Psychometric properties of the Mexican version of the opening minds stigma scale for health care providers (OMS-HC) (#85385)

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Psychometric properties of the Mexican version of the opening minds stigma scale for health care providers (OMS-HC)

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Background Health care providers are one of the main groups that stigmatize individuals with mental health problems. Apathy, accusation, fatalism, and morbid curiosity are the most common forms of stigmatization encountered, which are associated with inadequate treatment, reduced treatment adherence, decreased help-seeking behavior, an increased risk of relapse, and complications with other medical conditions. The aim of this study was to examine the psychometric properties of an adapted Spanish version of the Opening Minds Stigma Scale (OMS-HC) among healthcare providers in Mexico and identify certain stigmatizing attitudes within this group.

Methods An ex-post facto cross-sectional observational study was conducted with 556 health care providers in Mexico with an average age of 29.7 years, mostly women (80.4%). Validity was examined through confirmatory factor analysis. Differences between gender, discipline, occupation, and educational attainment were analyzed using multivariate methods.

Results The factor structure of the OMS-HC, consisting of three subscales identified by the original authors of the instrument (attitudes of healthcare providers towards people with mental illness, secrecy/help-seeking, and social distance), was confirmed. The model demonstrated good fit (x^2/df = 2.36, RMSEA = .050, CFI = .970, TLI = .962, SRMR = .054, NFI = 0.95, PNFI = 0.742) and adequate internal consistency (α = .73). Significant differences were found by discipline, educational attainment, and current academic semester. Higher scores were observed on the OMS-HC scale among nursing and medical professionals, undergraduate students, and those in early semesters.

Conclusions. The Spanish version of the OMS-HC is a valid and reliable tool for evaluating stigma, enabling further research on the issue in Mexico and Latin America.

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Abstract

Background

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Conclusions. The Spanish version of the OMS-HC is a valid and reliable tool for evaluating stigma, enabling further research on the issue in Mexico and Latin America.

Introduction

Mental health disorders and substance abuse are currently one of the leading causes of disability worldwide, accounting for 13% of the global disease burden (*WHO, 2021*). In the case of Mexico, they represent 16% of all disability-adjusted life years (DALYs) and 33.5% of all years lived with disability (YLDs) (*PAHO, 2018*). The stigma associated with mental health disorders impedes timely and effective care for individuals. This issue is particularly relevant in low- and middle-income countries where limited research and attention may exacerbate the problem more than in high-income countries (*Wainberg et al., 2017*).

Stigma is defined as the co-occurrence of labeling, stereotyping, separation, loss of status, and discrimination in a situation where power is exercised (*Link B & Phelan, 2001*). In addition to coping with their condition, those with mental health disorders are forced to deal with misinformation on the part of society, and being the object of prejudice and rejection, which affects their well-being and quality of life (*Martínez & Hishaw, 2016*).

59   Stigmatizing attitudes toward individuals with mental health disorders have been
60 identified in health care providers in various disciplines and health care services, including
61 specialized ones. These attitudes take on various forms, such as mockery, indifference, blame,
62 fatalism, and morbid curiosity. Unfortunately, these negative attitudes can lead to poor care,
63 treatment non-adherence, increased risk of relapse, and other medical complications (*Livingston*
64 *& Boyd, 2010; Dubreucq, Plasse & Franck, 2021*).

65   In recent decades, there has been a growing interest in reducing stigma among health care
66 providers. This is due to the need to combat discriminatory practices and improve medical care
67 for people with mental health disorders (*Griffiths et al., 2014*). The scientific literature has
68 documented several stigmatizing attitudes in health care providers, which have been associated
69 with their age, educational attainment, and work experience (*Mora-Ríos, Ortega-Ortega &*
70 *Natera, 2016; Rivera-Segarra, Varas-Díaz & Santos-Figueroa, 2019*). Although some studies
71 have disagreed over these results (*Kopera et al., 2015; Carrara et al., 2019*) it has been found
72 that increased contact with people with mental health disorders can reduce stigmatizing attitudes
73 (*Griffiths et al., 2014; Stuber et al., 2014*). These findings suggest that technical knowledge and
74 skills alone may not be enough to achieve behavior change among healthcare providers (*Schulze,*
75 *2007*).

76   Therefore, it is crucial to have instruments for measuring stigmatization that are valid,
77 reliable, and adapted to the cultural characteristics of each region (*Yang et al., 2014*). However, a
78 systematic review has pointed out issues in stigma assessment, such as the high number of items
79 and a lack of validity in some cases (*Sastre-Rus et al., 2019*). Despite these challenges, it is
80 essential to continue developing and validating instruments to measure stigmatization in health
81 care providers, since they are essential for identifying and addressing stigmatizing attitudes and
82 practices, improving care quality, and fostering inclusion and respect toward those with mental
83 health disorders.

