and use of a minority language.

In the first group, we found difficulties due to the conditions of depression, such as lack of motivation, loss of energy and interest, feelings of physical illness or weakness, lack of appetite and disturbed sleep, among other symptoms.

Implications that are specific to the Deaf population could be: relationship difficulties, feelings of isolation and loneliness. Additionally, symptoms appear to have a higher behavioral explanation than a cognitive one, probably because of the particular way Deaf people structure reality, where abstract psychological processes may be more hard to understand (like metaphors and analogies in a psychotherapy process) than the specific ones (behaviors, actions, sensations). These symptoms are influenced by other factors, such as family deaf-hearing status of deaf person, the education system through bilingual or oralist model, type of deafness (prelocutive or postlocutive), level of hearing loss, even other associated disabilities. All these factors may have some influence on differences in Deaf people depression, although more research is needed to confirm it.

In summary, Deaf people may have higher levels of depression, longer depressive states, higher social vulnerability\(^1\). All of this provides us with a strong argument for an urgent exploration of the profiles of depression in this population.

The main objective of this study is to present a version of the BDI-II\(^{18}\) adapted to Mexican sign language, providing preliminary information about validity and reliability. Furthermore, the objective is also to provide a preliminary profile of depressive symptoms in Mexican Deaf people.

**Method**

**Sample**

The sample consisted of Mexican profoundly prelingually Deaf people who use Mexican Sign Language and belong to the Deaf Association of Nuevo Leon, students from Multiple Attention Centers (CAM) from the Ministry of Education in Monterrey metropolitan area, in the State of Nuevo Leon; the city of Puebla, in the State of Puebla; in Nogales metropolitan area, in the State of Sonora, and catechist groups belonging to the Archdiocese of Monterrey. A total of 100 subjects, from which 52% were women and 48% men. Age range was between 14 and 59, taking an average age of 30.63 years old (SD = 12.98). 51.7% from sample’s participants had basic education (first 6 years of education after kindergarten).

**Instrument:**

We used Beck Depression Inventory-II\(^{18}\) adapted to the Spanish population\(^{19}\). The instrument was presented to the participants in video format, attached to an answer sheet and to a section for collecting socio-demographic data. In the video, a Deaf person translates into MSL the choices for questions and answers, followed by a short pause in which the participant chooses his answer and marks it in the appropriate format.

During the 19 minutes video, 21 items test for assessing the severity of depression symptoms in profoundly prelingually Deaf people from a minimum age of thirteen was presented. In each of the items, participants had to choose between a four-answer choice set itemized from the lowest to the highest severity. Participants can choose the option that best represents their state during the past two weeks, including the current day. Concerning correction, each item is evaluated
from 0 to 3 points, depending on the chosen option. The sum of these points allows obtaining a cut-point for categorizing the level of depression. Scores from 0 to 63 can be obtained.

The cut points we used to determine the levels of depression are presented in Table 1 and have been proposed by Beck, Steer and Brown (1996) in the BDI-II manual; they are the same used in the adaptation to general Spanish population and adaptations to Deaf people.

<table>
<thead>
<tr>
<th>From 0 to 13 points</th>
<th>Minimum depression</th>
</tr>
</thead>
<tbody>
<tr>
<td>From 14 to 19 points</td>
<td>Mild depression</td>
</tr>
<tr>
<td>From 20 to 28 points</td>
<td>Moderate depression</td>
</tr>
<tr>
<td>From 29 to 63 points</td>
<td>Severe depression</td>
</tr>
</tbody>
</table>

Table 1. Cutoffs for the BDI-II proposed by Beck, Steer & Brown (1996).

Procedure

In the first phase, a Deaf person and Mexican Sign Language interpreter participated in a BDI-II Spanish version review. When generating a consensus version of the translation into LSM, the Deaf person translated the questionnaire and made a videotape. In the second phase, a pilot test was conducted with a group of 15 profoundly prelingually deaf people. Some errors in the translation in terms of LSM were detected. In the third phase, those errors were corrected and a final revised version was achieved; it was again translated by a Deaf person, and then was videotaped. In this Mexican version (BDI-IIASM) we did not do back translation procedure as in Spanish version (BDI-IAS), since it is the same language and it only was a cultural review of the signs and adaptation to LSM (see Figure 1).

