Patient-reported distress and problems among elderly patients with hematological malignancy in Korea

Sun-young Park1,2 · Yoonjoo Kim3 · Hyunju Hong4

Received: 16 February 2022 / Accepted: 1 August 2022 / Published online: 10 August 2022
© The Author(s), under exclusive licence to Springer-Verlag GmbH Germany, part of Springer Nature 2022

Abstract
Purpose  Treatment for hematological malignancies (HMs) and functional decline associated with age can cause distress in elderly patients with HMs. However, information about the nature and effects of distress in this population is scarce. Therefore, this study examined the level of distress, its source, and the practical/familial/physical/emotional problems among elderly patients with HMs.

Methods  We conducted a cross-sectional study of patients with HMs aged ≥ 65 years who visited an outpatient clinic at a tertiary medical center in Korea between November 2019 and March 2020. Patient-reported distress and problems were measured using the distress thermometer (DT) and 39-item Problem List by the National Comprehensive Cancer Network. Descriptive statistics, χ2 test or Fisher’s exact test, and multivariate logistic regression analyses were conducted (N = 132).

Results  In total, 62.1% of patients had moderate to severe distress (DT score ≥ 4), experiencing an average of nine problems. Significant sources of distress on multivariate logistic analysis included problems with transportation, depression, and constipation, accounting for 47% of distress variance. Most patients had physical (97.0%) or emotional problems (79.5%). Among these, fatigue (60.6%), worry (59.8%), tingling (59.8%), difficulty with mobility (47.0%), and memory/concentration (40.2%) were the most frequently reported problems.

Conclusions  Elderly patients with HMs have a high burden of distress, which is affected by different sources, compared with younger patients with solid tumors. Thus, in this population, assessment and management of distress need to be conducted considering the unique features of their source and burden. Further research on distress should consider the cancer type and population age.

Keywords  Psychological distress · Distress thermometer · Elderly · Hematologic malignancy · Patient-reported outcome measures · Problem lists

Introduction

Over half of hematological malignancies (HMs) are diagnosed in the elderly (age ≥ 65 years) [1]. Compared with younger patients with solid tumors, elderly patients with HMs are more likely to experience distressing events, including frequent hospitalization [2, 3], aggressive treatment [4, 5], physical limitations [2, 3], and poorer prognosis [1]. In addition, changes in their social role resulting from the loss of family/friends, retirement, or unemployment due to aging can escalate distress [6]. Although distress risk in elderly patients with HMs have been established, little is known about their distress [7, 8].

Distress is defined as “a multifaceted and unpleasant experience of a psychological, social, spiritual, or physical nature,” which can interfere in coping with cancer...
diagnosis/treatment and its symptoms, as reported by the National Comprehensive Cancer Network (NCCN) [9]. In fact, 24–62% of cancer patients have reported high levels of distress that require further psychological referrals [10–15]. Moreover, untreated distress is a common complication of cancer and its treatment [15], which negatively affects quality of life [9, 16], adherence to treatment [17], and survival [8, 10]. Thus, international guidelines mandate healthcare professionals for early screening of distress in patients with cancer [8, 9, 13, 18].

To address this need, the NCCN developed the distress thermometer (DT), a patient-reported instrument that identifies levels of distress [19, 20], and the problem list (PL), which explores potential sources of distress [9, 20]. Studies have shown that DT has been associated with varying PL items, including practical, familial, emotional, and physical problems [12–15, 19–23]. However, problems related to high level of distress have been reported differently across studies [12–15, 19–23], which may be caused by various factors, such as younger age [15, 24], female sex [15], living alone [7], low income [7], comorbid conditions [25], recurrence of cancer [23], and time with HMs (e.g., DT score declines with time after HM diagnosis) [24]. Regarding PL, physical and emotional problems are the most prevalent in patients with cancer [12, 24], although the prevalence of specific problems varies. For example, the most commonly reported problems included fatigue, pain, nervousness, and breathing problems in patients with lung cancer [14]; depression, pain, and economic problems in elderly patients with solid tumors [7]; and fatigue, tingling, and worrying in women with gynecological cancers [21]. This varying frequency of problems among patients with cancer indicates that the problem characteristics of elderly patients with HMs might be different from those of younger patients with solid tumors. However, limited information is available regarding the relationship between distress and problems in elderly patients with HMs, despite having established the importance of distress in cancer care [6, 9, 16].

