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A four-year experience with a Web-based self-help intervention for depressive symptoms in Mexico

María Asunción Lara,[1] *Marcela Tiburcio,*[1]
Araceli Aguilar Abrego,[1] *and Alejandro Sánchez-Solís*[1]

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ABSTRACT

Objective. *To describe a four-year descriptive, naturalistic study monitoring the use of* HDep *(*Help for Depression *or* Ayuda para depression *(*ADep*) in Spanish), an open-access/free Web-based, psycho-education, cognitive-behavioral intervention program produced in Mexico consisting of seven self-help modules that include feedback-generating assessments of depressive symptoms, vignettes, recorded messages, a relaxation exercise, a personal workbook, blogs, and user discussion forums.*

Methods. *Data were collected on all individuals who entered the HDep site since the program's launching in 2009. Those who entered the site two or more times and also registered as "users" or "participants." The user data consisted of 1) user profiles; 2) scores for the CES-D (Center for Epidemiological Studies Depression Scale), for users who completed the feedback-generating assessments of depressive symptoms; 3) user evaluations of the usefulness of* HDep*; and 4) transcripts of* HDep *discussion forum posts. The raw user data were obtained through Moodle (Modular Object-Oriented Dynamic Learning Environment, a free software e-learning platform) and analyzed quantitatively (using SPSS) and qualitatively (using ATLAS.ti).*

Results. *A total of 28 078 individuals accessed* HDep *and 17 318 of those (61.6%) qualified as users. Of all users, 84.4% were women, 64.6% used the workbook, and 60.9% entered the discussion forums (of whom 16.3% added a post). Depressive symptoms (CES-D score ≥ 16) were observed in 97.1% of the users who completed the feedback-generating assessment (*n *= 16 564). User retention dropped across the seven modules (from 12 366 users for Module 1 to 626 for Module 7). However, all seven modules were rated very high for "helpfulness/usefulness," with mean scores all above 4 on a 1–5 scale. The* HDep *discussion forums showed a rich social interaction. Predictors of entering at least one module (based on stepwise logistic regression analysis) included being a woman, being ≥ 30 years old, reporting disability, and having attempted suicide. Of the 72 participants who completed the final user evaluation of* HDep*, 97.5% said it had an enormous influence on helping them to identify and transform negative thoughts.*

Conclusions. *Despite the high attrition among users, and the need for further structure adaptation,* HDep *can be considered a potentially useful mental health tool in Mexico for 1) detecting depression (via the CES-D assessments) and 2) providing a means of social support to those with depression. The high levels of depressive symptoms detected among users suggest that the role of free-access, self-help, Web-based interventions in public mental health programs should be further investigated. The effectiveness of* HDep *in reducing depressive symptoms and providing a support system has yet to be assessed and should be examined in future research.*

Key words Depression; Internet; social support; cognitive therapy; Mexico.

[1] Instituto Nacional de Psiquiatría Ramón de la Fuente Muñiz, Mexico City, Mexico. Send correspondence to: María Asunción Lara, laracan@imp.edu.mx

As the Internet is increasingly incorporated into everyday routines, it can also become a valuable resource for public mental health. Even in developing countries such as Mexico, there is widespread use, with 37.6 million Internet users (40.6% of the population), 6.9 million households with Internet access (23.3%), and an unknown number of users connecting at Internet cafés (1). Web-based interventions have the potential to play an important role in narrowing the treatment gap for mental health problems. Due to their accessibility and lower cost, and users' ability to remain anonymous if desired (due to the stigma associated with mental health problems), Web-based interventions are an attractive alternative to traditional treatments (2). In addition, their potential for providing access to treatment for common mental health disorders such as depression is encouraging (2, 3).

Depression is one of the most common mental health disorders worldwide and is associated with enormous personal suffering and costs. Of the global population, between 3.3% and 21.4% suffer from a mood disorder (4). Lifetime prevalence of depression in Mexico is 5.4% in males and 10.4% in females (5). It is expected that by the year 2020 major depressive disorder will be the second-leading cause of morbidity worldwide (6, 7). At present, depression is the principal cause of disability-adjusted life years lost (DALYs) among Mexican women and the ninth-ranked cause for Mexican men (8). Although depression is treatable, only a small minority of those affected by the most severe form of this and other mental health conditions receive treatment. Across all countries worldwide the proportion of those affected by depression ranges from 6.0% to 52.1% (9), and in Mexico, only 19.6% of those with a mental health disorder, including depression, seek treatment (10).

Most Web-based interventions for depression are based on cognitive behavioral therapy (CBT) (11, 12). A meta-analysis of 13 Web-based CBT interventions for depression and anxiety symptoms reports a moderate overall mean effect size and significant heterogeneity, whereas treatment with some kind of additional support showed a larger mean effect size and no heterogeneity (2).

