

Performance of Distress Thermometer: A Study among Cancer Patients

Sudip Thapa,¹ Susmita Sharma,² Nishim Gautam,² Sudip Shrestha,² Bijesh Raj Ghimire,² Sanuja Dahal,³ Bibhav Adhikari,⁴ Rubina Maharjan,⁵ Sadiksha Thapa,² Regina Kattel,⁶ Rishav Koirala⁷

¹B & B Hospital Pvt. Ltd, Department of Medical Oncology, Gwarko, Lalitpur, Nepal, ²Nepal Cancer Hospital and Research Center Pvt. Ltd, Department Medical Oncology, Harisiddhi, Lalitpur, Nepal, ³Vinayak College of Health Science, Battisputali-9, Kathmandu, Nepal, ⁴College of Management, Little Angels' College of Higher Studies, Hattiban, Lalitpur, Nepal, ⁵PGY-1, Pediatrics, New York Health And Hospitals, Woodhull Medical Center, United State, ⁶Nepal Cancer Hospital and Research Center Pvt. Ltd, Department of Psycho-oncology, Harisiddhi, Lalitpur, Nepal, ⁷Brain and Neuroscience Center Nepal, Kathmandu, Nepal.

ABSTRACT

Background: The Distress Thermometer accompanied with Problems List is a commonly used screening tool for psychosocial distress. However, its cut-off score, performance and risk factors for psychosocial distress varies among studies. This is the first study conducted in Nepal to investigate the Distress Thermometer's screening properties, its optimal cut-off score and evaluating the prevalence of psychosocial distress and its risk factors.

Methods: This cross-sectional study enrolled 162 heterogeneous cancer patients. The English form of the Distress Thermometer was translated to Nepali using a forward and backward translation method. Questionnaires including socio-demographic, clinical characteristics, the Hospital Anxiety and Depression Scale and Distress Thermometer accompanied with Problems List were filled. Receiver Operating Characteristic analysis of distress thermometer scores was evaluated against Hospital Anxiety and Depression Scale-Total (≥ 15). An Area Under the Curve, sensitivity, specificity, positive predictive value and negative predictive value were calculated at each Distress Thermometer cut-off score.

Results: Receiver Operating Characteristic analysis showed an excellent discriminating performance (Area Under the Curve = 87.4%). A cut-off score of 4 on Distress Thermometer was established and it yielded sensitivity (88.9%), specificity (71.1%), positive predictive value (75.4%) and negative predictive value (86.5%) respectively. Furthermore, 55.6% of participants were distressed and emotional problems (odd ratio = 28.00), practical problems (odd ratio = 12.152) and physical problems (odd ratio = 2.397) were found to be significant risk factors for PD.

Conclusions: PD is a global burden in cancer patients. The DT with a cut-off score of 4 accompanied with PL is valid instrument for screening PD in Nepali cancer patients. PL identified the problems that causes of PD.

Keywords: Cancer; Distress Thermometer; Nepal.

INTRODUCTION

Psychosocial distress (PD) is global issue in cancer patients. The National Comprehensive Cancer Network (NCCN) guidelines recommends that each cancer patients must be screened for PD and manage accordingly.¹

Single item NCCN Distress Thermometer (DT) is valid screening tool for PD in many countries and

recommended cut-off score is 4.^{2,3} However, DT's discriminative accuracy (0.47-0.91), sensitivity (0.42-1.00), specificity (0.36-0.98) differs from poor to excellent and the optimal cut-off score varies from 3-7 among studies and methodology.^{2,3}

The DT has been translated into various languages and in Nepal the performance of DT is understudied.

Correspondence: Rishav Koirala, Nepal Cancer Hospital and Research Center Pvt. Ltd, Department of Psycho-oncology, Harisiddhi, Lalitpur, Nepal. Email: rishavk@gmail.com, Phone: +9779851111515.

Examining the screening properties of DT among Nepali cancer patients remains is very vital. Thus, this study was conducted to: (1) investigate the DT's screening properties and to identify its optimal cut-off among Nepali cancer patients; and (2) evaluate the prevalence of PD and its risk factors.

