Who comes to a self-help depression prevention website? Characteristics of Spanish- and English-speaking visitors

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A B S T R A C T

Objective: To describe demographic and clinical characteristics of Spanish- and English-speaking visitors to a "Healthy Mood" website.
Methods: An online study intended to prevent depression by teaching users mood management skills recruited participants globally using primarily Google Ads. Those who consented responded to the Patient Health Questionnaire (PHQ-9) and the MDE Screener (Muñoz, 1998) upon entry into the study.
Results: 1423 participants consented, 437 English speakers and 986 Spanish speakers. Of the 1271 participants with sufficient depression symptom data, 65% screened positive for a current major depressive episode, 30% were at high risk for onset of a major depressive episode, and 5% were in the low-risk category.
Conclusion: Websites intended to be preventive appear to attract primarily individuals who are currently experiencing enough symptoms to screen positive for a major depressive episode. Only 30% of participants were appropriate for a depression prevention intervention. Therefore, such sites must be ready to encourage those with current depression to obtain professional help as well as ensure that the online self-help interventions are appropriate for participants who could benefit from both preventive and treatment interventions.

1. Introduction

Major Depressive Disorder (MDD) is a common and debilitating mental illness (American Psychiatric Association, 2013). According to the World Health Organization (World Health Organization, 2018), 264 million people suffer from depression worldwide. In addition, those who experience subthreshold depression symptoms are at risk for developing major depressive episodes or persistent depressive disorder (Thapar et al., 2012).

Patients of general hospitals often exhibit a high prevalence of major depression (IsHak et al., 2017; Rentsch et al., 2007; Walker et al., 2018). Innovative methods to conduct depression screening followed by either treatment or prevention (for those at high risk) are of great relevance in that context. Once methods to treat and prevent depression have been found effective with local populations, efforts to disseminate such evidence-based interventions beyond the confines of the hospital are warranted. This article describes a line of depression research conducted

at a large urban General Hospital that culminated in an initiative to disseminate depression prevention interventions globally using the Internet, and the characteristics of participants such an intervention might attract.

1.1. Addressing depression in local primary care patients

This line of research began by testing whether new onset of major depressive episodes could be prevented in general hospital outpatients (Muñoz and Ying, 1993). Prevention interventions have as their goal reductions in incidence, that is, the number and proportion of new clinical episodes; they are considered successful if individuals at risk for a clinical episode do not cross the threshold into a clinical episode. Treatment interventions are intended to reduce the prevalence, that is, the number and proportion of current clinical episodes; these are successful if diagnosed individuals no longer meet criteria after treatment. Our goal was to determine whether teaching cognitive-behavioral mood

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A.

Google Ads Examples

English	Spanish
Improve your mood [Link to the site] Join an online study to help you manage your mood better	Curso online gratis [Link to the site] Le enseñará habilidades para un mejor estado de ánimo – UCSF
Manage Your Mood Better [Link to the site] Join free online U of Calif study to learn healthy mood skills.	Estudio online gratis [Link to the site] De la Universidad de California para mejorar su estado de ánimo
Relax and de-stress [Link to the site] Learn skills to cope with stress and life's challenges	Proyecto Animo Saludable [Link to the site] Estudio gratis, Univ. de California Para mejorar su ánimo online

B.

C.

Fig. 1. A. Example of Google Ads used in recruitment. B. Healthy Mood Course (HMC) structure and participant flow. C. English version of the Healthy Mood website home page.

management to patients who did not meet criteria for major depression would reduce incidence of major depressive episodes. The screening phase of the study showed that physicians only recognized as depressed 36% of patients identified as having a major depressive episode using a structured clinical interview (Pérez-Stable et al., 1990). This led us to a three-pronged approach: 1) provide screening tools so that primary care providers could identify patients experiencing major depressive episodes (Muñoz, 1998), 2) establish a bilingual (Spanish/English) depression clinic to which providers could refer patients already suffering from depression (Organista et al., 1994), and 3) continuing our depression prevention research program to design interventions that would forestall the onset of major depressive episodes. The interventions developed at both the clinic and in our ongoing depression prevention studies have been found to be effective in several contexts (Muñoz and Mendelson, 2005).