84   The Opening Minds Stigma Scale for Health Care Personnel (OMS-HC) was developed
85 to assess the attitudes of health care providers toward mental illness (*Kassam et al., 2012*).
86 Originally consisting of twenty items, it was adjusted to two-factors structure with twelve items.
87 However, further validation by *Modgill et al.* (*2014*) resulted in a three-factor version with
88 fifteen items. This version of the instrument has demonstrated adequate psychometric properties,
89 including good internal consistency both globally ($\alpha = 0.79$) and in the three subscales
90 comprising it: 1) attitudes of health care providers toward those with mental illness ($\alpha = 0.68$), 2)
91 secrecy/help-seeking ($\alpha = 0.67$) and 3) social distance ($\alpha = 0.69$). The OMS-HC scale has been
92 widely adopted in international research (*Papish et al., 2013; Sastre-Rus et al., 2019; Sapag et*
93 *al., 2019*) and used to evaluate interventions in various populations, professional settings, and
94 online educational programs (*Knaak, Ungar & Patten, 2015; Fernandez et al., 2016; Chang et*
95 *al., 2017*). To obtain a brief measurement tool for assessing stigma in health care providers, this
96 study aimed to provide a Spanish version of the OMS-HC scale for health care providers in
97 Mexico and to examine its factorial structure, internal consistency, and psychometric properties.
98 In addition, possible differences in stigma levels are explored through sociodemographic

99 variables such as age, gender, educational attainment, occupation, discipline, and the current
100 academic semester in which students are enrolled.
101
102

Materials & Methods

Study Design

105 An ex post facto, cross-sectional observational study was designed. The research team
106 established contact with four family medicine health clinics in Mexico City and three
107 universities, which expressed their interest in participating in the study. Subsequently, approval
108 was obtained from the participating institutions and dates were scheduled for administering the
109 questionnaires. The institutions provided the necessary facilities to carry out the instrument
110 application and allowed the voluntary invitation of individuals from the fields of medicine,
111 nursing, psychology, and social work.
112   Data collection was carried out in two stages. The first stage involved 143 participants
113 and was conducted in person between February and March 2020. The second stage, which
114 involved 462 participants, was conducted between September and December, during the
115 COVID-19 health emergency, and participants were invited to collaborate through an online
116 platform. Before answering the questionnaires, the participants were provided with an informed
117 consent.

Participants

119 Non-probabilistic convenience sampling was used. To determine the correct sample size, the
120 authors used the recommendation of *MacCallum et al.* (*1999*) to obtain a sample equal to or
121 greater than 500 participants to obtain stable estimates considering communalities, number of
122 factors, and items.
123   A total of 605 students and professionals in the health care field participated in the study,
124 all of whom met the inclusion criteria of being over 18 years of age, residing in Mexico City, and
125 working in the health care field as either a student or a professional. Table 1 displays the
126 sociodemographic characteristics of the participants. The analysis included only completed
127 questionnaires, resulting in an effective sample of 556 participants (92%). The mean age of the
128 participants was 29.7 years (SD = 9.45), with 80.4% of them being female and the remaining
129 19.6% being male. Most of the participants came from the disciplines of medicine (59%) and
130 nursing (20.3%), and 79.5% held a bachelor's degree. For those engaged in professional training,
131 the semester in which they were enrolled was considered ranging from the first semester of
132 undergraduate programs to graduate programs. In addition, it was observed that 23.4% were
133 pursuing a specialty.
134 [Table 1]

Instruments

136 To evaluate the attitudes of health care providers toward individuals with mental disorders, the
137 Spanish adaptation of the Opening Minds Scale for Health Care Providers (OMS-HC) was
138 utilized. The original OMS-HC, developed by *Kassam et al.* (*2012*) in English, has a factorial

139   structure consisting of two dimensions that account for 45% of the variance using twelve of the
140   twenty proposed items. These dimensions include attitudes of health care providers toward
141   mental illness ($\alpha = 0.75$) and attitudes of secrecy toward mental illness ($\alpha = 0.72$). The first
142   dimension contains seven items, while the second contains five. The scale has adequate levels of
143   global internal consistency ($\alpha = 0.82$) and an interclass correlation of 0.66 (95% CI [0.54, 0.75]).
144   For this study, the fifteen-item version of the scale was used, based on the factorial
145   validation proposed by *Modgill et al.* (*2014*), in which three dimensions were identified: 1)
146   attitudes of health care providers toward people with mental illness, 2) secrecy/help-seeking, and
147   3) social distance. The answer form includes a five-point Likert scale (completely agree, agree,
148   neither agree nor disagree, disagree, and completely disagree). Higher scores on the scale
149   indicate greater stigmatization. Items 2, 6, 7, 8, and 14 are reverse scored. A section on
150   sociodemographic data was included, comprising age, gender, educational attainment,
151   occupation, discipline, and the semester in which participants are enrolled (in the case of those
152   undergoing training).
153   **Procedure**
154   The authors have permission to use the OMS-HC instrument from the copyright holders, in this
155   case *Kassam et al.* (*2012*). The Spanish adaptation of the scale was developed using the rational
156   criteria method with direct translation, which involved a consensus among experts who analyze
157   the contents of the scale in the original language to ensure its correct translation (*Sousa &*
158   *Rojjanasrirat, 2011*). The expert panel comprised three researchers with experience in mental
159   health who evaluated the theoretical relevance, clarity of writing, and appropriate language for
160   the Mexican population. Additionally, a pilot test was conducted with fifteen medical students
161   who evaluated the clarity of the instructions and items using a dichotomous scale (clear or
162   ambiguous). The instrument underwent adaptation in five main phases until a culturally relevant
163   version was obtained for the study population (Fig 1). The Spanish adaptation can be found in
164   the supplementary information in this study (see File S1).
165   [Figure 1]
166   Figure 1. The adaptation process of the OMS-HC scale to the Spanish version.
167   Data collection for factor analysis was conducted in two stages. At first, participants
168   completed the questionnaires on the premises of the institutions involved, taking an average of
169   eight minutes to complete the questionnaire. In the second, corresponding to the period of the
170   pandemic, data were collected through an online platform.
171   **Ethical considerations**
172   The study was approved by the ethics committee of the National Autonomous University of
173   Mexico, registration number Ext/01/2019. The study adhered to the ethical criteria established in
174   the international ethical guidelines for biomedical research in humans (*CIOMS, 2016*). The study
175   entailed minimal risk and participation was voluntary. The informed consent form included an
176   explanation of the objectives of the study, while ensuring confidentiality, privacy, and other
177   ethical guarantees for the participants.
178   **Data Analysis**