METHODS

This was questionnaire based cross-sectional study. It was conducted from December 2020 to March 2021 in both in and out-patients and day care department of Nepal cancer hospital and research center (NCHRC), Harisiddhi, Lalitpur, Nepal. NCHRC is the private cancer hospital of Nepal catering patients from all over Nepal. The first psycho-oncology clinic of Nepal was established here by one of the co-authors.

The inclusion criteria included: age >18 years, literate the cohorts who can read and write) with normal cognitive functions (the cohorts who did not have any medical records of mental health issues), histologically diagnosed with cancer and willing to participate. Informed consent was obtained from the eligible participants and were requested to complete the set of questionnaires including socio-demographic and clinical information by themselves or with the help of a research assistant, the DT included the problem list (PL) and Hospital Anxiety and Depression Scale (HADS). Patients with a history of diagnosed psychiatric illness were excluded from this study. This study was approved by the intuitional review Board of NCHRC (Reference numbers: 003/2077).

All socio-demographic information (age, gender, marital status, education level, occupation and diagnosis) were gathered by the questionnaires. However, clinical information (cancer type, date of diagnosis, staging and treatment status) were collected from the medical records.

The Hospital Anxiety and Depression Scale (HADS) is widely used for defining the presence of cancer-specific mood disorders. HADS is a 14 items self-rated screening tool, it includes anxiety (HADS-A) and depression (HADS-D) subscales and each subscale contains 7 items. Clinically the summed two subscales of anxiety and depression is called HADS-Total. Risal et al., stated that scores ≥ 11 on each subscale of HADS indicated caseness in Nepal.⁴ However, HADS was used as standard criterion in 95% of the DT validating studies and most DT validation studies used a cut-off score HADS-T ≥ 15 .² Hence, in this study we are using validated version

(translated in Nepali) of HADS with HADS-T ≥ 15 .

In 1998, Roth et al., developed Distress thermometer (DT) as a screening short tool for PD.⁵ DT is a single item, self-reported, thermometer shaped visual analogue scale consisting of 11 points ranging from 0 (no distress) to 10 (extreme distress) that measures PD over the past 7 days. Patients were requested to circle a number that describes their most appropriate level of distress. The problem list (PL) recommended by National Comprehensive Cancer Network (NCCN) is used to identify the nature of the possible problems that cause PD. It contains a list of 36 possible problems that are categorized in 5 domains (practical, family, emotional, physical problems, and spiritual or religious concerns).¹

The DT has been translated from the original English language to various languages.^{3,6} In this study, Nepalese psychiatrist translated the DT and PL from English to Nepali language (forward translated) and was then again translated from Nepali to English (backward translated) by an independent translator who is an oncologist in English medium setting. The guidelines for socio-cultural translation of mental health questionnaires were used while doing the translation.⁷ After translation, the authors of this study assessed the Nepali version of the DT and PL to determine its equivalence to the English version. Finally, after discussion authors finalized the non-stigmatizing words for Nepali translation of DT and PL.

The sample size was calculated using the Cochran's formula $[(N_0) = Z^2 \times p(1-p)/d^2]$. Further, it was adjusted by using sample size for finite population $[N_0 \times N/N_0 + N - 1]$. As per hospital record, 2020, In 2 months around 400 patients (N) had visited in Nepal Cancer Hospital & Research Center (NCHRC), Harisiddhi, Lalitpur, Nepal. Previous study from Nepal showed the 81.7% of cancer patients suffered from PD.⁸ Then, considering the 5% precision/ absolute allowable error at 95% the confidence interval. The finite population for this study was 147 and considering non-response rate of 10%, the final study population was 162.