In order to access the sample, we visited Multiple Attention Centers (CAM) of the Ministry of Education, Government of Nuevo Leon, in Monterrey metropolitan area, previously authorized by the Management of Special Education of the State of Nuevo Leon. Similarly, Deaf catechist centers were visited and some lectures about depression were organized as well, at the College of Psychology of the University of Monterrey. After these lectures (from the second author of this article), Deaf people saw the BDI-II video and answered each question.

Another strategy used to facilitate access to the sample was to establish contact with the Deaf Association of Nuevo Leon. Through its strong participation in this research, a second application was conducted, which took place in the 1st Congress of Deaf Rights, organized by the Association, in the city of Monterrey. Deaf people from several cities of Mexico came to Monterrey to attend this congress. It was an opportunity to administer the sample. The application was included in the Congress’ Agenda, and it was applied in a group setting.

A third application was coordinated by the Management of Special Education of the State of Puebla, who offered his help after knowing about the progress of the work at the conference "The family of Deaf children: Aspects about deafness, mental health and depression", given at the 1st International Congress’ Disabled People, by the first author of this work. A final application was made in the state of Sonora, with the collaboration of a group of parents organized in the newly created association "Manitas que hablan."

In every application, participants were given explanation of what the purpose of the visit was by the researcher. In addition, it was explained that researchers were psychologists at the University of Nuevo Leon and that they needed their collaboration to create and / or improve psychological care for Deaf people.

Data collection included three MSL basic knowledge applicators, so they could communicate with participants in case of any doubt during the application procedure. Once data collection was carried out, an analysis of the questionnaires was made to determine what should be excluded from the sample, since they did not meet the requirements for inclusion or were incomplete.
Questionnaires that complied with all the requirements were transferred to a database by using SPSS 15.0 program, where statistical analyses were made. Descriptive analysis included frequency distribution, minimum and maximum scores, calculation of mean, standard deviation, T test and Mann-Whitney test to compare means and contingency table between variables. Reliability analysis included Cronbach Alpha statistics and inter-item correlation. In exploratory factor analysis, it was used the principal components analysis. For extracting factors, oblique rotation (oblimin) was chosen since its use assumes that factors to be obtained were correlated.

**Outcomes**

BDI-IIASM total scores ranged from 0 to 62, with an average of 17.51, and a standard deviation of 12.24. These results are higher than those found in other studies with Deaf people, who show scores between 0 and 53, with an average of 14.5 and a standard deviation of 10.5 \(^7\,\text{to}\,\text{20}\); on Mexican hearing population, there is an average of 9.4 and a standard deviation of 8.8 \(^2\,\text{1}\); and in the hearing population of other countries, the average is equivalent to 8.4 and the standard deviation is 7.1 \(^19\).

Although the mean between men and women show a small difference, after carrying out an analysis by T test for independent samples \( t (98) = .252, p = .802 \), no evidence of statistically significant differences was found.

With respect to gender differences, it was found that minimum and maximum scores for women were from 0 to 62 respectively with a mean of 17.80, and the standard deviation was of 12.92. Minimum score obtained by men was 0 and the maximum 48, with an average of 17.18 and a standard deviation of 11.58.

About depression levels, 44% of the sample is in a minimum depression level (0-13); 18% is in a mild depression level (14-19); 22% is situated at a moderate level (20-28), and 16% is in a deep depression level (29-63).

Internal consistency analysis showed a Cronbach Alpha coefficient of .90. This score is better than the one resulted in other investigations of the same nature (.88 Estrada, 2006; Estrada, Delgado & Beyebach, 2010, .88 Leigh & Anthony, 2001, .72 Leigh et al, 1988).