179 Descriptive statistics were used to analyze sociodemographic data. A confirmatory factor
180 analysis (CFA) was performed to evaluate the factorial structure of the instrument. Before the
181 CFA, the Kaiser-Meyer-Olkin (KMO) sampling adequacy index and Bartlett's assumption of
182 sphericity were calculated. A parallel analysis was conducted to corroborate the factorial
183 structure suggested by *Modgill et al.* (*2014*). The model was subsequently calculated using a
184 three-factor CFA using the weighted least squares estimator with adjusted mean and variance
185 (WLSMV) (*Li, 2016*).
186   Multiple indicators were employed to assess the model's fit (*Hu & Bentler, 1999;*
187 *Schermelleh-Engel, Moosbrugger & Müller, 2003*). The Chi-Square Ratio between the Degrees
188 of Freedom (x^2/df) was used to measure the discrepancy between the data and the hypothesized
189 model, with a result between one and three considered as a good fit (*Schermelleh-Engel,*
190 *Moosbrugger & Müller, 2003*). The Root Mean Square Error of Approximation (RMSEA) was
191 used as an index based on covariances; the model is acceptable if its value is less than 0.05 (*Hu*
192 *& Bentler, 1999*). The Comparative Fit Index (CFI) was used to contrast the loss produced by the
193 change from the proposed model to the null model, in which a value equal to or greater than 0.95
194 is deemed optimal (*Hu & Bentler, 1999*). The Tucker-Lewis Index (TLI) was used to indicate the
195 proportion of total information explained by the model, and a value equal to or greater than 0.95
196 was considered a good level of fit (*Schermelleh-Engel, Moosbrugger & Müller, 2003*). The
197 Normalized Fit Index (NFI) was utilized to indicate the proportion of variance and covariance
198 explained by the model compared to the null model, with values close to one being considered a
199 good level of fit. The Standardized Root Mean Square Residual (SRMR) was included, and a
200 value below 0.08 was considered a good fit (*Schermelleh-Engel, Moosbrugger & Müller, 2003*).
201 The Parsimony Normed Fit Index (PNFI) was used to evaluate the relationship between the
202 constructs and the theory, and a model was deemed to have a good fit if the value was greater
203 than 0.60, which improved the closer it was to one (*Mulaik et al., 1989*).
204   The overall internal consistency of the instrument and by subscale was obtained through
205 Cronbach's alpha coefficient (*Tavakol & Dennick, 2011*). The means of the OMS-HC were
206 calculated and compared with the sociodemographic data using Student's t-tests and ANOVA,
207 with Tukey's test utilized as a post-hoc analysis. Before analysis, data homogeneity was assessed
208 by Levene's test. Mann-Whitney and Kruskal-Wallis U tests were performed as nonparametric
209 analysis to confirm results. The relationship between quantitative variables was analyzed using
210 Spearman's Rho. All analyses were performed using R statistical software version 4.0.3 (*R Core*
211 *Team, 2016*) and G*Power software version 3.1.9.7 (*Erdfelder, Faul & Buchner, 1996*).
212
213

214 **Results**

215 For this analysis, a total of 556 participants who completed all items on the OMS-HC
216 questionnaire were included in the sample. The data showed a satisfactory sample adequacy
217 measure (KMO) of 0.782, as well as a significant Bartlett sphericity test with df = 105,

