



# Determination of the Alexithymia in Patients with Myocardial Infarction

## Miyokard Enfarktüsü Geçiren Hastalarda Aleksitiminin Belirlenmesi

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### ABSTRACT

**Objective:** The aim of this study was to determine alexithymia and related factors in patients with myocardial infarction.

**Methods:** A cross-sectional and descriptive study including 211 patients was conducted between June and November 2016. Data were collected using a face-to-face interview method with "Patient Information Form" and Toronto Alexithymia scale-20. The number, percentage, mean, standard deviation, t-test, Mann-Whitney U test, Kruskal-Wallis and Bonferroni test were used to evaluate the data.

**Results:** Patients with myocardial infarction have alexithymic features. Gender, educational level, place of residence, working status, income level, duration of coronary artery disease and hypertension affected the "Toronto Alexithymia scale-20" point average ( $p<0.05$ ). Also, gender, education level, working status, income level and tell someone else about disease affect patients' "difficulty in recognizing emotions"; the use of alcohol affects the "difficulty of expressing emotions", the age and working status affect the "externally-oriented thinking" ( $p<0.05$ ).

**Conclusion:** Attention should be paid to the effect of alexithymic features on the diagnosis and treatment of myocardial infarction due to the presence of alexithymic features in patients with myocardial infarction and the presence of many factors affecting these features.

**Keywords:** Myocardial infarction, alexithymia, patient

### ÖZ

**Amaç:** Bu çalışmanın amacı miyokard enfarktüsü geçiren hastalarda aleksitimi ve ilişkili faktörleri belirlemektir.

**Yöntemler:** Kesitsel ve tanımlayıcı nitelikteki bu çalışma, Haziran-Kasım 2016 tarihleri arasında 211 hasta ile yapıldı. Veriler, yüz yüze görüşme tekniği kullanılarak "Hasta Bilgi Formu" ve "Toronto Aleksitimi ölçeği-20" ile toplandı. Verilerin değerlendirilmesinde sayı, yüzde, ortalama, standart sapma, Mann-Whitney U, Kruskal-Wallis ve Bonferroni testi kullanıldı.

**Bulgular:** Miyokard enfarktüsü geçiren hastalar aleksitimik özelliklere sahiptir. Cinsiyet, eğitim düzeyi, yaşanılan yer, çalışma durumu, gelir düzeyi, koroner arter hastalığı süresi ve hipertansiyon, "Toronto Aleksitimi ölçeği-20" toplam puan ortalamalarını etkilemektedir ( $p<0.05$ ). Ayrıca, cinsiyet, eğitim düzeyi, çalışma durumu, gelir düzeyi ve hastalığını anlatma hastaların "duygularını tanıma güçlüğü" etkilerken; alkol kullanımı "duygularını ifade etme güçlüğü", yaş ve çalışma durumu ise "dışa dönük düşünmeyi" etkilemektedir ( $p<0.05$ ).

**Sonuç:** Miyokard enfarktüsü geçiren hastaların aleksitimik özellikler göstermesi ve bu özellikleri etkileyen fazla sayıda faktörlerin varlığı nedeniyle aleksitimik özelliklerin miyokard enfarktüsünün tanı ve tedavi sürecindeki etkisine dikkat edilmelidir.

**Anahtar Sözcükler:** Miyokard enfarktüsü, aleksitimi, hasta

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**Received:** 29.03.2019

**Accepted:** 14.06.2019

**Cite this article as:** Türkmen A, Hintistan S. Determination of the Alexithymia in Patients with Myocardial Infarction. Bezmialem Science 2020;8(1):39-47.

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## Introduction

Myocardial infarction (MI) is still one of the most important health problems today despite improvements in diagnosis and treatment. In recent years, the interaction between emotional diseases and heart diseases has been noted, and the connection of mental disorders with cardiac diseases has been pointed out (1).

Alexithymia affects the onset, course and recovery of the disease, especially when it occurs with psychological and physical syndromes. In Greek, the concept of alexithymia, which consists of a combination of words meaning a=no, lexis=word, thymos=feeling, is defined as “absence of words for emotions”. The ability to regulate signals coming from the body is impaired due to the inability to recognize and understand emotions in alexithymide, and problems with experiencing, recognizing and understanding physical and psychological symptoms develop (2,3). People with alexithymia have difficulty in recognizing their feelings, putting them into words, distinguishing one emotion from another, paying more attention to details by moving away from their inner world due to limitations in their ability to dream, and arranging their actions and thoughts according to external stimuli. Their inability to distinguish their emotional arousal from their physical arousal is often explained by their use of physical symptoms to express their feelings (3,4). They may also face the risks of not being able to receive effective treatment on time in the event of a physical and emotional illness (5,6). Therefore, sensitivity to bodily symptoms and emotions plays an important role in symptom perception, treatment and care process (2).

