

patients. Constant occupational stress can lead to tension headaches, backache, anxiety, sleeping disorders, and cardiovascular and digestive problems. It can also lead to reduced concentration in the workplace, increased errors, and higher risks of occupational injury (such as injury to sharp objects) (5). The results of a seminal study indicated that people with low perceived self-esteem experienced higher stress, which in turn has affected their clinical decision-making (6). Also, the results of a qualitative study showed that insufficient knowledge and awareness in the clinical workplace is considered as one of the main causes of occupational stress among nurses (7).

Self-efficacy in the workplace is one of the important factors that can play a significant role in dealing with challenging problems and issues and in individuals' emotional reactions. Besides, it refers to the beliefs that a person needs to succeed. Bandura defines self-efficacy as an individual's belief in his or her own ability to perform the expected function (8). Low self-efficacy can make lead to ineffective use of the nurses' learned skills, which intimidates them in confrontation with challenging circumstances and impairs their performance (9). Numerous factors affect the self-efficacy among nurses in the workplace, including the nurses' access to desirable resources for specialized training, which can play an effective role in increasing their ability (10)

Education is considered as an effective strategy to reduce stress and improve self-efficacy. Teaching stress management strategies can be effective in improving mental health and reducing stress among nurses (11). However, stress-reduction educational interventions mainly focus on teaching relaxation and psychotherapy methods (12). Villani et al. conducted a study in Italy and found that teaching strategies to reduce stress via mobile phones can have a positive effect on oncology nurses (13). Based on the review of the related literature, there is only a limited number of studies that have examined the

impact of the promotion of clinical knowledge on nurses' stress and self-efficacy. In a seminal study by Singh et al. in the UK, the nurses were taught about different methods to identify and manage six major complications of the elderly (including delirium, dementia, malnutrition, incontinence, pressure ulcers, imbalance, and fall) through educational session twice a week and for 18 weeks. The results showed an insignificant reduction in nurses' stress (14). In addition, McDonough et al. (2006) examined the impact of practical and theoretical training of tracheostomy and laryngectomy care on improving nurses' knowledge and self-efficacy at a Medical Training Center in Boston. Then, they reported that there was an increase in nurses' self-efficacy (15).

On the other hand, nurses do not take part in training classes regularly, which is always one of the limitations of face-to-face training interventions. In addition, nurses often do not participate in face-to-face training courses because of high workload, lack of time, and fatigue. In recent years, however, information technology and online communications have led to a great shift in the field of education and the use of new technologies - including the use of virtual social networks in education - is inevitable (16). Virtual networks can lead to the promotion of critical thinking and problem-solving power because of their dynamic and accessible nature. Social networks are inexpensive, and they are always available so that they can be used as an educational instrument for nurses. It is important and necessary for oncology nurses to reduce stress and improve their self-efficacy. However, due to some effective factors such as lack of time, lack of access, costs and the nurses' need to improve and increase their specialized knowledge and also the lack of evidence in this field, the present study aimed to investigate the effect of mobile network-assisted nursing care training on stress and job self-efficacy among oncology nurses.

Methods

This non-randomized clinical trial study was conducted in selected educational hospitals in Tehran between January and March in 2018. The required sample size was determined based on a confidence level of 95% and a test power of 80%. It was also assumed that there should be a 23-unit difference between the nurses' stress in the intervention group and the control group (which equals ten percent of the maximum score) in order for the difference to be statistically significant. As a result, the required sample size suggests 37 people in each group, and given the probable drop rate, it was estimated to be 40 nurses per group (17). Available sampling was applied where the researcher would ask the nurses at the selected educational hospitals to participate in the study. Inclusion criteria for the present study include the ability to use the Telegram or WhatsApp mobile applications, volunteering, and having at least one year of experience in the oncology ward (to observe enough experience in dealing with various aspects of the work), and no record of mental disorders (based on the nurses' self-report). The exclusion criteria, on the other hand, include any changes in the nurses' working ward or workplace during the study and neglecting to study the educational materials during the intervention. To prevent contamination, two educational-medical centers affiliated by the Iran University of Medical Sciences (namely Firoozgar & Hazrate Rasool) were assigned as the workplace for the intervention group and the control group.

