Demoralization profiles and their association with depression and quality of life in Chinese patients with cancer: a latent class analysis

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Abstract
Purpose The study aimed to identify latent classes of demoralization and examine their associations with depression and quality of life (QOL) among patients with cancer.

Methods Cross-sectional data from 874 patients with cancer from three tertiary hospitals in Fujian province were collected using a convenience sampling method. Demoralization, depression, and QOL were assessed using the Chinese version of the Demoralization Scale-II, Patient Health Questionnaire-9, and McGill Quality of Life Questionnaire. Latent class analysis was performed on demoralization profiles. Binary logistic regression and multiple stepwise linear regression were used to examine the identified classes’ associations with depression and QOL.

Results Three latent classes of demoralization were identified: the “low demoralization and emotional disturbance” class (Class 1; 49.6%); “moderate demoralization and meaninglessness” class (Class 2; 29.1%); and “high demoralization and existential despair” class (Class 3; 21.3%). The severity of depression increased and the levels of QOL decreased with the three classes of demoralization. Patients with cancer being depressed in Classes 1 and 2 were 0.128 and 0.018 times that of Class 3, respectively, whereas the magnitudes of decrease in QOL scores for Classes 2 and 3 were 0.378 and 0.629, respectively.

Conclusion This study revealed three heterogeneous classes of demoralization in Chinese patients with cancer and indicated that increased classes were associated with more severe depression and decreased QOL. Targeted, step-by-step psychological interventions should be developed and implemented according to the characteristics of each class of demoralization to effectively promote psychological well-being among patients with cancer.

Keywords Cancer · Demoralization · Depression · Latent class analysis · Quality of life

Introduction

Demoralization is a syndrome that manifests as existential distress, helplessness, hopelessness, meaninglessness, incompetence, and diminished esteem associated with a specific event [1]. Globally, demoralization is highly prevalent among patients with cancer; the pooled average prevalence was 24 to 36% from 2014 to 2020 worldwide [2]. The increasing trend of demoralization has been found to exist independently of depression [3–7], but leads to patients with cancer experiencing higher death anxiety [8], greater existential distress [9], poorer psychological well-being [10, 11], and decreased quality of life (QOL) [12]. Notably, it is also associated with increased hastened death [7, 13] and suicidal ideation [14–18].

Previous studies on demoralization in oncology largely considered it as a continuous trait by using the scores of demoralization measurement tools (e.g., the Diagnostic Criteria for Psychosomatic Research [19], the Demoralization Scale [DS] [13], and the DS-II [20]), and then factor analysis identified that the DS includes five relatively different dimensions: “loss of meaning and purpose,” “dysphoria,” “disheartenment,” “helplessness,” and “sense of failure” [13]. However, this variable-centered analysis that captures information about demoralization...
as an overall sample and not an individual unit restricts the identification of the specific manifestations of demoralization.

Person-centered analysis approaches, such as latent class analysis (LCA), allow a more refined understanding of demoralization and identify whether there are distinct groups of patients with cancer who demonstrate similar patterns of demoralization responses [21]. This is useful for the identification of those who are most in need of psychological interventions, special or general. Bobevski et al. [22] identified four classes of psychological distress based upon demoralization, anxiety, depression, physical symptoms, and functional impairment among patients with cancer using LCA. However, it appears that latent classes of demoralization existing in patients with cancer have not been investigated.

In addition to identifying the latent classes of demoralization among patients with cancer, it is important to explore the relationship between depression and latent classes of demoralization. Demoralization is regarded as a component of depression [23] or independent of depression that could be a precursor or coexist with depression [2], which is an issue that is still debated. Moreover, how depression and demoralization impact QOL remains unclear. Unexamined associations between classes of demoralization, depression, and QOL may limit the development and efficacy of various tailored psychotherapeutic interventions for patients with cancer.

Given these premises, this study aimed to identify latent classes of demoralization using LCA and examine their associations with depression and QOL among patients with cancer. We hypothesized that the observed heterogeneity of demoralization presented by patients with cancer could be best explained by the existence of distinct classes, and depression and QOL would be differentially associated with each class.

Methods

Design

This was a descriptive cross-sectional study, conducted in Fujian province, China, from October 2020 to September 2021. The study was approved by the Institutional Review Board of Fujian Medical University (No: FMU2019012), and all participants provided written informed consent before taking part in the study. The study was reported according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement [24].

Participants

Using a convenience sampling method, 1000 patients with cancer were recruited from the oncology departments of three hospitals (two large tertiary general hospitals and one provincial cancer hospital) in Fujian province, China. Inclusion criteria were as follows: (1) diagnosed with cancer by pathology or cytology; (2) aged ≥18 years; (3) possessed clear consciousness, with sufficient reading comprehension and Mandarin language expression ability; and (4) willing to participate in this study and signed informed consent. Participants were excluded for any of the following: (1) cognitive deficits (the score of Montreal Cognitive Assessment [25]: ≤13 for illiteracy, ≤19 for individuals with 1–6 years of education, and ≤24 for those with 7 or more years of education); (2) mental disorders (e.g., schizophrenia, bipolar disorder, diagnoses were obtained from medical records); (3) neurological disease (e.g., Alzheimer’s, Parkinson’s, diagnoses were obtained from medical records); (4) with other cancer (s); (5) physical disability; (6) being critically ill; and (7) unable to fully participate in the research.