Different studies have reported a close relationship between cardiac diseases and alexithymia (1,7-9). Oxygen deprivation in MI requires urgent medical attention and causes damage to heart tissue and death of tissue, which requires urgency for early diagnosis and reperfusion treatment for good prognosis. Therefore, it is necessary for patients to be aware of their symptoms, to recognize and distinguish their symptoms as soon as possible, to seek help and to reach medical intervention (5,10). However, alexithymic features in MI increase medical admissions by causing higher perception of physical symptoms and increase mortality by preventing patients from taking appropriate treatment (1). Furthermore, the tendency for low somatic and emotional awareness in alexithymia reduces the perception and/or reporting of cardiac symptoms, thus causing excessive delays in receiving medical attention (4). Early recognition of symptoms such as chest pain, respiratory distress, sweating, nausea and vomiting, which are the first symptoms in MI, is very important for the initiation of life-saving interventions (5). However, patients with alexithymia may lose the chance of early treatment due to their inability to recognize cardiac symptoms (1,5). The ability of patients to accurately and timely describe their cardiac problems facilitates treatment and care possibilities. For this reason, it is very important for patients having MI to recognize and describe their feelings (5,10). A study found a significant relationship between somatic and emotional awareness and delay in admission of patients having MI, and it was determined that patients who were unable to describe their emotions, bodily

sensations and internal experiences were admitted to the hospital later for MI symptoms (10). In another study, alexithymia scores of patients who had previous MI were significantly higher than those who had acute MI (7).

It has been reported that recognizing and expressing emotions are important factors affecting the outcome of treatment and care, and therefore alexithymia is a guiding factor in the clinical treatment of patients (11). For this reason, the physical and psychological symptoms of patients with physical and emotional problems should be examined, and the contribution of the characteristics of alexithymia to these symptoms should be determined. In addition, it is thought that the determination of alexithymia is important in assessing treatment compliance and treatment outcomes in MI. The aim of this study was to determine the relationship of alexithymic characteristics with sociodemographic and disease characteristics of patients having MI.

## Methods

### Type and Location of Research

This cross-sectional and descriptive study was carried out at the coronary intensive care unit (CICU) of the Ahi Evren Chest and Cardiovascular Surgery Training and Research Hospital in Trabzon.

### Universe and Sample Size of Research

The universe of the study consisted of 1200 patients staying in CICU with a diagnosis of MI between January 1, 2015 and December 31, 2015 at The Trabzon Ahi Evren Chest and Cardiovascular Surgery Training and Research Hospital. Statistical analysis was performed using the OpenEpi program to determine the sample size of the study with a strength of 80% in the 95% confidence interval and it was found that at least 211 patients should be included in the study (12). The sample of the study was composed of patients who were aged 18 or over, were staying in CICU due to diagnosis of MI and whose discharge was planned, who could communicate in Turkish, did not have a previous psychiatric condition that required treatment, had orientation to person, place and time.

### Data Collection Tools

The data was collected using the “Patient Data Form” and the “Toronto Alexithymia scale (TAS-20)”.

### Patient Data Form

The Patient Data Form which was created by the researchers by scanning the literature consisted of two parts (1-11). The first section contained 10 questions to determine the characteristics of the patients (gender, age, marital status, education level, living place, working status, income level, people living together, smoking and alcohol use); the second section contained a total of 16 questions, including six questions to determine the patient’s disease characteristics [duration of coronary artery disease (CAD)], previous hospitalization due to MI, number of MI episodes, being able to describe the disease, being able

to recognize the symptoms of MI and seek help, presence of diabetes and hypertension).