In this study, we examined the levels of distress and its sources to identify patients at risk of distress and to devise optimal prevention and intervention strategies. In addition, to assess the burden of problems among elderly patients with HMs, we explored the characteristics of their practical, familial, physical, and emotional problems.

**Methods**

This was a cross-sectional study approved by the Institutional Review Board (IRB) of the National Cancer Center (approval number NCC 2019–0282). Patients were recruited from the outpatient clinic of a large cancer center (National Cancer Center) in Korea from November 2019 to March 2020.

**Participants**

To participate in the study, the inclusion criteria were as follows: (1) aged ≥65 years, (2) diagnosed with HMs (i.e., lymphoma, multiple myeloma, leukemia, and myelodysplastic syndrome), (3) was notified of the HM diagnosis directly by their physician and was therefore aware of the diagnosis, (4) did not receive palliative care, (5) was not hospitalized for stem-cell transplantation or supportive care, (6) visited an outpatient clinic for chemotherapy and/or immunotherapy treatment or follow-up at the time of the survey, (7) ability to understand and communicate verbally in Korean, and (8) ability to provide written informed consent.

**Procedures**

A nurse practitioner consecutively reviewed the patients’ medical records to determine eligibility for the study and contacted eligible patients to ask for participation. The study purpose and duration, as well as the fact that it is an anonymous survey unrelated to the ongoing treatment, were explained during recruitment. After receiving written informed consent from patients who were willing to participate, the survey was conducted for 10–20 min using questionnaires with DT/PL and sociodemographic/clinical characteristics. For the patients with difficulty reading and writing, the nurse practitioner verbally read and explained the questionnaire and then wrote the answers on behalf of the patients.

Of the 142 patients who met the inclusion criteria and were asked to participate in the study, 10 patients refused due to conflicts in time and poor physical health. As such, a total of 132 patients completed the survey without any missing data. A power analysis using G*Power [26] suggested a sample size of 107 based on a two-tailed test, with an α of 0.05, power of 0.95, an odds ratio (OR) between emotional problems and distress of 1.99 [14], and distress incidence of 0.52 [15]. Therefore, our sample size met the minimum requirement for performing multivariate logistic analyses.

**Measurements**

**Sociodemographic and clinical characteristics**

For baseline data, participants completed a questionnaire on sociodemographic (age, sex, marital status, living with companion(s), education level, employment, and monthly family income) and clinical characteristics (types of cancer diagnosis, current treatment type, recurrence, number of comorbidities, and time with HM).
Patient-reported distress and problems

Patient-reported distress and problems were measured using the Korean version of the DT and PL, which is freely available online and verified by the NCCN (Korean Edition—NCCN Guidelines for Version 2.2013: Distress Management) [27]. Permission to use the Korean version was granted via email from the NCCN. The short-form patient-reported outcome measures (PROM) was developed to rapidly screen distress and identify sources of physical and psychosocial distress. The DT is a single-item visual analog scale that resembles a thermometer. The level of distress in the previous week was measured from 0 (no distress) to 10 (extreme distress), with higher values indicating a higher level of distress. An established cutoff score of 4 indicates moderate or severe distress requiring additional psychological support [19, 27].

The PL is a 39-item questionnaire that asks patients if they had experienced any problems in the past week. Five categories are measured, including practical (six questions), emotional (six questions), familial (four questions), religious/spiritual (one question), and physical problems (22 questions) (Supplementary Table 1). The responses were either “yes” or “no” to indicate the “presence” or “absence” of a specific problem. Furthermore, the Cronbach alpha coefficient of this measurement tool was 0.90 in a previous study [28] and 0.73 in this study.

Statistical analysis

Descriptive statistics were applied to assess the means, frequencies, and percentages of patient characteristics, distress, and problem lists. Descriptive statistics were applied to assess the means, frequencies, and percentages of patient characteristics, distress, and problem lists. DT scores were divided into bivariate variables based on a cutoff score of 4, where a score of 0–3 represented a mild level of distress, and a score of 4–10 represented a moderate to severe level of distress requiring additional psychosocial support [19, 27]. Moreover, the $\chi^2$ and Fisher’s exact tests were performed to compare distress between the groups with and without a specific problem.

Multivariate logistic regression analysis was also conducted to identify significant problems related to distress using the individual PL items. Given the restrictions in available degrees of freedom, we included the significant problems from the $\chi^2$ test and Fisher’s exact tests, with the prevalence of more than 20%. In contrast, we excluded significantly correlated items within the same problem category and controlled variables, including sex, living alone, comorbidities, income, and time with HM, as indicated by previous studies [7, 24, 25]. All analyses were performed using SPSS (version 25.0, Chicago, IL, USA), and $p$-values of $<0.05$ were considered statistically significant.

