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RESEARCH/ARAŞTIRMA

CAN DISTRESS THERMOMETER BE USED TO MEASURE ANXIETY INDUCED SURGERY?

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ABSTRACT

Aim: The aim of the study is to evaluate the Distress Thermometer (DT) as a valid and reliable measurement tool that can be used to measure the patients stress because of surgery.

Method: This was a methodological study conducted with 200 patients. Data were collected using the the Hospital Anxiety and Depression Scale (HADS), the Distress Thermometer (DT) and surgery related distress causes list (DCL) for preoperative patients. The validation of the Distres Thermometer was performed in conjunction with the Hospital Anxiety and Depression Scale (HADS).

Results: Study results determined that the distress score average of the patients was 4.4 (SD 2.4), and the distress level of 47.5% of the patients was above this average. The sensitivity of HADS, which had a cut-off point of five or more, was 72.5% and specificity was 59.3%. The most expressed causes of distress were the development of infection after surgery. There was a moderate relation between the thermometer score and the total DCL score and HADS total score.

Conclusion: The distress thermometer can be used as a valid tool in determining surgery-related anxiety. And also distress causes list can be used to determine distress factors. In this study, the HADS was used as a criterion for DT-DCL, and according to this scale, the sensitivity of the thermometer was high, and the specificity was moderate. The tool can be retested by using different distress scales.

Keywords: Anxiety; distress thermometer; preoperative; surgery.

ÖZ

Distres Termometresi Cerrahiye Bağlı Stresi Ölçmek için Kullanılabilir Mi?

Amaç: Çalışmanın amacı Distres Termometresinin (DT) hastaların ameliyat olacakları için yaşadıkları stresi ölçmek için kullanılabilecek geçerli ve güvenilir bir ölçüm aracı olma durumunu değerlendirmektir.

Yöntem: Bu metodolojik çalışma 200 cerrahi hastası ile yürütülmüştür. Veri toplama formu olarak bilgi formu, Hastane Anksiyete ve Depresyon Ölçeği (HADÖ), Distres Termometresi ve cerrahi ilişkili Stres Nedenleri Listesi kullanılmıştır. Distres Termometresinin validasyonu Hastane Anksiyete ve Depresyon Ölçeği ile yapıldı.

Bulgular: Çalışma sonuçlarında, hastaların distres puanı ortalamasının 4.4 (SD 2.4) ve hastaların %47.5'inin distres düzeyinin bu ortalamanın üstünde olduğu belirlendi. Kesme noktası beş ve üzeri olarak saptanan HADÖ ye ait duyarlılık %72.5, özgüllük %59.3 olarak saptandı. Ameliyattan sonra enfeksiyon gelişme korkusu en sık ifade edilen stres nedeni olarak ifade edildi. Termometre puanı ile toplam stres nedenleri listesi puanı, HADS-A ve HADS toplam puanı arasında orta derecede bir ilişki bulundu.

Sonuç: Distres Termometresi ameliyatla ilgili stresi belirlemede geçerli bir araç olarak kullanılabilir. Ayrıca, strese yol açan faktörlerini belirlemek için stres nedenleri listesi kullanılabilir. Bu çalışmada, DT için HADS bir ölçüt olarak kullanıldı ve bu ölçüte göre termometrenin duyarlılığı yüksek ve özgüllüğü orta düzeydedir. Termometre farklı ölçekler kullanılarak yeniden test edilebilir.

Anahtar Kelimeler: Anksiyete; distres termometresi; preoperatif; cerrahi.

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INTRODUCTION

The word “distress” encompasses many emotions and states of being such as sorrow, despair, weakness, fear, excitement, anxiety, panic, depression, indecision, and exhaustion (1, 2). Patients experience thoughts and emotions related to the impact of the surgery on their lives, death, being damaged, suffering, the loss of an organ, the fear of postoperative pain. Waiting for a surgical intervention, and anxiety about becoming dependent on others after a surgery (3). In addition, patients’ distress in the preoperative period involves social and physiological concerns.

