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Original Article

## Death anxiety in patients with myocardial infarction or cancer

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## ABSTRACT

**Objective:** The aim of this study was to find out the level of death anxiety among 3 groups: patients with acute myocardial infarction, patients with cancer and healthy individuals in two training and research hospitals; also to evaluate its relationship with several sociodemographic and clinical variables.**Materials and method:** This study was conducted with one hundred and eighty persons (108 male, 72 female) who have been referred to cardiology or oncology departments and the healthy individuals. Participants completed sociodemographic and clinical data form, State and Trait Anxiety Inventory (STAI-I, STAI-II), Thorson Powell Death Anxiety Scale (TPDAS), Death Depression Scale (DDS).**Results:** Participants included in the present study were 40% female with an average age of 53.48 for whole group. The mean TPDAS score for patients with AMI was  $51.60 \pm 16.40$ , for patients with cancer  $37.10 \pm 10.23$  and for healthy individuals  $43.40 \pm 13.35$ . In AMI group there were positive correlations between STAI-I and TPDAS, DDS scores and also between STAI-II and DDS. In cancer group positive correlations were between STAI-I, II and TPDAS, DDS. TPDAS and DDS were positively correlated in all three groups. Women and participants who were unemployed scored higher on DDS.**Conclusion:** In this study patients with AMI had higher death anxiety than patients with cancer or healthy individuals. Generally death anxiety was related with education, employment and socioeconomic status. Prospective studies carefully searching for different variables in different medical groups would reveal and help us to understand the importance of death anxiety and its impact on courses of physical and mental disorders.© 2018 Egyptian Society of Cardiology. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## 1. Introduction

Death is one of the most significant issues in life that shapes one's thoughts and behaviours. Having a near death experience, facing a deadly disease or witnessing death of a family member or a friend may fear us and lead to check our lifestyle and to make our lives more meaningful. At the present day, advances in diagnostic instruments and improved health services seem not enough to annihilate feelings of fear and desperateness against death. Even though, there are thoughts about death in almost every period of life, having an illness related to death may prompt facing death

term more than ever. While some patients may feel hopelessness and fear, others may see death as a natural part of life, do not fear and countervail firmly.<sup>1</sup> Pollack and Aday stated about a multifactorial structure about death anxiety and researchers explored this area from many different perspectives.<sup>2,3</sup>

In clinical field, there are very few papers reflecting the relation between certain diseases and death anxiety, also the results are discourive.<sup>4,5</sup> The reason why we chose myocardial infarction and cancer to compare death anxiety is that they are the number 1 and 2, respectively in the list of diseases causing death worldwide.<sup>6</sup> We hypothesize an acute trauma like a heart attack may cause more death anxiety than having a progressive deadly disease like cancer. In this study, we aim to define relationship between these two diseases and death anxiety when compared to healthy control group, also to investigate associations between some sociodemographic, disease specific variables and to look for correlations in between state and trait anxiety, death anxiety and death depression.

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## 2. Subjects and methods

Between 24.04.2014–24.08.2014, 60 of oncology outpatients and patients waiting for chemotherapy in Haydarpasa Numune Training and Research Hospital who were diagnosed with cancer and 60 of cardiology outpatients and patients waiting for angiography in Siyami Ersek Thoracic and Cardiovascular Surgery Training and Research Hospital and 60 healthy volunteers planned to be included in the study.

Participants with less than 18 years of age, educational level less than primary school, CNS pathologies affecting reading and writing like dementia or mental retardation, patients currently suffering from an affective or a psychotic episode, patients with ophthalmic pathologies affecting reading and people not willing to participate in study were excluded.

Patients and volunteers who gave informed consent for the study instructed to fill in the forms and complete the scales. Sociodemographic form and self report scales: State and Trait Anxiety Scale, Thorson-Powell Death Anxiety Scale and Death Depression Scale were applied. There was no time limit and participants' questions about items were answered.