Results

Participants

A total of 132 patients completed the survey (Table 1). The mean age was 72.4 ± 5.5 years, and 77 patients (58.3%) were men. The majority of patients were unemployed (81.1%), married (74.2%), and living with others (84.1%). Over three-quarters of patients reported a monthly income of less than 2 million Korean won, which was approximately USD $1700 (mean household income was USD $3930 in 2019) [29]. Regarding clinical characteristics, the most common diagnoses were multiple myeloma and lymphoma (42.4% and 40.9%, respectively), followed by leukemia (11.4%) and myelodysplastic syndrome (5.3%). Approximately 65% of respondents were receiving chemotherapy and/or immunotherapy at the time of the survey, 15.2% had hematopoietic stem cell transplantation in the past, 37.1% had recurrence of HMs, and 65.9% had at least one comorbidity (e.g., hypertension, diabetes mellitus, cardiac disease, or cerebral infarction). The mean time with HM was 17.2 ± 21.0 months, and over half of patients were diagnosed with HMs within a year (Table 1).

Patient-reported distress

The mean level of distress was 4.7 ± 2.7, and more than half of the patients (62.1%; $N=82$) reported moderate or severe distress. This indicates that elderly patients with HMs were markedly distressed.

Sources of distress

According to the $\chi^2$ test, the group with moderate or severe distress was more likely to report higher frequencies in three practical problems (transportation, treatment decisions, and housing), all $p<0.05$, one familial problem (dealing with their partner, $p=0.015$), all emotional problems (worry, depression, fear, sadness, nervousness, loss of interest in usual activities, all $p<0.05$), and three physical problems (pain, $p=0.005$; constipation, $p=0.01$; and eating, $p=0.005$) (Fig. 1, Supplementary Table 1). However, distress was not significantly related to the spiritual/religious problem ($p<0.05$).

On multivariate logistic regression, transportation ($OR=3.57$, 95% confidence interval $[CI]=1.05–12.19$), depression ($OR=7.01$, 95% $CI=2.16–22.69$), and constipation ($OR=4.2$, 95% $CI=1.24–14.22$) remained significant sources associated with moderate or severe distress.
Other items that did not show a significant independent relationship with distress included treatment decisions, worry, sleep, and pain. The model accounted for 34% (Cox & Snell) to 47% (Nagelkerke) of variance for the distress status (Table 2). Patient-reported problems

The mean number of problems was 9.0 ± 5.2 among all participants; these problems increased to 10.8 ± 5.1 in the group with moderate to severe distress and decreased to 5.9 ± 3.6.
in the group with mild distress. Among all participants, the majority of patients had some type of physical (97.0%) and emotional problems (79.5%), whereas practical (54.5%) and familial problems (36.2%) were reported relatively less frequently. Furthermore, few patients (3.8%) reported a spiritual/religious problem (Fig. 1, Supplementary Table 1).

Table 2 Multivariate logistic regression for exploring the source of distress (N=132)

| Factors                                        | Distress (score < 4 vs. ≥ 4) | OR (95% CI) | p    | OR (95% CI) | p    |
|------------------------------------------------|-----------------------------|-------------|------|-------------|------|
| Sociodemographic and clinical characteristics  |                             |             |      |             |      |
| Sex (ref: men)                                  |                             | 0.66 (0.31–1.42) | 0.285 | 0.45 (0.16–1.22) | 0.117 |
| Living with companion(s) (ref: lives alone)    |                             | 1.21 (0.42–3.48) | 0.721 | 1.20 (0.32–4.43) | 0.787 |
| Monthly family income                           |                             | 0.91 (0.71–1.17) | 0.456 | 1.11 (0.81–1.52) | 0.522 |
| Recurrence (ref: no)                            |                             | 1.38 (0.63–3.06) | 0.423 | 1.34 (0.48–3.72) | 0.571 |
| Number of comorbid illnesses                    |                             | 2.11 (1.28–3.48) | 0.003 | 1.46 (0.79–2.7) | 0.229 |
| Time with hematological malignancy             |                             | 1.00 (0.98–1.02) | 0.916 | 1.00 (0.98–1.02) | 0.995 |
| Problems                                        |                             |             |      |             |      |
| Transportation (ref: no)                        |                             |             |      |             |      |
| Treatment decisions (ref: no)                   |                             |             |      |             |      |
| Worry (ref: no)                                 |                             |             |      |             |      |
| Depression (ref: no)                            |                             |             |      |             |      |
| Sleep (ref: no)                                 |                             |             |      |             |      |
| Pain (ref: no)                                  |                             |             |      |             |      |
| Constipation (ref: no)                          |                             |             |      |             |      |
| Full model statistics                           |                             |             |      |             |      |
| Model $R^2$ (Cox and Snell)                     |                             | 0.09        | 0.046 | 0.34        | <0.001 |
| Model $R^2$ (Nagelkerke)                        |                             | 0.13        | 0.47  |             |      |