**Toronto Alexithymia Scale (TAS-20)**

TAS-20 is a likert type, self-assessment scale consisting of 20 items which are rated between 1-5. TAS-20 was developed by Bagby et al. (13). The Turkish validity and reliability study of TAS-20 was performed by Sayar et al. (14). It was found that the cut-off score was 61 and the cronbach alpha internal consistency coefficient was 0.78 (14). TAS-20 explores alexithymia, which means that the individuals cannot be aware of their emotions and excitement. TAS-20 has three subscales: “difficulty in recognizing emotions (TAS-1)”, “difficulty in expressing emotions (TAS-2)”, and “outward thinking (TAS-3)”. The TAS-1 subscale consists of seven questions (questions: 1,3,6,7,9,13,14;7-35 points) evaluating difficulty in identifying emotions and distinguishing them from the bodily sensations that accompany emotional arousal (I cannot fully describe the feelings I have). The TAS-2 subscale consists of five questions (questions: 2,4,11,12,17;5-25 points) evaluating difficulty in transferring emotions to others (it is very difficult for me to find the right words for my feelings). The TAS-3 subscale consists of eight questions (questions: 5,8,10,15,16,18,19,20;8-40 points) evaluating the presence of an extroverted cognitive structure, the weakness of introverted thinking and imagination (I prefer to talk about people’s daily life activities rather than their emotions). The individual is asked to mark the most appropriate of the “never”, “rarely”, “sometimes”, “often” and “always” options for each question. The total score is between 20-100. High scores indicate a high alexithymic level. The alpha internal consistency coefficient of TAS-20 for this study is 0.65.

**Implementation of Data Collection Tools**

The patient data form and TAS-20 were applied to patients who were aged 18 or over, were staying in CICU due to diagnosis of MI and whose discharge was planned, who could communicate in Turkish, did not have a previous psychiatric condition that required treatment, had orientation to person, place and time with face-to-face interview method between June-November 2016. The face-to-face interview with the patients was conducted in a special room reserved for the interview with each patient in the CICU. The questions in the patient data form and TAS-20 were asked by the researcher and the responses were recorded in the relevant forms. The patient data form and TAS-20 took about 20 minutes to complete.

**Evaluation of Data**

Statistical analysis of data was done with SPSS Software for Windows (version 18.0; SPSS Inc., Chicago, IL) Statistics Package Program. Continuous variables were given as mean, standard deviation, (minimum-maximum values), and categorical variables as numbers (percentages). Normal distribution of the data was evaluated by Kolmogorov-Smirnov test and Homogeneity of variance analysis. The Mann-Whitney U test was used to compare binary groups without normal distribution and the Kruskal-Wallis test was used to compare three or more

groups without normal distribution. In comparison of three or more groups, the Bonferroni correction was performed to determine from which two subgroups this difference originated. P<0.05 was accepted as statistical significance value.

**Ethical Aspect of Research**

The study was approved by the Ethics Committee for Clinical Research of the University of Health Sciences Kanuni Training and Research Hospital (number: 23618724/03.06.2016). In addition, informed consent was obtained from the patients participating in the study and the necessary institution permission was obtained from the hospital where the research was conducted by submitting a data form containing the purpose and scope of the research (number: 96975576/10.05.2016). Considering the principle of “respect for human dignity” in the study, the participants were informed that data about themselves would not be disclosed to others and adhered to the “principle of confidentiality”. In addition, volunteerism was based on the participation of patients in the study, and patients who did not agree to participate in the study were not included in the study.

**Results**

The average TAS-1 score was 18.4±7.1, TAS-2 score 16.5±3.3, TAS-3 score 30.8±4.5 and TAS-20 total score was 65.2±11.6 (Table 1).

The Mann-Whitney U test showed that TAS-1 score (U=3083.5, p=0.012) and TAS-20 total score (U=3027.0, p=0.008) were significantly higher in men than in women. When patients were examined for alexithymic characteristics according to their age, there was a significant difference between the groups in terms of the TAS-3 subscale (X<sup>2</sup>kw=7.266, p=0.026) and the Bonferroni test performed to determine from which group this difference originated showed that this difference was due to those aged 60 or below and those in the 61-69 age range (p=0.024). The Kruskal-Wallis test was performed to determine if the difference between TAS-20 subscale and total score averages was significant according to the level of education variable, and a significant difference was found between education level and TAS-1 score (X<sup>2</sup>kw=19.106, p=0.001). This difference was caused by college graduates and illiterate ones (p=0.000). In addition, there was a significant difference between the educational level and the TAS-20 total score average (X<sup>2</sup>kw=18.290, p=0.001) and the Bonferroni test results showed that this difference was found between university graduates and primary school graduates (p=0.009), and between

**Table 1. TAS-20 subscale and total score averages of patients (n=211)**

TAS-20	X ± SD	Med (Min-max)
TAS-1	18.4±7.1	17 (7-35)
TAS-2	16.5±3.3	17 (8-25)
TAS-3	30.8±4.5	31 (15-40)
TAS-20 total	65.2±11.6	64 (1-92)

