



The effects of educational short message service messages about emergency scene management on perceived stress and satisfaction among the family caregivers of patients with mental disorders

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Abstract

Background and aims: Family caregivers have significant role in managing psychiatric emergencies in the time interval between their request for emergency medical services (EMS) and ambulance arrival at the emergency scene. This study aimed at assessing the effects of educational short message service (SMS) messages about emergency scene management (ESM) on perceived stress and satisfaction among the family caregivers of patients with mental disorders who requested EMS.

Methods: This randomized controlled trial was conducted in 2019–2020 using a two-group posttest-only design. Participants were sixty family caregivers of patients with mental disorders in Mashhad, Iran, who called the EMS center and requested EMS. They were continuously recruited and randomly allocated to an intervention or a control group. Participants in the control group received routine educations, while participants in the intervention group received routine educations and SMS-based educations about ESM. Data were collected using a demographic questionnaire, a researcher-made caregiver satisfaction questionnaire, and the Cohen's Perceived Stress Scale. Data analysis was performed via the SPSS software (v. 25.0).

Results: Most participants were female (53.3%) and their mean age was 44.30 ± 13.03 years. The mean score of perceived stress in the intervention group was significantly less than the control group ($P=0.001$), while the mean score of caregiver satisfaction in the intervention group was significantly more than the control group ($P=0.001$).

Conclusion: SMS-based education about ESM is effective in significantly reducing perceived stress and enhancing satisfaction among the family caregivers of patients with mental disorders.

Keywords: Stress, Satisfaction, Caregiver, Prehospital emergency, Psychiatry

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Introduction

The emergency medical services (EMS) system provides care to all individuals who need prehospital emergency medical care. Care delivery to patients with mental disorders is a component of EMS so that patients with mental health disorders such as psychiatric problems and substance abuse constitute one third of EMS clients (1). According to the American Psychiatric Association, psychiatric emergencies include the acute disorders of thought, behavior, mood, or social relationships among patients with mania, acute psychosis, or suicide/homicide attempts which can result in damages to self or others if left untreated. Psychiatric emergencies often include behaviors such as aggression, violence, and agitation, are different from medical emergencies in terms of preventing

potential risks to self, family, and community, and need emergency interventions (2). In Iran, prehospital care delivery to patients with mental disorders and their transfer to hospital settings are among the responsibilities of the EMS system. EMS staff provide response to telephone-based requests for EMS, refer to the emergency scene, provide necessary care services at emergency scene, take patients to hospital settings by ambulance, and continue emergency care delivery in ambulance (3).

Patients with mental disorders cannot identify the symptoms of their mental problems and hence, their family caregivers have significant role in symptom identification and medical help-seeking (4). The World Health Organization also highlighted the importance of family caregivers' participation in care delivery to patients

with mental disorders in order to improve care quality and patient outcomes (5). Deinstitutionalization policies in the 1970s also assigned the responsibility of caregiving to patients with mental disorders mainly to their family caregivers (4,6). Currently, family caregivers play significant role in providing support and care to their mentally-ill patients (4) and their participation in caregiving is considered as a key factor in achieving the goals of patient-centered care and enhancing patients' and family caregivers' satisfaction with care (7).

Despite their significant role in care delivery to mentally-ill patients, family caregivers receive limited informational and social support for caregiving (8). In other words, the family caregivers of mentally-ill patients should manage the challenges of chronicity and unpredictability of their patients' mental disorders without having adequate knowledge and receiving adequate education (9). Therefore, they cannot effectively manage psychiatric emergencies in their families (8) and are among the casualties of psychiatric crises (4). Moreover, they experience different problems and considerable distress when face the symptoms of mental disorders and the unusual behaviors of their patients' and hence, experience senses of fear, apprehension, unhappiness, anger, and guilt (9). They also experience considerable stress due to the sense of insecurity caused by the risk of damage by their patients to self or others (10,11) and report conflicting emotions such as love, respect, sorrow, despair, and acute stress (4).

