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TITLE: Latent class analysis differentiation of adjustment disorder and demoralization, more severe depressive and anxiety disorders, and somatic symptoms in patients with cancer

Running title: Contribution of demoralization to adjustment and psychiatric disorders

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Abstract

Objectives: Demoralization as a form of existential distress involves poor coping, low morale, hopelessness, helplessness and meaninglessness. In a secondary analysis of a cohort of German cancer patients, we aimed to explore latent class structure to assess the contribution that symptoms of demoralization make to anhedonic depression, anxiety, adjustment and somatic disorders.

Methods: Measures of demoralization, depression, anxiety, physical symptoms and functional impairment had been completed cross-sectionally by 1527 patients with early or advanced cancer. Latent class analysis used maximum likelihood techniques to define the unobserved latent constructs that can be predicted as symptom clusters. Individual patients were assigned to the most probable class. Classes were compared on demographics, and logistic regression assessed the odds of individual items predicting each class.

Results: A four class model provided the best fit. Class 1 (n=829, 54.3%) was defined by the absence of distress; Classes 2, 3 and 4 all carried functional impairment. Class 2 (n=333, 21.8%) was differentiated by somatic symptoms (sleep, tiredness, appetite); Class 3 (n=163, 10.7%) by anhedonia, anxiety and severe demoralization; and Class 4 (n=202, 13.2%) by adjustment and moderate demoralization. Members of Class 3 were more likely to be younger, female, anhedonic, depressed, and anxious. In both Classes 3 and 4, functional impairment, physical symptom burden and suicidal ideation were present.

Conclusions: In contrast with the severe symptom cluster carrying anhedonia, anxiety and demoralization, the moderate symptom cluster was formed by patients with demoralization and impaired functioning, a clinical picture consistent with a unidimensional model of adjustment disorder.

Keywords

Adjustment disorder, anhedonia, anxiety, demoralization, depression, existential distress, latent class analysis, suicidality

Background

Cancer patients face existential challenges which can result in demoralization and doubting the value of life. Demoralization is characterised by difficulty in coping with a stressor, wherein the person feels trapped, helpless, unable to control or change their predicament, and resultant feelings of hopelessness, aloneness and despair can result in the loss of meaning in life (1, 2). A systematic review showed a prevalence of 13%-18% in 2295 cancer patients across ten studies (3). In three systematic reviews, factors associated with demoralization included poor health, inadequately controlled physical or mental symptoms, reduced quality of life, unemployment and financial strain, reduced social functioning, single status and social isolation or alienation (3-5). Furthermore, demoralization has a stronger association than depression with desire for hastened death (6, 7) and suicidal ideation (8) .

As a failure to adapt and cope satisfactorily, demoralization is consistent with Adjustment Disorder (AD) (2). Yet when severe, demoralization can be co-morbidly present with major depressive disorder (MDD) (9-11). One approach to such comorbidity is the use of diagnostic specifiers in DSM-5, and supported by clinicians' perception of the utility of demoralization as a diagnostic specifier for AD and MDD (12). However, recent studies of AD for ICD-11 have emphasised its unidimensionality (13, 14). The DSM-5 and ICD-10 categories of AD have been critiqued for using broad and subjective criteria (14). Studies of AD for ICD-11 pointed to its own distinctive phenomena, separate to those defining depressive or anxiety disorders, rather than being hierarchically considered as a subthreshold disorder when the diagnostic requirements for depression or anxiety are not met (14, 15). Glaesmer and colleagues (2015) showed that confirmatory factor analysis and latent class analysis supported a unifaceted concept of AD. This unidimensional model of AD was characterized by a maladaptive preoccupation with a stressor, failure to adapt with significant functional impairment, and additional symptoms, including depressive, anxious, avoidance, and impulsivity (15). This definition of failure to cope, with functional impairment and distress overlaps with the construct of demoralization.