Although online interventions in Spanish developed in the United States for mental health problems have been well received among Spanish-speaking Latinos in the United States and in other populations (13, 14), in Latin America, there is as yet no published research on Web-based interventions designed in the region that consider populations with a wide range in educational and economic levels. *HDep* (*Help for Depression* or *Ayuda para depresión* (*ADep*) in Spanish) is an open-access/free Web-based, psycho-education, cognitive-behavioral intervention program produced in Mexico consisting of seven self-help modules that include feedback-generating assessments of depressive symptoms, vignettes, recorded messages, a relaxation exercise, a personal workbook, blogs, and user discussion forums. It is the first online intervention for depression in Mexico and, to best of the authors' knowledge, the first in Spanish. The aim of this descriptive, naturalistic study is to summarize a four-year experience monitoring the use of *HDep* through quantitative and qualitative analyses. The study explores the type of users reached by *HDep*, their use of the website's intervention for depression, whether they perceive it as useful, changes in any depressive symptoms they may have during their use of the program, and variables affecting user retention. The results of the study were used in the ongoing process of designing and adapting *HDep* to better meet user needs and were the basis for the second edition of *HDep*, which is already online (www.ayudaparadepresion.org.mx). These findings may be useful to other researchers in designing Web-based interventions in Latin America.

MATERIALS AND METHODS

Intervention

HDep was developed using the Moodle[2] platform, based on the results of a previous face-to-face intervention aimed at preventing depression in women (15, 16).[3] For the current study, data were collected on all individuals who visited the *HDep* site since the program's launching in 2009. Those who registered and entered the site two or more times qualified as "users" or "participants." The user data consisted of 1) user profiles; 2) scores for the CES-D (Center for Epidemiological Studies Depression Scale), for users who completed the feedback-generating assessments of depressive symptoms; 3) user evaluations of the usefulness of *HDep*; and 4) transcripts of *HDep* discussion forum posts. The raw user data for the study were obtained through Moodle and analyzed quantitatively (using SPSS) and qualitatively (using ATLAS.ti).

HDep website content includes seven modules that include assessments of depressive symptoms that provide feedback to users, vignettes, recorded messages, a relaxation exercise, a personal workbook, blogs, and discussion forums (Table 1). In the discussion forums, accessible at the end of each module, users can share their thoughts about what they have learned. Users are free to move through the modules at their own pace but are advised to 1) read the material in the initial modules, 2) take time to practice the ways of thinking and behaviors recommended within them, and 3) take at least eight weeks to complete the seven-module series. Users are not instructed to complete all of the modules.

The *HDep* homepage contains the terms and conditions of use of the website. Users are advised to utilize pseudonyms to protect their anonymity and are informed that user data will be used for research purposes but that confidentiality will be ensured by not disclosing names. By registering with the site, users accept these conditions and at the same time agree not to transfer any information obtained from *HDep* outside the site. The site is checked for proper functioning—particularly the discussion forums—at least twice per week.

Participants

The analysis of site usage was based on automatically recorded data on all visitors to *HDep* between March 2009 and April 2013 (n = 28 078).

[2] Modular Object-Oriented Dynamic Learning Environment (a free software e-learning platform). This program was selected to take advantage of its open-access and efficient resources for designing questionnaires, editing text, and incorporating images; creating databases transportable to other statistical programs for analysis (e.g., SPSS); and producing multiple products from the data collected, including blogs and forums, and thus avoiding the cost of having to build those elements from scratch.

[3] The initial study protocol, which assessed the effectiveness of the face-to-face intervention from which *HDep* was derived, was approved by the institutional review board of the Ramón de la Fuente Muñiz National Institute of Psychiatry in Mexico City.

TABLE 1. *HDep*[a] website content, March 2009–April 2013

Content component/module	Frequency per content component/module						
	Education segments and vignettes	Discussion forums and blogs	CES-D[b] assessment	Recorded relaxation exercise	Recorded messages[c]	Personal workbook entries	Quiz
"Welcome to *HDep*" (program introduction)					1		
Baseline assessment[d]			1				
Module 1. Depressive symptoms and risk factors for depression	5	+ 1			2	1	
Module 2. Negative thoughts affecting mood	12	+ 1			3	2	6
Module 3. Negative thought patterns learned from childhood CES-D	8	+ 1	1		3	4	2
Module 4. Everyday stressors and life events	10	+ 1		1	3	3	3
Module 5. The female role/stereotype and depression	13	+ 1			2	30	2
Module 6. Social support and pleasant activities	7	+ 1			2	3	2
Module 7. Violence, addictions, and depression[e]	12	+ 1			3	13	2
Final summary (*HDep* program)	1				1		
Final user evaluation[f] and CES-D assessment			1				