1.2. Disseminating evidence-based interventions beyond the hospital

The preponderance of evidence indicates that depression is preventable (Muñoz et al., 2010, 2012). However, programs to prevent depression are not available in most communities. Innovative depression prevention programs that can be widely distributed and freely available beyond the confines of a hospital or clinic are therefore needed (Wang et al., 2016). It is particularly important to provide such interventions to non-English-speaking communities. Our team has particular expertise in serving Spanish-speaking individuals, thus our interventions have been developed in Spanish and English.

Technology presents a promising avenue for disseminating depression prevention and treatment interventions (Clarke and Yarborough, 2013; Haberer et al., 2013). Cognitive Behavioral Therapy (CBT) is a treatment protocol shown to be successful in preventing and treating depression, including via the Internet (Buntrock et al., 2016; Christensen et al., 2016). Given the limited availability of providers skilled at delivering empirically supported interventions such as CBT in many parts of the world, including developed countries (Kohn et al., 2004), digital prevention and treatment programs may contribute to addressing this need (Muñoz et al., 2016). Such programs fit into a recently proposed framework that describes the continuum from face-to-face traditional interventions to fully automated digital interventions (Muñoz et al., 2018). This framework lists four types of interventions. The first two involve a therapist-patient therapeutic contract and ongoing contact. Type 1 interventions are administered solely by a human clinician. Type 2 interventions are administered by human clinicians with the help of digital adjuncts. The next two interventions are self-help interventions. Type 3 interventions involve digital interventions supported by human assistants to increase adherence. Type 4 interventions are fully automated evidence-based interventions. Though Type 3 interventions are generally more effective than Type 4 (Andersson and Cuijpers, 2009; Cuijpers et al., 2019), Type 4 interventions are non-consumable (they are not "spent" upon being used) and are therefore able to serve far greater numbers of users. Thus, they have the potential of reducing the total global depression burden to a greater extent than other types of interventions (Muñoz et al., 2018). Importantly, technology-based programs, even the Type 4 variety, can be flexible and adaptable to each user, making it possible to address individual concerns and characteristics (Andersson and Cuijpers, 2009). In order to develop and deliver better, more personalized, and ultimately more effective interventions, examining the characteristics of users of Type 4 interventions, such as Massive Open Online Interventions (Muñoz et al., 2016), is of high importance.

While prevention of depression can be very effective, recruitment for depression prevention studies presents substantial challenges. Individuals whose symptoms do not yet cause significant concern may have little reason to join such studies. Conversely, most of those whose symptoms are sufficiently debilitating to seek services may already be in the midst of an episode, and therefore ineligible for a prevention study.

Indeed, studies show that people are unlikely to use prevention services even if these are widely available and easily accessible (Cuijpers et al., 2010). Due to stigma related to mental health issues, many people are unwilling to take part in interventions that are for "depression." As we launched the current website, which we intended as a preventive intervention to teach mood management skills to forestall major depressive episodes, we decided not to use the words "depression prevention" in our recruitment materials. Instead, we labeled our website the "Healthy Mood Project" and described it as a study to learn skills to maintain a healthy mood.

The purpose of this report is to provide information on the demographic and clinical characteristics of visitors to "The Healthy Mood Project." The site was available to Spanish- and English-speaking adults anywhere in the world, regardless of depression status. Visitors were categorized into three groups based on responses to screeners for current and past depression symptoms: 1) "Current MDE": those screening positive for a current major depressive episode (MDE), 2) "High Risk": those having subthreshold symptoms for MDEs or a past history of MDEs, and 3) "Low Risk": those having low symptoms of depression and no history of MDEs.

2. Methods

2.1. Participants and recruitment

1423 individuals consented to take part in the Healthy Mood online study. To be eligible, participants had to understand written Spanish or English and be 18 years or older. Participants were recruited primarily via Google Ads (formerly Google AdWords), which are text ads appearing next to Google search engine search results. Other participants may have found the site via organic searches, and links from other sites, word of mouth, and other sources. Fig. 1A shows examples of Google Ads, in English and in Spanish.