High levels of stress among the caregivers of patients with mental disorders in psychiatric emergencies, the stressful conditions of emergency scenes, and the gathering of different people in the scene can impair family caregivers' communication with EMS staff, reduce the possibility of receiving their support, and thereby, add to their stress (9,12). Time pressure in psychiatric emergencies also causes EMS staff not to completely perform patient assessment and management and reduces their ability to establish effective communication with patients' family caregivers (13). Poor communication between EMS staff and family caregivers in psychiatric emergencies can negatively affect patient outcomes and caregivers' satisfaction (12). A study reported poor communication and limited family education by healthcare providers as the most important predictors of family caregivers' dissatisfaction with mental health services (14).

Telehealth is a method for promoting family caregivers' communication with healthcare providers, providing them with support, and facilitating their access to healthcare resources (15). As a division of telehealth, tele-mental health through mobile phones, computers, and other telecommunication methods is widely used for the delivery of mental health services and is potentially effective in reducing waiting time in healthcare settings, shortening hospital stay, and reducing re-hospitalization rate among patients with mental disorders (16). Short message service (SMS) is a simple, easy to use, and cost-

effective method for telehealth (17). Previous studies reported that SMS-based education for family caregivers was effective in fulfilling their expectations respecting communication with healthcare providers (12), giving them senses of emotional and social support, facilitating their stress management, and improving their coping skills (15). However, most previous studies into the effects of SMS-based interventions were conducted in non-emergency conditions (19-17) and hence, their results are not easily generalizable to family caregivers in medical emergencies, particularly psychiatric emergencies. The present study was conducted to narrow this knowledge gap. The aim of the study was to assess the effects of educational SMS messages about emergency scene management (ESM) on perceived stress and satisfaction among the family caregivers of patients with mental disorders who requested EMS.

Methods

Design

This randomized controlled trial was conducted in 2019–2020 using a two-group posttest-only design. Participants and setting: Participants were sixty family caregivers of patients with mental disorders in Mashhad, Iran, who called the EMS center and requested emergency mental health services. Sampling was performed continuously. Inclusion criteria were an age of more than eighteen years, being the main family caregivers of a patient with mental disorder, having a mobile phone with SMS option, no serious life events such as divorce or significant loss in the past one month, telephone call to EMS to request EMS for patient's aggressive or violent behaviors, no history of mental disorders or addiction, basic literacy skills, and EMS staff's confirmation of emergency psychiatric case of patient's aggressive or violent behaviors according to the criteria of the American Psychiatric Association. Exclusion criteria were refusal of completing the study instruments and not reading the SMS messages of the study intervention. Eligibility assessment was performed after any call to the EMS system for requesting EMS for mentally-ill patients. Accordingly, after the call, the first author made a telephone contact with the calling person, provided him/her with routine educations, and assessed him/her for eligibility. Eligible persons were informed about the study, their verbal consent was obtained, were registered as eligible participants, and were randomly allocated to an intervention or a control group through coin tossing. This process was continued until thirty participants were recruited to each group. Randomization was performed by one of the authors who was not involved in the implementation of the study intervention. Participants and the statistical analyst of the study were blind to group allocation.

Sample size was calculated using the formula for two mean comparison and the mean scores of perceived stress and satisfaction in a pilot study on twenty eligible family caregivers. Accordingly, with a confidence level of 0.95

and a power of 0.80, two sample sizes were calculated which were 21 and 26. The biggest number (i.e., 26) was considered as the minimum sample size per group. Given a 15% likelihood of participants' withdrawal from the study, sample size was increased to thirty per group.

Instruments Study instruments were a demographic questionnaire (with items on participants' and their patients' characteristics), a researcher-made caregiver satisfaction questionnaire, and the Cohen's Perceived Stress Scale.

The researcher-made caregiver satisfaction questionnaire contained ten items on the satisfaction of the caregivers of patients with mental disorders. Its items were scored on a five-point scale from 1 ("Very much") to 5 ("Very little"). Therefore, the possible total score of the questionnaire was 10–50, with higher scores standing for greater satisfaction. For qualitative content validity assessment of the questionnaire, ten faculty members of Mashhad University of Medical Sciences, Mashhad, Iran (consisting of two psychiatric nurses, three PhD holders in clinical psychology, and five psychiatrists) assessed and provided comments on the items. The items were revised based on the comments. In quantitative content validity assessment, content validity ratio (CVR) and index (CVI) were calculated for the whole instrument which were equal to 0.78 and 0.85, respectively. As the minimum acceptable values of CVR and CVI with ten experts are respectively 0.62 and 0.79 (20), the content validity of the questionnaire was confirmed. The reliability of the questionnaire was assessed through the internal consistency method, in which fifteen family caregivers of patients with mental disorders who had requested EMS in Mashhad, Iran, completed the questionnaire. The Cronbach's alpha of the questionnaire was calculated to be 0.78 which confirmed its acceptable reliability (20).

