Research Article

The Effect of Social Network and Short Messages through E-Content on Reducing Negative Thoughts in Women

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Abstract

Background: Nowadays, there is an ongoing development in virtual social networks and their application for patients' support, diagnosis, self-care, and education. On the other hand, applying short messages as the easiest, simplest, and cheapest way of presenting information would be helpful in this regard. Thus, in this study the effect of social network and sending short messages was assessed on negative thinking status of women.

Methods: This was an experimental study with pretest-posttest design performed in 2015. Out of 1165 women in Mohajeran city, 75 were randomly assigned into three groups of social network, short message, and control. The participants received a compact disc containing e-content about reducing negative thoughts. They filled out the Crandell cognition inventory (CCI) before and immediately after the intervention and also one month later for assessing their negative thoughts. A Telegram group was established for the social network group while follow-up short messages were sent for the other intervention group. SPSS V.21 was used for data analysis by paired t test, one way analysis of variance, analysis of covariance and repeated measures tests. Validity (in terms of content and structure) of the questionnaire was confirmed by comments from experts and professors and Bartlett test (KMO = 0.846, p and lt; 0.001); the reliability was confirmed by Cronbach's alpha coefficient (0.69) and test-retest coefficient (0.928).

Results: There were significant differences between pretest and posttest scores in social network, short message, and control groups (P value 0.45, 0.001 and lt; 0.001 and lt; respectively). There were also significant differences between pretest and follow-up scores in the abovementioned groups (P value 0.003, 0.012, 0.001 respectively). There was no significant difference in the follow-up scores between three groups (P = 0.917).

Conclusions: The results showed that multimedia e-content merely would reduce participants' negative thoughts. Therefore, providing multimedia e-content could be beneficial in improving the effectiveness of public health education.

Keywords: Social Learning, Distance Education, Community Health Education, Mental Health, Women's Health

1. Background

Nowadays, the virtual social networks have gained a significant importance. These networks permit users to eliminate the place and time constraints and hence, they help users communicate with each other more easily. Additionally, the patients and handicapped people who need counseling and caring also use the social media. Today, individuals take the benefit of being taught on the treatment methods and preventive measures against diseases and teaching each other (1). Therefore, nowadays social networks are applied for support, prevention, diagnosis, self-care, and treatment monitoring. Virtual social networks for health-related content allow the patients to enjoy the experience of other healthy people and patients' protective measures in order to encounter harsh conditions of

diseases (2). By sharing their experience and obtaining protective feelings, the members of virtual societies are capable to cope with sickness and get motivated to reach full improvement and take advantage of being supported by their peers in this way (3). Furthermore, such social networks empower other sick people to gain other patients' experiences. These people can teach treatment methods and particular behavioral strategies to each other; therefore, other sick persons can encounter difficult situations (2).

On the other hand, applying short message service (SMS) as the easiest, simplest, and cheapest way for presenting information would be helpful. SMS has become increasingly an effective tool in sending health information and engaging users in the improvement of their health conditions. Based on recent advancements, the performed

interventions by SMS have revealed positive and short-term behavioral outcomes. Cell phones because of their portability, cost-effectiveness, accessibility, data-sharing capability regarding health and disease information can make great opportunity in this field. By using this technology, learners will have a good chance to expand the learning process continuously, extensively, and profoundly (4).

In this way, e-health means applying information and multimedia technology for health as one of the fast growing areas that is acknowledged in ongoing health domain (5). The society's health conditions improve considerably by integrating traditional learning methods into e-learning. This causes the patients to participate in the treatment procedure and it constitutes the most important level of the community health (6). On the other hand, mental diseases are among the most problematic factors affecting health of every community (7). In the mental health domain, optimism or positive thinking, as a subsection of positive psychological realm, is one of the positive characteristics of human being which allocates a significant share in the domain of psychology of family and mental health in the recent decade (8). Taylor et al. believe that if ordinary perceptions of human being are accompanied with self-positive thinking and personal control and optimistic view point, it will help people not only control daily life problems, but also cope with stress and threatening events during life (9).