The data were collected using a demographic information form, Expanded Nursing Stress Scale (ENSS), and Job Self-Efficacy Questionnaire (JSEQ). These questionnaires were completed once before the intervention and then one month after the intervention. The researcher-made demographic information form included nurses' age, gender, marital status, work experience in the oncology ward, history of mental illness, and their contact numbers to follow in the social networks. The ENSS

occupational stress questionnaire was developed by French et al. in 2000 (18). The questionnaire includes nine subscales of death and dying, conflict with physicians, inadequate preparation, problems with peers, problems with supervisors, workload, uncertainty concerning treatment, patients and their families, and discrimination. All the fifty-seven items of the questionnaire will be scored on a five-point Likert scale, and the participants should choose one option from "I have no stress at all" to "I am under a lot of stress" according to their previous experiences. The scores indicate low occupational stress between 0 and 53, moderate occupational stress between 54 and 107, high occupational stress between 108 and 161, and very high occupational stress between 162 and 216. A Cronbach's alpha coefficient of 0.96 has been reported for the internal consistency of this questionnaire in Iran (19). Moreover, the corresponding Cronbach's alpha coefficient in this study was 0.83, which approves the internal consistency of the questionnaire.

The Job Self-Efficacy Questionnaire (JSEQ) was used to measure nurses' self-efficacy scores. The questionnaire was developed in 1994 and consists of 31 items on four dimensions of job self-efficacy, including personal self-efficacy beliefs (10 items), personal outcome expectancy (8 items), collective self-efficiency beliefs (7 items), and collective outcomes expectancy (6 articles). Each item should be scored based on a five-point Likert scale ranging from completely disagree to completely agree (20). Cronbach's alpha coefficient of this questionnaire was reported 0.85 in Iran (19). In addition, the Cronbach's alpha coefficient in the present study was 0.85, which indicates an acceptable internal consistency of the questionnaire.

The participants were asked to complete the questionnaires in 24 hours, and the researcher collected them. Then, the samples were registered in the Telegram or WhatsApp training group, and the training materials were posted in the group within 4 weeks and according to the specified schedule. The nurses in the intervention

group was provided with a chapter "Chemotherapy and Radiotherapy Standards" of the booklet entitled "Nursing Care Standards" of the Iranian Nursing System Organization. This chapter includes preparations for prescribing chemotherapy medications, nursing care, and interventions in the complications of chemotherapy and nursing care and interventions in the administration of common chemotherapy medications. The researcher was in touch with the nurses in the intervention group throughout the study and would pose some questions regarding the content of the course to make sure that the nurses study the booklet chapter. On the other hand, the nurses in the control group received the hospital routine training (the available educational content such as brochures and pamphlets). One month after the intervention, the researcher provided the nurses with the questionnaires and again collected them after 24 hours. Although the nurses in the control group were involved in the intervention, they also received the educational content after the post-test. Moreover, the researcher was in contact with the nurse in the intervention group via the

virtual network of Telegram or WhatsApp and would respond to their ambiguities and questions.

The permission to start the intervention was obtained from the Ethics Committee of Iran University of Medical Sciences (no. IR.IUMS.REC.1397.711), and then this clinical trial study was registered in IRCT (no. IRCT20190416043292N1).

For the study, descriptive statistics, including absolute and relative frequency, mean and standard deviation, were used to analyze the data. Also, an independent t-test was used to compare the means of stress and self-efficacy scores between the intervention and control group, paired t-test was used to compare the means of stress and self-efficacy scores before and after the intervention in each group, and a chi-square test was applied to compare the two groups in terms of qualitative variables and finally Kolmogorov-Smirnov test was used to observe the normality of the dependent variable. The collected data were then analyzed using version 16 of SPSS computer software, and the significance level was considered lower than 0.05.