There are important clinical differences between demoralization and MDD. Through techniques such as binary factor analysis and latent class analysis, discrete clusters show a distinction between

anhedonia (loss of pleasure), demoralization (loss of hope and meaning), anxiety (worry and fear), somatic symptoms (pain, fatigue) and grief (emotions of loss) with medically ill hospital patients (16-18). Several cancer studies have also shown that demoralization is independent from depression, despite a high association (16, 19). When anhedonic depression becomes severe, co-morbid demoralization could develop, or when moderate demoralization persists without relief, it could be a harbinger for MDD (20). Just as mixed states exist between anxiety and depression, so might demoralization develop co-morbidly.

Our theoretical model of demoralization suggests that it is a failure to adjust (1). Its severity exists across a spectrum, with suicidal thinking able to develop as initial disheartenment deepens into despair and existential angst. Demoralization offers an understanding of poor coping that is not captured by existing diagnostic systems (13, 14), is relevant to patients, and is more targeted in guiding interventions.

In this study we hypothesized that a group of cancer patients exists who are not anhedonic or in the severe range of depression and anxiety, but have symptoms consistent with adjustment difficulties, including moderate to high demoralization levels, suicidal ideation, physical symptoms, and impaired functioning. To investigate this hypothesis, the study aimed to conduct latent class analyses (defined below) on three combined samples of German cancer patients. This would generate empirical evidence for the phenomena of demoralization being understood within the unifaceted symptom cluster of adjustment disorder.

Methods

Sample and Procedures

To create a relatively balanced large sample of participants with early stage and advanced cancer, three samples of German patients were combined, the first with more early stage and the latter two with more advanced cancers. Sample 1 was recruited as part of a nationwide epidemiological study representative of all tumour sites and treatment settings [study protocol: (21)]. Samples 2 and 3 were recruited from in- and outpatient clinics at the University Medical Center Hamburg-Eppendorf.

Exclusion criteria were severe physical or cognitive impairment and language problems as evaluated by the attending physician. Overall, 1529 out of 2842 eligible patients participated (average participation rate 54%). Ethical approval was received from the Hamburg Medical Association Ethics Committee for all studies.

Materials

Demographic and disease-related characteristics

Age, gender, education level, and relationship status were assessed with a standardized self-report questionnaire. Disease-related characteristics including tumor diagnosis and stage were obtained from medical charts.

Demoralization Scale (DS)

Symptoms of demoralisation were measured with the German DS (10). This is a 24-item scale, with responses from 0 "Never" to 4 "All the Time". Total scores range from 0 to 96. Cut-off scores of ≥ 30 and ≥ 36 indicate moderate and high demoralization (9, 22). The German DS has high internal consistency ($\alpha=0.84$) and good construct validity (10). More recently, the DS-II, a 16-item version, was validated (23, 24), highlighting through item response theory the more clinically important symptoms to study in LCA.

PHQ-9

Depressive symptoms were measured with the Patient Health Questionnaire-9 (PHQ-9) (25), which consists of the nine criteria used to diagnose DSM-IV / 5 depression, each scored on a numeric 0-3 scale. Total scores range from 0 to 27. A cut-off score of ≥ 10 is indicative of MDD based on its psychometric evaluation in primary care patients. The German version shows good internal consistency with Cronbach's $\alpha=0.89$.

GAD-7

Anxiety symptoms were measured with the Generalized Anxiety Disorder-7 (GAD-7) questionnaire (26). Total scores range from 0 to 21. A cut-off of ≥ 10 is indicative of GAD. It serves as a screening

measure for other anxiety disorders based on its psychometric evaluation in primary care patients. The German version shows good internal consistency with Cronbach's $\alpha=0.89$.

Physical symptoms

In two samples, physical symptoms were assessed with the NCCN Distress Thermometer (DT), German version (27), asking about 21 symptoms common in cancer patients, scored as "Yes/No" responses. In the third sample, the German version of the Memorial Symptom Assessment Scale (MSAS) (28) asked about 28 physical symptoms, rated on a 5-point severity scale.

A common measure of physical symptoms coded as present was derived by matching 10 symptoms between the DT and the MSAS: pain, nausea, appearance, dyspnea, mouth sores, constipation, diarrhea, urinary symptoms, feeling swollen, and sexual problems.