Measures

Socio-demographic and clinical characteristics

We designed an information sheet to collect data on patients’ socio-demographic characteristics, including age, gender, marital status, educational level, place of residence, occupation, primary caregiver, monthly average household income (Yuan, RMB), medical insurance, and family history of cancer. Disease-related data, such as cancer type, cancer stage, comorbidity, time since diagnosis, admission times, and medical expenses, were gathered from patients’ clinical charts.

Chinese version of the Demoralization Scale–II (DS–II–CV)

The original DS-II contains 16 items, covering two subscales; it assesses the frequency of demoralization experiences in the past two weeks. Answers are classified according to a three-point Likert scale (0 = never, 1 = sometimes, 2 = often); higher scores indicate greater demoralization experienced by patients. The Cronbach’s α coefficient was 0.89 [20].

The DS-II-CV was translated by our research team based on the Brislin model [26], after being authorized by Robinson et al. [20], the author of DS-II (Fig. 4 in the Appendix). After deleting two items, the 14-item DS-II-CV (Table 5 in the Appendix) with a two-factor structure demonstrated good reliability and validity. The Cronbach’s α coefficient was 0.911. Construct validity of the scale was demonstrated by significant associations with self-reported depression and QOL levels (r = 0.772, and –0.635, p < 0.01). A confirmatory factor analysis confirmed the two-factor structure with good model fit indices. In Rasch analysis, the scale achieved person reliability of 5.63 and a separate index of 0.97. The
infit and outfit mean squares for each item ranged from 0.68 to 1.40. No differential item functioning across the place of residence, educational level, or comorbidity was found.

**Patient health questionnaire-9**

The patient health questionnaire-9 (PHQ-9) was designed based on the Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) [27] and translated into Chinese by Wang et al. [28]. It contains nine items with two sub-domains (cognitive [or affective] and somatic) [29], measuring depression over the past 2 weeks using 4-point Likert-type responses (0 = not at all to 3 = nearly every day). The total score of the PHQ-9 ranges from 0 to 27, with higher scores indicating more severe depression; the Cronbach’s α coefficient was 0.852 in patients with malignant tumors [30]. In the present study, a PHQ-9 score ≥ 10 was used to identify depression [30].

**McGill Quality of Life Questionnaire**

The McGill Quality of Life Questionnaire (MQOL) is a multidimensional questionnaire that measures QOL across four domains (physical, psychological, existential or spiritual, and social) and consists of 16 items and a single item rating overall QOL [31]. It measures QOL over the past two days, using a numerical scale for response categories from 0 to 10; all the physical and psychological scales are reverse-scored; and higher scores represent better QOL or fewer symptoms. The Cronbach’s α coefficient was 0.83 [32, 33].

**Statistical analysis**

Data were analyzed using SPSS 26.0 (IBM, Chicago, IL, USA) and Mplus 7.0. The significance level was set at \( P < 0.05 \) (2-tailed). Descriptive statistics were used to describe socio-demographic and clinical characteristics and to present data collected by the DS-II-CV, PHQ-9, and MQOL.

Exploratory LCA was performed to identify the latent classes of demoralization. The fit index, statistical significance, entropy index, and clinical interpretability were comprehensively considered to determine the appropriate number of class solutions. Good model fit indices are indicated by a lower level of the Akaike information criterion (AIC), the Bayesian information criterion (BIC), and the sample size adjusted BIC (aBIC), a value of entropy closer to 1, a significant Lo-Mendell-Rubin likelihood ratio test (LMR), and the bootstrapped likelihood ratio test (BLRT) [34, 35].

Binary logistic regression was used to assess whether there was a difference in class membership of demoralization based on depression. Multiple stepwise linear regression was performed to assess the differences in QOL levels according to the latent classes of demoralization. Categorical variables were recoded into dummy variables for the multiple linear regression analysis (Table 6 in the Appendix). The demographic and clinical variables were controlled in both regression models.

**Results**

Of the 1000 patients who met the study criteria, 874 (87.4%) patients completed the questionnaires and 126 declined to participate. Reasons for non-participation were no interest (\( n = 53 \)), lack of time (\( n = 21 \)), high symptom burden (\( n = 37 \)), and others (\( n = 15 \)). There were no differences in the demographic characteristics between participants and non-participants (\( P > 0.05 \)). The demographic and clinical characteristics of the participants are shown in Table 1.

**Latent classes of demoralization**

Models in Classes 1 to 4 were analyzed (Table 2). The three-class model was identified as the best fitting one as it had a smaller AIC, BIC, aBIC, significant BLRT \( P \)-value, and entropy value over 0.8. When the three- and four-class models were compared, the LMR \( P \)-value was not significant, indicating that the three-class model was better than the four-class one. The average latent class probabilities of the three-class model ranged from 0.922 to 0.969, which was closer to 1.0 and confirmed that the classification accuracy was high. The responses of the three latent classes for all 14 items of the DS-II-CV are displayed in Fig. 1.