Socio-demographic, clinical, and PL items were summarized by descriptive analysis by calculating frequency and percentages for categorical variables. Odd ratios was calculated at 95% CI to evaluate the risk factors. If OR=1 falls outside the range of 95% CI, it was considered as significant risk factor.⁹ Analysis were done using the statistical package for social science (SPSS) version 20.0. We calculated receiver operating

characteristic (ROC) analysis and the area under (AUC) the ROC curve to identify and compare the screening performance of the DT against the HADS-T (≥ 15). The AUC was used to measure the overall discriminative accuracy of DT and the value of 0.5-0.7, 0.7-0.9, and $\geq 0.9-1.0$ reflected low, moderate, and excellent discriminative accuracy respectively. Furthermore, the performance properties i.e., AUC, sensitivity (SE), specificity (SP), positive predictive value (PPV), and negative predictive value (NPV) were evaluated at each DT cut-off score against the HADS-Total.

RESULTS

A total of 162 patients were included in this study. Among them 51.2% were below 50 years, 58.6% were male, 92.0% were married, 38.9% attended junior high school or below in education and 64.8% were unemployed. Additionally, 90.7% were aware of their diagnosis, 54.3% were diagnosed less than 6 months prior, 49.4% had stage IV cancer and 66.7% received combined treatment. Finally, among heterogeneous cancer; 29.6% had digestive cancer, followed by 16.7% with breast cancer and so on. (Table 1)

DT showed an excellent discriminating accuracy (AUC = 87.4%; 95% CI, 81.8%-93.0%) between cases and non-case against HADS-T ≥ 15 . A cut-off score of 4 on DT indicated 88.90% of true cases (SE) and 71.10% of non-cases of distress (SP) with PPV and NPV of 75.47% and 86.50% respectively. (Fig 1 and Table 4)

At DT (≥ 4), 55.6% (90) of participants were found to be distressed. Patients with age ≥ 50 , female, married, lower education level, unaware of their diagnosis were among the people who mostly suffered from PD. Similarly, patients with >6 months of illness, receiving combined treatment, advanced stage and people suffering from gynecological cancer were perceived to be in higher distress. Moreover, among the problem list domain patients with emotional problems had higher distress. (Table 1, Table 2, Table 3)

Emotional problem (OR=28.00, 95% CI; 10.696-73.298), practical problem (OR=12.152 95% CI; 3.997-36.944) and physical problem (OR= 2.397, 95% CI; 1.270-4.526) increase risk of PD among cancer patients. (Table 3)

DISCUSSION

In our study, DT demonstrated excellent discriminating accuracy (AUC = 87.4%) against HADS-T (≥ 15). This finding is consistent with earlier studies from different

parts of the globe, where AUC ranged from 47% to 91%.^{2,3,6,10-15} Our findings suggested that Nepali version of DT is an easy and acceptable tool and it can be a simple communicating tool among patients and healthcare providers for screening unrecognized and untreated PD.

A cut-off point is commonly set to separate respondents into two groups namely, positive and negative respondents. Positively screened population need further confirmatory test which is determined by the appropriate cut-off score of the screening tool. Hence, cut-off point is very crucial. This study yielded an optimal cut-off score of 4 against the HADS-T (≥ 15). This finding is exactly in line with the cut-off score recommended by the NCCN guidelines and other existing international literatures from different demographics, clinical and cultural backgrounds i.e., Asian, Eastern and Western studies.^{1,3,6} Collectively, this result provides robust evidence in favor of generalization of DT cut-off score of ≤ 4 across the Nepali cancer populations.

Among the existing studies, DT's SE ranged from poor to excellent (0.42-1.00).^{2,16} In our study, a DT cut-off score of 4 correctly detected 88.9% of distress cases (SE). Which is higher than the study done in America (68%)¹⁰ Saudi Arabia (70%)¹⁷ Netherland (73%)¹⁸ and China (73%)¹⁹ and comparable with majority of previous studies conducted in other different countries and populations.^{3,6,12} Regarding SP, it ranged from 36%-98%.^{2,3} A cut-off score of 4 correctly detected 71.1% of non-distress cases in our study. This is comparable to Taiwan (73%), China (72%) and is also similar to the results from a meta-analysis done in Asian cancer patients (73%).^{6,20,21} Thus, Higher SE and SP of DT can effectively identify a large number of patients with or without PD. Moreover, it also avoids large number of false positive cases being diagnosed.