Functional impairment

In Samples 1 and 2, functional impairment was measured with the DT: the items about problems with work, with partner or children. In Sample 3, functional impairment was measured with similar content items from the German SF-8 (29): difficulty with work (item 3), or family and social activities (item 6). The SF-8 is scored on a 5-point scale from 0 "no difficulty" to 5 "could not do activity at all." If participants responded "Yes" to any of the three DT items or scored more than zero on any of the two SF-8 items, they were coded as having functional impairment.

Statistical Methods

Latent Class Analysis (LCA)

LCA was used to identify discrete subgroups of participants based on symptoms of demoralization, depression, anxiety, functional impairment, and physical symptoms. Unlike cluster analysis, LCA can handle binary variables simultaneously and provides objective, model-based methods for deciding upon the number of classes. LCA makes probabilistic, rather than absolute, assignments to classes; thus a particular patient might have probability 0.60 of belonging to one class, and 0.40 of belonging to another (30). LCA assumes that observed variables are indicators of an unobserved latent

construct and seeks to differentiate a small number of classes to explain this relationship (31). LCA has previously been applied in studies of demoralization and depression (e.g. 15, 17, 32).

LCA models were specified using maximum-likelihood techniques. Five hundred random sets of starting values were used initially and fifty final stage optimizations were calculated, which is usually sufficient for convergence on identical solutions. (33). Each model was examined to ascertain that the log likelihood value, an overall measure of model fit, was replicated several times, to increase confidence that the solution is not a local maximum (where an iteration looks good but does not generalize) (34). The Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), the sample size adjusted BIC (SSABIC), the Lo-Mendell-Rubin Likelihood Ratio Test (LMR-LRT), and the bootstrap likelihood ratio test were used as goodness-of-fit measures to compare models with different numbers of classes. Lower values of these indices or a statistically significant value of the likelihood ratio tests indicate a better fit (34). Entropy is another indicator of class separation, with values ranging between 0 and 1, and values closer to 1 indicating a better separation. The LCA analysis was carried out with Mplus 7 (35).

Items from the DS, PHQ-9, and GAD were dichotomized, as we were interested in clinically significant symptoms that would contribute to diagnosis. The PHQ-9 and GAD-7 items were dichotomized based on the diagnostic recommendations for these scales: symptoms were considered present if they were scored ≥ 2 , except for item 9 of the PHQ-9 (suicidal ideation), which was coded as present for scores ≥ 1 . Similarly, DS symptoms were coded as present if ≥ 2 , except for thoughts of death/suicidal ideation items (14 and 20), which were coded as present for scores ≥ 1 . To decrease the number of items entered into the LCA, only items that were retained in the DS-II (24) were used, because the longer DS contains several less discriminating items. Items that measured the same symptom were combined, by coding the symptom as present if scored in at least one of the items. These item combinations were planned prior to the analysis.

Physical symptoms exhibited the same pattern in the LCA, so rather than entering all 10 individually, a dichotomous variable was created with < 3 versus ≥ 3 physical symptoms.

Comparison of classes on demographics and scale scores

Once the classes were derived and individuals assigned to the most likely class using Mplus 7 (35) , the IBM SPSS Statistic Package Version 22.0 (36) was used to compare them on various demographics and scale scores, including logistic regressions and adjusted odds ratios. This was further validation that the classes differentiate in a clinically meaningful way.

Results

Demographics

The total sample comprised 1529 German cancer patients (Table 1). The mean age was 58 (SD=12), ranging from 18 to 88 years. There were slightly more females. Most had only secondary level education. The mean level of individual scales (DS, PHQ-9, and GAD-7) was in the mild to moderate range. Suicidal ideation, as measured by the PHQ-9, was reported by 13.8% of patients, but only 1.3% scored >1.