[a] *HDep* (*Help for Depression* or *Ayuda para depresión*), an open-access/free Web-based, self-help, psycho-education, cognitive-behavioral intervention program produced in Mexico using the open-access/free e-learning platform known as Moodle (Modular Object-Oriented Dynamic Learning Environment).
[b] Center for Epidemiological Studies Depression Scale. Three CES-D assessments were available for completion by users: 1) at baseline (user registration), 2) after completion of Module 3 (intermediate assessment), and 3) after completion of Module 7 (final assessment).
[c] "Welcome to *HDep*" (introduction to *HDep* program), module introduction, module summary, and final summary of *HDep* program.
[d] User questionnaire collecting demographic data (at user registration) and baseline CES-D assessment.
[e] Added by request from *HDep* sponsor, Fundación Gonzálo Río Arronte (Mexico City).
[f] User perceptions of the usefulness of *HDep*.

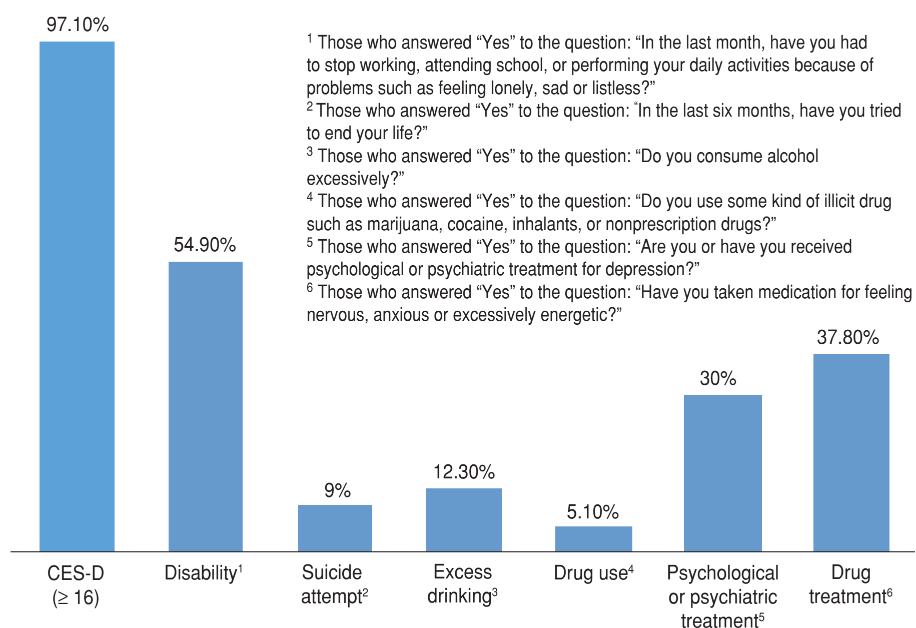
Measurements

The baseline *HDep* user questionnaire required for user registration collected demographic data, including sex, age, place of residence, marital status, educational attainment, and occupation. User depressive symptoms were measured at baseline and after users' completion of Module 3 (intermediate assessment) and Module 7 (final assessment), using the Center for Epidemiological Studies Depression Scale (CES-D) (17). The CES-D is a 20-item scale yielding a continuous score (0–60). The normal cutoff score for indication of depressive symptoms is ≥ 16. Other indications of mental health problems explored through purposively designed questionnaires were the presence or absence of: 1) disability; 2) suicide attempt; 3) excess drinking; 4) drug use; 5) previous psychological or psychiatric treatment for depression; and 6) drug treatment (Figure 1).

Site use was measured as 1) the number of self-reported activities completed in each module ("all," "half or more," or "less than one/none") and 2) the number of participants using the various tools (workbook, forums, and blogs), based on the Moodle data. User retention was measured as the proportion of people entering all modules of those who entered Module 1. Modules and activities were evaluated using brief scales measuring users' perception of their "helpfulness/usefulness" via their responses to three statements answered on a five-point Likert scale (1 = "not helpful/useful" to 5 = "very helpful/useful").