In this study, cut-off score of 4 also showed PPV and NPV of 75.47% and 86.50% respectively. These PPV and NPV were comparable to most of available studies.^{12,15,19,22} Among the distressed patients, 24.5% could be false positives and that of non-distressed, 13.5% could be false negatives which were notable findings as they prevented both over-misdiagnosis and under-diagnosis. This may help to reduce the unwanted patients investigations, overtreatment, and financial burden on the patients. Conclusively, considering all the above findings, our study further validated the existing evidence regarding the performance of DT. Furthermore, Nepali version of DT with cut-off score 4 is an efficacious and quick initial screener for PD that is patient-friendly and can be easily applied in clinical settings.

Table 1. Psychosocial distress according to socio-demographic characteristics.

Demographic characteristics	No. of patients (%) n=162	DT ≥4 (%) n=90	DT <4 (%) n=72
Age			
≥50	83(51.2)	48(57.8)	35(42.2)
>50	79(48.8)	42(53.2)	37(46.8)
Gender			
Male	95(58.6)	47(49.5)	48(50.5)
Female	67(41.4)	43(64.2)	24(35.8)
Marital status			
Married	149(92.0)	81(54.4)	68(45.6)
Single	13(8.0)	4(30.8)	9(69.2)
Education level			
Junior high school or below	63(38.9)	40(63.5)	50(50.5)
More than senior high school	99(61.1)	23(36.5)	49(49.5)
Occupation			
Yes	57(35.2)	31(54.4)	26(45.6)
No	105(64.8)	59(56.2)	46(43.8)
Diagnosis			
Known	147(90.7)	80(54.4)	67(45.6)
Unknown	15(9.3)	10(66.7)	5(33.3)

Single (unmarried + widow)

Table 2. Psychosocial distress according to clinical characteristics.

Clinical characteristics	No. of patients (%) n=162	DT ≥4 (%) n=90	DT <4 (%) n=72
Type of cancer			
Lung	22(13.6)	11(50.0)	11(50.0)
Digestive	48(29.6)	22(45.8)	26(54.2)
Breast	27(16.7)	13(48.1)	14(51.9)
Gynecological	25(15.4)	19(76.0)	6(24.0)
Head and neck	16(9.9)	12(75.0)	4(25.0)
Hematological	14(8.6)	6(42.9)	8(57.1)
Others	10(6.2)	6(60.0)	4(40.0)
Duration of illness			
<6months	88(54.3)	44(50.0)	44(50.0)
>6months	74(45.7)	46(62.2)	28(37.8)
Cancer staging			
0-III	82(50.6)	45(54.9)	37(45.1)
IV	80(49.4)	45(56.3)	35(43.8)
Treatment status			
Combined treatment	108(66.7)	61(56.5)	47(43.5)
Single treatment	54(33.3)	29(53.7)	25(46.3)

Others (Genitourinary cancer + bone and soft tissue sarcoma), Combined treatments (Chemotherapy + Surgery + Radiotherapy + Targeted treatment)

Table 3. Psychosocial distress according to problem list and its relationship with DT.

Problem lists domains	No. of patients (%) n=162	DT ≥4 (%) n=90	DT <4 (%) n=72	OR(95%CI)
Physical problems	89(54.9)	58(65.2)	31(34.8)	2.397(1.270-4.526)
Family problems	12(7.4)	8(66.7)	4(33.3)	1.659(0.479-5.746)
Emotional problems	108(66.7)	84 (77.8)	24(22.2)	28.00(10.696-73.298)
Practical problems	132(81.5)	86(65.2)	46(34.8)	12.152(3.997-36.944)

OR = odd ratio, DT = Distress Thermometer

Table 4. Sensitivity, specificity, positive predictive value, and negative predictive value of each DT cutoff score against HADS-T scale for 162 heterogeneous patients with cancer.

