# Effect of telenursing on stress, anxiety and depression in patients with myocardial infarction

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**Abstract**

**Introduction:** These problems along with myocardial infarction (MI) lead to worse physical and mental conditions, poor quality of life, readmission, and premature death. Therefore, the aim of the present study was to investigate the effect of telenursing on stress, anxiety, and depression in MI patients.

**Material and methods:** This quasi-experimental study was performed on 40 MI patients who were selected using simple random sampling and divided into intervention and control groups ($n = 20$ per group). Routine training was given to both groups before discharge. Then a demographic information questionnaire and standard Depression, Anxiety and Stress Scale – 21 Items (DASS-21), which had acceptable validity and reliability, were provided to each patient. The intervention group, in addition to routine training, received an average 10-min telephone follow-up intervention once a week for one month.

**Results:** The mean scores of stress, anxiety, and depression before the intervention were 18.80 ±47.4, 13.60 ±3.7, and 8.60 ±2.89 in the control group, and 20.90 ±6.03, 12.00 ±5.06, and 9.70 ±3.06 in the intervention group respectively, which were statistically significant in both groups after the intervention ($p < 0.001$).

**Conclusions:** The results showed that nurse-led telephone training and follow-up reduce stress, anxiety and depression in MI patients. It is recommended to take into account this method considering the lack of need for travelling, reduction of additional costs, and timely access to information, and training hygiene tips in health care centers.

**Key words:** myocardial infarction, telenursing, depression, anxiety.

## Introduction

Acute myocardial infarction is one of the most common diagnoses of heart disease in developing countries (Najmeh *et al.* 2020). Myocardial infarction (MI) occurs when coronary blood flow is suddenly reduced by blockage of a coronary artery that has already narrowed due to atherosclerosis. The number of cases of MI progressively increases with age and the presence of other risk factors such as hypertension, smoking, and diabetes (Carroll *et al.* 2003) so that approximately 1.5 million people suffer from MI in the United States each year, and the subsequent death rate is about 30%. In Iran, these diseases are the leading cause of death in people over 35 years of age (Rejeh *et al.* 2015). Despite rapid

diagnostic and therapeutic advances, one-third of MI patients still die and two-thirds of those who survive do not fully recover. Thus, this disease imposes a huge cost on health care systems (Shahsavari *et al.* 2013). On the other hand, more than 50% of patients need rehabilitation and other treatment measures following MI (Vahedian-Azimi *et al.* 2015). Since the physician forbids a person with MI from performing physical activities, especially strenuous ones, this physical inactivity causes mental disorders such as depression (Raufi *et al.* 2015).

Depression is a common disease associated with cardiovascular diseases (Rezaie *et al.* 2017). Undoubtedly, depression along with MI leads to worse physical and mental conditions, poor

quality of life, readmission, and premature death (Vaezzadeh *et al.* 2013). Feng *et al.* (2016) also reported high prevalence of anxiety and depression during the first two years after MI and this anxiety increases the risk of recurrent MI by 3.9 times. The results of a study in Iran showed that prevalence of post-MI depression was 48% (Bagherian *et al.* 2010). In a similar domestic study on 50 patients admitted to the coronary care unit, Allabadi *et al.* (2019) found that the prevalence of depressive and anxiety symptoms in cardiac patients was 47% and 68%, respectively. The anxiety in cardiac patients is firstly due to diagnosis and treatment, and then to lack of health and disruption of roles and relationships (Afrasiabi *et al.* 2020). Also, in these patients, various stressors reduce individual resistance and can have unpleasant effects on the physical and mental health of individuals in the long run by exerting a negative impact on the individual and social coping resources. It has been shown that stress can lead to the occurrence of physical and mental illnesses, dysfunction, adaptability, and ultimately lower quality of life (Naderifar *et al.* 2017).

The results of a study by Canli Ozer *et al.* (2009) showed that 34% of coronary care unit (CCU) patients experience severe stress. Today, although pharmacological methods are used to reduce consequences such as stress, anxiety and depression in cardiac patients, these methods can be associated with some side effects (Nikpayma *et al.* 2017).