Class 1 (\( n = 438; 49.6\% \)) was characterized by prominently low probabilities (\(< 0.15\)) for almost all the items, except for item 3 (“I no longer feel emotionally in control”) which showed moderate probability. It indicated that the patients in this class had low levels of demoralization but suffered moderate emotional disturbance. Therefore, we defined this as the “low demoralization and emotional disturbance” class.

Class 2 (\( n = 249; 29.1\% \)) had a moderate probability of responding to almost all items, except items 1 (“There is little value in what I can offer others”) and 12 (“I would rather not be alive”), which showed high probabilities. It indicated that the patients in this class had moderate levels of demoralization and a lack of self-worth and life meaning. Therefore, we defined this as the “moderate demoralization and meaninglessness” class.

Class 3 (\( n = 187; 21.3\% \)) showed a prominently high probability of responding for almost all the items, especially for items 8 (“I have a lot of regret about my life”) and 12 (“I would rather not be alive”). It indicated that the patients in this class experienced high levels of demoralization with a strong sense of hopelessness and helplessness.
Table 1  Sociodemographic and clinical characteristics of the overall sample and three classes of demoralization (n = 847)

| Variables                                         | Total (n = 874) | Class 1 (n = 438) | Class 2 (n = 249) | Class 3 (n = 187) |
|---------------------------------------------------|-----------------|-------------------|-------------------|-------------------|
| Age (year), M(SD)                                   | 51.66(13.05)    | 50.07(13.35)      | 51.85(13.07)      | 55.18(11.60)      |
| Gender, n (%)                                       |                 |                   |                   |                   |
| Male                                               | 503 (57.55%)    | 234 (53.42%)      | 146 (58.63%)      | 123 (65.78%)      |
| Female                                             | 371 (42.45%)    | 204 (46.58%)      | 103 (41.37%)      | 64 (34.22%)       |
| Place of residence, n (%)                           |                 |                   |                   |                   |
| Urban                                              | 364 (41.65%)    | 220 (50.34%)      | 93 (37.80%)       | 51 (27.27%)       |
| Suburban                                           | 176 (20.14%)    | 68 (15.56%)       | 68 (27.64%)       | 40 (21.39%)       |
| Rural                                              | 330 (37.76%)    | 149 (34.10%)      | 85 (34.55%)       | 96 (51.34%)       |
| Educational level, n (%)                            |                 |                   |                   |                   |
| Primary school or below                            | 269 (30.99%)    | 110 (25.29%)      | 71 (28.74%)       | 88 (47.31%)       |
| Middle school degree                               | 224 (25.81%)    | 96 (22.07%)       | 83 (33.60%)       | 45 (24.19%)       |
| High school/technical school degree                | 156 (17.97%)    | 71 (16.32%)       | 57 (23.08%)       | 28 (15.05%)       |
| Bachelor or higher                                 | 219 (25.23%)    | 158 (36.32%)      | 36 (14.57%)       | 25 (13.44%)       |
| Marital status, n (%)                              |                 |                   |                   |                   |
| Unmarried                                          | 50 (5.72%)      | 25 (5.73%)        | 15 (6.02%)        | 10 (5.38%)        |
| Married                                            | 790 (90.39%)    | 397 (91.06%)      | 226 (90.76%)      | 167 (89.78%)      |
| Others (e.g., divorced or widowed)                 | 31 (3.54%)      | 14 (3.22%)        | 8 (3.21%)         | 9 (4.84%)         |
| Occupation, n (%)                                  |                 |                   |                   |                   |
| Unemployed                                         | 142 (16.25%)    | 79 (18.12%)       | 40 (16.13%)       | 23 (12.30%)       |
| Worker                                             | 119 (13.62%)    | 25 (5.73%)        | 51 (20.56%)       | 43 (22.99%)       |
| Farmer                                             | 253 (28.95%)    | 111 (25.46%)      | 68 (27.42%)       | 74 (39.57%)       |
| Government officials                               | 129 (14.76%)    | 87 (19.95%)       | 29 (11.69%)       | 13 (6.95%)        |
| Commercial servers                                 | 78 (8.92%)      | 39 (8.94%)        | 24 (9.68%)        | 15 (8.02%)        |
| Retired                                            | 63 (7.21%)      | 33 (7.57%)        | 17 (6.85%)        | 13 (6.95%)        |
| Others (e.g., self-employed)                       | 87 (9.95%)      | 62 (14.22%)       | 19 (7.66%)        | 6 (3.21%)         |
| Primary caregiver, n (%)                           |                 |                   |                   |                   |
| Spouse                                             | 495 (56.64%)    | 243 (55.48%)      | 156 (62.65%)      | 96 (51.34%)       |
| Children                                           | 248 (28.38%)    | 122 (27.85%)      | 62 (24.90%)       | 64 (34.22%)       |
| Parent                                             | 92 (10.53%)     | 56 (12.79%)       | 19 (7.63%)        | 17 (9.09%)        |
| Sibling                                            | 24 (2.75%)      | 13 (2.97%)        | 7 (2.81%)         | 4 (2.14%)         |
| Others (e.g., friends, colleagues, and care workers)| 15 (1.72%)    | 4 (0.91%)         | 5 (2.01%)         | 6 (3.21%)         |
| Monthly average household income (Yuan, RMB), n (%) |                 |                   |                   |                   |
| < 3000                                             | 185 (21.17%)    | 91 (20.82%)       | 52 (21.31%)       | 42 (22.46%)       |
| 3000–4999                                          | 368 (42.11%)    | 174 (39.82%)      | 103 (42.21%)      | 91 (48.66%)       |
| 5000–7999                                          | 242 (27.69%)    | 138 (31.58%)      | 59 (24.18%)       | 45 (24.06%)       |
| > 8000                                             | 73 (8.35%)      | 34 (7.78%)        | 30 (12.30%)       | 9 (4.81%)         |
| Medical insurance, n (%)                           |                 |                   |                   |                   |
| Publicly funded free medical care                   | 16 (1.83%)      | 9 (2.06%)         | 6 (2.41%)         | 1 (0.53%)         |
| Provincial medical insurance                        | 169 (19.34%)    | 111 (25.46%)      | 40 (16.08%)       | 18 (9.63%)        |
| City medical insurance                              | 190 (21.74%)    | 98 (22.48%)       | 56 (22.49%)       | 36 (19.25%)       |
| New rural cooperative                               | 386 (44.16%)    | 184 (42.20%)      | 112 (44.98%)      | 90 (48.13%)       |
| Commercial insurance                                | 26 (2.97%)      | 10 (2.29%)        | 11 (4.42%)        | 5 (2.67%)         |
| Self-pay                                           | 71 (8.12%)      | 13 (2.98%)        | 22 (8.84%)        | 36 (19.25%)       |
| Others (e.g., Cadre’s medical insurance)           | 14 (1.60%)      | 11 (2.52%)        | 2 (0.80%)         | 1 (0.53%)         |
| Whether family members have cancer, n (%)           |                 |                   |                   |                   |
| No                                                 | 659 (75.40%)    | 361 (85.14%)      | 176 (72.43%)      | 122 (66.30%)      |
| Unclear                                            | 95 (10.87%)     | 30 (7.08%)        | 34 (13.99%)       | 31 (16.85%)       |
| Yes                                                | 97 (11.10%)     | 33 (7.78%)        | 33 (13.58%)       | 31 (16.85%)       |
| Cancer type, n (%)                                  |                 |                   |                   |                   |
| Breast                                             | 59 (6.75%)      | 32 (7.31%)        | 13 (5.22%)        | 14 (7.49%)        |
| Lung                                               | 414 (47.37%)    | 192 (43.84%)      | 144 (57.83%)      | 78 (41.71%)       |
| Colorectal                                         | 135 (15.45%)    | 58 (13.24%)       | 31 (12.45%)       | 46 (24.60%)       |
| Gastric                                            | 129 (14.76%)    | 88 (20.09%)       | 17 (6.83%)        | 24 (12.83%)       |
| Liver                                              | 131 (14.99%)    | 64 (14.61%)       | 43 (17.27%)       | 24 (12.83%)       |
The relationship between classes of demoralization and depression