Against HADS-T	Sensitivity	Specificity	PPV	NPV
0	100.00	0.00%	50.00%	0.00%
1	97.20	24.40%	56.25%	89.71%
2	95.80%	37.80%	60.63%	90.00%
3	93.10%	50.00%	65.06%	87.87%
4*	88.90%	71.10%	75.47%	86.50%
5	81.90%	83.30%	83.06%	82.15%
6	63.90%	90.00%	86.47%	71.37%
7	47.20%	94.40%	89.39%	64.13%
8	27.80%	98.90%	96.19%	57.80%
9	19.40%	100.00%	100.00%	55.37%
10	11.10%	100.00%	100.00%	52.94%

Bold* values signifies the Distress Thermometer optimal cut-off score.

HADS-T: Hospital Anxiety and Depression Scale-Total; PPV: Positive predictive value; NPV: Negative predictive value.

Globally, the reported prevalence of PD in cancer patients ranges from 22.1% to 89.1%.^{8,17,22-24} In our study 55.6% of participants were suffering from PD. The plausible cause may be because of disease itself and its treatment related complication i.e., pain, hair loss, lymphedema, infertility, skin changes, dry mucous membranes, weight loss, shortness of breath, sexual problem, fatigue, fear, sadness, nervousness and loss of interest in usual activity and so on.^{12,17} The percentage of patients suffering from PD being in the higher side when compared to the findings from other parts of the world may be due to financial burden as well as concept of cancer among general population. In Nepal the cost of burden for cancer treatment has to be borne by the patient or their family members. Which might be the plausible cause for higher PD. Besides suffering from physical and mental problems, PD is significantly associated with suicidal ideation.²⁵ Routine screening of PD with timely referral for psychosocial supports is an effective measure in lowering the severity and its burden in cancer patients.²⁶ Hence, PD is a global issue from which even Nepali cancer patient are not isolated. Therefore, every cancer patient should be screened for PD and timely referred for psychosocial support to ensure its prevention and management.

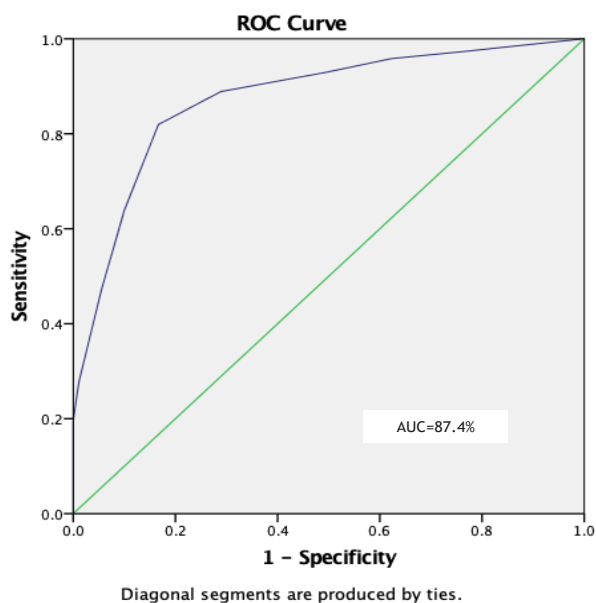


Figure 1. Receiver operating characteristic (ROC) curve of Distress Thermometer (DT) score against the Hospital Anxiety and Depression Scales Total (HADS-T) cut-off score.

Concerning the problems list domain of our patients, the emotional, physical and practical problems were significant risk factors for PD. These findings were consistent with the prior studies done in different countries, using different methodology, on various cancer types and treatments.^{12,13,17,18,22,27} Thus, these findings clearly states that these problem is most likely due to cancer itself rather than variables like ethnicity, geography or different methodology used and so these risk groups patients need to be recognized, monitored, documented and treated promptly by health worker for betterment of cancer care.

Though this study being the first of its kind in Nepal, it also carries some limitations. Firstly, this is a single center cross-sectional study with small population, though the center caters patients from all over Nepal. Secondly, we only selected the HADS criteria for DT validation. Finally, majority of study population were married, aware of their diagnosis, and had digestive system cancer. These limitations created difficulty in generalizing the study for the entire cancer patients. Hence, to generalize our result it requires further multicenter or cross cultural studies.

