

1 **Title:** Stress levels during the journey of cancer treatment

2 **Short running title:** The cancer treatment Journey

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10 **Abstract**

11 **Aim:** A patient's journey with cancer can cause many different psychological disorders or
12 exacerbate existing conditions. The field of psycho-oncology has found ways to link
13 psychological disorders to cancer and research the effects of mental disorders on patient
14 outcome and wellbeing.

15 **Method:** This review looked at current literature in the field of psycho-oncology to
16 understand how the stress level changes during the patient treatment journey. A systematic
17 search was performed to identify relevant published articles on various electronic databases,
18 including PubMed, ScienceDirect and Web of Science.

19 **Findings:** The results show that there is a direct link between cancer diagnosis and increased
20 stress, depression and anxiety within patients, not as medication side-effects and that these
21 levels reduce over time mainly due to patient acceptance and either improved prognosis, or
22 acceptance of death. Stress is complex and can precipitate many other psychological
23 disorders. It has also been shown that early diagnosis of patients with mental disorders is
24 crucial to improving long-term outcomes, as by accurately diagnosing and treating the mental
25 illness will improve oncology patient overall health outcomes.

26 **Conclusion:** There is need for adequate screening services for oncology patients and mental
27 illness should become common practice.

28 **Key words:** Stress, cancer treatment journey, psycho-oncology, mental illness, palliative,
29 acceptance, Post Traumatic Stress Disorder

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35 **Introduction**

36 In 2015 the number of new cases of cancer in England continued to rise and there were
37 299,923 cancers registered.^{[1] [2]} The data within this report showed that more cancers were
38 registered in males than in females, with the average incidence in males being 667.4 per
39 100,000 and the average incidence in females being 542.8 per 100,000. Of the cancers that
40 were detected breast (15.4%), prostate (13.4%), lung (12.5%) and colorectal (11.6%) cancers
41 account for more than half of the malignant cancers that were registered for all ages
42 combined.^[2]

43 Whilst much research is conducted in combatting cancer through introduction of new
44 treatments, there are various ways in which cancer can affect patients. One such factor is the
45 psychological stress a patient may encounter when learning of a cancer diagnosis. When
46 patients are faced with such news a natural reaction is normally associated with negative
47 thoughts, such as death and trauma, which in turn can lead to further mental health problems
48 such as anxiety or depression. It is of great importance therefore that healthcare professionals
49 screen for and understand how mental disorders can affect patients during their cancer
50 journey. There is much evidence to suggest that improper care for patients with psychological

51 disorders associated with cancer can significantly impact patient's quality of life, disability
52 and if left untreated may worsen over time. [3], [4], [5], [6], [7], [8] Steroid use can affect patient's
53 psychological distress by leading to side effects such as insomnia, suicidal ideology and
54 depressed mood. [9] [10] Research from Akechi found that between 3-35% of cancer patients
55 experience full-syndrome post-traumatic stress disorder (PTSD) following diagnosis of
56 terminal cancer. [11] This is understandable as the shock to the patient from realising they are
57 in end stage cancer can trigger PTSD, which has been attributed to various factors such as
58 age (i.e. those who are younger), sex (higher rates in females), physical symptoms (e.g. pain),
59 the type of cancer (e.g. pancreatic cancer), the treatment therapy, hypercalcaemia, use of
60 steroids, past history of major depression and social support.

61 As stress can manifest in many forms, and preclude many different types of mental illness, it
62 can be difficult to quantify.

63 **Methods and Design**

64 **Aims**

65 The aim of this review was to explore the changes in stress levels and clinical presentation in
66 cancer patients from all ages, documenting the changes from diagnosis to recovery, palliation
67 or remission.

68 **Search Strategy**

69 A systematic search was performed to identify relevant published articles on various
70 electronic databases, including Pubmed, ScienceDirect and Web of Science. The terms
71 "Depression", "Adjustment", "Mood", "Anxiety", "PTSD", "Stress", "Cancer", "Palliative"
72 and "Diagnosis" were used. The search was also conducted using standardised subject terms,
73 Boolean operators and alternative spellings.