A very important component in a patient’s healing process is the role of nurses. They determine the patient’s distress during the surgery process and provide the needed care throughout the perioperative period. The nurses’ expertise can help decrease patients’ anxiety and negative thoughts. Thus, the complications due to distress may decrease and healing can proceed more quickly (4-6). An accelerated healing process reduces the hospitalization period and the cost of care and positively affects patients’ quality of life (7-10).

A careful review of the existing literature on the subject revealed that there are various tools to determine a patient’s distress. However, these tools employ many questions and require a lot of time (11,12). For this reason, a tool that requires less time is needed. When compared to other scales, the Distress Thermometer is a less time-consuming and easy-to-use tool for measuring distress. Although many studies have been conducted with cancer patients using this tool, there has thus far been no study investigating its usability in patients who will undergo or have undergone a surgery. Therefore, a measurement tool that can be applied easily and in a short time to determine surgery-related distress will prove of great benefit to both patients and medical staff.

AIM

The main aim of the present study was to evaluate validation of the distress thermometer for preoperative patients as a screening tool and to determine the cut-off score which would measure patients’ distress based on surgery. And the other aim was to develop and test a questionnaire for identifying surgery-related distress causes.

METHODS

Design: This was a methodological study.

Population and Dataset: This was a methodological study conducted with 200 patients. The universe of the study was composed

of patients hospitalized in the surgical clinics included in the study to undergo surgery within one year. They were selected as a result of the power analysis performed with 95% confidence interval and 80% power according to the number of patients per year by using Openepi programme. Patients who were included in the research sample were those scheduled to undergo surgery, could read and speak in Turkish, had volunteered to participate in the study, were admitted to the clinic at least one day before the surgery, and were to undergo a surgery with general/spinal anesthesia. Excluded from the study were patients who were scheduled to undergo emergency surgery, had communication problems, were unconscious, were scheduled to undergo amputation, had vision and hearing loss, a cancer diagnosis, were scheduled to undergo surgery with local anesthesia, and were younger than 18 years and older than 65 years. Based on hospitalization orders and records, two-hundred fifty patients were interviewed until the study sample number was reached.

Data Collection Tools

Questionnaire Form: The form developed by the researchers consists of seven questions containing the sociodemographic (gender, age, marital status, educational status, working status, social security) and health status of the patients.

Hospital Anxiety and Depression Scale (HADS): The scale was used to determine the risk of anxiety in patients due to surgical intervention, to measure and evaluate the level of mood changes that may be experienced due to anxiety and measure the level of anxiety and depression in the patient. The scale was developed by Zigmond and Snaith (1983), and the validity study in our country was performed by Aydemir, Güvenir, Kuey and Kültür (1997) (13, 14). The two subscales within this scale are for anxiety (HADS-A) and depression (HADS-D). The results of a study conducted in Turkey found the cut-off score for the anxiety subscale to be 10/11 and 7/8 for the depression subscale, and the areas above the cut-off score are evaluated to be at risk (13-17). The Cronbach’s alpha in the current study was determined to be 0.82 for the total scale, 0.73 for the anxiety scale, and 0.66 for the depression scale, which demonstrated good internal consistency.

Distress Thermometer: The Distress Thermometer is a scale developed by Roth et al. (1998) for determining psychological distress in cancer patients (18). The thermometer is a Likert-

type scale with scores from 0 (no stress) to 10 (excessive stress). In a short and easy-to-understand scale, patients can easily mark their distress levels in ranges indicated on the thermometer. According to the National Comprehensive Cancer Network (19), the recommended cut-off score for the distress thermometry in cancer patients is $\frac{3}{4}$ (20-22). The Turkish validity-reliability study of the Distress Thermometer for cancer patients was performed by Özalp et al. and the recommended cut-off score for the thermometer in this study was set at four and above (23).