OR, odds ratio; CI, confidence interval; ref, reference group
The most frequently reported problems with prevalence of ≥ 30% were fatigue (60.6%), worry (59.8%), tingling (59.8%), difficulty with mobility (47.0%), memory/concentration (40.2%), depression (38.6%), feeling swollen (37.1%), skin dry/itchy (35.7%), fear (34.8%), and sadness (34.8%), indicating that patients experienced more emotional and physical problems than practical and familial problems. Other problems, such as fever (5.3%), sexual (3.0%), childcare (1.5%), and work/school (0.8%), were rare. None of the patients had problems with the ability to have children or substance abuse (Fig. 1, Supplementary Table 1).

Discussion

We elucidated three key findings in this cross-sectional study using patient-reported distress and problems among the elderly with HMs. First, elderly patients with HMs have a high burden of distress and problems, revealing that 62.1% of patients were distressed, with an average of nine problems. Second, the significant sources of distress were transportation, depression, and constipation, suggesting that their distress was affected by unique sources, compared to younger patients with solid tumors. Finally, the most common five problems were fatigue, worry, tingling, difficulty with mobility, and memory/concentration. Ultimately, these results can provide deeper understanding of distress in elderly patients with HMs, which may validate or contrast the findings of previous studies.

Compared with prior studies that reported distress prevalence rates of 24–62% in patients with varying cancer types and ages [10–15], the distress levels of our patients were at the higher end of the published range. Despite having no prior studies that confirmed our results, several studies have suggested that the characteristics of elderly patients with HMs can negatively affect distress. In particular, the dynamic characteristics of HM treatment [4, 5] and the decline in physical and social functions caused by aging were found to cause distress [30]. Therefore, our findings showed that elderly patients with HMs may be more vulnerable to distress than younger patients with solid tumors. Considering the high burden of distress, and the low level of disclosure of psychological symptoms by elderly patients with cancer [6, 15], this study suggests that greater attention needs to be given when screening and managing distress in this population.

The results of this study aid in the understanding of the unique sources of distress among elderly patients with HMs in Korea. In this study, housing, transportation, and problems with a partner were significant sources of distress, and transportation remained significant on multivariate logistic analysis, which has rarely been reported in prior studies [7, 13, 15, 21, 24]. One possible explanation is that social/cultural factors may influence the source of distress in this population [31–35]. Specifically, approximately half of the Korea elderly population live in poverty [31], which can adversely affect their housing quality [32], resulting in distress. Furthermore, in Korea, 31% of tertiary hospitals are located in metropolitan areas, and elderly’s driving rate is low as 22%, making it difficult for elderly patients to access healthcare facilities and incurring burden of transportation costs [33]. With reference to problems with a partner, in Korea, based on familism, spouses of cancer patients are considered primary caregivers, who shoulder additional responsibilities (e.g., household chores and economics) [34], which can lead to caregiving burden [35]. Thus, our findings suggest that the financial hardship [31–33], mobility independency [3, 6, 33], and familiar interactions [34, 35] that originated by the cultural and social background may affect distress in elderly patients with HMs. Thus, future studies need to consider the culture and social background of the study population in interpreting the sources of distress. Additionally, our finding suggests that medical professionals need to actively refer elderly cancer patients with those problems to social workers [9].