The fourteen-item Cohen's Perceived Stress Scale was used for stress assessment. This scale has two main dimensions, namely perceived helplessness (items 1–4, 11, 12, and 14) and perceived self-efficacy (items 5–10 and 13). Items are scored on a five-point scale from 0 ("Never") to 4 ("Very often"). Negatively worded items (i.e., items 4–7, 9, 11, and 13) are reversely scored. The possible total score of the scale is 0–56, with higher scores showing higher perceived stress. A former study on patients with cancer in Iran reported the acceptable construct validity and internal consistency of the scale with Cronbach's alpha

values of 0.60 for the perceived helplessness dimension, 0.80 for the perceived self-efficacy dimension, and 0.76 for the whole scale (21). In the present study, the scale was translated into Persian through the forward-backward translation method and its content validity was confirmed by ten faculty members of Mashhad University of Medical Sciences, Mashhad, Iran, with a scale-level CVR and CVI of 0.84 and 0.78, respectively. Internal consistency assessment also showed a Cronbach's alpha of 0.76 which confirmed the acceptable reliability of the questionnaire.

Intervention

Participants in the control group received routine educations provided to all persons who called the EMS center to request EMS for a mentally-ill patient. These educations were mainly about avoidance from irritating the patient and keeping calm until ambulance arrival. Participants in the intervention group received educations about ESM in addition to the routine educations. ESM educations were mainly about stress management at emergency scene before ambulance arrival, ethical considerations respecting aggression, patient and caregiver safety, and patient privacy (Table 1). Educations were provided through two SMS messages and participants were asked to manage the emergency scene based on the provided educations. Educational materials were developed using the existing literature and the educational resources of the Ministry of Health and Medical Education of Iran and were approved by several faculty members in psychiatric nursing, medical emergency, clinical psychology, and psychiatry. After the intervention, participants in both groups completed the study instruments.

Data analysis

The data were analyzed via the SPSS software (v. 25.0). The Kolmogorov-Smirnov test was performed to test normality and the Chi-square, the Fisher's exact, the independent-sample *t*, and the Mann-Whitney *U* tests were performed for between-group comparisons respecting participants' characteristics and the mean scores of perceived stress and satisfaction. The level of confidence was set at more than 0.95.

Results

In total, thirty participants were recruited to each study

Table 1. The content of the two educational SMS messages of the study intervention

Message	Content
First	<ol style="list-style-type: none"> 1- To protect your safety, stand in a place where you can escape at any moment (for example, close to the exit door) 2- Restrict patient's access to objects which can be used for harming (such as knife). 3- Ask police for help in case of severe violence or possible injuries. 4- Reduce environmental stimuli (such as disturbing noises or people).
Second	<ol style="list-style-type: none"> 1- Let the patient understand that he/she has the right to get angry but he/she should not harm others. 2- Explain the reasons of each action. Avoid ridiculing or disrespecting the patient. 3- Never leave the patient alone and avoid eye contact with him/her. 4- Respect patient privacy and avoid talking about his/her personal information in others' presence.

group. During the study, five participants from the control group and six participants from the intervention group did not answer our request for completing the study instruments and hence, they were excluded from the study. Nonetheless, we continued the study until thirty participants in each group completed the study. Accordingly, the study finished with thirty participants in each group (Figure 1).

The mean of participants' age in the intervention and the control groups was 41.7 ± 17.9 and 42.6 ± 14.4 years, respectively. There were no significant differences between the intervention and the control groups in terms of participants' and their patients' characteristics ($P > 0.05$; Table 2).

The results of the independent-sample *t* test illustrated that the mean score of perceived stress in the intervention group was significantly less than the control group ($P = 0.001$; Table 3). Moreover, the same test showed that the mean score of caregiver satisfaction in intervention group was significantly more than the control group ($P = 0.001$; Table 3).