Latent Class Analysis

Complete data were available for 1527 participants. Five latent class models were estimated, with indices shown in Table 2. Overall, the four class model provided the best fit based on statistical indices, was the most parsimonious (as indicated by the AIC and BIC) and also most meaningful conceptually. Classification quality for a four-class model was also adequate, based on the high average probabilities for a most likely latent class membership of participants of 0.936 for Class 1, 0.846 for Class 2, 0.951 for Class 3, and 0.871 for Class 4. A high entropy value of 0.838 also indicated that the four classes were well separated.

Table 3 displays the four classes with the probability of endorsing each symptom for members of a particular class. Class 1 is characterized by low distress and the absence of psychiatric symptoms, except for the ubiquitous sense of failure (i.e. 50.9% of respondents in Class 1 endorsed this item), which might be a marker for having cancer. Class 2 is characterized by somatic symptoms occurring with functional impairment, without other psychiatric symptoms with large class membership

probabilities. Class 3 is characterized by a high probability of all psychiatric symptoms occurring, but noteworthy as the only class with large probabilities of anhedonic (loss of interest and depressed mood) and anxiety symptoms occurring. Finally, Class 4 is characterized by moderate levels of demoralization symptoms with impaired functioning and some physical symptom burden. The Class 4 features of poor coping, hopelessness/helplessness, loss of meaning, social isolation and suicidal thinking may be best understood as adjustment disorder.

Comparison of the four classes on demographics and scale scores

In Table 4, we confirm that Class 3 carries clinically significant scores on the PHQ-9 for MDD and GAD-7 for anxiety disorders, alongside the most severely demoralized (DS scores) patients. Somewhat younger age, being female, and not having a partner are significant descriptors of this class, which carries the highest physical symptom burden and functional impairment. Suicidal ideation and anhedonia are also significant descriptors of Class 3. Class 4 is associated with moderately high demoralization scores, without clinically significant PHQ-9 or GAD-7 scores, yet more than half of its members are functionally impaired and carry a physical symptom load, while one third are potentially isolated (not partnered). A third of Class 4 also report suicidal ideation, although significantly fewer have anhedonia. Members of Class 4 are also more likely to be female, and have more advanced cancer. Class 2 is associated with physical symptom burden and functional impairment, without psychiatric symptoms being highly probable.

Logistic regressions were conducted, with class membership as dependent variables, to compare the classes on variables that were not used as class membership predictors in the LCA (see on-line supplement Table 5). Suicidal ideation (as measured by item 9 of the PHQ-9) was also included to determine if it was significantly associated with class membership after demographics and illness related variables were controlled for. It was important to determine this for Class 4, in particular, as this class is associated with relatively less severe psychopathology, yet still linked to suicidal ideation. We used a lower significance criterion of $\alpha=.01$ (rather than $\alpha=.05$) for the regression coefficients, to account for the possibility that standard errors can be underestimated (37). After adjusting for the effect of all independent variables, we found that members of Class 4 were more likely to have advanced cancer ($OR=2.29$, $p<.001$). Members of Class 1 were more likely to have early

cancer (OR=0.64, $p=.001$), and be male (OR=0.59, $p<.001$) and partnered (OR=1.54, $p=.004$). Suicidal ideation was independently associated with Class 3 (OR=8.41; $p<.001$) and Class 4 (OR=3.51, $p<.001$).

Discussion

From 1527 participants with cancer, a discrete class of 829 (54.3%) was free of psychiatric symptoms (Class 1), while another class of 333 (21.8%) had only somatic symptoms with resultant functional impairment (Class 2). The severe symptom class was formed by the probability of mixed depressive, anxiety and demoralization co-occurring (Class 3), but this is the only class in which there was a statistically significant probability of loss of interest or depressed mood, or anxiety symptoms, occurring. Thus anhedonia and anxiety prove distinctive for this class of 163 (10.7%) participants. Patients in this class have clear psychiatric disorders of depression and anxiety, alongside loss of coping and demoralization.