Our study found that depression was the most powerful influencer of distress, resulting in seven-fold higher levels of distress. Considering that the NCCN indicated that depression is one of the most common symptoms of distress, and the significant association with distress and depression is well known [9, 27], this finding is not surprising. Despite this, our finding challenges those of previous studies, which have indicated that other psychological problems, such as nervousness [13, 23], loss of interest [22], sadness [15], and worry [12, 13], are strongly associated with distress in cancer patients. In other words, the degree of association between distress and psychosocial problems was heterogeneous across studies [36]. Although no studies have explained those inconsistencies among studies, one possible explanation for our result is that elderly patients with cancer can be more affected by depression than younger patients [37, 38]. In elderly cancer patients, depression is one of the most prevalent psychological disorders, and depressive symptoms significantly increase with age [37, 38]. Hence, our findings suggest that depression may be responsible for distress among elderly patients with HMs as opposed to nervousness, loss of interest, sadness, and worry. Taking into account the present study’s findings, health care professionals can consider conducting additional tests to assess depressive symptoms using validated measurements, if the distress score is greater than 4 in elderly patients with HMs [9]. Further research is needed to identify the relationship between distress and depression among elderly patients with HMs, as well as their psychological needs associated with distress [37, 38].
Another essential finding of this study was that distressed elderly patients with HMs were affected by constipation, which was not found in prior studies [7, 13, 15, 20, 21, 24]. This implies that distressing factors may differ according to patient age, as constipation is a common complaint that occurs in 30% of the elderly and is a deteriorating factor for distress in this population [39]. This explanation is further supported by the fact that our study focused only on the elderly, whereas previous studies included patients of differing ages. Thus, assessing and modifying bowel function may be important to minimize distress in elderly patients with HMs [40].

Compared to prior studies, the prevalence of physical problems identified in our study is 10% higher than that of breast cancer patients [41]; however, it is comparable to those reported for patients with HMs, which have been reported at 92–100% [11, 24]. This result is understandable based on differences in treatment modality according to cancer type [11, 24]. In particular, recommended treatments for HMs (e.g., hematopoietic stem cell transplantation, [intense] chemotherapy, immunotherapy, and radiotherapy) are frequently intense, given for longer periods of time, and may often involve hospitalization, resulting in various physical side effects and increasing physical burden [11, 24]. Considering the high physical burden in elderly patients with HM, conducting a regular comprehensive symptom assessment would be beneficial for managing and reducing their physical burden. In addition, in order to develop a tailored intervention for the physical burden of elderly patients with HMs, it would be beneficial to explore the detailed process in which physical problems can affect daily life.

Although this study found fatigue to be prevalent, similar to in previous studies [11, 13–15, 17, 20, 21, 24], a significant association between fatigue and distress was not found [12, 14, 15, 19]. An explanation for this discrepancy might be due to the fact that elderly patients with cancer often regard fatigue as part of aging, possibly minimizing the severity and life-threatening impact of symptoms [42]. However, further research is needed to confirm the relationship between fatigue and distress in older adults with HMs.

Additionally, the prevalence of pain (30.3%) and sleep (32.6%) problems in this study was similar to or lower than those in previous studies, reporting pain prevalence of 29.8–64.5% and sleep problem prevalence of 36.6–61.5% [7, 12, 14, 15, 20, 24]. The reason for these discrepancies is yet to be confirmed; however, one study indicated that pain was reported less frequently in older patients with cancer than in younger patients [43]. Elderly patients may also develop higher pain tolerance over time, leading them to report symptoms that are newer, more serious, or more specifically related to cancer treatment [30]. Therefore, our results indicated that pain and sleep might be high priority problems that should be assessed and managed in elderly patients with HMs due to their association with distress. Further research is required to validate this assertion.

This study found unique features of physical problems among elderly patients with HMs. Specifically, some physical problems, such as tingling, difficulty with mobility, and memory/concentration, were reported to be 5–13% higher than those of other cancer patients in prior studies [7, 13, 14, 20, 21]. This discrepancy can be explained by the effects of aging and HM treatment on physical problems. In particular, patients with HMs, especially lymphoma and multiple myeloma, frequently experience tingling due to neurotoxic treatments (e.g., bortezomib, thalidomide, brentuximab vedotin, vinca alkaloid) [44]. Moreover, our prevalence of memory impairment and difficulty with mobility was comparable to other elderly patients with cancer that were measured using a different diagnostic tool (e.g., Mini-Mental State Examination) [45]. Given their circumstances, it can be asserted that elderly patients with HMs have higher prevalence of tingling, difficulty with mobility, and memory/concentration than younger patients with solid tumors. Considering tingling and memory/concentration problems are very common problems experienced by elderly patients with HMs, regularly assessing those problems is necessary for them.