The average total scores for DS-II-CV and PHQ-9 were 7.30 ± 6.00 and 7.92 ± 5.71, respectively. Overall, 68.8% of patients were found to be depressed based on the criterion of PHQ-9 ≥ 10. As shown in Fig. 2, the severity of depression increased with three classes of demoralization. Table 7 in the Appendix shows PHQ-9’s cognitive or affective and somatic domain scores of each class.

As shown in Table 3, after controlling the socio-demographic and clinical characteristics, patients with cancer being depressed in Classes 1 and 2 were 0.128 and 0.018 times that of Class 3, respectively.

Relationship between classes of demoralization and QOL

The average total score of MQOL was 102.88 ± 31.87. As shown in Fig. 3, the level of QOL decreased with the three classes of demoralization. Table 7 in the Appendix shows the total MQOL score and the physical, psychological, existential or spiritual, and social domains of the three classes.

The regression model (Table 4) showed that after controlling for the socio-demographic and clinical characteristics, the latent classes of demoralization could explain 22.9% of the variation in the QOL of patients with cancer. With Class 1 as the reference, the magnitudes of decrease in QOL scores for Classes 2 and 3 were 0.378 and 0.629 (P < 0.001), respectively.

Discussion

This is the first study to identify demoralization classes and their relationships with depression and QOL among patients with cancer, which is different from previous studies that treated such patients as a homogeneous group [4, 13, 36, 37]. Three distinct classes were identified, with the “low demoralization and emotional disturbance” class being the most common, and “moderate demoralization and meaninglessness” and “high demoralization and existential despair” being approximately similar in size. The findings provide us with a basis on which interventions can be tailored for those most in need.
Nearly half of the participants belonged to Class 1 ("low demoralization and emotional disturbance"). This indicates that under the stress of cancer, although most patients had a low level of demoralization, it still manifested as emotional disturbance. In other words, patients belonging to this class perceived themselves to be incapable of facing the stress of cancer, losing control, and feeling trapped and sad. Previous studies have also reported that one in two patients with cancer suffer significant emotional distress [38]. Therefore, emotional disturbance may hold the potential of functioning as ‘red flags’ for being demoralized in cancer patients.