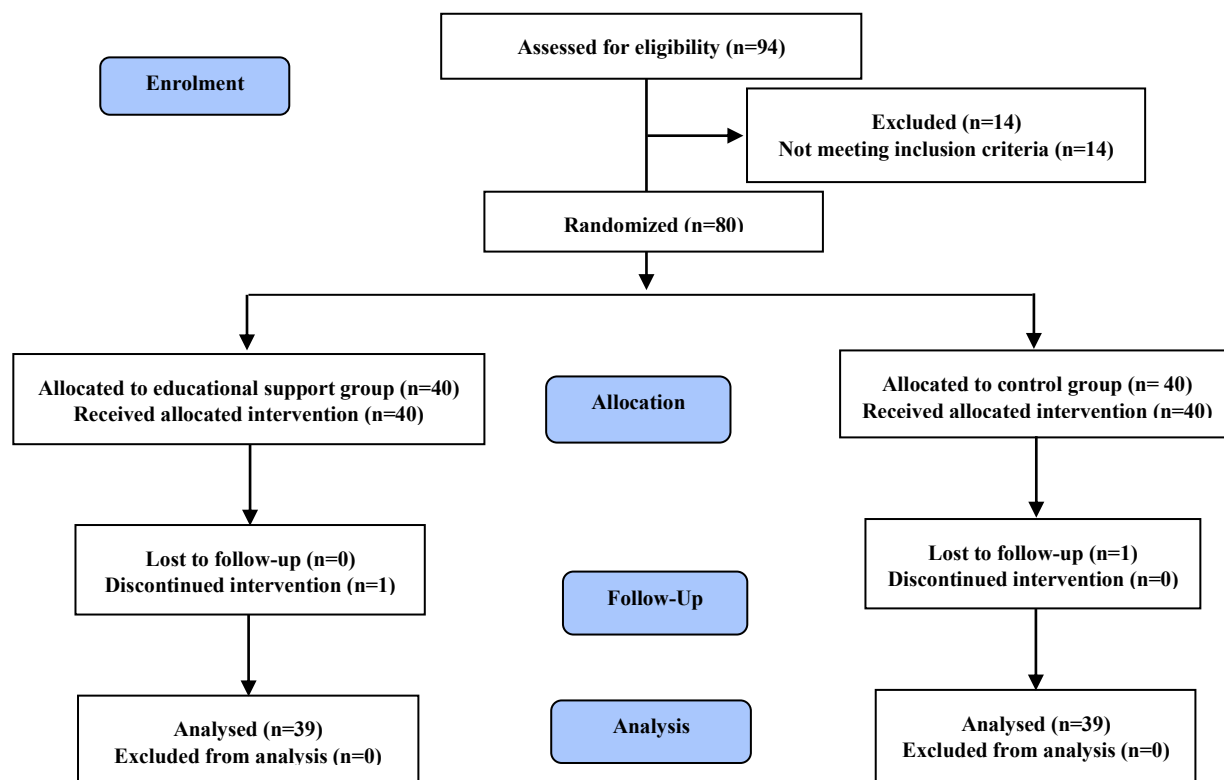


Figure 1. Consort flow diagram

Results

At first, 94 eligible individuals were observed, and then 80 entered the study after screening. In the post-test stage, 39 participants remained in the intervention group (1 person was excluded because he did not complete the sessions), and also 39 participants remained in the control group (one person was excluded because he did not submit the questionnaire after the intervention) (Figure 1). Most of the participants in both groups were between 30 and 35 years of age, and the mean and standard deviation of their age were 33.05 ± 4.29 and 32.97 ± 4.23 , respectively. Most of the participants were female and married and held a bachelor's degree. They also had 5 to 9 years of experience in the oncology ward (Table 1). The two groups were homogeneous in terms of the demographic characteristics, and there was no significant difference ($P < 0.05$). (Table 1)

There was no significant difference between occupational stress and its dimensions in the pre-intervention stage between the two groups. The mean and standard deviation of the total score of stress in the intervention and control group were 110.05 ± 11.33 and 114.35 ± 8.02 , respectively. However, after the intervention, there was reported a significant difference between the two groups regarding the total score of occupational stress and its conflict with the physicians and inadequate

preparedness ($P < 0.05$). Moreover, the total score and these dimensions were significantly lower in the intervention group. The mean of the total score of stress and its standard deviation, after the intervention, in the two groups of intervention and control were 105.56 ± 11.96 and 115.00 ± 7.76 , respectively. Furthermore, there was no significant difference between the two groups in terms of the dimensions of discrimination, patients and their families, problems with peers, problems with supervisors, workload, and death and dying ($P < 0.05$) (Table 2).