### Study limitations

Some limitations of the study should be noted. First, cross-sectional design of this study limits the causality between PL and DT. Second, since the study data were collected using a convenience sample and the participants were diagnosed with diverse types of HMs, our results may not be generalizable to a particular type of HMs. Additionally, because social norms, expression of distress, and the factors associated with distress may vary based on culture/society, the generalizability of these findings outside of Korea warrants caution. Third, since our study did not include younger patients with HMs, we were unable to distinguish DT and the number and types of problems according to age. Further research is needed to compare the differences between DT and PLs in patients with HMs based on age. Lastly, PL questionnaire only collects binary answers on whether patients have a specific problem. Therefore, it does not represent the severity of the reported problems.
Conclusions

Overall, the present study confirms that elderly patients with HMs have a high burden of physical and emotional problems, implying that there are unmet needs in these patients. It is therefore important to recognize their problems, with consideration to the adverse effects of aging and HM treatments, to allow health professionals to better understand the disease burden and manage distress.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s00520-022-07315-9.

Author contribution All authors contributed to the study conception and design. Specifically, Park S. performed the statistical analysis and drafted the manuscript. Kim Y. was involved in revising the manuscript for important intellectual contents. Hong H. collected the data and helped to draft the manuscript. All authors read and approved the final manuscript.

Data availability The datasets generated and/or analyzed during the present study are available from the corresponding author on reasonable request.

Declarations

Ethics approval This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Ethics Committee of National Cancer Center (Number NCC 2019–0282).

Consent to participate Informed consent was obtained from all individual participants included in the study.

Competing interests The authors declare no competing interests.

References

1. Surveillance, epidemiology, and end results program 2018 SEER cancer statistics review 1975–2014: age distribution at diagnosis and death. seer.cancer.gov/archive/csr/1975_2014/results_merged/topic_age_dist.pdf. Accessed 10 February 2022
2. Johnsen AT, Tholstrup D, Petersen MA, Pedersen L, Groenvold M (2009) Health related quality of life in a nationally representative sample of haematological patients. Eur J Haematol 83(2):139–148. https://doi.org/10.1111/j.1600-0609.2009.01250.x
3. Else M, Smith AG, Cocks K, Richards SM, Crofts S, Wade R et al (2008) Patients’ experience of chronic lymphocytic leukaemia: baseline health-related quality of life results from the LRF CLL4 trial. Brit J Haematol 143(5):690–697. https://doi.org/10.1111/j.1365-2411.2008.07407.x
4. Barata A, Wood WA, Choi SW, Jim HS (2016) Unmet needs for psychosocial care in hematologic malignancies and hematopoietic cell transplant. Curr Hematol Malig Rep 11(4):280–287. https://doi.org/10.1007/s11899-016-0328-z
5. Franchini M, Frattini F, Crestani S, Bonfanti C (2013) Bleeding complications in patients with hematologic malignancies. Semin Thromb Hemost 39:94–100. https://doi.org/10.1055/s-0032-1331154
6. Hurria A, Li D, Hansen K, Patil S, Gupta R, Nelson C et al (2009) Distress in older patients with cancer. J Clin Oncol 27(26):4346–4351. https://doi.org/10.1200/JCO.2008.19.9463
7. Hong JF, Zhang W, Song YX, Xie LF, Wang WL (2015) Psychological distress in elderly cancer patients. Int J Nurs Sci 2(1):23–27. https://doi.org/10.1016/j.ijnss.2015.02.006
8. Shreders AJ, Niazi SK, Hodge DO, Chimato NT, Kureti M, Kirla N et al (2018) Correlation of sociodemographic and clinical parameters with depression and distress in patients with hematologic malignancies. Ann Hematol 97(3):519–528. https://doi.org/10.1007/s00277-017-3198-0
9. Riba MB, Donovan KA, Andersen B, Braun I, Breithart WS, Brewer BW et al (2019) Distress management version 3.2019 NCCN clinical practice guidelines in oncology. J Natl Compr Canc Netw 17(10):1229–1249. https://doi.org/10.6004/jnccn.2019.0048
10. Troy JD, de Castro CM, Pupa MR, Samsa GP, Abernethy AP, LeBlanc TW (2018) Patient-reported distress in myelodysplastic syndromes and its association with clinical outcomes: a retrospective cohort study. J Natl Compr Canc Netw 16(3):267–273. https://doi.org/10.6004/jnccn.2017.7048
11. Musiello T, Dixon G, O’Connor M, Cook D, Miller L, Petterson A (2017) A pilot study of routine screening for distress by a nurse and psychologist in an outpatient haematological oncology clinic. Appl Nurs Res 33:15–18. https://doi.org/10.1016/j.apnr.2016.09.005
12. Troy JD, Locke SC, Samsa GP, Feliciano J, Richhariya A, LeBlanc TW (2019) Patient-reported distress in hodgkin lymphoma across the survivorship continuum. Support Care Cancer 27(7):2453–2462. https://doi.org/10.1007/s00520-018-4523-4
13. VanHoose L, Black LL, Doty K, Sabata D, Twumasi-Ankrah P, Taylor S et al (2015) An analysis of the distress thermometer problem list and distress in patients with cancer. Support Care Cancer 23(5):1225–1232. https://doi.org/10.1007/s00520-014-2471-1
14. Graves KD, Arnold SM, Love CL, Kirsh KL, Moore PG, Passik SD (2007) Distress screening in a multidisciplinary lung cancer clinic: prevalence and predictors of clinically significant distress. Lung Cancer 55(2):215–224. https://doi.org/10.1016/j.lungcan.2006.10.001
15. Mehner A, Hartung TJ, Friedrich M, Vehling S, Brähler E, Härtner M et al (2018) One in two cancer patients is significantly distressed: prevalence and indicators of distress. Psychooncology 27(1):75–82. https://doi.org/10.1002/pon.4464
16. Owby KK (2019) Use of the distress thermometer in clinical practice. J Adv Pract Oncol 10(2):175. https://doi.org/10.6004/japno.2019.10.2.7
17. Berry DL, Blonquist TM, Hong F, Halpenny B, Partridge AH (2015) Self-reported adherence to oral cancer therapy: relationships with symptom distress, depression, and personal characteristics. Patient Prefer Adherence 9:1587–1597. https://doi.org/10.2147/PPA.S91534
18. American College of Surgeons Commission on Cancer 2020 Optimal resources for cancer care (2020 standards). American College of Surgeons Commission on Cancer: Chicago, IL, USA. https://www.facs.org/-/media/files/quality-programs/cancer/coc/optim_resou_rces_for_cancer_care_2020_standards.pdf. Accessed 10 February 2022
19. Jacobsen PB, Donovan KA, Trask PC, Fleishman SB, Zabora J, Baker F et al (2005) Screening for psychologic distress in ambulatory cancer patients: a multicenter evaluation of the distress thermometer. Cancer 103(7):1494–1502. https://doi.org/10.1002/cncr.20940
20. McFarland DC, Jutagir DR, Miller A, Nelson C (2020) Physical problem list accompanying the distress thermometer: its association with psychological symptoms and survival in patients with
Supportive Care in Cancer (2022) 30:9019–9027