2.2. Procedures

Individuals clicking on the link in the Google Ad or in another source landed on the homepage of the Healthy Mood website (Fig. 1C). There, a brief description of the study was presented, and participants were asked to answer several questions to establish their eligibility. Eligible participants were informed of their eligibility and directed to the informed consent document. Those ineligible were directed to other websites that offered information on depression. Upon reviewing the informed consent document, individuals signed it with their email address and a unique identifier (randomly generated for each participant) and proceeded to complete the baseline assessments. Most questions and questionnaires in the baseline assessment could be skipped if participants were uncomfortable answering certain questions. Those who completed (or skipped) baseline measures were offered feedback on their responses, and those who endorsed suicidal ideation were shown a separate message expressing concern and directed to contact in-person services if available or to contact online resources for suicide prevention (e.g., befrienders.org) if in-person resources were unavailable. At the end of baseline assessments, participants were directed to the Healthy Mood website (see Fig. 1B for participant flow). These procedures were approved by the Institutional Review Boards at the University of California, San Francisco and Palo Alto University.

2.3. Structure of intervention

The Healthy Mood Course was a fully automated self-help online intervention (Type 4, per above definition). Healthy Mood was based on cognitive-behavioral approaches for mood management strategies adapted from the Depression Prevention Course (DPC; Muñoz and Ying, 1993). The intervention consisted of eight lessons presented in five blocks: Introduction, two lessons on Activities and their impact on mood

Table 1

Descriptions of the sections/lessons of the Healthy Mood Course.

Section/lessons	Description
Introduction	Participants learned the structure of the course and what they could expect from it. Main ideas from the course were introduced, including the possibility that one's mood could be managed.
Activities	
Lesson 1	Participants learned about the connection between engaging in activities and their mood.
Lesson 2	Participants were encouraged to increase the number of and engagement in pleasant activities, and to use tracking tools to evaluate whether their mood would be positively affected by activities.
Thoughts	
Lesson 3	Participants learned about the connection between their thoughts and their mood.
Lesson 4	Participants were taught to dispute their harmful thoughts and to replace them with helpful thoughts; tracking tools were provided to test the effect of improving thoughts on mood.
People	
Lesson 5	Participants learned about the connection between social contacts and their mood.
Lesson 6	Participants were taught techniques to increase frequency and quality of social contacts and ways to ask for support; tracking tools were provided to test the effect of social contacts on mood.
Graduation	Participants were provided with a summary of the information they learned throughout the course, and with encouragement to use the techniques that they found helpful.

(behavioral aspects of CBT), two lessons on Thoughts and mood (cognitive aspects of CBT), two lessons on Social Interactions and their impact on mood, and "Graduation". The lessons had to be completed in sequence; the next lesson became available only once the previous one was completed. Once completed, participants were able to repeat the lessons as often as they wished, at any time. Table 1 summarizes the eight lessons of the web-based course. To maximize engagement, the intervention was designed to be customizable. For example, participants were given the choice of brief and full-length versions of each lesson. Lessons included video and audio, individualized activities, and interactive components such as mood and behavior tracking. At 1, 3, and 6 months after signing up for the intervention, participants received email invitations to complete follow-up surveys.

2.4. Measures

Demographics. Participants were asked to indicate their age, gender, ethnicity, race, income level, marital status, subjective social status (Adler et al., 2000), and other demographic characteristics.

Patient Health Questionnaire (PHQ-9). PHQ-9 is a widely used 9-item self-report questionnaire that can be used as a screening tool to identify the current presence of the nine major depressive episode symptoms as well as assess the severity of the symptoms (Kroenke et al., 2001). The correspondence of depression severity levels and PHQ-9 scores is as follows: minimal (0–4), mild (5–9), moderate (10–14), moderately severe (15–19), and severe (20–27) (Kroenke et al., 2001). PHQ-9 has excellent psychometric properties (Kroenke et al., 2001), and has been shown to be a valid measure of depressive symptoms in the general population (Martin et al., 2006).