Although social networks are suitable educational tools for improving mental health, in Iran, most studies in this regard are conducted in the realm of social networks in relation with political, cultural, economic, commercial, social, religious, and educational affairs. Little attention has been paid to health, in particular, mental health (10-16). Therefore, in the present research, we intended to study the comparative influence of social network and SMS on reducing women's negative thoughts.

2. Methods

This was an experimental study, conducted in 2015 in Mohajeran city, Markazi Province, with pretest-posttest design. The study aimed to evaluate the effect of social network and short messages on the reduction of negative thinking in women.

The study population comprised 1165 women under the cover of oil health organization in Mohajeran. The inclusion criteria were the tendency to participate and feasibility of using Telegram. To recruit subjects, an announcement was sent to the study population through making a call and sending SMS. Therefore, 75 people were selected to participate in the research. After attending the clinic and briefing on the objectives of the research, confidentiality

of information, and obtaining signed consent forms, the subjects were divided randomly into three groups: control group, SMS intervention group, and social network intervention group. To this end, first, the random number 4 was chosen in the list of subjects' names and then the assigned coefficient number 5 among the groups were selected. This trend continued until the whole subjects were chosen for the three groups. The data collection tool was the Crandell cognition inventory (CCI). This questionnaire was designed in 1979 by Crandell and Lapointe. The questionnaire has 34 questions with five-point scale ranging from "almost never" to " almost always". Individuals were asked to rate how frequently they think each of the self-statements on a scale including 1 (Almost never), 2 (Usually), 3 (Occasionally), 4 (Usually), and 5 (Almost always).

For the study of structural validity, it has been stated that the questionnaire has four factors which constitute about 45% of the total variance (17). For surveying the structural validity, the pretest data were analyzed by principal component. The result of Bartlett test of sphericity showed that the data and their numbers were appropriate for this analysis (KMO = 0.846, P < 0.001). For surveying the number of questionnaire factors, specific index value, variance ratio for each factor, and scree plot were applied. Finally, it was revealed that the four factors solution was suitable for the Persian questionnaire. The questionnaire constitutes about 71.4% of the total variance. Varimax rotation was used for factor analysis and factor loads less than 3% were not taken into consideration. For the content validity, after translating the questionnaire into Persian, it was given to seven professors and specialists in psychology and psychiatry. Test-retest was used for its reliability. Also, for this purpose, the questionnaire was administered to 50 employees who were working in petroleum industry health organization in Mohajeran city. The questionnaire was filled out again after ten days. A test-retest coefficient was obtained as 0.928, strongly indicating that CCI is reliable. A Cronbach's α value of 0.967 was also obtained, indicating that the CCI is highly internally reliable.

At first, an ethical approval was obtained from the ethics committee of Tehran University of Medical Sciences. Then, the questionnaire was filled out by the three groups as pre-test. After that, an educational compact disc containing e-content was given to the three groups. The content of the CD was about reducing negative thinking; also, five educational sessions for five weeks were held by an educational psychologist. For compilation of the content, an educational design was done. It comprised multimedia content along with some slides, some lectures, and an educational video.

For making the interaction between the learner and the multimedia system, the learners were provided with

materials about the control of environmental learning and speed control that were reviewed by a teacher.

The members in the Telegram intervention group were asked to study the related educational subjects at the beginning of the week and they did the specified assignments of every session during the week. At the end of the week, a group discussion was conducted in the Telegram group for about two hours. An educational psychologist (Ph.D.) undertook the guidance and support of the group discussion. For the SMS group, short follow-up messages were sent every week for five weeks. The text messages had follow-up nature and comprised materials about the related session to remind the core of that session. At the end of the intervention, a posttest was performed on the three study groups. Moreover, at the end of intervention, to evaluate long-term learning, the questionnaire was filled out again by the three groups after one month. Figure 1 shows the flowchart of the research process.

The analysis of the obtained data was conducted by SPSS (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp) using paired-t test, one way analysis of variance, analysis of covariance, and repeated measures tests.

3. Results

All the three groups did not have any significant difference concerning variables such as age (P = 0.726), level of education (P = 0.569), marital status (P = 0.403), and job status (P = 0.008). The descriptive characteristics of the samples can be seen in Table 1. The survey of the samples using Kolmogorov–Smirnov's diagram and test showed that they had normal distribution.

