Comparison of Web-based vs. Non-web-based Approach in Measuring the Degree of Depression in Korea

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Summary
The continuously increasing rate of depression is directly proportional to the increasing research interest on this topic. At present, studies show that many computer-assisted intervention programs for depression are proven to be as effective as face-to-face therapies. This study aims: (1) to describe both web-based and non-web-based approach in measuring the degree of depression; (2) to compare the degree of depression between a web-based analysis and a field survey study approach; and (3) to compare the degree of depression according to their general characteristics. This system can be found useful in Korea where stigmatism for those who seek mental health treatment continues to exist. For this reason, in the past years, the primary investigator has conducted several studies on depression using both web-based and non-web-based approaches. Findings from this study highlights a comparative basis between web-based and non-web-based study on depression and offer an innovative intervention strategy against depression.

Key words:
computer-assisted instruction, depression, information systems, Internet, mental health

1. Introduction

The prevalence of depression all over the world is continuously increasing as it ranked as the second leading cause of death following ischemic heart disease in 2002 and it also accounted for more than ten percent of all global disabilities [1]. Worldwide, the mortality rate of depression-related suicides is higher than the combined death rates of AIDS, lung diseases, and traffic accidents [2,3]. This happens due to lack of early and proper diagnosis for depression sufferers. Depressed people often do not seek professional help in fear of society's negative view towards people with psychiatric illnesses. Same goes for Korea, where the incidence of depression has increased from 0.02% in 1962 up to 47% of the Korean population as reported in 2002 [4].

Depression is commonly treated by medications, psychosocial interventions and different psychotherapies; however, most psychotherapies are limited in number and the social stigma against mental illness still continues to exist. As a result, only 10-25% of Korean depression sufferers seeks and receives professional care [5].

Therefore, effective intervention techniques and a more efficient scheme of delivering these interventions are necessary. To answer these demands, a web-based home health care system could be the key. As today's information technology puts the Internet to be a highly effective tool in the field of health care information and intervention delivery. Moreover, several studies show a number of advantages that web-based programs provide to prevent and treat depression [6,7]. Reference [8] presents an increasing number of searches in the web using the phrase "web-based intervention" over a 7-year period (1996-2002).

In the same light, the functionality of web-based systems can be of great use in Korea where Internet usage in homes is widespread [6]. With this in mind, the primary investigator, together with her colleagues, conducted a descriptive study through field survey in 2003 regarding the incidence of depression in South Korea. A year later, they developed a web site (http:// www.baejy.com/smile) designed to measure the degree of depression and help manage and prevent depressive symptoms.

The purposes of this paper were: (1) to describe both the web-based and the non-web-based approach in measuring the degree of depression; (2) to compare the degree of depression between a web-based analysis and field survey study approach; and (3) to compare the degree of depression of web site users and non-web-based (field survey) participants according to their general characteristics.

The rest of this paper is organized as follows. In section 2, the developed website (design, functions, and content) is briefly described. Section 3 depicts the methods used in both web-based and non-web-based (field survey) approaches. Section 4 compares depression scores between web-based and non-web-based study findings. Finally, conclusions are drawn in section 5.

2. Brief Overview: Web site for depression

2.1 Design and Functions

The design of the site was based on a user-centered model guideline [9]. The site functions: 1) as an alternative depressive symptoms management program using evidence

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based interventions that they could access anytime, anywhere, through the web; 2) as a primary gauge to assess users' depression and link them to appropriate institutions that could help them; and 3) as a tool to promote mental health and decrease the incidence of depression.

2.2 Content Analysis and Evaluation

After an in depth deliberation with the development team, the program was finally furnished and openly housed in http:// www.baejy.com/smile for public use in 2004. The website includes the following pages: home or introduction, useful knowledge and information about depression, assessment and diagnosis, management of depressive symptoms, intervention for improving mental health, self-help groups, and counseling and resources section. Specific intervention programs include exercise, relaxation, deep breathing, visualization, music therapy, bibliotherapy, and family therapy. The contents were pilot tested for its effectiveness in decreasing depressive symptoms of a small sample size and the results were positive.