TAS-1, difficulty in recognizing emotions, TAS-2, difficulty in expressing emotions, TAS-3, outward thinking, TAS-20, Toronto alexithymia scale-20 total, SD: Standart deviation, Min: Minimum, Max: Maximum

university graduates and illiterates ( $p=0.000$ ). It was determined that there was a significant difference between the groups in terms of TAS-20 total score average according to the places where they were living ( $X^2_{kw}=6.393$ ,  $p=0.041$ ) and that this difference was due to those living in the province and those living in the village ( $p=0.038$ ). The TAS-1 score ( $U=3289.0$ ,  $p=0.005$ ), TAS-3 score ( $U=3094.0$ ,  $p=0.001$ ) and TAS-20 total score averages ( $U=2826.5$ ,  $p=0.000$ ) were significantly higher in working patients than in non-working patients. There was a significant difference between different income levels in terms of TAS-1 ( $X^2_{kw}=16.911$ ,  $p=0.000$ ) and TAS-20 score averages ( $X^2_{kw}=18.806$ ,  $p=0.000$ ). The Bonferroni test showed that the

differences in terms of TAS-1 score were between those whose income was higher than expense and those whose income was lower than expense ( $p=0.006$  and  $p=0.001$ , respectively) and that the differences in terms of TAS-20 total score were between those whose income was equal to expense and those whose income was lower than expense ( $p=0.003$  and  $p=0.008$ , respectively). The Mann-Whitney U test showed a significant difference between patients with alcohol use and patients without alcohol use in terms of the scores of TAS-2 ( $U=820.5$ ,  $p=0.027$ ).

Marital status, smoking and people they were living together did not significantly affect the TAS-1, TAS-2 and TAS-3 score averages and TAS-20 total score average ( $p>0.05$ ) (Table 2).

**Table 2.** TAS-20 subscale and total score averages according to the characteristics of the patients (n=211)

Features	n (%)	TAS-1 X ± SD	TAS-2 X ± SD	TAS-3 X ± SD	TAS-20 total X ± SD
<b>Gender</b>					
Woman	50 (23.7)	22.0±21.2	17±16.9	32±31.6	69±69.4
Man	161 (76.3)	17±17.5	17±16.4	31±30.5	64±63.9
	U	3083.5	3609.5	3338.0	3027.0
	p	0.012*	0.267	0.067	0.008**
<b>Age</b>					
≤60 years	88 (41.7)	18.2±7.2	16.2±3.4	30.0±4.2	63.2±12.3
61–69 years	55 (26.1)	17.7±7.3	16.5±3.3	32.1±3.8	66.2±10.3
≥70 years	68 (32.2)	19.3±6.8	16.8±3.3	30.8±5.1	66.9±11.5
	X <sup>2</sup> <sub>kw</sub>	1.883	1.122	7.266	2.751
	p	0.390	0.571	0.026*	0.253
<b>Marital status</b>					
Married	204 (96.7)	17.0±18.5	17.0±16.5	31.0±30.9	65.0±65.5
Single	7 (3.3)	16.0±15.8	17.0±15.4	28.0±28.8	62.0±57.0
	U	579.5	593.5	493.5	490.5
	p	0.396	0.445	0.163	0.159
<b>Education level</b>					
Illiterate	35 (16.5)	23.0±22.5	17.0±16.8	32.0±31.0	70.0±70.4
Literate	9 (4.2)	20.0±21.1	15.0±15.7	30.0±30.1	67.0±61.4
Primary school	119 (56.3)	17.0±18.2	17.0±16.8	31.0±31.4	65.0±66.1
Secondary school	21 (9.9)	17.0±16.8	17.0±16.9	29.0±29.9	64.0±61.9
College	27 (13.1)	13.0±14.5	14.0±14.7	28.0±28.8	58.0±58.2
	X <sup>2</sup> <sub>kw</sub>	19.106	7.831	7.920	18.290
	p	0.001**	0.098	0.095	0.001**
<b>Place of residence</b>					
Village	40 (18.9)	20.7±7.3	17.3±3.3	31.3±4.2	69.6±10.4
Town	75 (35.5)	17.6±6.6	16.5±3.2	31.1±4.5	64.1±12.1
City	96 (45.6)	18.1±7.2	16.1±3.4	30.4±4.5	64.1±11.4
	X <sup>2</sup> <sub>kw</sub>	4.616	3.820	1.750	6.393
	p	0.099	0.148	0.417	0.041*
<b>Working status</b>					
Working	57 (27.0)	16.1±6.2	16.1±3.3	29.2±4.2	59.5±12.6
Not working	154 (73.0)	19.3±7.2	16.7±3.3	31.4±4.4	67.3±10.5