Before the intervention, the mean and standard deviation of the total score of self-efficacy in the two groups of intervention and control were 78.12 ± 19.97 and 80.15 ± 18.26 ($26.05 < P < 0.05$), respectively. There was also no significant difference between the two groups in terms of the mean and standard deviation of total self-efficacy score and the dimensions of collective outcome expectancy, personal outcome expectancy, and collective self-efficiency belief after the intervention ($P > 0.05$). However, it was found that there was a statistically significant difference between the two groups in terms of the mean of the changes in total self-efficacy score and then personal self-efficacy belief ($P < 0.05$). Nevertheless, the changes in scores of other dimensions were not significant in the intervention group compared to the control group ($P > 0.05$) (Table 3).

Table 1. Demographic characteristics for the intervention and control groups

Variable	Intervention (N=39)	Control (N=39)	Test result
	N (%)	N (%)	
Sex	Male	11 (28.2)	$\chi^2 = 1.15$ *P= 0.28
	Female	28 (71.8)	
Age	Below 30	10 (25.6)	T=0/08 ** P=0.93
	30–35	13 (33.3)	
	36–40	11 (28.2)	
	Above 40	5 (12.8)	
	Mean±SD	33.05 ± 4.29	
Marital status	Single	13 (33.3)	$\chi^2 = 1.01$ *P= 0.31
	Married	26 (66.1)	
Education	Bachelors' degree	35 (89.7)	$\chi^2 = 2.35$ *P= 0.11
	Masters' degree	4 (10.3)	
Experience in oncology ward (year)	1–4	10 (25.6)	T=0/4 ** P= 0.68
	5–9	23 (59)	
	10–15	6 (15.4)	
	Mean ± SD	6.79 ± 3.25	

*Chi square test ** Independent t-test

Oncology nurses' occupational stress and self-efficacy

Table 2. Comparison of oncology nurses' occupational stress before and after the instructions in both groups of intervention and control

Occupational stress	Time	Intervention	Control	Independent t-test
		(N=39) Mean ±SD	(N=39) Mean±SD	
Total occupational stress	Pre-test	110.05 ± 11.33	114.35 ± 8.02	t= 1.93 df= 76 P= 0.057
	Post-test	105.56 ± 11.96	115.00 ± 7.76	t= 4.13 df= 76 P= 0.000
	Changes	-4.48 ± 5.93	0.64 ± 2.99	t= -4.81 df= 76 P< 0.001
Death and dying	Pre-test	15.15 ± 3.92	14.02 ± 3.02	t= 1.42 df= 76 P= 0.15
	Post-test	14.74 ± 4.04	12.10 ± 2.95	t= 0.79 df= 76 P= 0.42
	Changes	-0.41 ± 1.46	0.07 ± 0.48	t= -1.79 df= 76 P= 0.052
Conflict with physicians	Pre-test	10.23 ± 2.92	11.20 ± 2.46	t= 1.59 df= 76 P= 0.11
	Post-test	8.89 ± 2.77	11.48 ± 2.26	t= 4.15 df= 76 P< 0.001
	Changes	-1.33 ± 0.66	0.28 ± 0.94	t= -8.74 df= 76 P< 0.001
inadequate preparation	Pre-test	4.61 ± 2.45	4.82 ± 2.06	t= 0.39 df= 76 P= 0.69
	Post-test	4.00 ± 2.28	4.97 ± 1.89	t= -2.04 df= 76 P= 0.000
	Changes	-0.61 ± 1.06	0.15 ± 0.96	t= -3.34 df= 76 P= 0.01
problems with peers	Pre-test	12.61 ± 4.02	13.23 ± 3.47	t= 0.73 df= 76 P= 0.46
	Post-test	12.61 ± 4.04	13.23 ± 3.37	t= -1.92 df= 76 P= 0.35
	Changes	-0.35 ± 1.54	0.07 ± 1.13	t= -1.42 df= 76 P= 0.16
problems with supervisor	Pre-test	11.43 ± 3.17	11.51 ± 3.18	t= 0.78 df= 76 P= 0.96
	Post-test	11.07 ± 3.22	11.74 ± 3.12	t= -1.93 df= 76 P= 0.18
	Changes	-5.17 ± 5.29	-4.92 ± 5.85	t= -0.20 df= 76 P= 0.84
Workload	Pre-test	16.25 ± 3.97	16.66 ± 4.38	t= 0.43 df= 76 P= 0.66
	Post-test	16.07 ± 4.54	16.94 ± 4.44	t= -0.85 df= 76 P= 0.39
	Changes	-0.17 ± 1.31	0.28 ± 0.55	t= -2.01 df= 76 P= 0.47
uncertainty concerning treatment	Pre-test	22.02 ± 5.46	22.58 ± 5.58	t= 0.45 df= 76 P= 0.65
	Post-test	21.97 ± 5.54	22.51 ± 5.61	t= -1.21 df= 76 P= 0.22
	Changes	-1.05 ± 2.83	-0.07 ± 1.22	t= -1.97 df= 76 P= 0.053
Patients and their families	Pre-test	13.07 ± 4.39	14.69 ± 4.23	t= 1.65 df= 76 P= 0.10
	Post-test	12.64 ± 4.35	14.51 ± 4.34	t= -1.90 df= 76 P= 0.06
	Changes	-0.43 ± 1.81	-0.17 ± 1.12	t= -0.75 df= 76 P= 0.45
Discrimination	Pre-test	4.71 ± 1.89	5.61 ± 2.09	t= 1.89 df= 76 P= 0.058
	Post-test	4.84 ± 1.82	5.41 ± 1.85	t= 1.35 df= 76 P= 0.18
	Changes	0.12 ± 1.50	-0.20 ± 1.28	t= 1.05 df= 76 P= 0.29