CONCLUSIONS

PD is found out to be highly prevalent among Nepalese

cancer patient as much as it is globally. DT with a cut-off score of ≥ 4 is an efficacious and quick initial screener for PD in cancer patients. Hence, PD screening and its management should be an integral part of cancer management to lower the psychological burden among cancer patients.

ACKNOWLEDGEMENTS

We thanks Dr. Runa Shrestha (Oncologist working in the US) for back translations and all cancer patients who participated.

CONFLICT OF INTEREST

The authors hereby announce that they have no conflict of interest appearing from this study.

REFERENCES

- Holland JC, Andersen B, Breitbart WS, Buchmann LO, Compas B, Deshields TL, et al. Distress Management: Clinical practice guidelines in oncology. JNCCN J Natl Compr Cancer Netw [Internet]. 2013 Feb 1 [cited 2020 Sep 16];11(2):190-209. [PubMed]
- Donovan KA, Grassi L, McGinty HL, Jacobsen PB. Validation of the Distress Thermometer worldwide: State of the science [Internet]. Vol. 23, Psycho-Oncology. John Wiley and Sons Ltd; 2014 [cited 2020 Sep 16]. p. 241-50. [PubMed]
- Ma X, Zhang J, Zhong W, Shu C, Wang F, Wen J, et al. The diagnostic role of a short screening tool - The distress thermometer: A meta-analysis. Support Care Cancer [Internet]. 2014 [cited 2020 Sep 16];22(7):1741-55. [PubMed]
- Risal A, Manandhar K, Linde, Koju R, Tj S, Holen A. Reliability and Validity of a Nepali-language Version of the Hospital Anxiety and Depression Scale (HADS). Vol. 13. [Download PDF]
- Roth AJ, Kornblith AB, Batel-Copel L, Peabody E, Scher HI, Holland JC. Rapid screening for psychologic distress in men with prostate carcinoma: A pilot study. Cancer [Internet]. 1998 May 15 [cited 2021 Jan 1];82(10):1904-8. [PubMed]
- Sun H, Thapa S, Wang B, Fu X, Yu S. A Systematic Review and Meta-analysis of the Distress Thermometer for Screening Distress in Asian Patients with Cancer. J Clin Psychol Med Settings. 2021 Jun;28(2):212-20. [Article]
- van Ommeren M, Sharma B, Thapa S, Makaju R, Prasain D, Bhattarai R, et al. Preparing Instruments for Transcultural Research: Use of the Translation