21. Jewett PI, Teoh D, Petzel S, Lee H, Messelt A, Kendall J et al (2020) Cancer-related distress: revisiting the utility of the National Comprehensive Cancer Network distress thermometer problem list in women with gynecologic cancers. JCO Oncol Pract 16(8):649–659. https://doi.org/10.1200/JOP.19.00471

22. Clover KA, Oldmeadow C, Nelson L, Rogers K, Mitchell AJ, Carter G (2016) Which items on the distress thermometer problem list are the most distressing? Support Care Cancer 24(11):4549–4557. https://doi.org/10.1007/s00520-016-3294-z

23. Cook SA, Salmon P, Hayes G, Byrne A, Fisher PL (2018) Predictors of emotional distress a year or more after diagnosis of cancer: a systematic review of the literature. Psychooncology 27(3):791–801. https://doi.org/10.1002/pon.4601

24. Bergerot CD, Clark KL, Nonino A, Waliany S, Buso MM, Loscalzo M (2015) Course of distress, anxiety, and depression in hematological cancer patients: association between gender and grade of neoplasm. Palliat Support Care 13(2):115–123. https://doi.org/10.1017/S1478795151000084

25. Subramaniam S, Kong YC, Chinna K, Kimman M, Ho YZ, Saat N et al (2018) Health-related quality of life and psychological distress among cancer survivors in a middle-income country. Psychooncology 27(9):2172–2179. https://doi.org/10.1002/pon.4787

26. Paul F, Erdfelder E, Lang A-G, Buchner A (2007) G* Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences. Behav Res Methods 39(2):175–191. https://doi.org/10.3758/BF03193146

27. National Comprehensive Cancer Network 2013 Distress thermometer and problem list https://www.nccn.org/professionals/physician_gls/pdf/distress_tool_korean.pdf. Accessed 10 February 2022