Table 3. Comparison of oncology nurses' occupational self-efficacy before and after the instructions in both groups of intervention and control

Occupational self-efficacy	Time	Intervention	Control	Independent t-test
		Mean ± SD	Mean ± SD	
Total self-efficacy	Pre-test	78.12 ± 19.97	80.15 ± 187.26	t= -0.47 df= 76 P= -0.63
	Post-test	89.64 ± 18.34	79.38 ± 18.24	t= 1.99 df= 76 P= -0.04
	Changes	9.20 ± 4.37	1.43 ± 4.86	t= 0.74 df= 76 P= 0.000
Personal self-efficacy belief	Pre-test	24.05 ± 6.50	25.38 ± 6.48	t= 0.91 df= 76 P= -0.36
	Post-test	35.38 ± 5.75	29.89 ± 7.48	t= 5.61 df= 76 P= -0.00
	Changes	10.82 ± 3.68	3.82 ± 3.04	t= 9.149 df= 76 P= 0.000
Personal self-efficacy expectancy	Pre-test	23.28 ± 7.47	23.20 ± 6.24	t= -0.428 df= 76 P= -0.77
	Post-test	23.38 ± 7.44	23.01 ± 6.34	t= -0.28 df= 76 P= -0.77
	Changes	-0.25 ± 1.11	0.25 ± 1.01	t= 0.11 df= 76 P= -0.90
Collective self-efficacy belief	Pre-test	16.48 ± 4.84	16.92 ± 4.07	t= 1.16 df= 76 P= 0.24
	Post-test	16.46 ± 4.44	16.62 ± 4.37	t= -0.35 df= 76 P= -0.72
	Changes	0.17 ± 0.72	0.10 ± 0.96	t= -0.43 df= 76 P= -0.66
collective self-efficacy expectancy	Pre-test	13.10 ± 3.84	14.65 ± 3.13	t= 0.69 df= 76 P= 0.39
	Post-test	13.20 ± 3.64	14.66 ± 3.23	t= -1.04 df= 76 P= 0.29
	Changes	-0.66 ± 3.32	0.00 ± 0.39	t= -1.24 df= 76 P= 0.21