The Major Depressive Episode Screener (MDE Screener) (Muñoz, 1998) is an 18-item self-report screener for current and past major depressive episodes. The measure is based on the Diagnostic Interview Schedule (DIS) (Robins et al., 1981). The MDE Screener assessed for each of the nine DSM-IV (Diagnostic and Statistical Manual, 4th Edition) (American Psychiatric Association, 1994) symptoms of a MDE during any two-week period aside from the immediate past two weeks. Participants screen positive for MDE when they endorse five or more symptoms, including sad mood or anhedonia, as well as indicate that the

Table 2

Demographic characteristics of the overall sample.

	English	Spanish	Total
	n= 437 (30.7)	*n*= 986 (69.3)	*N*= 1423
	n (%)	n (%)	*n* (%)
Age	35.53 (SD= 12.64)	34.24 (SD= 12.19)	34.64 (SD= 12.34)
Gender			
Male	134 (30.7)	366 (37.1)	500 (35.1)
Female	300 (68.6)	613 (62.2)	913 (64.2)
Other	3 (0.7)	7 (0.7)	10 (0.7)
Ethnicity			
Latinx	69 (15.8)	790 (80.1)	859 (60.4)
Non-Latinx	351 (80.3)	41 (4.2)	392 (27.5)
Missing	17 (3.9)	155 (15.7)	172 (12.1)
Race			
African-American	44 (10.1)	23 (2.3)	67 (4.7)
Native-American	9 (2.0)	3 (0.3)	12 (0.8)
East Asian-American	34 (7.8)	0 (0)	34 (2.4)
South Asian-American	27 (6.2)	2 (0.2)	29 (2.0)
European-American	239 (54.7)	139 (14.1)	378 (26.6)
Pacific Islander	7 (1.6)	1 (0.1)	8 (0.6)
Mestizo	17 (3.9)	485 (49.2)	502 (35.3)
Other	59 (13.5)	168 (17.0)	227 (16.0)
None of the above	1 (0.2)	165 (16.7)	166 (11.7)
Marital status			
Single	187 (42.8)	350 (35.5)	537 (37.7)
Married/cohabitating	179 (41.0)	373 (37.8)	552 (38.8)
Separated/divorced	52 (11.9)	116 (11.8)	168 (11.8)
Widowed	6 (1.4)	7 (0.7)	13 (0.9)
Missing	13 (2.9)	140 (14.2)	153 (10.8)
Income			
≤$5000	75 (17.1)	418 (42.4)	493 (34.6)
$5001–$20,000	118 (27.0)	204 (20.7)	322 (22.6)
$20,001–$50,000	86 (19.7)	46 (4.7)	132 (9.3)
$50,001–$100,000	89 (20.4)	16 (1.6)	105 (7.4)
>$100,000	35 (8.0)	14 (1.4)	49 (3.4)
Missing	34 (7.8)	288 (29.2)	322 (22.6)
SSS relative to community	5.44 (SD= 1.91)	5.90 (SD= 1.79)	5.76 (SD= 1.84)
SSS relative to country	5.53 (SD= 1.94)	5.52 (SD= 1.86)	5.52 (SD= 1.89)
Top 10 countries (of 86)			
Argentina	2 (0.5)	92 (9.3)	94
Chile	0 (0)	110 (11.2)	110
Colombia	2 (0.5)	141 (14.3)	143
Dominican Republic	0 (0)	68 (6.9)	68
Ecuador	1 (0.2)	48 (4.9)	49
Mexico	5 (1.1)	76 (7.7)	81
Peru	2 (0.5)	84 (8.52)	86
United Kingdom	36 (8.2)	0 (0)	36
United States	246 (56.3)	88 (8.9)	334
Venezuela	1 (0.2)	74 (7.5)	75
Other	142 (32.5)	205 (20.7)	350

Note. SSS = subjective social status (Adler et al., 2000).

symptoms "interfered with their life or activities a lot" during that two-week period. The MDE Screener has been found to be valid and reliable (Muñoz et al., 1999; Vázquez et al., 2008).

3. Results

3.1. Demographic and clinical profile of Healthy Mood Course users

Visitors from 231 countries and territories came to the site. Consented participants represented 86 countries (Table 2). The majority of participants came from Latin American countries (54.1%), with the second largest group coming from Western countries (26.6%).