The ideal treatment for ischemic heart disease involves the application of multilateral pharmacological measures, surgery, control of risk factors, and lifestyle modification that lead to the empowerment of these patients (Boroumand *et al.* 2015). In this regard, health care providers, including nurses, can help patients with chronic diseases such as MI by having counseling and education programs (Salavati *et al.* 2017). Telenursing provides long-distance education for patients. Since the patient is responsible for self-care at home after discharge and cannot achieve the desired treatment without the necessary guidance, telenursing allows patients to overcome these problems (Elham *et al.* 2011). Telenursing refers to the use of telecommunication technology to improve patient care and enhance patient-nurse communication (Kamrani *et al.* 2015). The use of this technology leads to rapid patient access to better services and a comprehensive increase in the quality of health care services provided to patients. Post-discharge telephone calls are helpful in identifying and correcting care gaps that may occur after discharge (Forouzesh *et al.* 2017). It is also used as a suitable tool for exchanging information, giving education and health awareness, managing the symptoms of the disease, providing rapid diagnosis of complications, and reassuring the patient and his/her family (Raziani *et al.* 2017). The results of studies of patients with cardiovascular disorders also showed that telenursing is a safe, low-cost method in educating and pursuing patient care that increases adherence to the treatment programs in developing countries such as Iran (Shirkosh and Rostami 2017). Therefore, the aim of the present study was to investigate the effect of telenursing on stress, anxiety, and depression in MI patients.

## Material and methods

### Study design

This before and after quasi-experimental study was performed on MI patients admitted to Amir Al-Momenin Hospital in Zabol in 2019. The samples were selected using a simple random sampling method and were divided into intervention and control groups ($n = 20$ people).

### Instrument

Instruments and methods of data collection included a demographic characteristics questionnaire (age, sex, place of residence, marital status, level of education, insurance status, employment status, history of other diseases, duration of illness and duration of treatment) and the standard Depression, Anxiety and Stress Scale – 21 Items (DASS-21). To score this questionnaire, we first score each phrase in the following order: very true of me (score 3), significantly true of me (score 2), somewhat true of me (score 1), and it is not true about me at all (score 0). In this questionnaire, the scores of stress, anxiety, and depression subscales were calculated by summing up the scores of questions 1, 6, 8, 11, 12, 14, 18, and 2, 4, 7, 9, 15, 19, 20, and 3, 5, 10, 13, 16, 17, 21, respectively. Since this questionnaire is a shortened form of the main scale (42 questions), the final score of each subscale should be doubled. After doubling the score of each of the subscales, the scores were interpreted as follows: Stress subscale: 0-14 (normal), 15-18 (mild), 19-25 (moderate), 33-36 (severe), and 33 and above (very severe); Anxiety subscale: 0-7 (normal), 8-9 (mild), 10-14 (moderate), 15-19 (severe), and 20 and above (very severe); Depression sub-scale: 0-9 (normal), 10-13 (mild), 14-20 (moderate),

21-27 (severe), and 28 and above (very severe) (Lovibond *et al.* 1995). The psychometric properties of DASS-21 have been assessed in several studies, including the study by Henry and Crawford (2005) using a large English sample size ($n = 1794$ people). In their study, Cronbach's α of the whole scale as well as the three scales of depression, anxiety and stress subscales were 0.93, 0.88, 0.82, and 0.90, respectively.

### Ethical considerations

After approval of the project by the Research Council of the School of Nursing and Midwifery and after obtaining the code of ethics (IR.ZBMU. REC.1397.213) from the Ethics Committee of Zabol University of Medical Sciences, the researcher collected data.

### Data collection

To this end, the researcher referred to CCU2, CCU1, and PCCU wards of Amir Al-Momenin Hospital in Zabol and selected the MI patients who were discharged from the hospital and met the inclusion criteria. The method of study was explained to them and they were informed that they could withdraw from the study at any stage if they did not want to continue the cooperation and their informed written consent was taken from them. Then, both the demographic infor- mation questionnaire and DASS-21 were given to each patient in the intervention and control groups. Routine training was given to both groups before discharge. The intervention group, in addition to the routine training, received an average 10-min telephone follow-up intervention once a week for one month (Farazmand *et al.* 2017). The patient was instructed on diet, fluid intake, medication regimen, activity, and rest, follow-up treatment, and reduction of anxiety and stress during the telephone call. The re- searcher's contact number was also provided to patients so that they could ask their questions. Finally, DASS-21 was given to the intervention group. DASS-21 was also given to the control group after one month without any educational intervention and their performance compared with the intervention group.

### Data analysis

Data analysis was carried out using $\chi^2$, inde- pendent *t*-test, and ANCOVA in SPSS ver. 25. *P*-value $< 0.05$ was considered as the signifi- cance level in all tests.