### 2.1. Scales used

State-Trait Anxiety Inventory (STAI-I and STAI-II): developed by Spielberger et al.<sup>7</sup> It consisted of two scales each having 20 items, these are state and trait anxiety scales. Test-retest consistency coefficient of Turkish form of STAI-I is 0.26–0.68 and that of STAI-II is 0.71–0.86. Internal consistency and homogeneity coefficients are 0.94–0.96 for STAI-I and 0.83–0.87 for STAI-II. This inventory was translated to Turkish by Öner and LeCompte also validity and reliability study was performed by them.<sup>8</sup> You can find Turkish version of the scale in [Addition-1](#).

Thorson-Powell Death Anxiety Scale (TPDAS): This death anxiety scale was developed by Thorson and Powell in 1992.<sup>9</sup> It includes 25 items. 17 of these are statements like 'Coffins distress me' and rest 8 are negative statements like 'I don't worry about being in a state of insolvency forever'. It is rated on a 5 point Likert scale from 0 to 4. In negative statements Likert scale is reversed from 4 to 0. Totally score can be minimum 0 and maximum 100. Higher points indicate higher death anxiety. This scale was translated to Turkish also validity and reliability study of it was done by Karaca and Yıldız.<sup>10</sup> It was found to be a valid and reliable scale to measure death anxiety in researches. In this study correlation coefficient was 0.73 and homogeneity measure Cronbach  $\alpha$  was proposed as 0.84. You can find Turkish version of the scale in [Addition-2](#).

### 2.2. Death depression scale (DDS)

It is a self-report scale developed by Templer and et al. in 1990 to examine depression, sadness, loneliness, terror and grief about death in 17 items. Scores can be 0 at least and 17 at most.<sup>11</sup> Turkish version validity and reliability study of the scale was carried out by Yaparel and Yıldız in 1998 and it was found to be valid and reliable. Correlation coefficient of this form calculated by test-retest technique  $r = 0.79$  which is significant at  $p < 0.001$  level. Cronbach  $\alpha = 0.74$  and  $\alpha$  reliability was 0.92.<sup>12</sup>

You can find Turkish version of the scale in [Addition-3](#).

### 2.3. Statistical tests

NCSS (Number Cruncher Statistical System) 2007& PASS (Power Analysis and Sample Size) 2008 Statistical Software (Utah, USA) were used for statistical analysis. Besides definitive methods (mean, standard deviation, median, frequency, ratio, minimum,

maximum) to evaluate quantitative data for two group comparisons, student t test was used with normally distributed parameters and Mann Whitney U test was used for parameters not normally distributed. For three or more normally distributed group comparisons One Way Anova Test and to determine the group causing difference Tukey HSD Test was used. For nonnormally distributed three or more group comparisons Kruskal Wallis Test and to determine the group causing difference Mann Whitney U Test was used. To test relations between parameters Pearson Correlation Analysis and Spearman's Correlation Analysis was used. Significance was accepted as  $p < 0.01$  and  $p < 0.05$ .

## 3. Results

Sociodemographic characteristics of study participants are demonstrated in [Table 1](#).

When demographic characteristics of participants correlated with scores of scales, women and unemployed participants had higher scores in DDS and participants educated at secondary school level had higher TPDAS scores. There was no relationship of death anxiety with age and marital status. As the level of income increased, death anxiety decreased (see [Table 2](#)).

Patients with MI had significantly higher STAI-I and II scores than other groups ( $p < 0.01$ ).

Difference was not significant between cancer and control groups ( $p > 0.05$ ).

Death anxiety of patients with MI were higher than other groups ( $p < 0.01$ ). Healthy controls' death anxiety was higher than cancer patients ( $p < 0.05$ ).

To see if state or trait anxiety was related with death anxiety and death depression, correlations are shown in [Table 3](#).

In MI group STAI-I was correlated with both TPDAS and DDS; STAI-II was correlated with DDS. In cancer group STAI-I and II were correlated positively with both death anxiety and death depression. There was significant correlation between TPDAS and DDS in all 3 groups.

In MI group patients believing life after death had higher death anxiety than ones who don't believe. In cancer group there was no significant relationship between belief in afterlife and death anxiety.