Distress Causes List (DCL): Along with the original Distress Thermometer used for determining the causes of distress in cancer patients, there is a symptom list (a list of items which are frequent causes of distress) to which patients are requested to give answers in the form of “yes” or “no”). Problems, which are frequently experienced and considered to be the features and causes of distress, are included in the list. It can be regarded as a checklist, which utilizes dichotomous items (yes or no) to specify needs for help or whether there is such a need. In this study, the original symptom list was not used. So, it was only inspired this list as in idea and arranged a new list which is called “distress causes list (DCL)”. With purpose to create the items of this list, researchs related to preoperative anxiety/fear/distress searched by the researcher (9, 24-26). Then it was addressed the opinions of ten nurses working in surgical clinics, three general surgeons, one neurosurgeon, and one urologist and 20 patients in order to test the content validity of this list.

The prepared list of causes of distress consists eight domains. Domains are related to anesthesia (four items), surgery (four items), operating room (five items), hospital (four items), physiological (13 items) and emotional (14 items) experiences after the surgery, earlier experiences (four items), and economic problems (two items). With the list of causes of distress, patients were asked to mark the causes leading to the preoperative distress, and each item selected was rated as “1” point. Thus, the total “number of stressors” can be calculated from the list of causes of distress, and each patient can score “0-50” from the list. There is no any cut-off point for this list.

Ethical Aspect of the Study

To conduct the study, the ethics committee approval was obtained from the Scientific Research Ethics Committee (24237859-465), and the institution approval was obtained from the

hospital where the study was conducted. Furthermore, patients were informed about the study and their written consent was obtained. Also the author of the Turkish validity-reliability study of the distress thermometer (23) received the usage permit for the thermometer.

Data Collection

The patients who were admitted to the clinic to undergo a surgery were interviewed the day before the surgery. The face-to-face interview took place in the patient’s room in a way which respected the patient’s privacy.

Statistical Analysis of Research

The data obtained from the study were analyzed using the IBM SPSS 23.0 (Statistical Package for the Social Sciences) package program. In the evaluation of the breakpoint of the data, ROC analysis was performed to determine the sensitivity and specificity and the correlation between the results was examined. The findings were evaluated within the 95% confidence interval and $p < 0.05$ significance level. Pearson product moment correlations of the thermometer score and Distress Causes List scores with the HADS were performed. Pearson correlations (r) < 0.30 were regarded as minimum, $0.30-0.49$ as moderate, and 0.50 as strong (20). Receiver operating characteristics (ROC) and sensitivity and specificity were calculated, and thus, agreement between the HADS scales and the DT-DCL was quantified. Considering previous recommendations, an AUC value in the range of $0.60-0.79$ was defined as a sign of good discrimination, and an AUC value of 0.80 and above was defined as a sign of excellent discrimination in the present study (20).

FINDING AND DISCUSSION

The identifying characteristics of the patients participating in the study are shown in Table 1. The mean value on the DT was found to be 4.4 (SD 2.4). Moderate levels of distress ($4-6$) were reported by 45.5% of individuals while low distress levels ($0-3$) were reported by 35.5% of the patients.

Distress is a negative experience experienced by most patients before surgery. Learning the distress levels and causes of patients is important for the management of distress. In the current study, we investigated DT psychometric characteristics by utilizing the information obtained from 200 patients. The mean value on the DT was found to be 4.4 (SD 2.4), the distress average for surgical patients in our country, using the distress thermometer, has been reported to be in the range of 4.7 ± 2.8 (27). In this study,

however, the distress thermometer was used alone and not tested with a parallel scale.

In the current study, the AUC was 0.73 utilizing the HADS total scale, respectively, as the criteria measurement (standard error, 0.04; 95% CI, 0.67-0.79; $P < .0001$) (Figures 1,2 and 3). The sensitivity and specificity values for the cut-off scores determined on the DT, together with positive and negative predictive values, are summarized in Table 2.