After completing all the modules, participants were asked to complete a final evaluation of *HDep*, based on their perceptions of its usefulness, which included two closed questions ("Did this

FIGURE 1. Proportion of *HDep* users[a] (*n* = 17 318) who completed the baseline CES-D[b] assessment (*n* = 16 564) and attained a score indicating depressive symptoms (97.10%) and their mental health characteristics, March 2009–April 2013



[a] Registered, repeat visitors to *HDep* (*Help for Depression* or *Ayuda para depresión*), an open-access/free Web-based, self-help, psycho-education, cognitive-behavioral intervention program produced in Mexico.
[b] Center for Epidemiological Studies Depression Scale (CES-D), a mental health assessment tool available on the *HDep* website.

intervention help you lift your mood?" (Yes/No), and "Did participating in this intervention have an influence on your current problems or the way you look at life?" (0 = "negative influence" to 5 = "enormous influence"), followed by seven open-ended questions: 1) "What influence did the intervention have on you?" 2) "What aspect of the intervention was most helpful?" 3) "What aspect of the intervention was least helpful?" 4) "What improvements would you make?" 5) "Will you continue using these techniques in your everyday life?" 6) "Which ones?" and 7) "Under what circumstances?"

As participation in the discussion forums yielded a rich source of information on the use of *HDep*, a content analysis of the transcripts of the forums was also carried out. Data were obtained from two periods: the first six months after the *HDep* launch (March–August 2009), and the last three months after the launch (February–April 2013). These two study periods yielded about the same number of user discussion forum posts. In preparation for the qualitative analyses, all discussion forum posts for the two selected study periods were compiled in a text file and analyzed according to the categories used by Salem et al. (18) to explore the type of interactions that take place in Web-based mutual-help groups for persons suffering from depression (e.g., emotional support, advice or information, disclosure, reflections, etc.). The categorization was carried out by two of the coauthors (AAA and AS) supervised by two other coauthors (MAL and MT). For the final sample, a research assistant confirmed the prevalence of the categories and sought new ones supervised by one of the coauthors (AAA), finding similar categories in this second sample. Prior to coding the entire text, 90% interrater reliability was attained by coding 15% of the posts. Because the contents of a single post sometimes included several topics, it was possible that some posts were classified in more than one category.

Procedure

Immediately after the launch of *HDep* in 2009, dissemination activities only included a few radio and television interviews. However, as of 2011, *HDep* was promoted on the Web, thanks to a grant from Google AdWords (www.google.com.mx/intl/es/grants/). Data on the number of visits to the site were retrieved from Google Analytics (www.google.com/analytics), and the activity of each participant within the site as well as his/her answers to the questionnaires were automatically recorded by Moodle, and then converted into a database.

Data analyses

The raw data generated by Moodle were organized in Excel databases for further analyses. Descriptive analyses were performed to obtain means and standard deviations. Two stepwise logistic regression analyses were conducted to assess predictors of user retention for Modules 1–3 only because retention was very low in the remaining modules. The independent variables included sex, age, marital status, occupation, suicide behavior (Yes/No), and psychological treatment (Yes/No). These analyses yielded maximum likelihood estimates for combined relative odds with 95% confidence intervals (CIs). Analyses were conducted using SPSS version 19 (IBM SPSS Statistics for Windows, IBM Corp., Armonk, NY, USA) and a qualitative analysis of forum content was carried out using ATLAS.ti version 6.2.16 (ATLAS.ti Scientific Software Development GmbH, Berlin, Germany).

RESULTS

Characteristics of *HDep* users

During the four-year study period, 28 078 individuals accessed the *HDep* online intervention but only 17 318 (61.6%) registered and entered the site two or more times, qualifying as "users" or "participants." The majority of all visitors to the site (83.2%) learned about *HDep* through searches on the Internet. Surprisingly—as *HDep* is designed for women—15.6% of registered users were male. In addition, 80% were 18–40 years old, most lived in Mexico City (95%), and the majority had medium or high educational attainment (64%) (Table 2).

Depressive symptoms (indicated by a CES-D score ≥ 16) were observed in 97.1% of users answering the scale (n = 16 564), among which 54.9% reported disability associated with depressive symptoms, 9% a suicide attempt, 12.3% excess drinking, and 5.1% consumption of illegal drugs. Almost one-third (30%) said they had received psychological or psychiatric treatment for depression, and 37.8% said they had taken medication for "nerves" or anxiety (Figure 1).

The percentages of *HDep* users who reported suicidal behavior and disability from depression and had also received treatment were further investigated. The analyses found that 34.2% and 42.4% respectively of those reporting disability had been given psychological/psychiatric treatment or taken medication because of an emotional condition, while 40.2% and 50.3% respectively of those reporting a suicide attempt in the previous six months had received psychological/psychiatric treatment or medication.

Very few participants completed the intermediate CES-D assessment (after Modules 1–3) or the final CES-D assessment (after Modules 4–7), precluding comparisons with the baseline CES-D assessments. Among those that did complete the follow-up CES-Ds, 79.2% (n = 592) (intermediate assessment) and 63% (n = 191) (final assessment) reported depressive symptoms.