In MI group there was no significant correlation between death anxiety scores and number of heart attacks and time passed since last heart attack (see [Table 4](#)).

In cancer group there was no correlation between death anxiety scores and the time passed after learning the diagnosis of cancer.

There were 38.3% ( $n = 23$ ) breast, 23.3% ( $n = 14$ ) colon cancer, 16.7% ( $n = 10$ ) lung cancer and 6.7% ( $n = 4$ ) stomach cancer, 1.7% ( $n = 1$ ) pancreatic cancer, 3.3% ( $n = 2$ ) choledoch, 1.7% ( $n = 1$ ) bladder, 1.7% ( $n = 1$ ) small intestine, 1.7% ( $n = 1$ ) liver, 1.7% ( $n = 1$ ) skin and 1.7% ( $n = 1$ ) larynx cancer in study population. In cancer group breast cancer had higher death anxiety than other cancer types (see [Table 5](#)).

## 4. Discussion

This study was designed to examine death anxiety level in patients with MI, cancer and healthy participants. The most important finding in this study was that death anxiety levels of patients with MI were higher than patients with cancer and healthy controls. This may be caused by facing death suddenly and unexpectedly. While studies on MI's association with anxiety levels are mostly focused on anxiety as a predictor for cardiac event,<sup>13–15</sup> a few studies focused on anxiety levels during or after the course of MI.<sup>16,17</sup> Studies focusing specifically on death anxiety or fear of death are fewer.<sup>18,19</sup>

**Table 1**  
Sociodemographic characteristics of study participants.

		MI		Cancer		Control	
		Min-max	Mean ± SD	Min-max	Mean ± SD	Min-max	Mean ± SD
Age		34–88	57.17 ± 12.32	33–80	56.55 ± 10.23	30–79	46.72 ± 11.23
Sex	Women	n	%	N	%	n	%
	Men	11	18.3	34	56.7	27	45.0
Education	Primary school	49	81.7	26	43.3	33	55.0
	Secondary school	20	33.3	34	56.7	14	23.3
	High school	13	21.7	9	15.0	7	11.7
	University	21	35.0	12	20.0	17	28.3
Marital status	University	6	10.0	5	8.3	22	36.7
	Married	57	95.0	46	76.7	50	83.3
	Single	1	1.7	3	5.0	4	6.7
Work	Widowed	2	3.3	11	18.3	6	10.0
	Employed	24	40.0	7	11.7	36	60.0
	Unemployed	15	25.0	20	33.3	13	21.7
Monthly income	Retired	21	35.0	33	55.0	11	18.3
	<800 TL	18	30.0	16	26.7	5	8.3
	800–1499 TL	32	53.3	18	30.0	24	40.0
	1500–2999 TL	8	13.3	24	40.0	19	31.7
	≥ 3000 TL	2	3.3	2	3.3	12	20.0

**Table 2**  
STAI-I, STAI-II, death anxiety, death depression scores of groups.<sup>a</sup>

	MI (n = 60) Mean ± SD	Cancer (n = 60) Mean ± SD	Control (n = 60) Mean ± SD	p
STAI-I	41.75 ± 11.62	35.95 ± 10.38	33.95 ± 8.99	0.001**
STAI-II	46.67 ± 7.42	39.13 ± 8.88	41.65 ± 7.75	0.001**
Death anxiety	51.60 ± 16.40	37.10 ± 10.23	43.40 ± 13.35	0.001**
Death depression	9.77 ± 3.65	9.65 ± 3.58	10.12 ± 3.49	0.758

<sup>a</sup> Oneway Anova Test.  
\*\*  $p < 0.01$ .

**Table 3**  
STAI-I, STAI-II, death anxiety and death depression score correlations.

	MI (n = 60)		Cancer (n = 60)		Control (n = 60)	
	r	p	r	p	r	p
STAI-I – death anxiety	0.502	0.001**	0.435	0.001**	0.111	0.397
STAI-I – death depression	0.357	0.005**	0.290	0.024*	–0.047	0.720
STAI-II – death anxiety	0.174	0.184	0.374	0.003**	0.186	0.155
STAI-II – death depression	0.326	0.011*	0.464	0.001**	0.209	0.109
Death anxiety – death depression	0.454	0.001**	0.496	0.001**	0.599	0.001**

r = pearson correlation coefficient.  
\*  $p < 0.05$ .  
\*\*  $p < 0.01$ .