Table 1. Demographic data of respondents (n=200)

Demographics		S	%
Age	18-41	53	26.5
	42-65	147	73.5
Gender	Female	107	53.5
	Male	93	46.5
Marital Status	Married	169	84.5
	Single	31	15.5
Educational Level	Primary education	98	49.0
	High School	79	39.5
	University	23	11.5
Working Status	Work	57	28.5
	No work	143	71.5
Health Insurance	Yes	197	98.5
	No	3	1.5
Clinic	Brain Surgery	61	30.5
	Clinic	47	23.5
	General Surgery	38	19.0
	Clinic	33	16.5
	Urology Clinic	21	10.5
	Orthopedics and Traumatology Clinic		
	Chest and KVC Clinic		

The ROC curve estimates the clinically increased distress in accordance with the clinical HADS total score. Using a cut-off score of 5 (Figure 2 and 3), 72.5% of HADS “clinical HADS cases” (sensitivity) and 59.3% of HADS “nonclinical HADS cases” (specificity) were accurately determined. Clinically increased overall distress was reported by 95 individuals (47.5%), utilizing the cut-off score of 5 on the thermometer.

According to the HADS total score, the ROC curve determining the cutting point of the distress thermometer is seen. When the cutoff point was accepted as 15 and above for the total score of HADS, it was found that the cutoff point for the distress thermometer was five and above

(sensitivity: 72.5%, specificity: 59.3%) ($p < 0.0001$). Study results showed that the average number of stressors was 4.6 ± 4.6 and 88.5% of the patients indicated at least one stressor. According to the frequency of expression, when the causes of stress of the patients are listed; The top three rankings are the anxiety of infection (31.5%), the operating room being a cold environment (27%) and the inability to move after surgery (25%). To determine whether the Distres Causes List could be considered an additive scale, the Cronbach’s alpha statistic found that the Distres Causes List demonstrated good consistency at 0.82. The surgery, pre-operative physiological and emotional problems domain showed good internal consistency (Cronbach’s alpha 0.680, 0.800, 0.609, respectively). However, the domain of problems related to existing experiences was not adequate (0.540) for it to be treated as an additive subscale.

According to the HADS, there was a moderate relation between the thermometer score and the Distres Causes List score ($r=0.471$), HADS-A ($r=0.426$) and HADS total score ($r=0.471$). However, it was less correlated with the HADS-D ($r=0.279$). The DCL was less correlated with all domain scores of the problem ($0.201 < r < 0.317$). All sub-dimensions of the DCL were related to the HADS ($0.147 < r < 0.304$). This is also valid for the total problem scores ($r=0.370$, $p=0.000$).

Table 2. Sensitivity and Specificity Values of the DT-SP Thermometer Scores According to the HADS Total Score.

Thermometer Score	Sensitivity	Specificity
>0	100	2.5
>1	95.0	14.3
>2	95.0	23.7
>3	90.0	41.8
>4	72.5	59.3
>5	50.0	76.8
>6	45.0	87.5
>7	35.0	93.1
>8	25.0	96.8
>9	20.0	98.7
>10	0.00	100

To decide which score in the distress thermometer constitutes “clinical distress”, it is necessary to find the cut-off score. For the present study, we selected a cut-off score with a high sensitivity, since we consider not missing patients with problems to be extremely important. Missing patients with problems can lead to false-positive

results due to lack of optimal specificity. A cut-off score of 5 in the Distress Thermometer had optimal sensitivity relative to the HADS. Cancer patients in Turkey the DT cut-off score of 4 yielded the optimal combination of sensitivity and specificity (23). According to the results of the National Comprehensive Cancer Network (NCCN), the best cut-off score for the Distress

Thermometer is $\frac{3}{4}$ (19).. Related sources indicate that the cut-off scores of the Distress Thermometer are between “4-5 for cancer patients’ (19, 23, 27-31). A study conducted with surgical patients in our country determined the cut-off score as three and above (27).