218 suggesting that the data was suitable for factor analysis. Further analysis, using parallel analysis,
219 identified the presence of three common factors.
220   To confirm the appropriateness of the three-factor model for this sample, confirmatory
221 factor analysis (CFA) was performed. The three-factor model demonstrated consistency with the
222 proposed theoretical model and showed good fit indicators. Specifically, the Chi-Square Ratio
223 between the Degrees of Freedom (193.765 / 82) was 2.36, the Root Mean Square Error of
224 Approximation (RMSEA) was 0.050, the Comparative Fit Index (CFI) was 0.970, the Tucker-
225 Lewis Index (TLI) was 0.962, the Normalized Fit Index (NFI) was 0.95, the Standardized Root
226 Mean Square Residual (SRMR) was 0.054, and the Parsimony Normed Fit Index (PNFI) was
227 0.742.
228   All of the standardized loads of the items were higher than the criterion of 0.3, indicating
229 that the items were well-represented by their respective factors. Additionally, the covariances by
230 factor indicated correlation among the three subscales. The final solution of the model is
231 presented in Figure 2.
232 [Figure 2]
233 Figure 2. Factorial solution of the OMS-HC.
234   Table 2 presents the results of the internal consistency analysis and item correlation of the
235 OMS-HC scale. Corrected correlation values between each item and the total questionnaire score
236 ranged from 0.23 to 0.57, with all items showing a corrected correlation above 0.2. Cronbach's
237 alpha values if each item was removed did not indicate significant changes in the global value of
238 the scale. The global internal consistency of the scale was adequate with an alpha value of 0.73.
239 Cronbach's alpha values per subscale were 0.61, 0.60, and 0.51 for health care providers'
240 attitudes toward people with mental illness, social distance, and secrecy/help-seeking
241 respectively.
242 [Table 2]
243   Table 3 describes the means and standard deviations of the three subscales and their
244 respective items. Both the total score of the OMS-HC (M = 30.80, SD = 6.77) and its
245 dimensions: secrecy/help-seeking (M = 9.33, SD = 2.75), attitudes toward mental illness (M =
246 11.60, SD = 3.28) and social distance (M = 9.86, SD = 3.05) have lower values than their
247 respective mean scores. The item "If I were under treatment for a mental illness, I would not
248 disclose this to any of my colleagues." obtained the highest average (M = 3.07, SD = 1.17),
249 while the item "I would be reluctant to seek help if I had a mental illness." obtained the lowest
250 average (M = 1.56, SD = 0.86).
251 [Table 3]
252   Table 4 presents the relationship between the sociodemographic variables and the total
253 score of the OMS-HC. The results indicate that gender and occupation did not display any
254 significant differences (p = 0.897 and p = 0.203, respectively), while discipline did, with a small
255 effect size (p < 0.01, f = 0.20). Specifically, the medicine and nursing groups had the highest
256 levels of stigma, and significant differences were observed between them (95% CI [-3.857, -
257 0.114], p-Tukey = 0.036), as well as between medicine and clinical psychology (95% CI [.421, -

258 4.913], p-Tukey = 0.012), nursing and clinical psychology (95% CI [2.055, 7.251], p-Tukey =
259 <0.001), and clinical psychology and other disciplines (95% CI [-7.380, -.796], p-Tukey =
260 0.008).
261   Regarding the educational attainment variable, significant differences were found
262 between groups with a small effect size (p = 0.018, f = 0.134), particularly between master's
263 degrees and technical education (95%CI [.597, 8.797], p-Tukey = 0.017), with the latter showing
264 the highest levels of stigmatization. When the sample was restricted to "students" and "both"
265 only (n = 332) and analyzed by current academic semester, the lowest levels of stigmatization
266 were observed among those who were most academically advanced. Significant differences were
267 found with a medium effect size (p = <0.001, d = 0.309), specifically between 1st-4th semester
268 students and graduate program (95%CI [0.035, 11.206], p-Tukey = 0.047), between 5th-6th
269 semester and 9th-10th semester students (95%CI [2.109, 10.473], p-Tukey = <0.001), between
270 5th-6th semester and social service students (95%CI [0.056, 7.739], p-Tukey = 0.044), and
271 between 5th-6th semester and graduate program (95%CI [2.825, 11.304], p-Tukey = <0.001), as
272 well as between specialties and graduate level students (95%CI [0.328, 7.902], p-Tukey =
273 0.023). Lastly, no correlation was found between the age variable and the OMS-HC score (rho =
274 0.072, p = 0.092).
275 [Table 4]
276
277

278 **Discussion**
279 The findings of this research indicate that the OMS-HC scale is a valid, reliable instrument for
280 assessing stigmatizing attitudes associated with mental illness in health care providers in Mexico.
281 The measures to assess the fit of the model were adequate (*Mulaik et al., 1989*; *Hu & Bentler,*
282 *1999; Schermelleh-Engel, Moosbrugger & Müller, 2003*) and the three subscales identified
283 correspond to the factorial structure proposed by *Modgill et al.* (*2014*). Additionally, the global
284 reliability of the scale (α = 0.73) was similar to that obtained in other adaptations. For example,
285 in Singapore α was found to be 0.75 (*Chang et al., 2017*), in Canada it was 0.77 (*van der Maas et*
286 *al., 2018*), in Chile it was 0.69 (*Sapag et al., 2019*), in Hungary it was also 0.73 (*Őri et al.,*
287 *2020*), and in Germany it was 0.74 (*Zuaboni et al., 2021*). The subscales presented an internal
288 consistency greater than 0.60 except for secrecy/help-seeking, which is consistent with previous
289 studies (*Chang et al., 2017; Sapag et al., 2019; Zuaboni et al., 2021*). *Tavakol et al.* (*2011*) have
290 noted that subscales with few items tend to have low Cronbach's alpha values, suggesting that
291 the secrecy/help-seeking subscale components might require a higher level of theoretical
292 development. The internal consistency evaluation showed that all items significantly contributed
293 to the scale. Moreover, it was observed that the elimination of any item does not produce an
294 increase in the global value of the scale.
295   The results of the administration of the OMS-HC by health care providers were
296 examined, with a general mean score of 30.80 (SD = 6.77) among the 556 participants in the
297 sample. Given that the minimum score of the scale is fifteen points and the maximum seventy-