TABLE 2. Characteristics of *HDep* users[a] (n = 17 318), March 2009–April 2013

Characteristic	No.	%
Sex		
Female	14 616	84.4
Male	2 702	15.6
Age (years)		
< 18	452	2.7
18–30	8 698	50.2
31–40	5 264	30.4
41–50	2 130	12.3
> 51	774	4.4
Country		
Mexico	16 447	95.0
Other	871	5.0
Marital status		
Single	10 995	63.5
Has partner	6 323	36.5
Education		
Primary school	154	0.9
High school	5 931	34.3
University	11 233	64.8
Occupation		
Student	3 538	20.4
Homemaker	2 372	13.7
Employed	10 535	60.9

[a] Registered, repeat visitors to *HDep* (*Help for Depression* or *Ayuda para depresión*), an open-access/free Web-based, self-help, psycho-education, cognitive-behavioral intervention program produced in Mexico.

HDep use

Overall, 16 564 of all users answered the initial CES-D assessment and participated twice or more in *HDep*. Table 3 (top row) shows the number of individuals who accessed each module, with numbers ranging from 12 366 for Module 1 (which addresses depressive symptoms and risk factors) to 626 for Module 7. Of those accessing Module 1, a small percentage (5.06%) completed all seven modules. Even fewer individuals completed the user evaluations of the modules (Table 3, second row). Completion rates for the module activities, reported in the user evaluations of each module, were between 29.5% and 65%. Modules 5 and 7 had lower completion rates (Table 3, rows 3–5). These lower rates are most likely due to the fact that Modules 5 and 7 address female roles/stereotypes and depression and violence, addictions, and depression, and are therefore not likely to be accessed by men. Rates of use for other components of *HDep* include the following: 64.6% used the workbook; 60.9% entered the discussion forums, and 16.3% added a post; and 66.8% contributed to the blogs. All modules were rated very high for "helpfulness/usefulness," with mean scores higher than 4 on a 1–5 scale (Table 3, rows 6–8). The lowest mean scores for that criterion were for Module 1, which is more educational; users described Module 1 content as not being much help in lifting their mood, and said the activities were less useful.

User retention predictors

The stepwise logistic regression analysis assessing the predictors for users accessing at least one module was significant (χ^2 = 48.93, degrees of freedom (df) = 4; P = 0.000) (Table 4). The predictors were 1) being a woman, 2) being over 30, 3) reporting disability, and 4) having attempted suicide. The stepwise logistic regression analysis for accessing at least two modules was also significant (χ^2 = 42.42, df = 4; P = 0.000). Predictive factors for that criterion included 1) being a woman, 2) being a homemaker, 3) being employed, and 4) reporting disability from mental illness. The same analysis for entering at least three modules was also significant (χ^2 = 14.31, df = 4; P= 0.006), and the predictors were 1) being a woman, 2) being a homemaker, and 3) being employed.

Discussion forums

Qualitative analysis showed that a copious, open exchange of experiences (using empathetic and positive statements rather than neutral/flat language) occurred in the discussion forums. No potentially harmful exchanges were detected. Of the 1 451 posts analyzed, the most frequent categories were: 1) reflections (60% of posts), defined as thoughts and deliberations based on personal experiences, the content of the intervention, or posts by others; 2) disclosure (45%), defined as descriptions of feelings, desires, and behaviors not often revealed to others; 3) advice or information provided by users (30%), defined as suggestions or guidance about possible courses of action, or information intended to be useful to others; and 4) emotional support (29%), defined as comments that nurtured, encouraged, supported, or approved of other members' comments.

Final user evaluation of *HDep*

The final user evaluation of *HDep* usefulness was completed by 72 women and 7 men, 94.9% of which thought that the intervention helped lift their mood. With regard to the influence of the intervention on their current problems or the way they looked at life, 97.5% said it had an enormous influence and 2.5% said it had some influence; no users said it had a negative influence. Ways in which the intervention provided the greatest benefit, according to users, included helping them to: 1) identify negative thoughts and transform them into a thinking pattern that was more realistic and favorable to decision-making and positive thinking; 2) understand the connection between childhood/adolescent experiences and their adult behavior and depression; 3) understand and analyze their feelings, particularly those related to depression; 4) learn how to ask for help; 5) find an environment in which they could freely express their feelings and achieve a better understanding of their problems; and 6) realize their need for professional help. Male users also cited the intervention's value in providing an opportunity to better understand women's perspectives.