As can be seen in Table 2, there are significant differences between pretest posttest and pretest-follow-up test; i.e. all interventions caused reduction in negative thinking after intervention as well as one month after the intervention. The difference between posttest-follow-up test was not statistically significant; that is to say that the reduction occurred in negative thinking has been remained constant until one month after intervention. In comparison of the three groups in the three stages of tests, the results were similar in test-retest and we observed a significant difference among the three groups by using Bonferroni's test for finding the cause of significance. It was revealed that the observed difference was due to statistically significant difference between pretest and follow-up test among the three groups. The comparison of the three groups in the three stages of tests was surveyed and confirmed with the need for repeated measures test which comprising outliers, having normal distributions, and the equivalent of

the sphericity; then, the results were obtained by performing test-retests (F = 417, df = 1.71, P = 0.03).

The scores of pretest, posttest and follow-up test regarding negative thinking in the three groups including Telegram, SMS, and control are compared in Table 3. Regarding the significance level of the test (P = 0.05), no statistically significant difference was observed between pretest scores on negative thinking among the three groups (P > 0.05).

The three groups were compared after omitting the effect of pretest as an intervening factor using covariance analysis. First, the test hypotheses such as normal distribution of data and homogeneity of variances were confirmed (Levene's test, P value = 0.51 for the posttest and P value = 0.15 for the follow-up test). The result of this test suggested that there were not any significant difference among the three groups in terms of scores of posttest on negative thinking (P = 0.06) as well as follow-up test (P = 0.27) (Tables 4 and 5). These observations verified the previous test results by emphasizing merely the effect of e-content in reducing negative thinking, indicating that adding Telegram and SMS to the educational program did not have any influence on the outcomes.

4. Discussion and Conclusion

The main aim of the present study was to compare the influence of social network and short messages through e-content on reducing women's negative thoughts.

The results indicated that there was a significant difference between pretest and posttest scores of negative thinking among the three groups, implying the simultaneous reduction of negative thinking. In this study, to assess the durability of intervention effect on reducing negative thinking, the participants' posttest scores one month after the intervention were evaluated. The results showed that mean scores of negative thinking in the three groups had meaningful differences compared to pretest; that is to say that the intervention caused a stability effect on the reduction of negative thinking. On the other hand, by making a comparison between the three groups, the results showed that the mean scores of negative thinking in posttest and follow- up did not have statistically significant differences; that is, representation of e-content merely caused changes in negative thinking in the three groups and adding Telegram and SMS to the educational program could not have a meaningful effect on further reduction of negative thinking.