In contrast to Class 1, there was a similar proportion of participants belonging to Classes 2 ("moderate demoralization and meaninglessness"; 29.1%) and 3 ("high demoralization and..."

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**Fig. 1** Three-class model of demoralization among cancer patients

**Fig. 2** The association between PHQ-9 score and the three classes of demoralization
existential despair”; 21.3%). Regarding Class 2, patients experienced a higher level of demoralization than those in Class 1 and were more likely to have the self-perception of being incapable of facing cancer and its related adverse consequences; this led to a reduced sense of purpose and meaning in life, which is rooted in the experience of meaningful relationships [1]. Therefore,

### Table 3 Binary logistic regression analysis of depression between demoralization profiles

| Variables                                      | β     | S.E  | Wald  | OR(95%CI)          | P     |
|------------------------------------------------|-------|------|-------|--------------------|-------|
| Constant                                       | 5.002 | 0.868| 33.189|                    | <0.001|
| Marital status (unmarried as reference)       |       |      |       |                    |       |
| Married                                        | −1.154| 0.380| 9.223 | 0.315(0.150–0.664)  | 0.002 |
| Occupation (unemployed as reference)          |       |      |       |                    |       |
| Farmer                                         | −0.595| 0.251| 5.628 | 0.552(0.337–0.902)  | 0.018 |
| Government officials                           | −0.980| 0.330| 8.826 | 0.375(0.197–0.716)  | 0.003 |
| Commercial servers                             | −0.693| 0.337| 4.227 | 0.500(0.258–0.968)  | 0.040 |
| Others (e.g., self-employed)                  | −1.338| 0.359| 13.882| 0.262(0.130–0.530)  | <0.001|
| Cancer type (breast cancer as reference)      |       |      |       |                    |       |
| Lung                                           | 0.881 | 0.335| 6.927 | 2.413(1.252–4.649)  | 0.008 |
| Colorectal                                     | 1.257 | 0.387| 10.547| 3.516(1.646–7.511)  | 0.001 |
| Whether family members have cancer (No as reference) |       |      |       |                    |       |
| Yes                                            | 1.142 | 0.289| 15.666| 3.133(1.78–5.515)   | <0.001|
| Classes of demoralization (Class 3 as reference) |       |      |       |                    |       |
| Class 1                                        | −4.017| 0.270| 221.208| 0.018(0.011–0.031)  | <0.001|
| Class 2                                        | −2.057| 0.262| 61.737| 0.128(0.077–0.214)  | <0.001|

$\chi^2=616.297$, $P<0.001$, and Nagelkerke $R^2=0.518$. SE, standard error; OR, odds ratio; CI, confidence interval. Class 1, “low demoralization and emotional disturbance” group; Class 2, “moderate demoralization and meaninglessness” group; Class 3, “high demoralization and existential despair” group

**Fig. 3** The association between MQOL score and the three classes of demoralization
we recommend meaning-centered therapy [39] to reduce the demoralization of patients with cancer in Class 2.

Compared with Class 2, the participants belonging to Class 3 were more likely to be trapped in existential despair. This may be because nearly half of the patients with cancer participating in this study were in stages III and IV of the disease. The progressive disability in the physical condition and social connections, an increasing dependency on disease. The progressive disability in the physical condition and social connections, an increasing dependency on disease. The progressive disability in the physical condition and social connections, an increasing dependency on disease. The progressive disability in the physical condition and social connections, an increasing dependency on disease. The progressive disability in the physical condition and social connections, an increasing dependency on disease.

As found in another study that used total scores [6], both the severity and probability of depression increased with an increase of the demoralization class. However, we found a difference between them: the presence of depression among the three classes of demoralization was 11.9%, 36.8%, and 51.9% for Classes 1, 2, and 3, respectively. This indicated that there was a significant proportion of patients who were demoralized but not depressed, which aligns with the findings from previous studies [3–7]. Effective management of demoralization may reduce the level of depression. Our findings suggest that tailored stepwise psychological interventions should be provided for patients with cancer and that the high demoralization and existential despair class requires more urgent attention.

We also found the level of QOL decreased with an increase in demoralization classes. Compared to Class 1, Classes 2 and 3, with higher levels of demoralization are characterized by hopelessness or existential despair. This further supports a previous finding that loss of meaning and purpose has a more profound effect on QOL than distress, down-heartedness, and sense of incompetence [37]. We found that increases in classes of demoralization among patients with cancer were significant predictors of a worse QOL, which is consistent with previous findings that indicate an inverse relationship between demoralization and QOL [3, 4, 7, 13, 36, 42]. Thus, determining how patients with cancer become demoralized and providing tailored psychological interventions to improve their QOL are crucial.

This study has some limitations that should be considered. First, given the cross-sectional study design, it is difficult to infer causality based on the associations of demoralization classes with depression and QOL. Future longitudinal research is required to address this important issue. Second, the current samples were recruited from three tertiary hospitals in one province, which may limit the generalizability. A multicenter survey is required to ensure the representativeness of the sample. Third, this study included heterogeneous cancer types and stages, which may have failed to identify divergent patterns of demoralization that emerge with different cancers. Therefore, future studies should focus on specific types and stages of cancer. Fourth, we have not measure subjective incompetence considered to be the clinical hallmark of demoralization because the scale of subjective incompetence has not been translated to Chinese. Further studies are needed to address this problem. Finally, as all variables were assessed using self-report questionnaires, reporting bias may have affected the findings; objective data could preferably be collected in the future to address this issue.