Discussion

The findings of the present study showed that the mean score of perceived stress in the intervention group was significantly less than the control group, implying that SMS-based education about ESM was effective in significantly reducing perceived stress among the family caregivers of patients with mental disorders who requested EMS. In line with this finding, a former study in India reported that education and counseling through mobile phone

and SMS messages significantly reduced stress among patients with diabetes mellitus (22). Another study in Iran found that SMS-based foot care education had significant effects on foot self-care behaviors among patients with type 2 diabetes mellitus (23). Moreover, the results of a study showed that patients with hypertension desired to receive SMS-based messages about stress management (18). These findings confirm the effectiveness of SMS-based education in reducing stress and promoting self-care behaviors and thereby, are in line with the findings of the present study.

Stress is a process in which request is more than individual's capacity and perceived stress is the individual's evaluation of this process (24). As family caregivers have limited knowledge and receive limited education about psychiatric emergency management, they cannot effectively cope with their conditions in psychiatric emergencies and hence, perceive high levels of stress (15). The level of stress perceived by family caregivers in psychiatric emergencies is so high that they widely experience senses of abandonment, double deprivation, and lack of perceived support (25). Therefore, quality ESM educations for family caregivers can reduce their sense of abandonment, improve their ESM, help them better cope with their conditions, and reduce their stress.

Contrary to our findings, a study showed that automatically generated smartphone data had no significant relationship with self-assessed stress among healthy blood donors (26). This contradiction is attributable to the fact that the aim of SMS messages in that study was stress self-assessment, while SMS messages

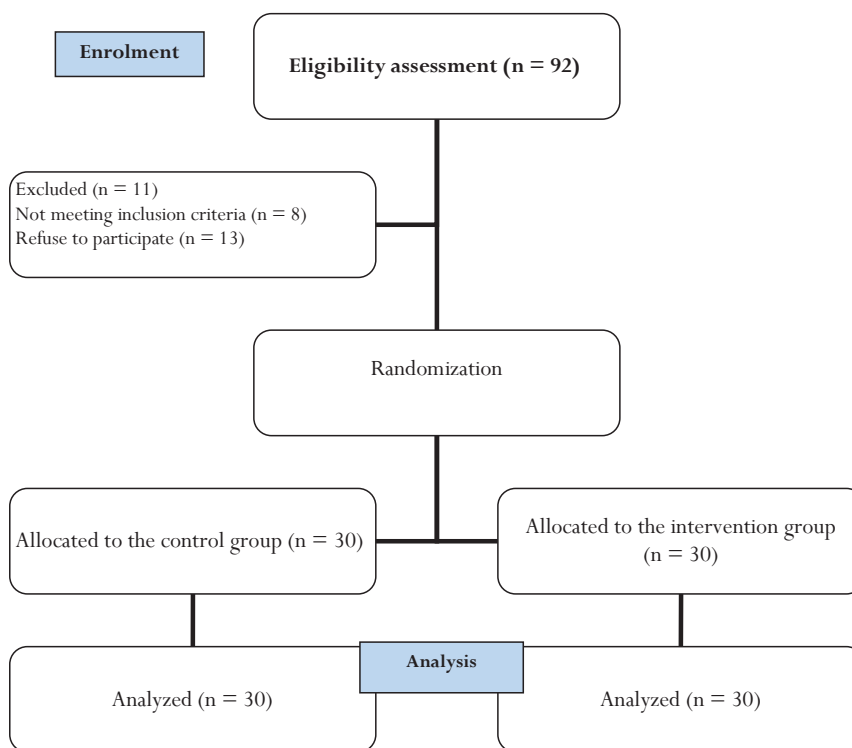


Figure 1. The flow diagram of the study.

Table 2. Between-group comparisons in terms of participants' and their patients' characteristics