**Table 4**  
Correlation of number of heart attacks and STAI-I, STAI-II, death anxiety and death depression scores.<sup>a</sup>

		1. MI (n = 47)	2. MI (n = 10)	3. MI (n = 3)	p
		Mean ± SD	Mean ± SD	Mean ± SD	
STAI-I	Mean ± SD	40.28 ± 11.94	48.10 ± 9.59	43.67 ± 6.03	0.146
	Median	40.00	48.00	43.00	
STAI-II	Mean ± SD	45.68 ± 7.39	49.80 ± 6.09	51.67 ± 9.61	0.150
	Median	45.00	51.50	50.00	
Death anxiety	Mean ± SD	52.87 ± 16.05	49.60 ± 19.14	38.33 ± 6.11	0.136
	Median	50.00	41.00	37.00	
Death depression	Mean ± SD	9.81 ± 3.80	9.70 ± 3.09	9.33 ± 4.04	0.939
	Median	10.00	10.00	7.00	

<sup>a</sup> Kruskal Wallis Test.

**Table 5**  
Type of cancer and STAI-I, STAI-II, death anxiety and death depression scores correlations.<sup>a</sup>

		Type of cancer				p
		Breast (n = 23)	Colon (n = 14)	Lung (n = 10)	Others (n = 13)	
STAI-I	Mean ± SD	38.26 ± 9.84	35.71 ± 12.50	33.30 ± 9.74	34.15 ± 9.63	0.348
	Median	37.00	33.00	29.00	33.00	
STAI-II	Mean ± SD	39.48 ± 9.87	40.43 ± 9.97	38.50 ± 8.78	37.62 ± 6.17	0.943
	Median	39.00	38.00	39.50	38.00	
Death anxiety	Mean ± SD	39.96 ± 10.27	38.14 ± 9.89	32.50 ± 7.20	34.46 ± 11.58	0.026*
	Median	41.00	36.00	30.50	32.00	
Death depression	Mean ± SD	10.22 ± 3.70	9.21 ± 3.53	9.10 ± 3.84	9.54 ± 3.48	0.730
	Median	10.00	8.50	8.50	10.00	

<sup>a</sup> Kruskal Wallis Test.

\*  $p < 0.05$ .

Our findings indicating higher levels of death anxiety in MI patients were consistent with previous studies.<sup>16–19</sup> While higher levels of anxiety predict for a heart attack according to literature, heart attack itself seems to be a predictor for higher levels of anxiety.<sup>20,21</sup> In our study state anxiety, trait anxiety and death anxiety were higher among patients who lived heart attack and state anxiety was associated with death anxiety. These findings can be explained by the view of anxious people-as a personality type-being more prone to heart attack<sup>20,22,23</sup> so they have higher levels of anxiety after this event, but trait anxiety was not associated with death anxiety so it needs further investigations.

Although we didn't find difference between healthy controls and patients groups for death depression scores, for all groups death depression was associated with death anxiety. Whilst inconsistent with studies of Nakamura et al. and Welin et al., it seems that depression and anxiety after heart attack may predict mortality.<sup>15,24–26</sup> Despite anxiety as a trait wasn't associated with death depression; death anxiety was correlated with death depression. Thus we think death anxiety should be further investigated to predict and prevent depressive states and mortality.