## Results

The findings showed that most of the sub- jects participating in both intervention and control groups were male, married, resident in

**Table 1.** Frequency distribution of demographic and clinical characteristics in control and intervention groups

| Variable | | Number (%) | | Significance level |
|---|---|---|---|---|
| | | Intervention | Control | |
| Sex | female | 7 (35) | 4 (20) | 0.288 Z = 1.12 |
| | male | 13 (65) | 16 (80) | |
| Marital status | married | 20 (100) | 20 (100) | 1.000 Z = 0 |
| Place of residence | village | 9 (45) | 7 (35) | 0.519 Z = 0.417 |
| | city | 11 (55) | 13 (65) | |
| Insurance | no | 3 (15) | 0 | 0.115 Z = 3.24 |
| | yes | 17 (85) | 20 (100) | |
| Level of education | elementary | 11 (55) | 15 (75) | 0.105 Z = 5.82 |
| | middle school | 7 (35) | 1 (5) | |
| | diploma | 1 (5) | 2 (10) | |
| | bachelor | 1 (5) | 2 (10) | |
| Past medical history | no | 6 (30) | 5 (25) | 0.723 Z = 0.12 |
| | yes | 14 (70) | 15 (75) | |
| Job | employee | 2 (10) | 2 (10) | 0.770 Z = 1.67 |
| | self-employed | 11 (55) | 13 (65) | |
| | housewife | 6 (30) | 3 (15) | |
| | unemployed | 1 (5) | 2 (10) | |

Table 2. Mean and standard deviation of age, duration of infection and treatment in intervention and control groups

| Variable | Mean (SD) | | 95% confidence interval | Significant level |
|---|---|---|---|---|
| | Intervention | Control | | |
| Age | 54.80 (6.73) | 54.50 (9.05) | −4.80, 5.40 | 0.906 $t = 0.119$ |
| Duration of infection | 4.42 (1.86) | 4.26 (2.15) | −1.37, 1.70 | 0.831 $t = 0.21$ |
| Duration of treatment | 4.42 (1.86) | 3.93 (2.25) | −1.07, 2.07 | 0.526 $t = 0.64$ |

the city, self-employed and had insurance and an elementary education level. The majority also had a history of diabetes, hypertension, and hyperlipidemia and were self-employed (Table 1).

Independent $t$-test showed no statistically significant difference between the two groups in terms of age ($p = 0.0906$), duration of infection ($p = 0.831$) or duration of treatment ($p = 0.526$) ($p > 0.05$) (Table 2).

Independent $t$-test did not show a significant difference between the two groups in terms of stress ($p = 0.219$), anxiety ($p = 0.262$), or depression scores ($p = 0.120$) before the intervention. Mean stress scores were 18.80 ±4.47 and 15.50 ±6.92 in the control group before and after the intervention and 20.90 ±6.03 and 9.60 ±2.01 in the intervention group. Mean anxiety scores were also 11.40 ±4.21 and 13.60 ±3.7 in the control group and 12 ±5.06 and 4.7 ±2.27 in the intervention group after the intervention. Finally, the mean depression scores were 8.60 ±2.89 and 5.3 ±3.14 in the control group and 9.70 ±3.06 and 2.90 ±2.46 in the intervention group, which was statistically significant in both groups after the intervention. ANCOVA test also showed a statistically significant difference between the two groups in terms of the mean post-intervention scores (Table 3).

## Discussion

The data from the present study showed that the mean age of MI patients is 54 years, which is similar to the mean age of MI patients (54 years) in the study of Hatami et al. (2020). The mean age of MI patients was 58 years in studies by both Rahimi et al. (2020) and Faraji et al. (2015). Also, in a review study of Rahimzadeh et al. (2017) on MI patients in Iran (2017), the mean age of patients was higher (62.4 years). However, the mean age of MI patients in the present study was lower, which could be due to the different lifestyles of the people of this region, the breadth of the study, and sample size. The results also revealed that most of the MI patients in both intervention and control groups were male, which is consistent with the results of other studies such as studies carried out by Rahimi et al. (2020) and Akbari et al. (2015).