Characteristics	Groups		P value	
	Intervention	Control		
	N (%) or Mean \pm SD	N (%) or Mean \pm SD		
Gender	Male	16 (53.3)	12 (40.0)	0.44 ^a
	Female	14(46.7)	18(60.0)	
Educational level	Primary	10(33.3)	12(40.0)	0.51 ^b
	Secondary	10(33.3)	12(40.0)	
	University	10(33.3)	6(20.0)	
Marital status	Single	5(16.7)	4(13.3)	0.23 ^b
	Married	25(83.3)	22(73.3)	
	Widowed	0(0.0)	1(3.3)	
	Divorced	0(0.0)	3(10.0)	
Kinship with patient	Spouse	8(26.7)	6(20.0)	0.66 ^b
	Child	2(6.7)	4(13.3)	
	Father	6(20.0)	4(13.3)	
	Mother	7(23.3)	5(16.7)	
	Other	0(0.0)	11(36.7)	
Age (y)		45.43 \pm 14.15	43.17 \pm 11.94	0.50 ^c
Caregiving duration (y)		8.77 \pm 8.11	9.93 \pm 8.59	0.56 ^d
Gender	Male	18(60.0)	20(66.7)	0.79 ^a
	Female	12(40.0)	10(33.3)	
Educational level	Illiterate	3(10.0)	3(10.0)	0.78 ^b
	Primary	7(23.3)	10(33.3)	
	Guidance school	10(33.3)	6(20.0)	
	High school	8(26.7)	8(26.7)	
Marital status	University	2(6.7)	3(10.0)	0.75 ^b
	Single	8(26.7)	9(30.0)	
	Married	16(53.3)	12(40.0)	
	Widowed	2(6.7)	3(10.0)	
	Divorced	4(13.3)	6(20.0)	
Age (y)		41.67 \pm 17.88	42.60 \pm 14.40	0.33 ^c
Duration of mental disorder (y)		9.30 \pm 8.36	10.60 \pm 8.68	0.48 ^d
Number of hospitalizations		8.77 \pm 8.11	9.93 \pm 8.59	0.45 ^d

^a The results of the Fisher's exact test; ^b The results of the Chi-square test; ^c The results of the independent-sample *t* test; ^d The results of the Mann-Whitney U test.

Table 3. Between-group comparisons in terms of caregivers' perceived stress and satisfaction

Variables	Groups		P value
	Intervention	Control	
Perceived stress	35.67 \pm 6.99	43.13 \pm 9.12	0.001 ^a
Satisfaction	22.93 \pm 4.95	17.03 \pm 3.16	0.001 ^a

^a The results of the independent-sample *t* test.

in the present study aimed at providing ESM educations to reduce family caregivers' perceived stress.

The findings of the present study also showed that the mean score of caregiver satisfaction in the intervention group was significantly more than the control group. This finding implies that the SMS-based ESM intervention of the study had significant positive effects on satisfaction

among the family caregivers of mentally-ill patients who requested EMS. In agreement with this finding, a study reported that psychiatric care services provided through video conference had the potential to significantly enhance satisfaction among patients with mental disorders (27). Another study also showed that SMS-based interventions in mental health care delivery can reduce re-hospitalization rate among patients with deliberate self-harm (28). Several other studies also reported that SMS-based interventions significantly enhanced patient satisfaction in rural outpatient services (17), treatment adherence among patients infected with human immunodeficiency virus (19), satisfaction among pregnant women (29), and self-efficacy among patients receiving hemodialysis (30). Although these studies were conducted in non-emergency conditions, their findings are in line with the findings of

What does this paper contribute to the wider global clinical community?

EMS managers can use the findings of the present study for:

- develop and use SMS-based interventions for improving ESM among the family caregivers of patients with mental disorders
- reducing perceived stress among the family caregivers of patients with mental disorders
- enhancing satisfaction among the family caregivers of patients with mental disorders.

the present study.

One of the study limitations was the refusal of some eligible family caregivers to participate in the study due to their high level of stress. This limitation can reduce the generalizability of the findings.

Conclusion

This study concludes that SMS-based education about ESM can significantly reduce perceived stress and enhance satisfaction among the family caregivers of patients with mental disorders who request EMS.

Authors' contribution

The first and the corresponding authors designed and conducted the study, the third and the fifth authors provided professional advice for conducting the study, and the fourth author performed statistical analysis.

Conflict of interests

The authors reported no conflict of interest.

Ethical Approval

The Ethics Committee of Mashhad University of Medical Sciences, Mashhad, Iran, approved this study (code: IR.MUMS.NURSE.REC.1398.001). The study was also registered in the Iranian Registry of Clinical Trials (identifier: IRCT20181029041489N1). All participants were ensured of the confidentiality of their data and the voluntariness of participation in and withdrawal from the study. They were also informed about the study aim, their questions about the study were answered, and their verbal and written informed consents were obtained.

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