Table 2 continued

	U	3289.0	3926.0	3094.0	2826.5
	p	0.005**	0.236	0.001**	0.000***
<b>Income level</b>					
Income higher than expense	19 (9.0)	14.8±6.3	15.0±3.9	29.1±3.5	56.7±11.6
Income equal to expense	61 (28.9)	16.1±5.4	16.3±3.1	30.4±4.6	62.3±8.5
Income lower than expense	131 (62.1)	20.1±7.4	16.8±3.3	31.2±4.5	67.7±12.1
	X <sup>2</sup> kw	16.911	3.691	5.434	18.806
	p	0.000***	0.158	0.066	0.000***
<b>People living together</b>					
Alone	23 (10.9)	21.2±8.2	17.4±2.9	31.7±4.5	69.6±15
Partner	121 (57.3)	18.2±6.9	16.6±3.5	31.1±4.6	65.7±10.6
Partner and kids	57 (27.0)	17.8±7.1	15.8±3.1	30.1±4.0	62.4±12.1
Partner, kids and family elders	10 (4.8)	18.3±6.5	16.3±3.3	29.5±4.7	64.1±9.4
	X <sup>2</sup> kw	2.718	3.964	3.535	7.283
	p	0.437	0.265	0.316	0.063
<b>Smoking status</b>					
Smoking	94 (44.5)	17.6±6.7	16.1±3.4	30.5±4.4	63.5±12
Not smoking	117 (55.5)	19.1±7.3	16.8±3.2	31.1±4.5	66.5±11.2
	U	4899.5	4825.0	5015.5	4886.0
	p	0.173	0.123	0.271	0.164
<b>Alcohol use</b>					
Using	13 (6.1)	18.2±3.4	14.6±2.9	29.4±4.1	58.4±11.6
Not using	198 (93.9)	18.4±7.3	16.6±3.3	30.9±4.5	65.6±11.1
	U	1196.5	820.5	1041.0	1062.5
	p	0.671	0.027*	0.247	0.292

TAS-1, difficulty in recognizing emotions, TAS-2, difficulty in expressing emotions, TAS-3, outward thinking, TAS-20, Toronto alexithymia scale-20 total, U: Mann-Whitney U test, X<sup>2</sup>kw: Kruskal-Wallis test, \*p<0.05, \*\*p<0.01, \*\*\*p<0.001, SD: Standart deviation

The difference between CAD duration and TAS-20 subscale and total score averages was evaluated by the Kruskal-Wallis test and significant difference was found between CAD duration and TAS-20 total score average (X<sup>2</sup>kw=9.701, p=0.021). In further analysis, it was determined that this difference was between patients with CAD duration less than one year and patients with CAD duration of 1-5 years (p=0.019). The Mann-Whitney U test showed that the TAS-1 score average (U=231.5, p=0.035) was significantly higher in patients who could describe their disease than in patients who could not and that TAS-20 total score average (U=4334.0, p=0.035) was significantly higher in patients with hypertension than in patients without hypertension.

The patients' previous hospitalization due to MI, the number of MI episodes, the ability to recognize MI symptoms and seek help, and the presence of diabetes did not significantly affect the TAS-1, TAS-2 and TAS-3 score averages and TAS-20 total score average (p>0.05) (Table 3).

## Discussion

In our study, patients having MI were found to have alexithymic features. This result suggested that patients were not adequate

in recognizing and correlating their bodily sensations, tended to focus on somatic sensations and reported these sensations as physical discomfort or other distinct symptoms. However, it is very important for patients with MI to recognize and explain their feelings in order to reach treatment on time. For this, patients need to be aware of their symptoms as soon as possible, recognize and distinguish their symptoms, seek help and reach medical intervention (4). Similar to our study, Valkamo et al. (8) found the TAS-20 total score average in the alexithymic group in patients with CAD as 65.7±0.6 and Meloni et al. (5) found it in 28% of patients admitted to the emergency room due to MI as 64.8±3.4. Alexithymic people who have problems in recognizing, understanding and arranging their feelings have characteristics such as not being able to name their feelings, not being able to distinguish their feelings from each other and from their physical feelings, and not being aware of their feelings (15). In our study, patients experienced difficulty in recognizing their emotions. The tendency of low somatic and emotional awareness to alexithymia is thought to reduce recognition and perception of cardiac symptoms. Unlike our results, the average TAS-1 scores in patients with CAD were 23.54±6.29 (9), 22.6±2.4 (8) and 21.83±6.00 (1) in other studies.