Concurrent with the present research, Jafari in his study indicated that teaching nutrition using weblog groups did not have any effect on patients' blood sugar and HbA1C. In this study, teaching nutrition using weblog
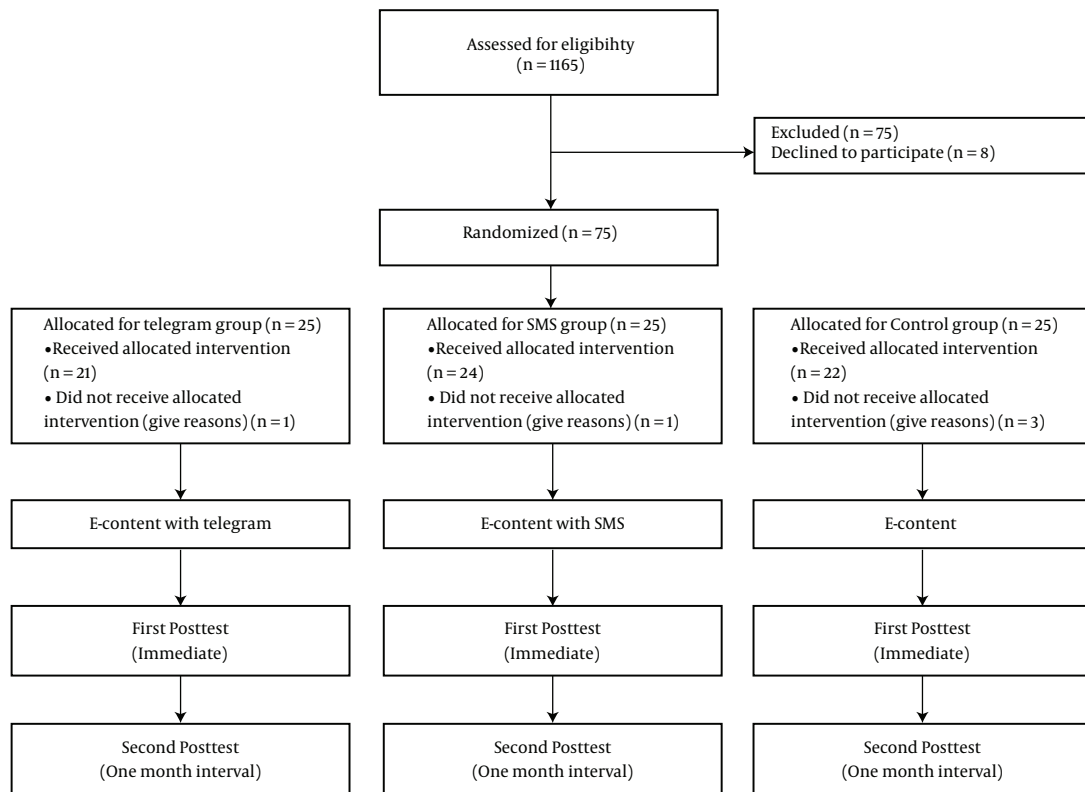
Figure 1. The Flowchart of the Research Process

Table 1. The Demographic Characteristics of the Subjects[a]

Variable	SMS Group	Social Network Group	Control Group	P Value
Age, y[b]	41.0 ± 6.4	38.2 ± 7.4	42.0 ± 6.0	0.72
Marital Status				0.4
Divorced/Widow	1 (1.5)	0 (0)	0 (0)	
Married	23 (34.3)	22 (32.8)	21 (31.3)	
Education Level				0.56
Diploma or below	9 (13.4)	8 (11.9)	7 (10.4)	
Graduate	11 (16.4)	11 (16.4)	13 (19.4)	
Post graduate	4 (6.0)	3 (4.5)	1 (1.5)	
Job Status				0.08
Housewife	17 (25.4)	20 (29.8)	13 (19.4)	
Employed	7 (10.4)	2 (3.1)	8 (11.9)	

[a] Values are expressed as No. (%).
[b] Values are expressed as mean ± SD.

group also did not reduce Triglycerides and LDL, which was compatible with the results of the present study (18). Evans's study showed that the social online groups caused improvements in emotional and informational support and provided a pleasant atmosphere for women after delivery to improve their caring (19). In this study, 512 mes-

Table 2. Study of Differences Between Pretest and Follow-Up Test Regarding Negative Thinking in the Groups (Independent T-Test)

group	Paired Test	Mean ± SD	T	Sig.
Social network	Pretest-posttest1	0.19 ± 0.42	2.13	0.04
	Posttest1-posttest2	0.01 ± 0.40	0.18	0.86
	Pretest-posttest2	0.21 ± 0.29	3.34	0.003
SMS	Pretest-posttest1	0.22 ± 0.47	2.4	0.02
	Posttest1-posttest2	-0.01 ± 0.26	-0.27	0.78
	Pretest-posttest2	0.20 ± 0.37	2.72	0.01
control	Pretest-posttest1	0.36 ± 0.38	4.39	< 0.001
	Posttest1-posttest2	0.03 ± 0.32	0.45	0.66
	Pretest-posttest2	0.39 ± 0.43	4.14	0.001

Table 3. The Comparison of Pretest, Posttest and Follow- Up Test Regarding Negative Thinking Among Telegram, SMS, and Control Groups (ANOVA)