298   five, the result is consistent with other international studies conducted in Singapore (M = 35.7,
299   SD = 6.4) (*Chang et al., 2017*), Canada (M = 30.38, SD = 6.72) (*van der Maas et al., 2018*), and
300   Chile (M = 34.55, SD = 7.02) (*Sapag et al., 2019*). However, while it is recommended to
301   develop locally adapted measurements that consider cultural aspects, providing evidence of the
302   validity of the OMS-HC in the Mexican population will allow for cross-regional comparative
303   studies (*Yang et al., 2007; Yang et al., 2014*). Overall, the findings suggest that stigmatizing
304   attitudes among health care providers in the sample are comparable to those in other settings.
305   Therefore, future research should explore the similarities and differences in these attitudes across
306   different cultures and sociodemographic factors to identify additional variables that could be
307   associated with stigma.
308   The comparison of the means of the OMS-HC with sociodemographic characteristics
309   found no significant relationships between stigmatization levels and age or gender variables.
310   This is consistent with previous research using the same scale (*Chang et al., 2017; Destrebecq et
311   al., 2017; Sapag et al., 2019*), suggesting that these variables alone do not seem to be related to
312   stigma. However, these variables may be related to other conditions such as education, personal
313   experience, and mental health literacy. No significant differences were found in this sample
314   regarding the relationship between stigma and occupation (student, professional, or both). This
315   finding would seem to reinforce the results of previous studies by *Kopera et al.* (*2015*) and
316   *Carrara et al.* (*2019*), suggesting that everyday contact does not necessarily modify negative
317   attitudes toward those with mental health disorders. Although professionals have more frequent
318   contact with these individuals than students, the quality of social interactions may be negatively
319   impacted by factors such as organizational culture, structural stigma, and work overload, as
320   suggested by *Henderson et al.* (*2014*) Therefore, it is essential to consider how these external
321   conditions may influence the stigma reduction process.
322   On the other hand, the results of this study indicate that the type of health discipline has a
323   certain effect on stigma levels. Specifically, nursing, and medical groups had higher
324   stigmatization scores than clinical psychology staff, which is consistent with other studies
325   (*Chang et al.,* 2017; *Sapag et al., 2019*). *Lauber et al.* (*2006*) suggest that professional
326   background may have a slight influence on perpetuating negative stereotypes, whereas *Cleary et
327   al.* (*2009*) note that differences in stigmatization levels may be due to variations in the role and
328   responsibilities of health care providers in treating individuals with mental health disorders, such
329   as familiarity with the recovery process, the importance of therapeutic risk, symptom
330   management, and the causes of mental illness.
331   An association was found between educational attainment and stigmatization. Although
332   the effect size is moderate, it was observed that the level of stigma decreases as educational
333   attainment increases. This trend was also observed in the student subsample, with stigma scores
334   being lower in later than early semesters, where a medium effect was observed. According to
335   *Evans-Lacko et al.* (*2010*), the presence of certain types of knowledge could contribute to the
336   reduction of stigmatization, especially those associated with symptom recognition and the

337 diversity of effective treatments. This could also be related to a higher level of experience and
338 quality of contact during clinical practice (*Henderson et al., 2014*).
339   The findings of the present study point to the need to create specially designed
340 interventions to reduce the stigmatization of mental illness by health care providers at various
341 levels of care. Attitudinal factors, particularly those related to social contact, are one of the main
342 components for the reduction of stigmatization in this group (*Stuber et al., 2014*). It is therefore
343 necessary to study its effects on and between different contexts.
344 **Limitations of the study**
345 First, it is important to note that convenience non-probability sampling was used, which limits
346 the generalization of the findings to other population groups. Therefore, it is essential to realize
347 criteria validity studies with other stigmatization scales, including scales of mental health literacy
348 and discrimination intentions. Secondly, stigma-related issues can generate biases due to social
349 desirability, which could have led to low scores on the OMS-HC. However, this limitation can be
350 mitigated by the self-report format in which the questionnaires were administered, in addition to
351 the confidentiality measures that allowed participants to respond anonymously. Thirdly, it should
352 be pointed out that certain contact-related variables, such as regular experience with mental
353 health patients or having had a mental health problem themselves or with a family member,
354 could be determinants for the development of certain stigmatizing attitudes. However, these
355 variables were not included in the study and could be considered in future research for a better
356 understanding of the stigma and discrimination phenomenon in this context.
357
358