**Table 3.** TAS-20 subscale and total score averages according to the disease characteristics of the patients (n=211)

Disease characteristics	n (%)	TAS-1 X ± SD	TAS-2 X ± SD	TAS-3 X ± SD	TAS-20 total X ± SD
<b>CAD duration</b>					
<1 year	129 (61.1)	17.8±7.0	16.1±3.2	30.4±4.6	63.5±11.9
1-5 years	32 (15.1)	21.4±8.0	17.4±2.8	32.0±4.2	70.6±11.6
6-10 years	18 (8.5)	18.1±6.2	17.5±4.2	31.3±4.3	66.7±9.6
≥11 years	32 (15.3)	18.1±6.6	16.8±3.7	30.8±4.2	65.7±9.7
	X <sup>2</sup> kw	5.656	6.573	3.666	9.701
	p	0.130	0.087	0.300	0.021*
<b>Previous hospitalization due to MI</b>					
Yes	73 (34.5)	18.4±7.0	16.8±3.8	31.3±4.3	66.3±10.7
No	138 (65.5)	18.4±7.2	16.3±3.1	30.5±4.5	64.6±12.1
	U	4994.0	4699.5	4536.5	4682.0
	p	0.919	0.420	0.234	0.400
<b>MI episoded</b>					
1 time	142 (67.2)	18.5±7.3	16.3±3.2	30.6±4.5	64.7±12.1
2 times	46 (21.8)	17.2±6.6	16.7±3.5	31.8±3.8	65.1±11.1
≥3 times	23 (11.0)	20.4±6.4	17.0±4.1	30.3±5.0	68.1±9.8
	X <sup>2</sup> kw	3.667	0.483	2.377	2.466
	p	0.160	0.786	0.305	0.291
<b>Being able to tell about his/her disease</b>					
Yes	206 (97.6)	18.6±7.1	16.5±3.4	30.8±4.5	65.3±11.7
No	5 (2.4)	12.2±3.7	17.0±1.8	30.8±3.9	60.4±3.6
	U	231.5	476.0	503.5	344.5
	p	0.035*	0.771	0.932	0.206
<b>Being able to recognize MI symptoms and seek for help</b>					
Yes	79 (37.4)	18.1±6.7	16.4±3.7	30.7±4.2	64.2±12.3
No	132 (62.6)	18.6±7.3	16.5±3.1	30.8±4.6	65.7±11.2
	U	5130.0	5045.0	5098.0	5046.5
	p	0.845	0.692	0.786	0.696
<b>Diabetes Mellitus</b>					
Yes	73 (34.5)	19.8±7.6	16.7±3.2	30.0±4.8	66.2±12.8
No	138 (65.5)	17.7±6.7	16.3±3.4	30.8±4.2	64.6±10.9
	U	4301.5	4830.0	5000.5	4424.5
	p	0.081	0.621	0.931	0.146
<b>Hypertension</b>					
Yes	131 (62.0)	19.1±7.4	16.8±3.2	31.1±4.5	66.8±10.7
No	80 (38.0)	17.3±6.4	16.1±3.5	30.3±4.3	62.5±12.6
	U	4604.5	4710.0	4644.5	4334.0
	p	0.139	0.215	0.165	0.035*
TAS-1, difficulty in recognizing emotions, TAS-2, difficulty in expressing emotions, TAS-3, outward thinking, TAS-20, Toronto alexithymia scale-20 total, CAD: Coronary artery disease, MI: Myocardial infarction, U: Mann-Whitney U test, X <sup>2</sup> kw: Kruskal-Wallis test, SD: Standart deviation					
*p<0.05					

Patients with MI with alexithymia tend to focus on bodily sensations due to their limitations in cognitive processing of emotions, leading to situations that can be misinterpreted as symptoms of physical illness (1). In this study, patients had difficulty in explaining and expressing their feelings. Failure to adequately express emotions leads to the development of different physical symptoms (15). In different studies, similar to our results, average TAS-2 scores in patients with CAD were  $15.25 \pm 3.92$  (9),  $15.00 \pm 5.30$  (1) and  $17.7 \pm 1.8$  (8).