Conclusions

This study is the first to elucidate the three heterogeneous classes of demoralization in Chinese patients with cancer and indicate that increased classes are related to more severe depression and decreased QOL. Targeted, step-by-step psychological interventions should be developed and implemented according to the characteristics of each demoralization class to effectively promote psychological well-being among patients with cancer.
Appendix

Fig. 4 The cross-cultural translation of DS-II. DS-II, the Demoralization Scale-II; TVI, Translation validity index; CTT, Classical Test Theory

Table 5 The 14-item of the Chinese version of the Demoralization Scale-II (DS-II-CV)

| Item                                      | Never | Sometimes | Often |
|-------------------------------------------|-------|-----------|-------|
| 1. There is little value in what I can offer others | 0     | 1         | 2     |
| 2. My life seems to be pointless          | 0     | 1         | 2     |
| 3. I no longer feel emotionally in control| 0     | 1         | 2     |
| 4. No one can help me                     | 0     | 1         | 2     |
| 5. I feel hopeless                        | 0     | 1         | 2     |
| 6. I feel irritable                       | 0     | 1         | 2     |
| 7. I do not cope well with life           | 0     | 1         | 2     |
| 8. I have a lot of regret about my life   | 0     | 1         | 2     |
| 9. I tend to feel hurt easily             | 0     | 1         | 2     |
| 10. I feel distressed about what is happening to me | 0     | 1         | 2     |
| 11. I am not a worthwhile person          | 0     | 1         | 2     |
| 12. I would rather not be alive           | 0     | 1         | 2     |
| 13. I feel quite isolated or alone        | 0     | 1         | 2     |
| 14. I feel trapped by what is happening to me | 0     | 1         | 2     |
Table 6  Value assignment for categorical independent variables in the multiple regression analysis of the quality of life

| Independent variables | Value assignment |
|-----------------------|------------------|
| Age                   | Input the original data |
| Monthly average household income | |
| Time since diagnosis  | |
| Admission times       | |
| Medical expense       | |
| Cancer stage          | |
| Depression            | |
| Place of residence    | Reference: urban  |
|                       | Dummy-coded variables: suburban, rural |
| Educational level     | Reference: primary school or below; dummy-coded variables: middle school degree, high school/technical school degree, bachelor or higher |
| Marital status        | Reference: unmarried |
| Occupation            | Dummy coded variables: married, others |
| Primary caregiver     | Reference: spouse |
| Medical insurance     | Dummy-coded variables: children, parent, sibling, others |
| Cancer type           | Reference: breast |
|                       | Dummy-coded variables: lung, colorectal, gastric, liver, others |
| Whether family members have cancer | Reference: no |
|                       | Dummy-coded variables: unclear, yes |
| Gender                | Male = 0, female = 1 |
| Comorbidity           | No = 0, yes = 1 |

Table 7  Depression and quality of life of three classes of demoralization

| Variables                                  | Total ($n=874$) | Class 1 ($n=438$) | Class 2 ($n=249$) | Class 3 ($n=187$) | $F/\chi^2$ | $P$  |
|--------------------------------------------|----------------|-------------------|-------------------|-------------------|-----------|------|
| Depression                                 |                |                   |                   |                   |           |      |
| PHQ-9 total score                          | $7.92 \pm 5.71$| $3.17 \pm 3.11$   | $7.32 \pm 3.49$   | $12.20 \pm 5.64$  | $532.517$ | $<0.001$ |
| Cognitive/affective score                  | $4.83 \pm 3.71$| $1.96 \pm 2.12$   | $4.73 \pm 2.43$   | $7.90 \pm 3.22$   | $608.799$ | $<0.001$ |
| Somatic score                              | $3.12 \pm 2.65$| $1.22 \pm 1.43$   | $2.60 \pm 1.57$   | $4.30 \pm 3.10$   | $233.687$ | $<0.001$ |
| Being depression                           | $27.6\%$       | $11.9\%$          | $36.8\%$          | $51.9\%$          | $527.528$ | $<0.001$ |
| Quality of life                            |                |                   |                   |                   |           |      |
| MQOL total score                           | $102.88 \pm 31.87$| $129.58 \pm 26.50$| $101.58 \pm 26.55$| $82.97 \pm 24.26$| $233.310$ | $<0.001$ |
| Physical score                             | $29.00 \pm 9.68$| $33.92 \pm 7.05$  | $30.13 \pm 8.34$  | $24.15 \pm 10.32$ | $93.556$  | $<0.001$ |
| Psychological score                        | $28.11 \pm 10.07$| $34.25 \pm 7.78$  | $29.12 \pm 8.85$  | $22.42 \pm 9.57$  | $130.219$ | $<0.001$ |
| Existential score                          | $27.70 \pm 13.87$| $37.19 \pm 13.20$ | $25.17 \pm 13.19$ | $22.54 \pm 11.04$ | $118.165$ | $<0.001$ |
| Support score                              | $18.00 \pm 8.77$| $24.16 \pm 7.49$  | $17.16 \pm 8.96$  | $13.95 \pm 6.62$  | $136.363$ | $<0.001$ |

MQOL, Mc Gill Quality of Life Questionnaire; PHQ-9, Patient Health Questionnaire-9. Class 1, “low demoralization and emotional disturbance” group; Class 2, “moderate demoralization and meaninglessness” group; Class 3, “high demoralization and existential despair” group
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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 Fujian Medical University (No: FMU2019012).