In order to know whether the levels of depression from our sample were consistent with those found in Hearing and Deaf population samples, we carried out a Chi-Square test to compare frequencies of depression levels reported by studies from BDI adaptation to Spanish population (see Table 2). Results indicate there is a statistically significant difference between the percentage frequency of depression level among Spanish Hearing population \(^19\) and Deaf population \(^7,\text{20}\).

<table>
<thead>
<tr>
<th>Depression ranges</th>
<th>Sanz, Perdigón &amp; Vázquez (2003) Spanish general population, (N=470)</th>
<th>Estrada (2006) Spanish Deaf people, (N=144)</th>
<th>This study (2009) Mexican deaf people, (N=100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum (0-13)</td>
<td>75.3%</td>
<td>52.8%</td>
<td>52%</td>
</tr>
<tr>
<td>Mild (14-19)</td>
<td>15.7%</td>
<td>18.8%</td>
<td>16%</td>
</tr>
<tr>
<td>Moderate (20-28)</td>
<td>5.7%</td>
<td>16.7%</td>
<td>17.3%</td>
</tr>
<tr>
<td>Severe (29-63)</td>
<td>3.2%</td>
<td>11.8%</td>
<td>14.7%</td>
</tr>
<tr>
<td>(\chi^2) when comparing the frequencies</td>
<td>(\chi^2(3)=53.675, p=.000)</td>
<td>(\chi^2(3)=.863, p=.834)</td>
<td></td>
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</tbody>
</table>

As for the age groups, levels of depression did not show a specific trend or a significant difference, as shown in Table 3. Age group showing higher number of subjects in the severe level of depression is that of people between 13 and 17 years old.
Analysis of evaluated symptoms intensity is shown in Table 4. The items that received the highest scores in frequency and intensity were, in the following order: changes in sleep patterns (1.22), changes in appetite (1.15), sadness (1.04), feelings of punishment (1.00) and indecisiveness (96). In contrast, the lowest scores correspond to items of suicidal thoughts (41) and irritability (57).

These results partially agree with those found in other studies with Deaf people, where higher frequencies are in the items of sadness, agitation, changes in sleep patterns, indecision and fatigue.

Finally, we conducted a factor analysis, so as to collect preliminary data indicating the probable formation of BDI-IIASM dimensions. This analysis was performed by extracting two factors (see Table 5). The resulting factor solution identified a first factor that explains a 40.42% variance. It is also defined mainly by the following items representing somatic, motivational and affective dimensions: changes in appetite, tiredness or fatigue, loss of interest, thoughts of suicide, crying, irritability, loss of energy, loss of sexual interest, indecisiveness, worthlessness, difficulty concentrating and feelings of punishment.

The second factor explains 8.26% of variance defined by the following items, which represent symptoms essentially cognitive. Such factor represents the cognitive dimension and is configured by items of failure, loss of pleasure, dissatisfaction, self-criticism, sadness, agitation, changes in sleep patterns, pessimism and feelings of guilt.

Both factors - the Somatic-motivational and cognitive ones- explain 48.69% of variance, with a Pearson correlation of .54, by supporting the idea that BDI-IIASM measures a general depression.
dimension made of these two symptomatic dimensions, as BDI-II does.