The more moderate symptom class reflected poor coping (Class 4), without loss of interest, depressed mood or anxiety symptoms loading prominently. Symptoms with the highest probability of loading on Class 4 were sense of failure, helplessness and suicidal ideation, with hopeless/helpless, loss of meaning, regret, social isolation, and somatic symptoms having moderate probabilities, alongside reduced functioning. Some 202 (13.2%) participants occupied this class. Patients who fail to adapt and cope, and experience symptoms consistent with the ICD-11 concept of AD are in Class 4. They are demoralized without anhedonic or anxiety states prevailing, and consistent with the class identified by Clarke and colleagues (17) through binary factor analysis among medically ill inpatients.

Suicidal ideation occurs in both the demoralization/adjustment class, and the severe psychiatric disorder class. This is consistent with recent studies of demoralization that revealed higher odds of suicidal ideation than with anhedonic depression (6, 8). Loss of meaning, hopelessness, worthlessness and loss of control were also stronger mediators of a desire for hastened death than

depressed mood (7). Clinicians recognize suicidal risk in patients with AD as well as MDD, with these mediators of suicidality arising from disordered coping rather than anhedonia per se (2).

Class 3 had clinically significant mean total scores on the PHQ-9 for depression and GAD-7 for anxiety, unlike the other classes. This class also carried younger patients, more women, and highest levels of functional impairment (67.1%) and somatic symptoms (70.6 %) than other classes. Class 3 comprised participants with severe co-morbid demoralization, while class 4 had elevated but more moderate demoralization. Class 4 with adjustment/demoralization was most likely to have members who were not partnered, and had advanced cancer.

Clinical Implications

Our findings are consistent with studies examining the construct of AD for ICD-11 (14, 15). The group of symptoms defined by Class 4 indicate poor coping with a stressor, which is the core criteria of the ICD-11 adjustment concept. Where the stressor arises from the existential threat of the cancer, its treatment or progression, the phenomena of demoralization when moderately present are consistent with poor adjustment. That advanced cancer, a situation with higher existential threat, predicted Class 4, supports this finding. Elements of demoralization, such as helplessness, meaninglessness, and sense of failure, are not specifically proposed for the ICD-11 AD criteria, but are indicative of poor coping in people with cancer. These elements of demoralization have also been shown to result from a wider range of stressors, such as other medical conditions, being a refugee or an immigrant, stressful postnatal situations, substance abuse or carrying genetic risk such as BRAC 1/2 positivity (12). Nevertheless, further studies are needed to examine the generalizability of our findings to a fuller spectrum of stressful situations.

The co-morbidity between demoralization, depression and anxiety when a more severe psychiatric state develops is not conceptually problematic. Poor coping is an inherent consequence of developing a depressive or anxiety disorder, and hence the likelihood of demoralization occurring when anhedonia or anxiety become clinically significant. Alternatively, demoralization-adjustment disorder could increase the risk for depression and anxiety.

Study Limitations

The combination of three samples obtained with varied recruitment strategies is a limitation, yet a strength is the large cohort incorporating different treatment settings and a range of tumor sites. Common measures of physical symptoms and functional impairment were obtained by matching different scales; there may have been variations in how patients responded to these items. We used categorical indicators in the LCA analysis as we were interested in clinically significant symptoms that would contribute to diagnostic categories. Although this has clinical utility, it can result in loss of variability and statistical power, compared to a continuous approach. Furthermore, LCA must be acknowledged as an exploratory statistical technique, necessitating the future use of more complex confirmatory techniques with different samples.

Conclusions

Using LCA techniques, meaningful subgroups of cancer patients were identified that enhance conceptual understanding of coping and adjustment processes. An AD category emerged with features of moderate demoralization, which is consistent with current proposals for AD in ICD-11. Such a diagnostic category offers considerable utility for designing or selecting more targeted psychosocial interventions.

Conflict of Interest Statement: The authors declare no conflict of interest.

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Tables (Word count 813 words)

Table 1. Description of the total cohort, comprised of 3 samples of German patients recruited in studying aspects of demoralization. Sample 1 had more early stage and samples 2 & 3 more advanced stage cancer.