Approximately 4% (*n*= 204) of people who provided their age (*N*=5133) were excluded due to being under 18 years of age. This suggests that at least some individuals younger than 18 are actively seeking online mood related resources, and the field should commit to

Table 3
Major Depressive Episode (MDE) risk levels by language and gender.

	English				Spanish				TOTAL
	Low risk	High risk	Current MDE	Total	low risk	High risk	Current MDE	Total	
MDE history available									
Men	7	23	74	104	21	70	103	194	298
With MDE Hx	–	*19*	*66*	*85*	–	*39*	*78*	*117*	*202*
Women	9	60	185	254	28	102	266	396	650
With MDE Hx	–	*35*	*160*	*195*	–	*63*	*222*	*285*	*480*
Other	0	1	1	2	0	1	3	4	6
With MDE Hx	–	*0*	*1*	*1*	–	*1*	*3*	*4*	*5*
MDE history not available									
Men	–	11	11	22	–	49	49	98	120
Women	–	9	33	42	–	58	94	152	194
Other	–	0	1	1	–	1	1	2	3
TOTAL	16	104	305	425	49	281	516	846	1271

Note. The numbers above represent counts of people classified into risk levels by language and gender identity. Major depressive episode history (i.e., MDE Hx) represents counts of people within each risk group who reported a previous MDE. By definition, individuals classified within the low-risk group could not have a previous MDE. Italicized rows are subsets of the row immediately above.

exploring avenues of providing such resources in an ethically sound manner.

A total of 1423 individuals were eligible to participate in the Healthy Mood study and consented. All consenting participants provided information about their gender identity and language, most completed the PHQ-9 ($n = 1416$) and the MDE Screener ($n = 955$) and provided information about their racial identity ($n = 1266$).

Sixty-four percent of all the individuals in our sample identified as female ($n = 913$) and almost 70% reported speaking Spanish as their primary language ($n = 986$). Of the entire sample, 43% were Spanish speaking females ($n = 613$), 26% – Spanish speaking males ($n = 366$), 21% – English speaking females ($n = 300$), and 9% – English speaking males ($n = 134$). Of participants who provided information about their racial identity, the largest group – 35% – identified as Mestizo ($n = 502$), followed by those identifying as European or White (27%, or $n = 378$), and by those identifying as other (16%, or $n = 227$).

Individuals who provided data on the PHQ-9 or the MDE screener ($n = 1271$) were classified into three categories based on current level of risk for a MDE (i.e., Low Risk, High Risk, and Current MDE). Those with PHQ-9 scores between 0 and 4 and with no history of MDE were classified as Low Risk; those with PHQ-9 scores between 0 and 4 but with a history of MDE were classified as High Risk. Those with PHQ-9 scores between 5 and 9 were classified as High Risk regardless of MDE history, and those with scores between 10 and 27 were classified as Current MDE regardless of MDE history. The Low-Risk group would be appropriate for promotion interventions rather than preventive or treatment interventions. The High-Risk group would be appropriate for preventive interventions. The Current MDE group would be appropriate for treatment interventions. Approximately two thirds ($n = 821$; 65%) were in the Current MDE category, 385 (30%) were in the High-Risk category, and 65 (5%) were in the Low-Risk category.

Table 3 presents the distribution of risk categories by gender and language. When individuals with unknown MDE history status were included in the risk classification ($n = 1271$), 305 of 425 (72%) English speakers screened positive for a current major depressive episode, 104 (24%) for high risk, and 16 (4%) for low risk. Similarly, 516 of 846 (61%) Spanish speakers screened positive for a current MDE, 281 (33%) for high risk, and 49 (6%) for low risk. For the subset of participants ($n = 954$) who provided at least the following data: information about language, gender identity, PHQ-9 scores, and previous MDE history, the results are as follows: Of the 360 English speakers, 260 (72%) screened positive for a current major depressive episode, 84 (23%) for high risk, and 16 (4%) for low risk. Of 594 Spanish speakers, 372 (63%) were classified into the current major depressive episode group, 173 (29%) as high risk, and 49 (8%) as low risk.