28. Park JS, Oh YJ (2012) Development and evaluation of the psychosocial distress nursing intervention for patients with gynecological cancer. Korean J Adult Nurs 24(3):219–231. https://doi.org/10.7475/kjan.2012.24.3.219

29. Statistics Korea: household income trends in the fourth quarter of 2019. http://kostat.go.kr/portal/eng/pressReleases/61/index.board. Accessed 10 February 2022

30. Wochna Loerzel V (2015) Symptom experience in older adults undergoing treatment for cancer. Oncol Nurs Forum 42(3):269–278. https://doi.org/10.1188/15.ONF.E269-E278

31. Youn HM, Lee HJ, Lee DW, Park EC (2020) The impact of poverty transitions on frailty among older adults in South Korea: findings from the Korean longitudinal study of ageing. BMC Geriatr 20(1):1–10

32. Ascencio-Huertas L, Allende-Pérez S, Pastrana T (2021) Associated factors of distress in patients with advanced cancer: A retrospective study. Palliat Support Care 19(4):447–456. https://doi.org/10.1017/S1478951520001166

33. Jang SY, Seon JY, Oh IH (2020) Influencing factors of transportation costs regarding healthcare service utilization in Korea. J Korean Med Sci 35(35):e290. https://doi.org/10.3346/jkms.2020.35.e290

34. Jeong A, An JY, Park JH, Park K (2017) What cancer means to the patients and their primary caregivers in the family-accounted Korean context: a dyadic interpretation. Psychooncology 26(11):1777–1783. https://doi.org/10.1002/pon.4364

35. Oh Y, Han E (2019) Review of studies on spousal caregivers of frail spouses in South Korea. Int Soc Work 62(2):529–548. https://doi.org/10.1177/0020872817731144

36. Silva S, Bértolo A, Santos IM, Pereira A, Monteiro S (2022) Towards a better understanding of the factors associated with distress in elderly cancer patients: a systematic review. Int J Environ Res 19(6):3424. https://doi.org/10.3390/ijerph19063424

37. Parpa E, Tsilika E, Gennimata V, Mystakidou K (2015) Elderly cancer patients’ psychopathology: a systematic review: aging and mental health. Arch Gerontol Geriatr 60(1):9–15. https://doi.org/10.1016/j.archger.2014.09.008

38. Spoletinì I, Gianni W, Repetto L, Bria P, Caltagirone C, Bossu P et al (2008) Depression and cancer: an unexplored and unresolved emergent issue in elderly patients. Crit Rev Oncol Hematol 65(2):143–155. https://doi.org/10.1016/j.critrevonc.2007.10.005

39. Dore MP, Pes GM, Bibbò S, Tedde P, Bassotti G (2018) Constipation in the elderly from northern sardinia is positively associated with depression, malnutrition and female gender. Scand J Gastroenterol 53(7):797–802. https://doi.org/10.1080/00365521.2018.1473485

40. Talley NJ 2004. Definitions, epidemiology, and impact of chronic constipation. Rev Gastroenterol Disord 4:3–10. https://pubmed.ncbi.nlm.nih.gov/15184814/

41. McFarland DC, Shafler KM, Tiersten A, Holland J (2018) Physical symptom burden and its association with distress, anxiety, and depression in breast cancer. Psychosomatics 59(5):464–471. https://doi.org/10.1016/j.psym.2018.01.005

42. Siegel K, Lekas H-M, Maheshwari D (2012) Causal attributions for fatigue by older adults with advanced cancer. J Pain Symptom Manage 44(1):52–63. https://doi.org/10.1016/j.jpainsymman.2011.07.013

43. Cataldo JK, Paul S, Cooper B, Skerman H, Alexander K, Aouizerat B et al (2013) Differences in the symptom experience of older versus younger oncology outpatients: a cross-sectional study. BMC Cancer 13(1):1–16. https://doi.org/10.1186/1471-2407-13-6

44. Li T, Timmins HC, Lazarus HM, Park SB (2020) Peripheral neuropathy in hematologic malignancies—past, present and future. Blood Rev 43:100653. https://doi.org/10.1016/j.blre.2020.100653

45. Caillet P, Laurent M, Bastuji-Garin S, Liu E, Culine S, Lagrange J-L et al (2014) Optimal management of elderly cancer patients: usefulness of the comprehensive geriatric assessment. Clin Interv Aging 9:1645. https://doi.org/10.2147/CIA.S7549

Publisher’s Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.