74 **Selection Criteria**

75 Studies for the literature review were judged to be relevant if they met the following criteria:
76 (i) all study participants had one or more definite cancer states diagnosed; (ii) all participants
77 were adults, aged 18 or older; (iii) mental health issues due to the nature of cancer from
78 diagnosis to palliation/recovery; (iv) depression or mental disorders associated with stress,
79 caseness was determined by using diagnostic interviews (ICD-10 and/or DSM). Studies
80 included for the review were from primary sources so as to obtain the full paper. Review
81 papers were analysed mainly for background research and information regarding the issues
82 concerning psycho-oncology. A few selection criteria were used to determine if the papers
83 were to be used for the review. These included papers where results were reported for at least
84 80% of the initial cohort size, papers with error or misdiagnosis of below 10% of the patient
85 sample size, papers with clinically significant results (i.e. P value < 0.05) and papers who
86 used similar inclusion and exclusion criteria for patient selection. It was envisaged that only
87 papers with larger cohorts (i.e. above 100) would be used, however due to lack of available
88 research this had to be relaxed and allow for any paper that met the preceding criteria to be a
89 candidate for the review.

90 **Results**

91 After conducting the search strategy on various electronic databases, many of the articles
92 found within the search strategy were excluded from the final review due to factors such as
93 out-dated methodology (such as older versions of the DSM criteria not currently used in
94 practice), non-clinically significant results and high rate of cohort dropout from the study.
95 Out of the possible 131 there were 42 potential studies. After applying PICO principles
96 (Patient/Population/Problem; Intervention; Comparison; Outcome) on the 42 articles, 15
97 articles were chosen for this review as they met the quality criteria required for this study.
98 Some of the remaining articles (out of the 42) were used in the introduction and discussion
99 sections.

100 The final 15 articles that were selected were analysed and factors such as type of
101 psychological disease researched, patient stage within cancer and overall cancer type within
102 patients were compared. Significant results were highlighted and utilised for the results
103 section of this thesis. Table 1 shows the fifteen articles used for the systematic review. The
104 comparator for each paper was chosen by grouping all the articles together, listing all the
105 similar variables and choosing a mental state that was compared against a standard, in this
106 case cancer/type of cancer. The outcomes were chosen by reading the findings thoroughly
107 and listing information which were relevant for this systematic review. In order to understand
108 the significance of each specific outcome, the conclusions of each article were included in the
109 last column.

110 **Insert table 1 here**

111 Figure 1, shows the diagnostic prevalence of depression within the patients from each study.
112 Each study has utilised a different method for diagnosis, for example Akechi used HADS and
113 the mini-mental state examination (MMSE) examination, whereas Berard utilised BDI and
114 HADS. ^[11] ^[12] The study from Berard was able to diagnose more patients with depression,
115 especially when compared to results from Akechi. However, it also should be noted that the
116 results from these two studies are not comparable in terms of patient number, the type of
117 cancer in question and the inclusion and exclusion criteria. In general, studies that utilised
118 SCID and the DSM criteria remained in the middle of the diagnostic horizon. ^[13] ^[14]

119 **Insert figure 1 here**

120 When looking at the occurrence of PTSD within the study cohorts it is evident from Figure 2
121 that the methodology used by Mehnert and Koch yielded the greatest number of diagnosed
122 cases. ^[15] However, this result considers patients who had both PTSD stemming from their
123 cancer diagnosis, and lifetime PTSD from other traumatic events. However, Kadan-Lottick

124 and Matsuoka considered patients who had PTSD directly related to their cancer diagnosis
125 separately from others producing more realistic results. ^{[15] [17]}

126 **Insert figure 2 here**

127 **Discussion**

128 **Common Psychological Disorders within Cancer Patients**

129 Stress can alter the physiological status of a patient and can have both a positive and negative
130 effect. Stress can be either acute or chronic, and it is chronic stress that can have long term
131 effects on patient health leading to conditions such as insomnia, depression, PTSD and
132 anxiety. ^[19]