The results showed that the mean scores of stress, anxiety and depression before the telephone follow-up intervention (tele-nursing) were 18.80 ±4.47, 13.60 ±3.7, and 8.60 ±2.89 in the control group, and 20.90 ±6.03, 12 ±5.06, and 9.70 ±3.06 in the intervention group, respectively, which indicates moderate to severe stress, severe anxiety and mild depression. Moreover, the mean stress, anxiety and depression

Table 3. Mean and standard deviation or 95% confidence interval of pre-intervention, post-intervention, and adjusted stress, anxiety, and depression scores in control and intervention groups

| Variable | | Mean (SD) | | 95% confidence interval | Significance level |
|---|---|---|---|---|---|
| | | Intervention | Control | | |
| Stress | pre-intervention | 20.90 (6.03) | 18.80 (4.47) | −1.29, 5.49 | 0.219, $t = 1.25$ |
| | post-intervention | 9.60 (2.01) | 15.50 (6.92) | −9.16, −2.63 | 0.001, $t = -3.65$ |
| | adjusted | 9.22 (7.03, 11.43) | 15.87 (13.67, 18.07) | 3.50, 9.78 | < 0.001, $F = 18.37$ |
| Anxiety | pre-intervention | 12 (5.06) | 13.60 (3.7) | −4.44, 1.24 | 0.262, $t = -1.14$ |
| | post-intervention | 4.7 (2.27) | 11.40 (4.21) | −8.86, −4.53 | < 0.001, $t = -6.26$ |
| | adjusted | 5.05 (3.77, 6.33) | 11.04 (9.77, 12.32) | 4.17, 7.81 | < 0.001, $F = 44.52$ |
| Depression | pre-intervention | 9.70 (3.06) | 8.60 (2.89) | −0.40, 3.40 | 0.120, $t = 1.5$ |
| | post-intervention | 2.90 (2.46) | 5.3 (3.14) | −4.01, −0.39 | 0.018, $t = -2.46$ |
| | adjusted | 2.76 (1.47, 4.06) | 5.23 (3.94, 6.53) | 0.61, 4.32 | 0.011, $F = 7.24$ |

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scores were significantly lower in the intervention group compared to the control group after the intervention. This positive effect could be due to the appropriateness of the intervention duration in the present study and appropriate telephone training based on the needs of each patient (telenursing). Similar studies confirm the findings of the present study. Jahromi *et al.* (2016) investigated the effect of nurse-led telephone follow-up (telenursing) on depression, anxiety, and stress of hemodialysis patients. They reported a significance difference between the two groups in terms of mean stress, anxiety and depression scores after the intervention, that is, these scores were lower in that the intervention group than the control group. The results of this study emphasize the importance of nurse support in improving the mental health of patients, especially those living in remote areas (Jahromi *et al.* 2016). Consistent with Jahromi's study, the present study showed a reduction in patients' levels of stress, anxiety, and depression after telephone follow-up intervention. In a study of the effect of telenursing on the level of anxiety of intensive care unit (ICU) patients, Imani *et al.* (2015) found that the mean anxiety scores decreased after the telephone intervention. According to the positive results of this study and since the telephone is available in most of the clients' homes today on the one hand, and it is easy to use and available on the other hand, it is recommended to include this technology in the field of nursing care and education (Imani *et al.* 2015). In a study entitled "Comparison of patient education and nurse-led telephone follow-up on the anxiety of patients with heart failure", Shojaee *et al.* (2014) found that telephone follow-up intervention reduces patients' anxiety more effectively. Therefore, it was recommended to implement telephone follow-up intervention to reduce patients' anxiety level. Consistent with the present study is a study of the effect of continuous telephone care on readmission and depression of patients undergoing open heart surgery in selected hospitals of the Army of the Islamic Republic of Iran. Zolfaghari *et al.* (2017) showed that this intervention reduces the incidence of depression and readmission of these patients. Therefore, the use of follow-up telephone care is recommended (Zolfaghari *et al.* 2017). On the other hand, in a study comparing the effect of telenursing on the level of depression and anxiety among caregivers of stroke patients, Goudarzian *et al.* (2018) found a statistically significant difference between the intervention and the control

groups in terms of the post-intervention anxiety score, indicating that the telenursing intervention significantly reduced anxiety in patients; however, there was no statistically significant difference between intervention and control groups in terms of the depression scores, so it is not consistent with the present study, which could be due to differences in the intervention duration. Since one of the key nursing aims is patient care, it can be concluded that the nurse can play this role completely by following the patients after discharge. It should be noted that individual differences, patients' previous knowledge and experiences, inability to match and control confounding variables were among the limitations of the present study.

## Conclusions

The results of the present study showed that nurse-led telephone training and follow-up reduce stress, anxiety, and depression among MI patients. Therefore, it is suggested to use this method considering the lack of time and space constraints, no need for travel, and reduction of additional costs, and timely access to information and training of care tips in healthcare centers.

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## Disclosure

The authors declare no conflict of interest.

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