Cancer patients had lower death anxiety levels than control group. Healthy participants may see themselves very far away from death but patients with cancer may have thought more about death and their sensitivity may be reduced. Acceptance of mortality and reflecting on death seems to develop coping abilities for anxiety.<sup>27</sup> However another explanation for lower scores of death anxiety is denial. Literature provides data that patients who have lower death anxiety could be disclaiming their illness.<sup>28</sup> Gibbs and Lawlis compared death anxiety levels of patients with terminal cancer and patients without a deadly disease, they reported death anxiety scores to be lower in cancer group.<sup>29</sup> In a similar way Dougherty et al. showed death anxiety to be lower in terminal cancer patients than other diseases.<sup>30</sup> Although literature provides supportive data for low levels of death anxiety in cancer patients,<sup>31,32</sup> there are contradictory findings in some other studies.<sup>33</sup>

State and trait anxieties of cancer patients are associated with death anxiety and death depression. Although there was no difference in respect to state and trait anxiety and death depression among cancer patients and healthy controls, it seems cancer patients who are prone to anxiety had higher death anxiety and depression. Higher levels of anxiety in patients reported to be associated with factors as worse medical status, high physical symptom distress and high perceived burden to others.<sup>34,35</sup>

There was no relation between level of death anxiety and how many heart attacks a patient had. This could be explained with theory that in the area related with death there is no habituation to this fearful stimulus and death anxiety is always present at background, it does not change with time and we spend continuously our energy for denial of it.<sup>36</sup>

Patients with breast cancer had higher death anxiety than other cancer types. While higher levels of anxiety among breast cancer patients was demonstrated with former studies,<sup>37</sup> other studies comparing anxiety among cancer patients found contradictory results.<sup>38</sup> Even if some other cancer types such as lung or pancreas are known to be more fatal, higher death anxiety in patients with breast cancer especially the ones who underwent mastectomy may be related with lessened self confidence about body image – not feeling like a woman – may lead to psychological problems and death anxiety. A study showed breast cancer patients had better outcomes after breast conserving surgery with respect to body image, social and emotional functioning but anxiety and depression levels were not lower than patients who had mastectomy.<sup>39</sup>

In both patient groups (MI and cancer) there were correlations between anxiety and death anxiety. Also death anxiety was related with death depression.

We could not find any association between death anxiety and age, sex or marital status. Although there are very different findings about age and sex in many studies, our findings were similar to large meta analysis of Fortner and Neimeyer reviewing 49 studies in 1999. It can be discussed rather than age, psychosocial maturity may be a better predictor of death anxiety.<sup>40</sup>

As educational level is increasing people may be more busy in work and daily life so they are less likely to remember death and their death anxiety may decrease.<sup>41</sup>

It is not known why participants educated from secondary school have higher death anxiety than primary school. Maybe having a medium level of education may keep people in more death anxiety than higher or lower levels.

An important component of religious belief is to believe in a day of judgement thus many scales tried to be invented for measuring it.<sup>42</sup> We tried to ask belief in afterlife with only one question. Against many other studies<sup>43,44</sup> participants believing in life after death had higher death anxiety than ones not believing. Participants being ambivalent about afterlife had death anxiety higher than both believer and non-believers. However non-believer and ambivalent ones were very few in number so this may not be a true statistics. To get statistically significant results believer, unbeliever and ambivalent groups in equal numbers should be compared.

In MI group male to female ratio is high. Although patients were randomly selected, epidemiologically cardiovascular diseases are more prevalent in men which makes the difference. Likewise healthy controls are younger than patient groups because as we age, prevalence of many diseases increase and we are healthier when we are young. These epidemiological factors could not be controlled. There were missing data about stages of cancer so we could not correlate death anxiety with cancer stages. It is a cross-sectional study, scales applied only once to participants and results should be interpreted carefully. Strengths of our study were, study participants had a wide sociocultural diversity

spectrum because study was conducted in two hospitals of most crowded and immigrated city in Turkey, Istanbul. It had two patients and one control group. Death anxiety scale we used was multifactorial.

## 5. Conclusions

In this study patients with AMI had higher death anxiety than patients with cancer or healthy individuals. Generally death anxiety was related with education, employment and socioeconomic status. Prospective studies carefully searching for different variables in different medical groups would reveal and help us to understand the importance of death anxiety and its impact on courses of physical and mental disorders.

## Notes

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## Conflict of interest

The authors declare that there is no conflict of interest.

## Appendix A. Supplementary material

Supplementary data associated with this article can be found, in the online version, at <https://doi.org/10.1016/j.ehj.2018.04.003>.

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