The difficulty in recognizing, describing and expressing emotions in people with alexithymic characteristics decreases the ability to dream and the tendency to think solid, and causes them to do their actions and thoughts more in line with external stimuli (3). In our study, the TAS-3 score average was high showing the difficulty of outward thinking of the patients. This conclusion reinforced the fact that patients with MI focused more on external events when their internal experiences were damaged. Nekouei et al. (9) showed that the TAS-3 score average in patients with CAD was  $21.59 \pm 3.48$ ; Silva et al. (1) showed that it was  $23.43 \pm 4.96$  and Valkamo et al. (8) showed that it was  $25.5 \pm 2.2$ , which were all lower than our results.

Mattila et al. (2) reported that alexithymic features were associated with female sex. In our study, female patients had more difficulty in recognizing, distinguishing and making sense of their emotions showed more alexithymic characteristics than male patients. In parallel with our study, Meloni et al. (5) noted that female patients admitted to the emergency room due to MI had significantly higher alexithymic characteristics, that women waited longer for MI symptoms to pass, and that they were not able to assess their symptoms seriously/urgently.

In our study, patients in the 61-69 age range thought more outwardly and had difficulty in dreaming. This suggested that patients in our study group placed much greater emphasis on environmental factors and detail in the problems they experienced. Silva et al. (1) found significant differences between TAS-1 and TAS-3 score averages and TAS-20 total score average and age of the patients with MI. Oktay and Batıgün (16) stated that there was a relationship between age and TAS-3 and that the ability to dream decreased as age increased. Valkamo et al. (8) found the mean age of patients with CAD with alexithymic characteristics as  $60.4 \pm 1.6$ ; Meloni et al. (5) as  $60.8 \pm 11.9$ ; and Kojima et al. (7) as  $60.8 \pm 10.9$  years.

Mattila et al. (17) found that education level was negatively associated with alexithymia, and that alexithymic features were seen in 3.3% of highly educated people and 16.5% of low educated people. In our study, illiterate patients experienced more difficulty in recognizing their emotions and their alexithymic characteristics increased as their level of education decreased. This result was interpreted as follows: As education level decreased interpersonal communication decreased, difficulties in recognizing and distinguishing emotions occurred, and difficulty in finding appropriate words to express emotions occurred. Similar to our study, Oktay and Batıgün (16) found that alexithymia decreased as education level increased; Kojima

et al. (7) found that 39.9% of post-MI patients with alexithymia had an educational level of  $\leq 7$  years.

It was argued that alexithymic features arise as a result of learning in the sociocultural environment in which individuals were present (18). In our study, the patients living in the village had high alexithymic characteristics. The reason for this was that the patients living in the village had more patriarchal family structure. It was stated that alexithymia was a condition learned in the process of social development and that the traditional patriarchal approach provided the basis for alexithymic features in adult life (18). In addition, societies in underdeveloped regions are more controlling and oppressive, which can lead to poor social life, personality development, and therefore emotional development. Parallel to our study, Kokkonen et al. (19) also found high alexithymia in people living in the village.

In this study, patients who did not work experienced more difficulty in recognizing their emotions than those who did, thought more outwardly, and had higher alexithymic characteristics. This has been associated with decreased interactions of non-working patients with people in their lives that contribute to the recognition and expression of emotions and with lack of adequate social support. Similar to our results, Kokkonen et al. (19) found non-workers to be more alexithymic than employees, and noted that alexithymia was associated with unemployment. Valkamo et al. (8) showed that the sick leave/retirement rate was 78% in the group without alexithymia and 97% in the group with alexithymia in patients with CAD.

In our study, it was found that patients with decreased income levels had more difficulty in recognizing their emotions and increased alexithymic characteristics. It was thought that as income levels decreased, it became difficult to deal with problems and social support decreased. Parallel to our study, Kokkonen et al. (19) found that alexithymia was associated with low income levels; people with low income levels had higher alexithymia score averages than those with high income levels. Again, Mattila et al. (2) found that people with low income had a higher average score of TAS-20.

It is very important to realize the feelings experienced and to put them into words in order to establish healthy and balanced relationships. In emotional situations, such as alcohol and drug use, it is stated that losses in the process of regulating emotions are likely to negatively affect emotional health (4). In our study, patients who did not use alcohol had more difficulty expressing their feelings than those who did. This result suggested that patients who used alcohol could express themselves more freely by creating social environments in terms of meaningful interpersonal relationships, self-acceptance, attractiveness, and recognition, and that they used alcohol as a relief tool in coping with stressful situations. In a study of inpatient alcohol addicts in Turkey, anxiety and avoidance subscales of the Liebowitz Social Anxiety scale were found to correlate with TAS-1, TAS-2 and TAS-3 subscales, while the anxiety subscale was associated with TAS-1 subscale (20).