Test	Group	Mean ± SD	Sum of squares	df	F	Sig.
pretest	Social network	1.69 ± 0.74	0.77	2	0.64	0.52
	SMS	1.77 ± 0.82				
	control	1.95 ± 0.73				
Posttest1	Social network	1.50 ± 0.71	0.06	2	0.13	0.87
	SMS	1.55 ± 0.75				
	control	1.59 ± 0.73				
Posttest2	Social network	1.49 ± 0.72	0.09	2	0.08	0.91
	SMS	1.57 ± 0.74				
	control	1.56 ± 0.72				

Table 4. Comparison of the Results of Posttest 1 on Negative Thinking Among Telegram, SMS and Control Groups After Omitting the Influence of the Pretest (ANCOVA)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected model	25.02	3	8.34	54.1	< 0.001
Intercept	0.08	1	0.08	0.55	0.45
pretest	24.92	1	24.92	161.7	< 0.001
group	0.18	2	0.09	0.59	0.56

Table 5. Comparison of the Results of Posttest 2 on Negative Thinking Among Telegram, SMS and Control Groups After Omitting the Influence of the Pretest (ANCOVA)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	26.71	3	8.9	74.63	< 0.001
Intercept	0.01	1	0.01	0.09	0.76
pretest	26.62	1	26.62	222.25	< 0.001
group	0.32	2	0.16	1.33	0.27

sages were sent to the participants during six months, and the obtained results were not in line with the findings of the present study. The reason for this contradiction can be attributed to duration of intervention and the nature and number of texts which were sent. The sent texts in the present study were follow-up and informative in nature, whereas, those of the abovementioned study had ed-ucational and supportive nature. van der Eijk et al. stated that social networks have improved the efficiency of health care and increased the relationship among physician, pa-tient, treatment, and health care outcomes ([20]). The lat-ter study was conducted with the help of 2400 specialists in 66 zones on different chronic patients suffered from, for example, Parkinson in Holland. This study was not congru-

ent with our study because of the numerous counselors and the vastness of social network and participants' quick feedback.

On the other hand, the results of this study indicated that SMS did not bring about any significant difference on negative thinking. Concurrent with the results of this study, in another investigation in order to follow up diabetic patients' care during a six-month treatment using SMS indicated that SMS did not create any statistically meaningful change in their lives and the level of patients' HbA1C type II (21). Moreover, Farmer et al. showed that there was a positive relationship between cell phone utilization and treatment of diabetic patients, which was not in line with our study (22). The cause of incompatibility lies in participants' quick online feedback. Cooper et al. performed a study (23) and indicated that SMS is a good and cheap way for pregnant smokers to cease smoking. Baghiani et al. showed that SMS caused an increase in patients' insights, and it was effective in the diabetic patients' self-care (24). This study was not compatible with our study because of the nature and the number of sent texts. The number of sent texts was less in the present study than Baghiani's study while their natures were also different (follow-up vs. educational).

This study showed that Telegram social network caused long-term learning compared to SMS. Social networks have special characteristics, which facilitate learning. These networks provide an environment which is more attractive and interactive compared to SMS, and it engages the learner more in the learning process. Social networks provide exclusive opportunities for learners to share their information, opinions, and knowledge with others and they can use other people's knowledge and information simultaneously in forums.

Overall, mental health has an influential role in health of community while studies in this regard similar to this research are sporadic; therefore, it is proposed to conduct more investigations on thinking and mental health. It is recommended that this research be performed with large number of samples in different ages, genders and climatic conditions as well as longer duration of intervention and hours of group discussion and extended numbers of sent texts.

There were some limitations in this study that probably affected the results. One of the limitations was the lack of 24-hour intervention and limited time during the week, which both caused the participants to not be able to discuss online due to daily activities. On the other hand, it seems that the number of counselors was not proportional to the number of participants. Some subjects stated that they would participate more actively in meetings if the date of the meetings was changed.

Footnotes

Authors' Contribution: Parvin Razmgah involved in the study design and data gathering. She also had a main contribution to drafting the manuscript. Rita Mojtahedzadeh designed and supervised the study and critically revised the manuscript for important intellectual content. Somayyeh Borjaliloo developed e-content and supervised social networks. Aeen Mohammadi contributed to study design and data analysis.

Conflict of Interests: None declared.

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