4. Discussion

The Healthy Mood Project was intended to recruit online participants at risk for major depressive episodes in order to teach them mood management skills to prevent onset of MDEs. We purposefully did not mention "depression" or "prevention" hoping to attract people who might otherwise avoid a "mental health" website. Nevertheless, though the primary intended audience for this website were individuals at risk for depression (rather than those currently in the midst of the episode), about two thirds of our participants did in fact screen positive for a current major depressive episode. This suggests that Type 4, fully automated mood management sites intended to provide preventive services should be ready to offer services to participants who are currently highly symptomatic, and who, if the intervention is effective, will transition from Current MDE to a lower symptom level. Thus, websites focused on mood management should consider testing for treatment effects on those who screen positive for Current MDE, for prevention effects on those who meet the high-risk profile, and for promotion effects on the small percentage that meet the low risk profile.

Whether preventive interventions will actually be used by those at high risk is an ongoing question for the field. Christensen et al. (2004) have reported that only 15% of participants in one of their online studies completed 2 or more modules. However, these investigators also noted that even if people do not complete all modules, they can still improve. Furthermore, administration of either a cognitive, an interpersonal, or a behavioral activation intervention has been found to be effective in reducing depression symptoms (Zeiss et al., 1979). This suggests that a modular intervention that includes all three of these approaches could be effective even if a user utilizes only one of them. Nevertheless, increasing completion rates is clearly a goal for intervention research, and should test elements intended to engage the user, such as gamification.

This study also reinforces the importance of providing websites in languages other than only English. Our Spanish-language version of the site served over two thirds of the participants. On one hand, the language ratio was caused in part by differences in cost between English-language and Spanish-language Google Ads: bidding for a higher position on a Google search is more expensive in English than in Spanish. On the other hand, one of the reasons that Google Ads are more expensive in English may be because there are many more mood-related resources in English, and the comparatively lower cost of Spanish-language ads reflect the relative dearth of mood management resources in Spanish on the Internet. In either case, our figures suggest that there is substantial interest among Spanish speakers throughout the Americas in accessing information related to mood management.

We encourage researchers to be more culturally inclusive when using measures reflecting ethnicity and race. In our sample, the largest self-identified ethno-racial group was Mestizo (35.8%, *n*=502); which are individuals who consider their ancestry to reflect both indigenous American heritage and European (usually Spanish) heritage. This suggests that the Mestizo designation is personally meaningful to a large proportion of Spanish speakers and should therefore be always included as an option in studies that recruit Latinx individuals.

Women outnumbered men approximately two to one in our sample, which is similar to the known prevalence of depression in the general population (Hasin et al., 2018). Although not all studies find differences in utilization rates for mental health services by gender (Gagné et al., 2014), there is some evidence that women may use mental health services at higher rates than men. For example, Rhodes et al. (2002) report that the odds of women using outpatient mental health treatment were some 70% higher than that of men. Wells et al. (1985) report that women were twice as likely as men to use prescription medication. If that is the case, and online interventions are more likely to be used by both genders at rates that are reflective of the population rates, these might contribute to improving gender equity in utilization of evidence-based interventions.

5. Conclusion

We have long advocated that treatment is not enough, and that we must also prevent major depression (Le et al., 2003; Muñoz et al., 2007). Thus, we were gratified that the U.S. Preventive Services Task Force (US Preventive Services Task Force et al., 2019) recently recommended "that clinicians provide or refer pregnant and postpartum persons who are at increased risk of perinatal depression to counseling interventions" (p. 580). We believe that preventive services should also be made available to other populations at risk for depression.

According to the World Health Organization (World Health Organization, 2018), depression is the leading cause of disability in the world. Thinking globally, then, depression interventions accessible to all should be a major goal. Acting locally, developing methods to identify people at risk, prevent, and, if necessary, treat depression in the context of general hospitals should be a major priority. Once evidence-based prevention and treatment interventions have been developed locally, we should use the technological tools now available to share them globally.

Declaration of competing interest

None.

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