- Monitoring Form with Nepali-Speaking Bhutanese Refugees. *Transcult Psychiatry* [Internet]. 1999 Sep 1;36(3):285-301. doi: <https://doi.org/10.1177/136346159903600304>
8. Sah GS. Psychosocial and functional distress of cancer patients in a tertiary care hospital: A descriptive cross-sectional study. *J Nepal Med Assoc* [Internet]. 2019 Aug 31 [cited 2020 Sep 16];57(218):252-8. Available from: www.jnma.com.np
 9. Lisa Sullivan, Professor of Biostatistics BUS of PH. Confidence Intervals [Internet]. Available from: https://sphweb.bumc.bu.edu/otlt/mph-modules/bs/bs704_confidence_intervals/bs704_confidence_intervals_print.html
 10. Cutillo A, O’Hea E, Person SD, Lessard D, Harralson TL, Boudreaux E. The distress thermometer: Cutoff points and clinical use. *Oncol Nurs Forum* [Internet]. 2017 May 1 [cited 2020 Sep 10];44(3):329-36. [PubMed]
 11. Zheng B, Du PX, Yi TW, Liu J, Zeng Z, Luo D, et al. Effects of two translated phrases of distress thermometer on screening distress in Chinese cancer patients: A comparative study. *J Clin Nurs* [Internet]. 2019 Mar 1 [cited 2020 Sep 9];28(5-6):828-35. [PubMed]
 12. Thapa S, Sun H, Pokhrel G, Wang B, Dahal S, Yu S. Performance of Distress Thermometer and Associated Factors of Psychological Distress among Chinese Cancer Patients. *J Oncol*. 2020;2020. [Download PDF]
 13. Nguyen TQ, Do TM, Pham TA. Screening for Psychological Distress in Vietnamese Cancer Patients: An Evaluation of the Distress Thermometer. *Cancer Med*. 2021;10(21):7793-803. [Article]
 14. Martínez P, Galdón MJ, Andreu Y, Ibáñez E. The Distress Thermometer in Spanish cancer patients: Convergent validity and diagnostic accuracy. *Support Care Cancer*. 2013 Nov;21(11):3095-102. [Article]
 15. Iskandarsyah A, de Klerk C, Suardi DR, Soemitro MP, Sadarjoen SS, Passchier J. The Distress Thermometer and its validity: a first psychometric study in Indonesian women with breast cancer. *PLoS One*. 2013;8(2):e56353. [Article]
 16. Hong JS, Tian J. Sensitivity and specificity of the Distress Thermometer in screening for distress in long-term nasopharyngeal cancer survivors. *Curr Oncol*. 2013;20(6). [Article]
 17. Alosaimi FD, Abdel-Aziz N, Alsaleh K, AlSheikh R, AlSheikh R, Abdel-Warith A. Validity and feasibility of the Arabic version of distress thermometer for Saudi cancer patients. *PLoS One*. 2018;13(11):e0207364. [Article]
 18. Ploos Van Amstel FK, Tol J, Sessink KH, Van Der Graaf WTA, Prins JB, Ottevanger PB. A specific distress cutoff score shortly after breast cancer diagnosis. *Cancer Nurs* [Internet]. 2017 May 1 [cited 2021 Jan 9];40(3):E35-40. [PubMed]
 19. Deng YT, Zhong WN, Jiang Y. Measurement of distress and its alteration during treatment in patients with nasopharyngeal carcinoma. *Head Neck* [Internet]. 2014 [cited 2021 Jan 15];36(8):1077-86. [PubMed]
 20. Tang LL, Zhang YN, Pang Y, Zhang HW, Song LL. Validation and reliability of distress thermometer in Chinese cancer patients. *Chinese J Cancer Res*. 2011;23(1):54-8. [Article]
 21. Wang GL, Hsu SH, Feng AC, Chiu CY, Shen JF, Lin YJ, et al. The HADS and the DT for screening psychosocial distress of cancer patients in Taiwan. *Psychooncology*. 2011;20(6):639-46. [Article]
 22. Guan B, Wang K, Shao Y, Cheng X, Hao J, Tian C, et al. The use of distress thermometer in advanced cancer inpatients with pain. *Psychooncology* [Internet]. 2019 May 1 [cited 2020 Sep 28];28(5):1004-10. [PubMed]
 23. Chiou YJ, Chiu NM, Wang LJ, Li SH, Lee CY, Wu MK, et al. Prevalence and related factors of psychological distress among cancer inpatients using routine Distress Thermometer and Chinese Health Questionnaire screening. *Neuropsychiatr Dis Treat*. 2016/11/09. 2016;12:2765-73. [Article]
 24. Xie J, Ding S, He S, Duan Y, Yi K, Zhou J. A prevalence study of psychosocial distress in adolescents and young adults with cancer. *Cancer Nurs* [Internet]. 2017 May 1 [cited 2020 Dec 31];40(3):217-23. [PubMed]
 25. Diaz-Frutos D, Baca-Garcia E, García-Foncillas J, López-Castroman J. Predictors of psychological distress in advanced cancer patients under palliative treatments. *Eur J Cancer Care (Engl)*. 2016 Jul 1;25(4):608-15. [Article]
 26. Carlson LE, Groff SL, Maciejewski O, Bultz BD. Screening for distress in lung and breast cancer outpatients: A randomized controlled trial. *J Clin Oncol* [Internet]. 2010 Nov 20 [cited 2021 Jan 5];28(33):4884-91. [PubMed]
 27. Özalp E, Cankurtaran ES, Soygür H, Geyik PÖ, Jacobsen PB. Screening for psychological distress in Turkish cancer patients. *Psychooncology* [Internet]. 2007 Apr [cited 2020 Sep 10];16(4):304-11. [PubMed]