According to users, least useful areas and those in need of improvement included the user-friendliness of *HDep* (e.g., some users said they did not know how to determine where they had left *HDep* during the previous session) and the lack of both personalized feedback and access to an online system administrator to answer questions. While one-third of the respondents said that Modules 5 and 7 were of little use to them,

TABLE 3. Number of *HDep* users[a] who accessed and evaluated various modules and completed some or all module activities, and mean scores (on 1–5 scale) for program helpfulness/usefulness, March 2009–April 2013

	Module 1	Module 2	Module 3	Module 4	Module 5	Module 6	Module 7
Accessed module	12 366	7 283	3 553	1 928	1 542	897	626
Evaluated module	6 872	1 111	274	204	61	72	57
Completed module activities (%)							
All	4 469 (65.1)	565 (50.9)	138 (50.4)	90 (44.1)	18 (29.5)	31 (43.1)	19 (33.3)
More than half	1 893 (27.5)	452 (40.6)	111 (40.5)	96 (47.1)	33 (54.1)	33 (45.8)	20 (35.1)
Less than half/none	510 (7.4)	94 (8.5)	25 (9.1)	18 (8.8)	10 (16.4)	8 (11.1)	18 (31.6)
Mean score for helpfulness/usefulness (SD[b])							
"It helped me know what to do to lift my mood"	3.73 (0.8)	4.3 (0.7)	4.4 (0.7)	4.4 (0.6)	4.5 (0.6)	4.6 (0.5)	4.5 (0.8)
"The information was useful"	4.14 (0.9)	4.5 (0.7)	4.6 (0.6)	4.5 (0.6)	4.5 (0.6)	4.5(0.6)	4.4 (0.9)
"The activities were useful"	3.94 (0.9)	4.3 (0.8)	4.4 (0.7)	4.4 (0.7)	4.4 (0.6)	4.5 (0.5)	4.4 (0.7)

[a] Registered, repeat visitors to *HDep* (*Help for Depression* or *Ayuda para depresión*), an open-access/free Web-based, self-help, psycho-education, cognitive-behavioral intervention program produced in Mexico.
[b] SD: standard deviation.

TABLE 4. Stepwise logistic regression analyses: predictors of retention among *HDep* users[a] who completed the baseline CES-D assessment (n = 16 564), March 2009–April 2013

Characteristic	Accessed at least one module		Accessed at least two modules		Accessed at least three modules	
	OR[b]	CI[c]	OR	CI	OR	CI
> 30 years old	1.08[d]	1.00–1.16	–[e]	–	–	–
Female	1.19[d]	1.07–1.30	1.28[d]	1.02–1.61	1.65[d]	1.02–2.66
Homemaker	–	–	1.80[d]	1.20–2.50	2.22[f]	1.20–4.55
Employed	–	–	1.14[d]	1.03–1.20	1.67[d]	1.13–2.15
Disability due to depression	1.15[d]	1.07–1.24	1.15[d]	1.07–1.24	–	–
Suicide attempt	1.10[d]	1.00–1.22	–	–	–	–

[a] Registered, repeat visitors to *HDep Help for Depression* or *Ayuda para depresión*), an open-access/free Web-based, self-help, psycho-education, cognitive-behavioral intervention program produced in Mexico.
[b] OR: odds ratio.
[c] CI: confidence interval.
[d] $P \geq 0.05$.
[e] ORs and CIs only provided for variables included in the regression equation.
[f] $P \geq 0.001$.

many respondents said that the current version of *HDep* was fine. The majority said that they would use the techniques learned from *HDep* in their everyday life, whether they felt depressed or not, and a quarter of them said they would use *HDep* techniques in combination with those learned from other resources.

DISCUSSION

The four-year study of *HDep*, an innovative, online free-access intervention designed for women, and to the best of the authors' knowledge the first one in Spanish, provided useful information on *HDep*'s strengths and weaknesses.

The relatively high number of visits to *HDep* (28 078) shows that Mexicans with depression do seek help/information for this problem on the Internet. However, more than one-third of the people accessing the site failed to register. Some hypotheses about why these visitors were not motivated to register and revisit the site include 1) the possibility that for some reason males were discouraged from continuing, and 2) technical difficulties upon user sign-in (which was frequently reported). These results highlight the need for 1) additional content for males and 2) a redesign of the homepage.

HDep's reach was mainly local, with most users living in Mexico. As expected, the majority were women, predominantly within the 18–50 age range and with high educational attainment (middle and higher). This outcome is consistent with previous evidence showing that people using Web-based interventions for depression are mostly highly educated women from their mid-20s to mid-40s (11, 19–21). Compared to these studies, *HDep* users were younger and more often single (22). Male participation in *HDep* (15.6%) highlights men's need for help for depression. The research team speculated that the anonymity of Web-based interventions might be attractive to male users because the male role often prevents face-to-face expression of feelings of sadness and helplessness (23).