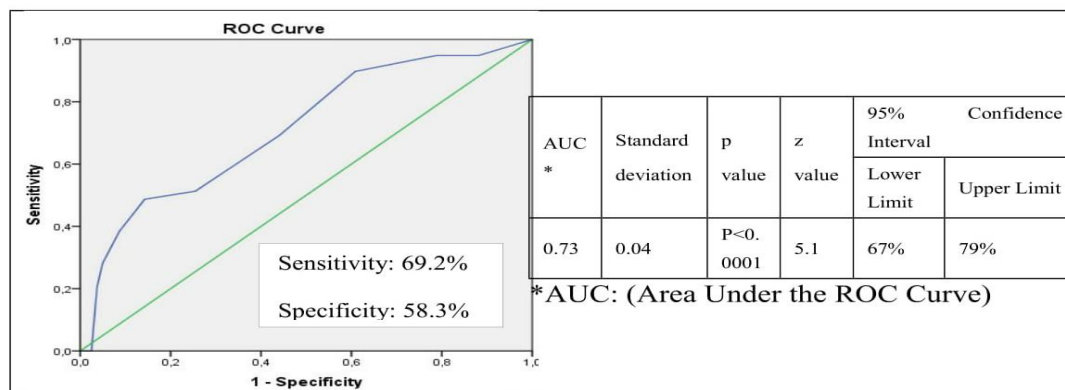


Figure 1: The ROC Curve for the Distress Thermometer According to the HADS- Anxiety

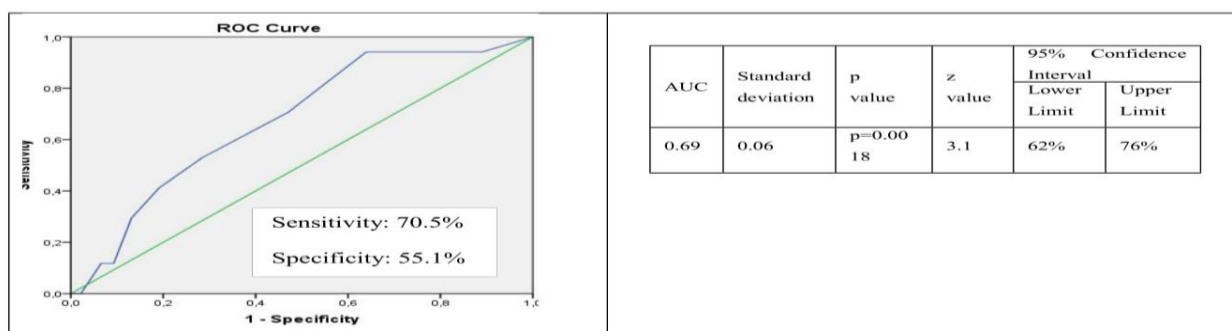


Figure 2: The ROC Curve for the Distress Thermometer According to the HADS-Depression

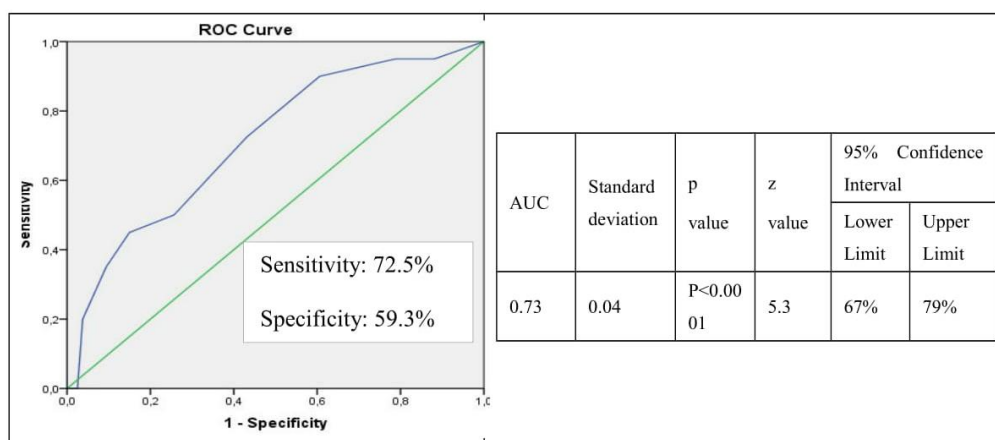


Figure 3: The ROC Curve for the Distress Thermometer According to the HADS Total Score