In our study, patients with CAD duration of 1-5 years had higher alexithymic characteristics. This result suggested that patients were unable to relax even though the acute period had passed, and were unable to cope with the complex nature of MI in daily life and were unable to reduce painful emotions. It was stated that the duration of the disease affected daily life and emotions, and that patients needed time to learn how to adapt to the disease and how to cope with it (7). Kojima et al. (7) noted that high alexithymic characteristics developed in patients who had MI in three and six months after discharge, and those who had previously CAD were more alexithymic than those who had acute MI. It was also stated that there was a limitation in the imagination activities and emotional expression of patients who experienced a life-threatening fatal condition or received treatment in the intensive care unit (5).

The fact that MI is a stressful event causes the patient to tell those around him/her (family, friends) what he/she feels and to seek help (6). Meloni et al. (5) noted that 22.2% of patients with high alexithymic characteristics with ST-segment elevation MI consulted a family member for the disease. In our study, it was thought that telling about the disease might play an important role in accelerating the recovery of the cardiac condition, but on the contrary, these patients experienced more difficulty in recognizing their emotions. We could relate this to the fact that patients were still in critical period of MI. It was also thought that patients were unable to convert their emotions into meaningful feelings and were unable to fully describe their emotions. It was stated that people with alexithymia had impaired ability to establish personal intimate relationships, cognitive losses occurred in their emotions, and that they had difficulty in properly recognizing and responding to other people's feelings have (6). Nekouei et al. (9) noted that alexithymia reduced social support in patients with CAD, and that alexithymic patients did not receive adequate social support from their families and/or friends.

There are studies showing that in alexithymia which can be effective on physical health, emotional status is associated with traditional risk factors for CAD, such as emotional sedentary lifestyle, high body mass index and essential hypertension (5,11). Hypertension and CAD make it necessary for the individual to develop a certain lifestyle. This causes patients to lead stressful lives and therefore develop various emotional responses (11). In our study, patients with hypertension had high alexithymic features. Many studies have shown a close relationship between alexithymia and hypertension. Meloni et al. (5) showed that 44.4% of patients with hypertension and ST-segment elevation had high and 48.5% of them had low alexithymic features. Grabe et al. (21) showed that there was a clear association between alexithymia, hypertension and carotid atherosclerosis in the general population. Kojima et al. (7) showed that alexithymic features were more common in patients with essential hypertension and CAD compared with healthy individuals.

### Study Limitations

The limitation of the study was that only patients hospitalized in the CICU of Trabzon Ahi Evren Chest and Cardiovascular

Surgery Training and Research Hospital were included in the study. The results of this study are therefore directed at patients receiving treatment in this unit. The results of this study cannot be generalized to all patients.

### Conclusion

The patients who had MI included in the study were shown to have alexithymic characteristics. In our study, it was found that the "alexithymic characteristics" of the patients were influenced by sex, age, education level, place of residence, working status, income level, alcohol use, CAD duration, being able to tell about their disease and the presence of hypertension. Patients with MI with alexithymic features may require more support and individual attention. Patients with MI should be monitored for alexithymic features and sociodemographic and disease-related features should be taken into consideration during this process. In addition, it is recommended to carry out comparative studies between the alexithymic characteristics and sociodemographic and disease-related characteristics of the patients having MI.

It is thought that the results of the study may increase awareness of the alexithymic characteristics of patients having MI and the factors affecting their alexithymic characteristics, and contribute to the planning, implementation and monitoring of health care in the diagnosis and treatment of MI. In addition, considering that it is very important for patients having MI to express themselves, it is thought that further investigation of this issue will be useful in developing new recommendations.

### Ethics

**Ethics Committee Approval:** The study was approved by the Ethics Committee for Clinical Research of the University of Health Sciences Kanuni Training and Research Hospital (number: 23618724/03.06.2016).

**Informed Consent:** A consent form was completed by all participants.

**Peer-review:** Internally peer-reviewed.

### Authorship Contributions

Concept: A.T., S.H., Design: A.T., S.H., Data Collection or Processing: A.T., S.H., Analysis or Interpretation: A.T., S.H., Literature Search: A.T., S.H., Writing: A.T., S.H.

**Conflict of Interest:** No conflict of interest was declared by the authors.

**Financial Disclosure:** The authors declared that this study received no financial support.

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