133 **Scales and Tests for Diagnosing Psychological Disorders**

134 When conducting the review, it was realised that there is no common scale for screening and
135 diagnosing psychological disorders within cancer patients. Whilst there are scales that are
136 routinely used, such as the Hospital Anxiety and Depression Scale (HADS), they are aimed at
137 the general population, and do not consider cancers. ^[20] Therefore, whilst many studies
138 employed the use of common scales, they were mainly adapted to suit oncology cohorts.
139 Furthermore, many studies employed more than one type of scale for their sample cohorts.
140 The commonly used scales were HADS, structured clinical interviews for the DSM
141 framework (SCID), the Beck depression inventory (BDI), the schedule for affective disorders
142 and schizophrenia (SADS), research diagnostic criteria (RDC), the brief symptoms inventory
143 (BSI), the brief Edinburgh depression scale (BEDS), the Hamilton rating scale for depression
144 (HAMD) and the schedule of attitudes towards hastened death (SAHD). ^[21-29]

145 **The Hospital Anxiety and Depression Scale (HADS)**

146 This scale was originally developed by Zigmond and Snaith in 1983 and is routinely used by
147 physicians to determine the levels of anxiety and depression that a patient is experiencing. It
148 is a 14-item scale, has 14 questions, which generate ordinal data. ^[20] The scale is split evenly

149 between anxiety and depression and was designed to avoid the reliance of aspects that are
150 common somatic symptoms of illness for the determination of anxiety or depression. These
151 symptoms such as fatigue, hypersomnia and insomnia are avoided; thereby creating a scale
152 that is useful for patients with physical health problems. Each item within the scale is scored
153 from 0-3, meaning a patient can get a score between 0-21 for either anxiety or depression.
154 The main aspect of this test is to determine an accurate cut-off for the scales to help diagnose
155 correctly which mental illness the patient is suffering from. For example, research from
156 Bjelland showed that a cut-off of 8/21 for anxiety or depression gives and specificity of 78%
157 and a sensitivity (the number of non-cases correctly identified) of 90% for anxiety, and a
158 specificity of 79% and a sensitivity of 83% for depression. ^[30]

159 A prominent case study that was researched was work from Akechi in 2004 who utilised
160 HADS, in combination with a follow-up psychiatric interview, to determine the prevalence of
161 major depression, adjustment disorders and PTSD within terminally ill cancer patients
162 admitted to a palliative care unit (PCU) in Japan. It is estimated that between 3-35% of
163 cancer patients experience full syndrome PTSD, which is understandable as the shock to the
164 patients from realising they are terminally ill with cancer can trigger a severe emotional
165 response. ^[31] Various factors that may attribute to this are including age (the younger), sex
166 (females), physical symptoms (pain and nausea) and the therapy. ^[11] Akechi in 2004 took
167 these factors into consideration, out of 209 patients, 85 completed both the HADS scale and
168 the follow-up MMSE. As the patients were of Japanese origin, and English is not commonly
169 spoken, the tests required translation into Japanese before they could be administered. The
170 study used MMSE produced by Folstein in 1975, as well as the DSM criteria for PTSD in the
171 terminally ill, where patients who had a score of 24 or more on the MMSE were re-
172 interviewed within 1 week of admission using HADS (34/209 patients had adjustment
173 disorders and 14/209 had major depression). ^[32] At the follow-up, where the number of

174 patients had decreased to 85 (from 209), 4.7% had depressed mood, 3.5% had anxious mood
175 and 2.4% had mixed emotions. After second admission, the number of patients had dropped
176 again to 66 due to factors such as death and emergency admission to other care units. The
177 follow-up interview showed 6/66 of patients had developed adjustment disorders, 4/66 had
178 developed major depression, where 5/10 had no adjustment disorders on follow-up and 1
179 patient transitioned from having adjustment disorders to having major depression. ^[11]