Discussion

The findings indicate that teaching nursing care through social media can reduce stress among nurses. This finding can be explained using the model presented by

the national institute for occupational safety and health (NIOSH). Accordingly, individual ability and awareness of how to do the job can reduce occupational stress (21). Since the training included educational materials related to chemotherapy and

explained, in detail, how it works and how safe it is, the nurses who study the content are expected to implement them in their daily work environment. Proper performance in the workplace increases the sense of control and mastery of work, which also helps reduce occupational stress (22). Given that lack of enough skills and the need for training are among the main causes of stress in oncology nurses (23), Niks et al. conducted a study and concluded that education, especially if tailored based on the factors related to nurses' occupational stress, can have a significant effect on reducing stress among nurses (24). The results of another study showed that telephone-assisted education could reduce occupational stress among oncology nurses (25), which is consistent with the findings of the present study.

The findings also showed that teaching nursing care through social networks helped promote self-efficacy among nurses. Bandura's social cognitive theory is based on the triple practical pattern of behavior, environment, and individual. This pattern refers to the interrelationship between behavior, environmental influences, and individual factors (8). The questionnaire used in this study included four dimensions of personal belief, personal expectancy, collective belief, and collective expectancy; however, it was reported that personal belief was the only dimension to increase significantly. Collective self-efficacy explains that if group members notice that their peers are showing shared behaviors, they will also be driven by such behaviors.

On the other hand, evaluating peers' capabilities is also effective in developing collective self-efficacy. These results were consistent with the findings of a study by Kadivar et al. indicating that nurses in the pediatric ward showed higher self-efficacy after receiving online training (26). The results of the study by Parchebafieh et al. also showed that education increases clinical self-efficacy (27), which are consistent with the findings of the present study. In another study on web-based education, the researchers concluded that web-based

education increases learners' self-efficacy (28). Poddar et al. examined web-based educational interventions, which indicated that web-based learning and intervention increase self-efficacy (29). Also, McDonough et al. conducted a study on 1,450 nurses and provided them with online educational courses. The results showed that participants reported higher self-efficacy and awareness after the training course (15). However, the results of Brannagan et al.'s study on the teaching of clinical skills through peer learning did not report any significant effects on the self-efficacy of nursing students (30). Such discrepancy in results can be due to differences in teaching methods and the research community.

Given that the samples in the present study included nurses working in hospitals who were obliged to follow the contents of the instructions every day, their sense of self-efficacy would probably be affected because they were using these skills daily. Moreover, the researchers applied the peer-learning method, while, in the present study, the approved instruction was used. Therefore, learners would show a more positive attitude if they consider the resources of information reliably. They would also learn and implement the content more enthusiastically. Management of continually changing, ambiguous, unpredictable, and stressful situations requires multiple skills. According to Bandura's theory, self-efficacy is a constructive ability by which individuals' cognitive, social, emotional, and behavioral skills are organized to achieve different goals (26) effectively.

Limitation

As one of the limitations of the present study, the psychological condition of the environment outside the hospital, which was beyond the control of the researcher, could affect the level of stress in nurses. According to the results of the training, although the overall stress score was reduced among nurses, the intervention did not affect some subscales such as discrimination or

workload. It is recommended to implement this educational intervention along with psychological interventions such as teaching relaxation techniques for oncology nurses. In addition, it is suggested to examine the synergistic effect of these two interventions on occupational stress and its subscales.

Conclusion

The results of the present study showed that teaching nursing care through the social network can lead to the reduction of stress and improvement of self-efficacy among oncology nurses. Nurses, especially in the oncology ward, experience high levels of stress, which can lead to many complications such as psychosomatic pain, occupational burnout, and quitting. It will, in turn, result in high costs to the health care system and hospitals. Along with other educational methods, teaching through the promotion of clinical knowledge can be used by managers and educators in the field of health to reduce stress and improve self-efficacy among nurses. The use of cost-effective and efficient teaching methods has always been considered as one of the important concerns of managers and educators in the field of health. The present study showed that using mobile phone social network, in addition to continuous access to educational resources and being simple and inexpensive, can be applied as an efficient and effective method in training employees, especially nurses.

Conflict of Interest

There are no conflicts of interest to declare.

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