The risk of designating non-distressed patients as distressed while maximizing the determination of distressed patients is increased with this cut-off score. The sensitivity according to this cut-off score was found to be 69.2% for anxiety, 70.5% for depression, and 72.5% for the total score. In the studies conducted with cancer patients, the specificity of the anxiety and depression domains ranged from 49.0% to 71.2%, and the sensitivity ranged from 70.5% to 88.2%. The current study's results indicate that the sensitivity scores are in line with other studies, and the specificity scores are lower (20,23).

According to our study, the results obtained from the distress causes list found that patients experienced the most fear of infection development (31.5%), and feared that the operating room was a cold environment (27%). The internal consistency of the separate assessment of problem domains using the Distress Causes List was useful for surgery-related stressors, the post-operative physical and emotional low. Thus, this domain can be designated an additive problems domain. Only the Cronbach's alpha value of previous experiences was found to be sub-scale. In the original problem list used in many studies with cancer patients, it is stated that patients mostly experience fatigue, fatigue, fear, anxiety, pain and sleep problems (32). Since the list is not the same as the original list, we cannot compare the internal validity values.

The total score of the Distress Causes List using the DT-DCL was moderately related to anxiety and the HADS total score, however, it was less related to the total domain score and depression. This result suggests that the distress level of the patient increases as the number of stressors increases. Similarly, other earlier studies with cancer patients have reported that the scores on the DT were associated with more problems in all domains of the Distress Causes List (32-34). It is understandable that the DT-DCL results conducted with cancer patients are less related to depression (2, 23, 35). The treatment processes of patients with cancer may be longer and more severe compared to a surgical patient. During this process, individuals may develop and experience a problem that occurs over time such as depression or physiological problems. The Distress Causes total score and all the domains were related to the HADS.

Limitations: There were a few limitations in this study, which should be noted. The first limitation is related to representativeness. These

features make the results valid for a certain group. The present study was conducted as cross-sectional, and the effectiveness of the DT-DCL in distress or problem resolution over time could not be assessed. It would be beneficial to carry out a longitudinal study, which could investigate the course of distress over time and assess test-retest reliability. A strong aspect of the present study was its comparatively large sample size as well as the employment of the HADS as a criterion measure, which had been used in previous studies. Nevertheless, the employment of the HADS alone as a criterion measure constitutes the limitation of the present study; future studies can be useful for the further understanding of the validity of the DT by utilizing additional criterion measures.

CONCLUSION

When the cut-off point for HADS was accepted as 15 and above, the cut-off point for the distress thermometer was found to be five and above (sensitivity: 72.5%, specificity: 59.3%). In the evaluation of anxiety related to surgery, the distress thermometer can be easily applied by both the patient and the nurse in terms of its fast and easy applicability.

Five or more (>4) can be used when evaluating the anxiety of preoperative patients. The list of causes of stress used in the study can contribute to the easy identification of stress and anxiety. The results of the distress thermometer may differ in different groups and societies.

As an integral part of the surgical team, nurses spend the most time with their patients and are in a better position to know and observe each patient on an individual basis. They are thus more involved in patients' care and are better able to emotionally support each patient. Furthermore, through appropriate nursing interventions, nurses can reduce or minimize the adverse consequences caused by patients' distress from the time of admission to the clinic to the time of patients' discharge.

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Conflict of Interest: There is no personal or financial conflict of interest within the scope of the study.

Author Contributions: GÇÖ: Data collection and manuscript writing, analysis and

interpretation of data, editing of manuscript. GÇÖ & AG: Design of the study, review and final approval of manuscript.

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