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

Consent to publish Not applicable.

Conflict of interest The authors declare no competing interests.

References

1. Clarke DM, Kissane DW (2002) Demoralization: its phenomenology and importance. Aust N Z J Psychiatry 36(6):733–742. https://doi.org/10.1046/j.1440-1614.2002.01086.x

2. Gan LL, Gong S, Kissane DW (2021) Mental state of demoralisation across diverse clinical settings: a systematic review, meta-analysis and proposal for its use as a ‘specifier’ in mental illness. Aust N Z J Psychiatry. 0004874021106074. https://doi.org/10.1177/000487402110607466

3. Hung H, Chen H, Chang Y et al (2010) Evaluation of the reliability and validity of the Mandarin Version of Demoralization Scale for cancer patients. J Intern Med Taiwan 21(6):427–435

4. Lee C, Fang C, Yang Y et al (2012) Demoralization syndrome among cancer outpatients in Taiwan. Support Care Cancer 20(10):2259–2267. https://doi.org/10.1007/s00520-011-1332-4

5. Mehniert A, Vehling S, Höcker A, Lehmann C, Koch U (2011) Demoralization and depression in patients with advanced cancer: validation of the German version of the demoralization scale. J Pain Symptom Manage 42(5):768–776. https://doi.org/10.1016/j.jpainsymman.2011.02.013

6. Wu W, Quan M, Gao L et al (2021) Demoralization and depression in Chinese cancer patients. Support Care Cancer 29(11):6211–6216. https://doi.org/10.1007/s00520-021-06195-9

7. Mullane M, Dooley B, Tiernan E, Bates U (2009) Validation of the Demoralization Scale in an Irish advanced cancer sample. Palliat Support Care 7(3):323–330. https://doi.org/10.1016/S1478-9515(09)0090253

8. Eggen AC, Reyers AK, Shen G et al (2020) Death anxiety in patients with metastatic non-small cell lung cancer with and without brain metastases. J Pain Symptom Manage 60(2):422-429. e421. https://doi.org/10.1016/j.jpainsymman.2020.02.023

9. Bovero A, Sedghi NA, Opezzo M et al (2018) Dignity-related existential distress in end-of-life cancer patients: prevalence, underlying factors, and associated coping strategies. Psycho-Oncol 27(11):2631–2637. https://doi.org/10.1002/pon.4884

10. Peng H, Hsueh H, Chang Y, Li R (2021) The mediation and suppression effect of demoralization in breast cancer patients after primary therapy: a structural equation model. J Nurs Res 29(2):e144. https://doi.org/10.1097/JNR.0000000000000421

11. Nikoy Kouphes E, Karami Z, Rahmani B, Shoaei F (2020) The relationship between existential anxiety and demoralization syndrome in predicting psychological well-being of patient with cancer. Clin Psychol 8(3):175–182. https://doi.org/10.32598/cjpc.8.3.515.1

12. Ghiggia A, Pierotti V, Tesio V, Bovero A (2021) Personality matters: relationship between personality characteristics, spirituality, demoralization, and perceived quality of life in a sample of end-of-life cancer patients. Support Care Cancer 29(12):7775–7783. https://doi.org/10.1007/s00520-021-06363-x

13. Kissane DW, Wein S, Love A et al (2004) The Demoralization Scale: a report of its development and preliminary validation. J Palliat Care 20(4):269–276

14. Fang C, Chang M, Chen P et al (2014) A correlational study of suicidal ideation with psychological distress, depression, and demoralization in patients with cancer. Support Care Cancer 22(12):3165–3174. https://doi.org/10.1007/s00520-014-2294-0

15. Vehling S, Kissane DW, Lo C et al (2017) The association of demoralization with mental disorders and suicidal ideation in patients with cancer. Cancer 123(17):3394–3401. https://doi.org/10.1002/cncr.33749

16. Ko KT, Lin CJ, Pi SH, Li YC, Fang CK (2018) Demoralization syndrome among elderly patients with cancer disease. Int J Gerontol 12(1):12–16. https://doi.org/10.1016/j.jgie.2018.01.001

17. Liu ST, Wu X, Wang N et al (2020) Serial multiple mediation of demoralization and depression in the relationship between hopelessness and suicidal ideation. Psycho-Oncol 29(8):1321–1328. https://doi.org/10.1002/pon.5439

18. Xu K, Hu DY, Liu YL et al (2019) Relationship of suicidal ideation with demoralization, depression, and anxiety a study of cancer patients in mainland China. J Nerv Ment Dis 207(5):326–332. https://doi.org/10.1097/NMD.0000000000000974

19. Fava GA, Freyberger HJ, Bech P et al (1995) Diagnostic criteria for use in psychosomatic research. Psychother Psychosom 63(1):1–8. https://doi.org/10.1159/000288931