	Total sample (N=1529)	Sample 1 (n=944)	Sample 2 (n=270)	Sample 3 (n=315)
Age	M=57.9; SD=12.2	M=57.7; SD=12.1	M=56.9; SD=13.9	M=59.3; SD=11.2
Gender				
Female	54.7%	52.2%	46.7%	68.9%
Male	45.3%	47.8%	53.3%	31.1%
Relationship status				
Not partnered	23.4%	22.3%	25.6%	24.8%
Education level				
Secondary school not completed	60.3%	56.5%	70.3%	63.6%
Secondary school	14.2%	15.2%	9.3%	15.3%
Tertiary	25.5%	28.4%	20.4%	21.4%
Cancer type				
1. Breast	29.3%	29.2%	18.9%	38.3%
2. Gynecological	7.6%	7.8%	0.0%	13.4%
3. Lung	11.8%	5.5%	6.3%	35.5%
4. Gastrointestinal	9.5%	9.3%	11.1%	8.6%
5. Genitourinary	4.5%	2.5%	16.7%	0.0%
6. Prostate	16.1%	26.1%	0.0%	0.0%
7. Hematological	10.9%	9.5%	28.1%	0.0%
8. Other	10.3%	10.0%	18.9%	4.2%
Cancer stage				
Stage 0-2	45.1%	55.7%	39.9%	23.3%
Stage 3-4	54.9%	44.3%	60.1%	76.7%
Demoralization Scale total score	M=21.8; SD=13.9	M=21.0; SD=14.0	M=22.1; SD=13.8	M=24.0; SD=13.6
PHQ-9 total score	M=6.4; SD=4.6	M=6.0; SD=4.5	M=7.2; SD=4.5	M=7.0; SD=4.5
GAD-7 total score	M=5.0; SD=4.0	M=4.7; SD=4.3	M=4.1; SD=4.0	M=4.8; SD=4.1
Functionally impaired	40.0%	27.0%	23.0%	93.3%
≥3 physical symptoms (out of 10 symptoms)	42.5%	38.0%	38.1%	59.5%

Abbreviations: M = Mean; SD = Standard Deviation.

Table 2. Latent Class Analysis model indices.

Tests of fit	1 class	2 classes	3 classes	4 classes	5 classes
AIC	35014.0	29717.2	28925.3	28543.8	28401.3
BIC	35141.9	29978.5	29319.8	29071.5	29062.4
Sample size adjusted BIC	35065.7	29822.8	29084.7	28757.0	28668.5
Entropy	N/A	0.92	0.87	0.84	0.79
Lo-Mendell-Rubin Likelihood Test					
log likelihood value	N/A	-17483.0	-14809.6	-14388.6	-14172.9
p	N/A	<.0001	<.0001	<.0001	0.3445
Bootstrap Likelihood Ratio Test					
p		<.0001	<.0001	<.0001	<.0001

Table 3. Estimated probabilities for endorsing symptoms for each class for a four-class model.