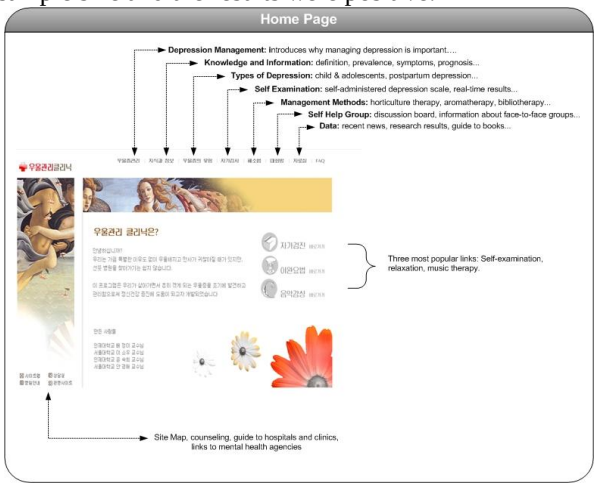

Fig. 1 Homepage.

3. Methodology

3.1 Field Approach

We conducted a descriptive study surveying 1,715 participants coming from major provinces in Korea [10]. We used the Korean Depression Scale to assess depression. It is a self-report 4-point Likert scale ranging from 40-160 and consists of 40 items where 4=always, 3=sometimes, 2=rarely, and 1=not at all. The higher the score means the more depressed [10]. Internal consistency coefficient Cronbach's alpha was 0.9538.

Data through visit surveys was gathered from April to December 2003. During this time, there was no IRB yet in Korea and researches were not required to get ethical approval then. Instead, we solicited informed consent where the purpose of the project and the right to not participate was clearly explained to each subject and all their inquiries were addressed. Among the total sample population, 908 were collected during the first phase and analyzed for testing the reliability and validity of KDS and the findings have been published [10]. We used SPSS 12.0 to analyze the data. Socio-demographic characteristics were described by frequency and percentiles, comparisons of degree of depression were done using t-tests or ANOVA, and Cronbach's alpha was calculated for internal consistency reliability.

3.2 Web-based Approach

After a year since the field survey study was conducted, the website was released for public use with the URL: http://www.baejy.com/smile. Being an open site, anyone interested in depression assessment or management could gain access via Internet. For ethical reasons, a dialogue box was made to appear before the home page, explaining the research and asking permission for the users to participate by clicking either, 'I agree' or 'I disagree.' A feedback system was also incorporated and inquiries were answered via email or phone. There was no log-in system required because web site users' IP addresses were used to monitor all those who accessed the site. This kept the subjects' identity confidential as their IP together with all the information they render the site is kept safe in a highly secured database. From 2004 to 2008, there were 166,805 users who participated in this study and completed answering both demographic and depression assessment questions. The web-based program automatically calculated the degree of depression as well as the demographic information of web users in real-time while still using the same instrument, KDS, and SPSS 14.0 for data analysis.

Table 1: Comparison of Depression Scores

Approach	Total N	Mean(SD)	F/t	p
Web-based	166,805	106.87(24.19)	36.67	.000*
Non-Web-based	1715	101.20(20.08)		

4. Results

4.1 Comparison of Depression Scores:

As shown in Table 1, 166, 805 web visitors had a total

mean depression score of 106.87±24.19 and non-web-based approach with 1,715 participants had a slightly lower mean depression score of 101.20±20.08. These close results suggested that web-based approach was as effective as non-web-based method in measuring depression scores of the Korean population. In addition, the participants in the web-based approach were found to be more depressed than those in the non-web-based approach.

4.2 Depression According to General Characteristics

Table 2 showed the general characteristics of both web-site user and non-web user in relation to their depression.