HDep users reported high levels of psychopathology. Depressive symptoms (CES-D score ≥ 16) were reported by 97% of them, with half of those reporting associated disability, and 9% a suicide attempt in the previous six months. Many users with depressive symptoms also appeared to have substance abuse problems. A high level of depressive symptoms relative to population samples has also been observed in studies of other Web-based interventions for depression. For example, Christensen et al. (22) found that 90% of the participants in their intervention reported being highly depressed. About one-third of *HDep* users said they had sought some kind of mental health treatment (psychological/psychiatric). Likewise, Christensen et al. (22) found that 64% of their users had sought professional help at some time prior to participating in the online intervention. These findings raise the question of the extent to which an open-access/free Web-based intervention such as *HDep*, accessed by a population with high levels of depressive symptoms and other probable pathologies, can reduce these symptoms in a clinically significant way. Conversely, consistent with population studies (10), a high percentage of *HDep* users with this symptomatology were not receiving any type of professional help. Some authors have expressed concern about individuals eschewing face-to-face treatment in favor of the online environment (20), suggesting that further studies are required to determine the role played by Web-based interventions in the choices people make when seeking help. For those that did seek professional treatment, the question remains whether *HDep* can be a useful complement to professional treatment, particularly in primary care, where there is shortage of mental health professionals (24).

User retention decreased with every consecutive module (from 12 366 in Module 1 to 626 in Module 7). Possible factors associated with this low retention rate (5.6%) may be related to user gender, users not being instructed to complete all of the modules, and technical difficulties attributable to the *HDep* software platform. Attrition in Web-based interventions for depression has been considered a function of the length rather than the content of specific sections (19), meaning that this aspect of *HDep* must be revised. User attrition has been documented in several open-access, non-tracked, fully automated Web-based interventions (25). Certain features in these automated interventions—unfiltered users, anonymity, ease of enrollment, participation free of cost—make it easy to drop out (25).

In contrast with the low user retention rates, active participation was observed in users who stayed, reflected in the large proportion that used the workbook (64%) and wrote in the blogs (66.8%). In addition, user ratings of the helpfulness/usefulness of *HDep* were very high. Nevertheless, the small number of respondents and the likelihood that only those most satisfied with the intervention answered the questionnaire constitute a significant bias.

Predictors for accessing one, two, or three modules included being 1) a woman, 2) > 30 years old, 3) a homemaker, and 4) employed. Future research is needed to help determine why *HDep* is less appealing to younger people and what features encourage homemakers and employees to persevere. Reporting suicidal behavior predicted accessing one module while reporting disability

due to depression predicted accessing one or two modules.

Female gender and higher pretest depression scores have been found to be predictors of adherence in a CBT website for depression for adolescents (26). These results were interpreted in terms of motivation: those with higher symptoms regarded *HDep* as being more relevant or beneficial to them.

The transcripts of the *HDep* discussion forums showed a very rich social interaction. These forums were visited by a high proportion of users (60.9%), although only a few posted comments (16.3%). The question remains as to what fosters or inhibits participation in forums. The social interactions observed in the forums included sharing thoughts and personal experiences, disclosing feelings, giving advice and information, and offering mutual emotional support. In this respect, *HDep* forum interactions closely resemble those that take place in Internet support groups (20, 27). The potential benefit of this type of social communication is a reduction in feelings of loneliness and social isolation.

Of the small proportion of users that completed the final evaluation of *HDep*, most (94.5%) said that *HDep* helped lift their mood and had an enormous (97%) influence on their current problems and the way they looked at life. Specific benefits mentioned by users were *HDep*'s interactive features and the identification of their negative thoughts and ways to try to change them. This type of user feedback encourages the research team to continue their efforts to adapt *HDep* to improve user retention.

Conclusions

Overall, the study findings 1) show that *HDep* is a useful mental health tool for Mexicans and 2) indicate that changes should be made to the program's design, some of its content, and its length, which may be partly responsible for user attrition. While Moodle was not the most suitable platform for development of this intervention in terms of user friendliness, financial constraints prevented the use of other options. The second edition of *HDep* (*ADep* in Spanish) was built using open Web technology with greater capacity.[4]

While user retention was very low, the more frequent users to *HDep* said that they liked the content, found the activities helpful, and used the forums as a source of social support. The high level of symptoms of depression and other mental disorders among users (of whom about one-third were using other types of therapy) suggests that the role of Web-based interventions in providing guidance to those seeking help should be further investigated.