Scales	Items	Symptoms	% prevalence of symptoms in total sample	Probabilities of endorsing each symptom			
				Class 1: low distress	Class 2: discrete somatic symptoms	Class 3: mixed anhedonic/ anxious with severe psychopathology	Class 4: adjustment/ demoralization
			N=1527	(n=829; 54.3%)	(n=333; 21.8%)	(n=163; 10.7%)	(n=202; 13.2%)
DS	1,17,19	sense of failure [†]	63.3%	0.509	0.632	0.837	0.964
PHQ-9	6						
DS	2,3,4	loss of meaning [†]	22.7%	0.026	0.157	0.803	0.660
DS	7,8	helplessness [†]	35.0%	0.109	0.313	0.952	0.867
DS	14,20	thoughts of death/ suicidal ideation [†]	30.2%	0.091	0.275	0.755	0.813
PHQ-9	9						
DS	5	emotional control	20.2%	0.030	0.208	0.748	0.416
DS	9	hopelessness	15.7%	0.007	0.055	0.677	0.495
DS	12	cope	23.5%	0.087	0.195	0.722	0.488
DS	13	regret	31.9%	0.190	0.371	0.549	0.551
DS	23	isolated	17.5%	0.021	0.149	0.578	0.495
DS	24	trapped	26.5%	0.044	0.278	0.771	0.694
PHQ-9	1	loss of interest	17.2%	0.051	0.279	0.483	0.212
PHQ-9	2	down/depressed	9.5%	0.000	0.095	0.515	0.126
PHQ-9	8	psychomotor	8.8%	0.019	0.154	0.301	0.075
PHQ-9	3,4,5	somatic (sleep, tired, appetite) [†]	52.3%	0.288	0.816	0.923	0.620
PHQ-9	7	concentration	13.5%	0.024	0.229	0.436	0.166
GAD-7	1	nervous	14.5%	0.004	0.225	0.740	0.064
GAD-7	2	control worry	9.9%	0.000	0.108	0.631	0.029
GAD-7	3	worry too much	13.3%	0.008	0.142	0.715	0.125
GAD-7	4	relaxing	16.1%	0.006	0.233	0.763	0.126
GAD-7	5	restless	10.2%	0.011	0.176	0.446	0.038
GAD-7	6	irritable	11.6%	0.012	0.180	0.481	0.114
GAD-7	7	afraid	8.1%	0.001	0.076	0.531	0.030
DT, SF-8		functioning	40.0%	0.246	0.508	0.680	0.596
DT, MSAS		≥3 physical symptoms	42.5%	0.245	0.615	0.709	0.575

[†] Where similar symptoms were measured by more than one item, the symptom was considered as present if respondents endorsed at least one of these items as being categorically present.

Table 4. Comparison of classes on demographic characteristics, scale scores, and suicidality.

	Class 1: low distress (n=829)	Class 2: discrete somatic symptoms (n=333)	Class 3: mixed anhedonic/anxious with severe psychopathology (n=163)	Class 4: adjustment/ demoralization (n=202)
Age (F=12.1; p<.001)	M=59.4; SD=12.1	M=55.6; SD=12.5	M=54.6; SD=12.6	M=58.2; SD=11.2
Gender				
Female	48.3%	61.0%	67.5%	60.4%
Male	51.7%	31.0%	32.5%	39.6%
($\chi^2=32.6$; p<.001)				
Relationship status				
Not partnered	19.0%	25.6%	31.4%	32.1%
($\chi^2=23.2$; p<.001)				
Education level				
Secondary school not completed	60.7%	63.3%	57.4%	56.2%
Secondary school	13.2%	13.6%	17.9%	15.4%
Tertiary	26.1%	23.0%	24.7%	28.4%
($\chi^2=5.3$; p=.508)				
Cancer Stage				
Stage 0-1	48.7%	44.8%	46.7%	31.4%
Stage 3-4	51.3%	55.2%	53.3%	68.6%
($\chi^2=16.3$; p=.001)				
Suicidal ideation present (item 9 of PHQ-9)	2.9%	14.0%	46.0%	32.2%
($\chi^2=278.52$; p<.001)				
Anhedonia/Loss of interest item score ≥ 2 (item 1 from the PHQ- 9)	4.9%	29.6%	49.7%	21.4%
($\chi^2=243.6$; p<.001)				
Demoralization Scale total score	M=12.8; SD=6.6	M=22.7; SD=7.2	M=45.4; SD=10.6	M=37.6; SD=8.2
F=1221.7; p<.001				
PHQ-9 total score	M=3.7; SD=2.6	M=8.8; SD=3.5	M=13.3; SD=4.2	M=8.2; SD=3.7
F=530.2; p<.001				
GAD-7 total score	M=2.4; SD=2.1	M=6.4; SD=3.0	M=12.6; SD=3.4	M=5.4; SD=2.5
F=811.9; p<.001				
Functionally impaired ($\chi^2=193.2$; p<.001)	24.4%	53.5%	67.1%	60.5%
≥ 3 physical symptoms	24.6%	63.9%	70.6%	58.0%

(out of 10 symptoms)
($\chi^2=238.7$; $p<.001$)

Abbreviations: M = Mean; SD = Standard Deviation.

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