Table 2: Comparison of Depression Scores According to General Characteristics

Characteristics		Frequency (%)		Mean(SD)		F/t		p	
		WB	N-WB	WB	N-WB	WB	N-WB	WB	N-WB
Sex	Men	48227(28.9)	593(34.6)	100.68(26.13)	76.64(17.58)	1021.47	9.65	.000**	.002**
	Women	118578(71.1)	1,122(65.4)	109.39(22.89)	82.76(15.54)				
Age	20~29	126881(76.1)	392(22.9)	107.40(24.79)	83.48(16.99)	90.73	5.36	.000**	.000**
	30~39	29290(17.6)	574(33.5)	105.45(21.56)	76.50(17.02)				
	40~49	7749(4.6)	379(22.1)	104.18(22.43)	81.12(15.99)				
	50~59	2885(1.7)	370(21.6)	105.29(26.22)	82.35(15.18)				
Educational Attainment	Elementary	11234(6.7)	54(3.1)	109.17(31.94)	90.83(20.14)	931.81	8.50	.000**	.000**
	Middle	13199(7.9)	83 (4.8)	113.07(25.24)	81.46(15.06)				
	school	40480(24.3)	259(15.1)	110.24(22.87)	82.70(16.06)				
	High school	101892(61.1)	1293(75.3)	104.48(23.23)	79.87(15.83)				
Religion	Catholic	16759(10.0%)	199(11.5%)	106.13(23.91)	78.35(17.74)	35.97	2.30	.000**	.057
	Christian	42700(25.6%)	474(27.6%)	106.06(25.28)	81.51(16.57)				
	Buddhism	24206(14.5%)	517(30.1%)	106.88(24.31)	79.56(15.95)				
	None	83140(49.8%)	519(30.3%)	107.44(23.63)	77.91(16.50)				
Marital status	Married	39739(23.8)	871(50.8)	105.79(23.59)	81.18(15.28)	182.19	2.62	.000**	.034*
	Single	122837(73.6)	763(44.5)	106.95(24.23)	78.67(18.29)				
	Widowed	656(0.5)	44(2.6)	113.34(29.50)	87.93(14.67)				
	Divorced	3573(2.1)	37(2.1)	115.14(26.59)	80.63(19.34)				
Number of family members	Alone	24785(14.9)	220(13.0)	107.90(24.81)	78.87(17.12)	35.98	3.46	.000**	.004*
	2-3	85526(51.2)	632(36.9)	107.06(23.26)	81.30(16.23)				
	4-5	52238(31.3)	559(32.6)	106.07(24.98)	80.37(16.64)				
	Above 6	4256(2.6)	300(17.5)	106.99(28.49)	75.52(17.36)				
Occupation	Student	78005(46.8)	321(18.7)	106.26(25.97)	84.25(16.82)	242.19	6.27	.000**	.000**
	OfficeEmployee	24287(14.6)	228(13.3)	104.08(22.01)	80.24(16.80)				
	Civil worker	3449(2.1)	79(4.6)	101.33(24.91)	71.07(19.45)				
	House wife	16090(9.6)	316(18.4)	109.77(20.68)	83.67(14.52)				
	Professionals	7783(4.7)	262(15.3)	103.46(22.67)	79.84(14.94)				
	Businessmen	4224(2.5)	68(4.0)	103.74(22.64)	80.60(17.24)				
	Technicians	2380(1.4)	38(2.2)	107.35(22.63)	79.93(16.99)				
	Educators	4301(2.6)	135(7.9)	104.08(21.51)	79.55(14.80)				
	Salesmen	437(0.3)	11(0.6)	110.37(22.78)	90.00(12.74)				
	In Service	6986(4.2)	40(2.3)	110.30(21.76)	83.62(15.20)				
	Unemployed	18863(11.2)	206(12.0)	112.89(22.98)	82.11(15.07)				
Monthly income (10,000 won)	99 or less	38098(22.8)	268(15.6)	111.50(24.94)	87.46(19.01)	620.42	5.23	.000**	.000**
	100~199	50983(30.6)	503(29.3)	108.13(22.66)	79.09(16.75)				
	200~299	32630(19.6)	371(21.6)	105.20(23.21)	80.95(15.82)				
	300~399	19414(11.6)	232(13.5)	103.58(23.74)	79.38(15.21)				
	400~499	10224(6.1)	133(7.8)	102.85(24.10)	78.70(17.19)				
	500 or more	15456(9.3)	140(8.2)	101.66(27.28)	60.96(13.66)				
Health status	Very healthy	15892(9.5)	320(18.7)	91.75(29.74)	71.67(17.53)	5765.04	46.60	.000**	.000**
	Healthy	119598(71.7)	1,231(71.8)	105.59(22.35)	81.42(15.32)				
	Unhealthy	29329(17.6)	40(8.2)	118.52(21.15)	95.50(16.49)				
	Very unhealthy	1986(1.2)	16(1.4)	133.03(27.91)	98.25(21.39)				
Depression History	Past	22186(13.3)	142(8.3)	108.66(23.63)	85.57(15.52)	12449.11	58.28	.000**	.000**
	Present	60330(36.2)	98(5.7)	117.63(20.42)	102.20(17.84)				
	Never	84289(50.5)	1395(86.0)	98.70(23.72)	78.41(16.07)				