359 ## Conclusions
360 The OMS-HC scale is a valid and reliable tool for measuring the stigmatization of mental illness
361 among healthcare providers. The Spanish adaptation of the OMS-HC scale will enable cross-
362 cultural and cross-disciplinary comparisons, as well as evaluate the effectiveness of interventions
363 designed to reduce stigmatizing attitudes. The findings of this study reveal the presence of
364 stigmatizing attitudes in the Mexican population. Therefore, targeted interventions in the
365 healthcare sector at different levels of care are necessary to address this issue. As health care
366 providers are often the first point of contact for individuals with mental health disorders, urgent
367 research on stigmatizing attitudes toward mental health among healthcare providers in Latin
368 America is needed.
369
370

371 ## Acknowledgements

376

377

Data Availability

379 The following information was supplied regarding data availability:

380 Data is available in the Supplementary Files.

381

382

Supplemental Information

384 S1 File. Opening Minds Stigma Scale for Health Care Providers (OMS-HC) Adapted Version in
385 Spanish. (PDF)

386 S2 File. Raw data.

387

388

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Figure 1

Figure 1. The adaptation process of the OMS-HC scale to the Spanish version.

```
                    ┌─────────────────────┐
                    │      OMS-HC          │
                    │  Original version    │
                    └─────────────────────┘
                              │
                              ▼
                    ┌─────────────────────┐
PHASE 1             │  Direct translation  │         Research team
                    │  English - Spanish   │
                    └─────────────────────┘
                              │
                              ▼
                                              Experts in health
                    ┌─────────────────────┐   and mental health
PHASE 2             │    Expert panel     │   w ith experience
                    │                     │   adapting
                    └─────────────────────┘   instruments
                              │
                              ▼
                    ┌─────────────────────┐
PHASE 3             │  Reverse translation │        Research team
                    │   and proofreading   │
                    └─────────────────────┘
                              │
                              ▼
                    ┌─────────────────────┐
PHASE 4             │     Pilot test      │        Medical students
                    │                     │             n=15
                    └─────────────────────┘
                              │
                              ▼
                    ┌─────────────────────┐
PHASE 5             │      Synthesis      │         Research team
                    │                     │
                    └─────────────────────┘
```
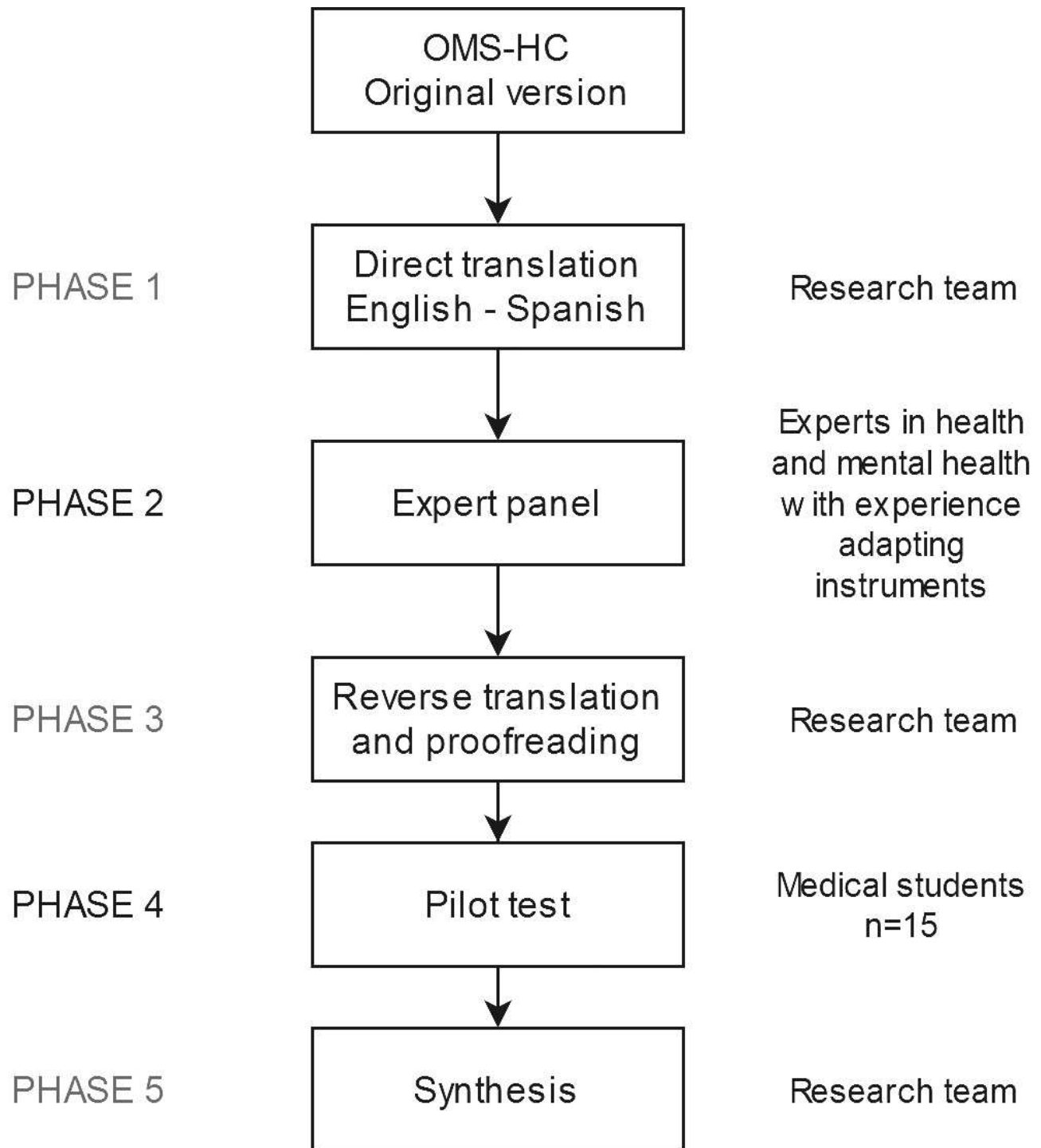
Figure 2