Web-based interventions have an enormous potential to reach people with unmet needs. The current study results suggest that *HDep* is a promising mental health tool that, if the above-mentioned weaknesses are addressed, has the potential to 1) serve as a useful tool for educating people about depression, and how to change negative thinking patterns, and 2) be a source of social support. *HDep* feedback to users also stresses the importance of seeking professional help when depressive symptoms are detected, which could increase the diagnosis of untreated depression.

Collecting and systematizing data from all users for an extended study period (four years) proved extremely effective in providing the information required to modify *HDep*. The next step will involve running a randomized controlled trial studying the efficacy and cost-effectiveness of *HDep* in reducing depressive symptoms to help provide evidence on whether or not the program can be used as a tool to help bridge the mental health treatment gap. A major contribution of the current study results is that, to the best of the authors' knowledge, this is the first analysis of the feasibility of using a Web-based intervention as a self-help tool for depression in Latin America.

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Conflicts of interest. None.

[4] The minimum Internet requirements for *HDep* are 2 megabytes on the server side and 1 megabit for the user Internet connection.

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RESUMEN

Experiencia de cuatro años en una intervención de autoayuda para síntomas depresivos basada en la internet y llevada a cabo en México

Objetivo. Presentar un estudio descriptivo y naturalista de cuatro años de duración que realizó un seguimiento del uso del programa de Ayuda para la Depresión (ADep), un programa gratuito de acceso abierto, basado en la internet, con finalidades de psicoeducación e intervención cognitivo-conductual, elaborado en México, y que se compone de siete módulos de autoayuda que incluyen evaluaciones de síntomas depresivos que brindan retroalimentación, viñetas, mensajes grabados, un ejercicio de relajación, un cuaderno de ejercicios personal, bitácoras y foros de discusión para los usuarios.
Métodos. Se recopilaron datos de todas las personas que se inscribieron y entraron en la página web de ADep dos o más veces desde la puesta en marcha del programa en el 2009, y se las calificó como "usuarios" o "participantes". Los datos de los usuarios consistieron en: 1) los perfiles de usuario; 2) las puntuaciones obtenidas en la Escala de Depresión del Centro de Estudios Epidemiológicos (CES-D) en el caso de los usuarios que cumplimentaron las evaluaciones de síntomas depresivos que brindan retroalimentación; 3) las evaluaciones de los usuarios sobre la utilidad del ADep; y 4) las transcripciones de las aportaciones al foro de discusión del ADep. Se obtuvieron los datos brutos de los usuarios mediante la plataforma gratuita de ciberapreindzaje Moodle y se analizaron cuantitativamente (mediante SPSS) y cualitativamente (mediante Atlas.ti).
Resultados. En total, 28 078 personas entraron en la página de ADep y de ellas 17 318 (61,6%) fueron calificadas como usuarios al inscribirse y entrar en el sitio dos o más veces. Del total de usuarios, 84,4% fueron mujeres, 64,6% utilizaron el cuaderno de ejercicios, y 60,9% entraron en los foros de discusión (de estos 16,3% hicieron algún comentario). Se observaron síntomas depresivos (puntuación de la CES-D ≥ 16) en 97,1% de los usuarios que cumplimentaron la evaluación que brinda retroalimentación (n = 16 564). La permanencia de los usuarios descendió a lo largo de los siete módulos (desde 12 366 usuarios del módulo 1 a 626 del módulo 7). Sin embargo, los siete módulos recibieron una puntuación alta en cuanto a "beneficio o utilidad", con puntuaciones medias en todos los casos superiores a 4 en una escala de 1 a 5. Los foros de discusión del ADep mostraron una rica interacción social. Los factores predictivos de que se entrara al menos en un módulo (con base en un análisis de regresión logística gradual) incluyeron el sexo femenino, la edad igual o superior a 30 años, la notificación de discapacidad y los antecedentes de intento de suicidio. De los 72 participantes que completaron la evaluación final de los usuarios del ADep, 97,5% indicaron que el programa había sido de gran ayuda para detectar y transformar los pensamientos negativos.
Conclusiones. A pesar del alto índice de abandono por parte de los usuarios, y la necesidad de nuevas adaptaciones estructurales, el ADep se puede considerar como una herramienta de salud mental potencialmente útil en México para detectar la depresión (mediante las evaluaciones de la CES-D) y proporcionar un medio de apoyo social a las personas con depresión. Los niveles altos de síntomas depresivos detectados en los usuarios indican que debe investigarse más la función de las intervenciones de acceso libre y autoayuda con base en la internet en los programas públicos de salud mental. La eficacia del ADep en la reducción de los síntomas depresivos y como sistema de apoyo aún no ha sido evaluada, por lo que se la debería analizar en futuras investigaciones.

Palabras clave Depresión; internet; apoyo social; terapia cognitiva; México.