20. Robinson S, Kissane DW, Brooker J et al (2016) Refinement and revalidation of the demoralization scale: the DS-II—internal validity. Cancer 122(14):2251–2259. https://doi.org/10.1002/cncr.30015

21. Hagenaaars JA, McCutcheon AL (2002) Applied latent class analysis. Cambridge University Press, Cambridge

22. Bobeski V, Kissane D, Vehling S et al (2018) Latent class analysis differentiation of adjustment disorder and demoralization, more severe depressive and anxiety disorders, and somatic symptoms in patients with cancer. Psychooncology 27(11):2623–2630. https://doi.org/10.1002/pon.4761

23. Clarke DM, Kissane DW, Trauer T, Smith GC (2005) Demoralization, anhedonia and grief in patients with severe physical illness. World Psychiatry 4(2):96–105

24. Von Elm E, Altman DG, Egger M et al (2007) The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. Lancet 370(9596):1453–1457. https://doi.org/10.1016/s0140-6736(07)61602-x

25. Lu J, Li D, Li F et al (2011) Montreal cognitive assessment in detecting cognitive impairment in Chinese elderly individuals: a population-based study. J Geriatr Psychiatry Neurol 24(4):184–190. https://doi.org/10.1177/0891987711422528

26. Brislin RW (1970) Back-translation for cross-cultural research. J Cross Cult Psychol 1(3):185–216. https://doi.org/10.1177/002200227003000301
27. Kroenke K, Spitzer RL, Williams JB (2001) The PHQ-9: validity of a brief depression severity measure. J Gen Intern Med 16(9):606–613. https://doi.org/10.1046/j.1525-1497.2001.01600.x

28. Wang W, Bian Q, Zhao Y et al (2014) Reliability and validity of the Chinese version of the Patient Health Questionnaire (PHQ-9) in the general population. Gen Hosp Psychiatry 36(5):539–544. https://doi.org/10.1016/j.genhosppsych.2014.05.021

29. Chilcot J, Rayner L, Lee W et al (2013) The factor structure of the PHQ-9 in palliative care. J Psychosom Res 75(1):60–64. https://doi.org/10.1016/j.jpsychres.2012.12.012

30. Wang B (2013) A study of the application of PHQ-9 and GAD-7 in malignant tumor population. Dissertation, Central South University.

31. Cui J, Fang F, Shen F et al (2014) Quality of life in patients with advanced cancer at the end of life as measured by the McGill quality of life questionnaire: a survey in China. J Pain Symptom Manage 48(5):893–902. https://doi.org/10.1016/S0885-3924(12)00593-6

32. Hu W, Dai Y, Chiu T (2003) Psychometric testing of the translated McGill Quality of Life Questionnaire-Taiwan version in patients with terminal cancer. J Formos Med Assoc 102(2):97–104

33. Lo RS, Woo J, Zho C et al (2001) Cross-cultural validation of the McGill Quality of Life questionnaire in Hong Kong Chinese. Palliat Med 15(5):387–397. https://doi.org/10.1191/026921601680419438

34. Celeux G, Soromenho G (1996) An entropy criterion for assessing the number of clusters in a mixture model. J Classif 13(2):195–212. https://doi.org/10.1007/BF01246098

35. Nylund KL, Asparouhov T, Muthén B (2007) Deciding on the number of classes in latent class analysis and growth mixture modeling: a Monte Carlo simulation study. Struct Equ Modeling 14(4):535–569. https://doi.org/10.1080/10705110701575396

36. Cheng J, Chen J, Zhang Y, Kissane D, Yan J (2019) Translation and psychometric properties for the Demoralization Scale in Chinese breast cancer patients. Eur J Oncol Nurs 42:134–140. https://doi.org/10.1016/j.ejon.2019.09.001

37. Robinson S, Kissane DW, Brooker J et al (2016) Refinement and revalidation of the demoralization scale: the DS-II—external validity. Cancer 122(14):2260–2267. https://doi.org/10.1002/cncr.30012

38. Mehnert A, Hartung TJ, Friedrich 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

39. Fraguell-Hernando C, Limonero JT, Gil F (2020) Psychological intervention in patients with advanced cancer at home through individual meaning-centered psychotherapy-palliative care: a pilot study. Support Care Cancer 28(10):4803–4811. https://doi.org/10.1007/s00520-020-04382-2

40. Bovero A, Botto R, Adriano B et al (2019) Exploring demoralization in end-of-life cancer patients: prevalence, latent dimensions, and associations with other psychosocial variables. Palliat Support Care 17(5):596–603. https://doi.org/10.1017/S1478951519000191

41. Griffith JL, Dsouza A (2012) Demoralization and hope in clinical psychiatry and psychotherapy. The psychotherapy of hope: the legacy of persuasion and healing. The Johns Hopkins University Press, Baltimore, pp 158–177

42. Nanni MG, Caruso R, Travado L et al (2018) Relationship of demoralization with anxiety, depression, and quality of life: A Southern European study of Italian and Portuguese cancer patients. Psychooncology 27(11):2616–2622. https://doi.org/10.1002/pon.4824

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