<table>
<thead>
<tr>
<th>Table 5. Means, Standard Deviation, Correlation corrected inter-item BDI-IASM</th>
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</thead>
<tbody>
<tr>
<td>Items BDI-IASM</td>
</tr>
<tr>
<td>1. Sadness?</td>
</tr>
<tr>
<td>2. Guilt?</td>
</tr>
<tr>
<td>3. ?Failure?</td>
</tr>
<tr>
<td>4. Loss of pleasure?</td>
</tr>
<tr>
<td>5. Agitation?</td>
</tr>
<tr>
<td>6. Feelings of pessimism?</td>
</tr>
<tr>
<td>7. Disinterest in activities?</td>
</tr>
<tr>
<td>8. Self-criticism?</td>
</tr>
<tr>
<td>9. Guilt thoughts of suicide?</td>
</tr>
<tr>
<td>10. Agitation?</td>
</tr>
<tr>
<td>11. Loss of interest?</td>
</tr>
<tr>
<td>12. Loss of interest?</td>
</tr>
<tr>
<td>13. Indecision?</td>
</tr>
<tr>
<td>14. Agitation?</td>
</tr>
<tr>
<td>15. Loss of energy?</td>
</tr>
<tr>
<td>16. Changes in your sleep pattern?</td>
</tr>
<tr>
<td>17. Irritability?</td>
</tr>
<tr>
<td>18. Changes in appetite?</td>
</tr>
<tr>
<td>19. Difficulty concentrating?</td>
</tr>
<tr>
<td>20. Loss of energy?</td>
</tr>
<tr>
<td>21. Loss of interest?</td>
</tr>
</tbody>
</table>

Note: Bold items appear with greater frequency and intensity, in italics the lowest weight.

Discussion

Deaf people seem to explain further depression condition with variables such as behavioral changes in appetite, tiredness or fatigue, loss of interest, suicidal thoughts, crying, irritability, loss of energy, loss of sexual interest, among others. This indicates that there is more chance of finding this type of symptoms in a depressed deaf person, than other kind of them (such as guilt and pessimism feelings).

The higher incidence of depression in the Deaf population, and their confirmed symptomatological profile should guide us, in the first place, to design valid and reliable methods of psychological assessment. It requires us to design an appropriate instrument that is linguistically compatible with this population’s characteristics.

On the other hand, more research is needed about BDI-II standardized cut-points for the Deaf population. Until now, all research published by this instrument on the Deaf population used the same cut-points as that used in measuring the general hearing population. This can even be a limitation of the present work; there is a need for factorial research to ensure that original cut-points proposed are in fact reliable to measure the intensity of symptoms depression in Deaf population. Moreover, there are no BDI-II published studies translated and videotaped into any sign language, which provide factorial data on a Deaf sample, so we cannot compare our data to know if original cut-points are also reliable to Deaf people. For this reason, our findings should take this into account.

Conclusions

The most significant difference between the results reported in the general population and those found in this study refers to the opposition in the nature of the factors, as it was also observed in the Spanish Deaf people sample. This is the most significant finding from our work, because only one previous study, made in Spain, reported similar results, and this study found similarities to a deaf sample from other country, thereby adding important information to the existing literature.

BDI-IASM seems to be a valid and reliable instrument for assessing Deaf depression in Mexico.

Through the analysis of data collected, we have found that depression in Deaf people shows a significantly higher level than the one reported by hearing population. When comparing the levels of depression found in this study with those reported...
in previous studies, it is verified these levels are significantly minor in hearing population $x^2(3) = 111.048$, $p = .000$. Furthermore, such difference indicates depression intensity is higher in Deaf people.

Careful examination of results from factorial analysis reveals the most important difference found up to now: the opposition in factors’ nature. While Factor 1 (which explains most of the variance) corresponds to the cognitive-affective dimension, and Factor 2, to the somatic-motivational dimension in hearing population, in the Deaf population the order is reversed, meaning, somatic-motivational factor has the highest percentage of explained variance.

Moreover, we recognise the need to design and develop appropriate cultural intervention methods$^{8,22,23}$. It includes taking into account patient's competence in the language (either sign or oral language) and cognitive areas, level of family communication, sense of belonging to a particular group and therapeutic alternatives according to the patient somatic-motivational profile.

Research in the area of mental health assessment is a challenge we must continue in order to meet the ethical commitment of providing an objective, valid and reliable method of evaluation so that research in the field of depression assessment of Deaf people may continue.

**Future directions:**

The use of BDI-II is now being focused towards achieving specific cut-points for this population, which certainly requires a coordinated effort by several researchers to obtain a large enough sample to obtain valid and reliable results.

**References:**