Figure 2. Factorial solution of the OMS-HC.

AT = Attitudes of health personnel toward people with mental illness; DH = Disclosure/help-seeking; SD = Social Distance. Item numbers refer to the version adapted by Modgil et al. (2014).
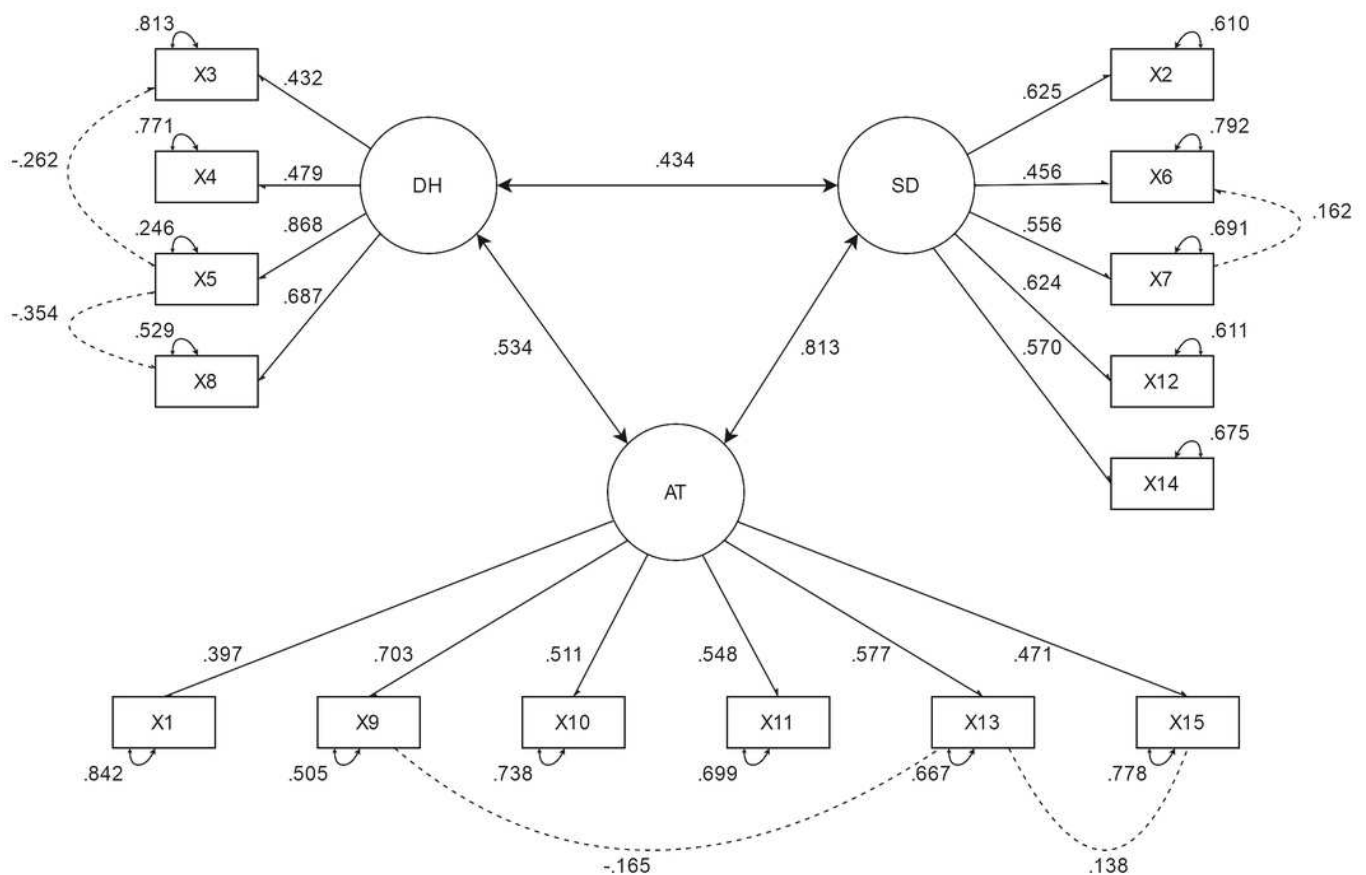
Table 1(on next page)

Table 1. Sociodemographic characteristics of sample.

1   **Table 1.** Sociodemographic characteristics of sample.