WB (N=166,805); N-WB (N=1,715) ** <.05

For the web-based approach, depression was significantly different to all characteristics. While in field study, depression was not significantly different with religion.

The two methods showed similar results with the following characteristics. First, women were more depressed than men (web-based, 109.39±22.89; non-web, 82.76±15.54). This result coincides with [11] that states that most epidemiological population studies have shown that women suffer more anxiety and depression than men.

Next, people in their twenties were more depressed (web-based, 107.40±24.79; non-web, 83.48±16.99). This high incidence of depression among Koreans in their twenties is consistent with the study of [12] indicating that depression begins during one's earlier life.

The proceeding characteristics for both approaches exhibited higher depression levels than others: lower educational attainment (web-based, 109.17±31.94; non-web, 90.83±20.14), low monthly income of W99, 000 (approximately $990 US) or less (web-based, 111.50±24.94; non-web, 87.46±19.01), seeing themselves fit (web-based, 133.03±27.91; non-web, 98.25±21.39), and having a history of depression or currently diagnosed with it (web-based, 98.70±23.72; non-web, 78.41±16.07).

On the other hand, the two approaches had contrasting results in the following variables, namely, religion, marital status, number of family members and occupation as shown in Table 2.

5. Conclusion

Findings from this study consider many points. First, since the website was primarily promoted to manage depression, it is considered that most, if not all, people who access the site is currently suffering from or is highly-interested in depression. This could be the reason why the incidence of depression among web users is higher than those who participated in the non-web-based method that targeted the general population.

Second, religion is the only insignificant characteristic under the non-web-based study. However, the frequencies of results from both studies are quite similar, showing that atheists tend to be more depressed than those who have religions. This means that religion plays a helpful and important role in fighting depression.

Lastly, a comparison of depression-related characteristics from the two approaches could help identify and screen high-risk groups and provide appropriate prevention strategies to decrease the incidence of depression in Korea.

This paper also offers the advantages and disadvantages of using a web-based approach compared to that of a non-web-based approach in studying depression. The positive points of a web-based over a non-web-based approach are found to be: its cost-effectiveness, ease of data collection, real-time analysis and display of statistical results (a feature that might prove to be useful in future research and education), and the avoidance of stigma against face-to-face psychiatric care. One noted disadvantage, however, is that only Internet and computer-literate people could participate in this approach, which sets aside those illiterate depression sufferers in the general population. This is a drawback better solved by using survey and interview techniques (non-web-based approach) to holistically accommodate the general population.

This study not only provides a comparison between web-based and non-web-based approaches (methodology, results, advantages and disadvantages), but also promotes mental health and highlights another innovative approach in taking research, education, and health intervention delivery to a higher level.

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