Characteristic	n = 556	%
Age		
(Years)	18–72	
(Mean)	29.7	
Gender		
Female	447	80.4
Male	109	19.6
Discipline		
Medicine	328	59
Nursing	113	20.3
Clinical psychology	71	12.8
Others	44	7.9
Educational attainment		
Technical education	23	4.1
Bachelor's degree	442	79.5
Master's degree	81	14.6
Doctoral degree	10	1.8
Occupation		
Student	246	44.2
Professional	224	40.3
Both	86	15.5
Current academic semester[a]		
1°-4° semester	17	5.1
5°-6° semester	44	13.2
7°-8° semester	58	17.4
9°-10° semester	40	12
Social service	57	17.1
Specialization	78	23.4
Graduate program	38	11.4

2   Note. [a]Only "student" and "both" categories were included (n = 332).

3

Table 2(on next page)

Table 2. Internal consistency analysis and item correlation of the OMS-HC scale.

PeerJ

1   **Table 2.** Internal consistency analysis and item correlation of the OMS-HC scale.

Item Number	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Item 1	0.35	0.72
Item 2i	0.41	0.72
Item 3	0.23	0.73
Item 4	0.34	0.72
Item 5	0.37	0.72
Item 6i	0.31	0.73
Item 7i	0.48	0.71
Item 8i	0.37	0.72
Item 9	0.57	0.70
Item 10	0.40	0.72
Item 11	0.43	0.72
Item 12	0.52	0.71
Item 13	0.43	0.72
Item 14i	0.35	0.72
Item 15	0.37	0.72

2   Notes. Item numbers refer to the version adapted by Modgil et al. (2014). "i" refers to items that
3   have been reverse coded for scoring.

Table 3(on next page)

Table 3. Means and standard deviations of the OMS-HC scale.

1   **Table 3.** Means and standard deviations of the OMS-HC scale.

Item	M	SD
Attitudes of health care providers toward people with mental illness	11.60	3.28
1. I am more comfortable helping a person who has a physical illness than I am helping a person who has a mental illness.	2.55	1.07
9. Despite my professional beliefs, I have negative reactions towards people who have mental illness.	1.87	0.91
10. There is little I can do to help people with mental illness.	1.83	0.99
11. More than half of people with mental illness don't try hard enough to get better.	1.86	0.88
13. Health care providers do not need to be advocates for people with mental illness.	1.73	0.89
15. I struggle to feel compassion for a person with a mental illness.	1.77	0.88
Disclosure/help-seeking	9.33	2.75
3. If I were under treatment for a mental illness, I would not disclose this to any of my colleagues.	3.07	1.17
4. I would see myself as weak if I had a mental illness and could not fix it myself.	2.54	1.25
5. I would be reluctant to seek help if I had a mental illness.	1.56	0.86
8i. If I had a mental illness, I would tell my friends.	2.16	1.01
Social Distance	9.86	3.05
2i. If a colleague with whom I work told me they had a managed mental illness, I would be as willing to work with him/her.	1.69	0.90
6i. Employers should hire a person with a managed mental illness if he/she is the best person for the job.	1.78	0.92
7i. I would still go to a physician if I knew that the physician had been treated for a mental illness.	2.13	0.98
12. I would not want a person with a mental illness, even if it were appropriately managed, to work with children.	2.34	1.06
14i. I would not mind if a person with a mental illness lived next door to me.	1.93	1.05
OMS-HC total	30.80	6.77

2   Notes. Item numbers refer to the version adapted by Modgil et al. (2014). "i" refers to items that
3   have been reverse coded for scoring. Text presented here is the original English text.
4   Participants answered the items in Spanish from the cross-culturally adapted version of the
5   scale.
6

Table 4(on next page)

Table 4. Sociodemographic variables and their relationship with the OMS-HC

1 **Table 4.** Sociodemographic variables and their relationship with the OMS-HC

Variables	M	SD	F	df	p-value	ES
Gender						
Female	30.81	6.91	2.678	1,554	0.897	0.014
Male	30.72	6.20				
Discipline						
Medicine	30.62	6.82	7.687	3,552	<0.01**	0.200
Nursing	32.61	6.64				
Clinical psychology	27.95	5.77				
Others	32.04	6.76				
Educational attainment						
Technical education	33.95	6.36	3.390	3,552	0.018*	0.134
Bachelor's degree	30.95	6.78				
Master's degree	29.25	6.63				
Doctoral degree	29.10	5.93				
Occupation						
Student	30.22	6.59	1.601	2,553	0.203	0.075
Professional	31.25	6.84				
Both	31.26	7.07				
Current academic semester[a]						
1°-4° semester	32.64	6.48	5.747	6,325	<0.001**	0.309
5°-6° semester	34.09	5.25				
7°-8° semester	30.68	6.51				
9°-10° semester	27.80	6.68				
Social service	30.19	6.10				
Specialization	31.14	7.43				
Graduate program	27.02	5.58				

2 Notes. [a]Only "student" and "both" categories were included (n = 332). *The correlation is
3 significant at the 0.05 level (bilateral). **The correlation is significant at the 0.01 level
4 (bilateral). Results were confirmed by the nonparametric Mann-Whitney and Kruskal-Wallis U
5 tests.