180 Although symptoms for PTSD were screened within the first 100 patients referred to the unit,
181 the HADS scores revealed that none of these patients were suffering from PTSD, and
182 therefore it was not carried on in the remaining 109 patients and it was also not screened in
183 the follow-up interviews for the entire sample. ^[11]

184 A higher level of education within patients was deemed as a factor for stress, anxiety and
185 depression as it was shown that these patients were able to fully realise the extent of a
186 terminal diagnosis and how it would affect not only the rest of their lives, but also the lives of
187 those around them, it was shown that religious beliefs had no effect. ^[11]

188 There was bias within the study as in the follow-up there were mainly female patients agreed
189 to be interviewed. ^[11] This study found that the use of Fluoxetine in patients was beneficial at
190 reducing symptoms of both adjustment disorders and major depression and could be added to
191 a patient's regime. This study did reveal however that the HADS scale is an excellent
192 preliminary test that can accurately diagnose anxiety and depression within patients. ^[11]

193 **The DSM and SCID Frameworks**

194 Whilst the DSM has been used as a standard for many years, it has undergone criticism for
195 being an unscientific and subjective system. ^[33] It has also been scrutinised for relying on the
196 use of superficial symptoms, having unclear division from what is considered to be normality
197 and having cultural bias. ^[34] However, when combined with SCID it has been given validity
198 in accurately diagnosing a wide variety of mental illnesses. ^[22] The SCID process can take

199 between 1-2 hours depending on the complexity of the patients' psychiatric history and their
200 ability to clearly describe their past experiences. The interview is designed such that either a
201 psychologist or psychiatrist administers it, however with adequate training many researchers
202 can also utilise this tool.

203 In another study by Akechi in 2010 included one of the largest cohorts from records of
204 psychiatric division of a local hospital. Of the 5431 patients who were referred, 329 males
205 and 399 females were diagnosed with major depression.^[35] The study also looked at suicidal
206 ideation within these patients and found that among those that had major depression, 136
207 males and 157 females also had suicidal thoughts.^[35] The results also show that of the
208 patients referred to the unit, 40% has suicidal thoughts, and this did not change greatly with
209 gender.^[35] However, it was noticed that a more advanced cancer in males would lead to
210 suicidal ideation, and that females with suicidal ideation are more likely to seek help with
211 their feelings than males are.^[35]

212 A larger, multi-site study from Lichtenthal in 2009 looked at the prevalence of mental
213 disorders in palliative patients with advanced cancer.^[36] The main criteria for the study were
214 that the patients were diagnosed with advanced cancer, were 20 years or older, had adequate
215 health to complete the questionnaires, were diagnosed at the site this research was conducted
216 and had some level of informal caregiving.^[36] This study used modified inventory of
217 complicated grief to diagnose prolonged grief disorder (PGD) in those coping with cancer
218 and the SCID. Interestingly Lichtenthal results showed that the prevalence of depression and
219 anxiety does not increase as death nears, as it was concluded by Akechi in 2010 which
220 thought to be due to acceptance. The results were compared to Kadan-Lottick in 2005 study
221 of 251 patients with advanced cancer where 12% of patients met the criteria for major
222 psychiatric conditions.^[16] This study used patient utilisation of mental health services, as an
223 indicator of their willingness to deal with the issues despite having terminal cancer.^[16] It was

224 found that 28% of patients had accessed a mental health intervention for their psychiatric
225 conditions, and that 90% of patients were willing to be treated. A study by Ciaramella and
226 Poli looked at using SCID in conjunction with the Hamilton depression rating scale (HAMD)
227 to diagnose depression and anxiety in 100 consecutive patients admitted to a palliative care
228 unit. ^[13] The patients had an even split between males and females, of which 79/100 were on
229 chemotherapy, 37/100 were taking analgesic drugs, 12/100 were on corticosteroids and
230 28/100 were on multiple treatments. ^[13] Initial contact with patients involved a structures
231 interview and this was followed up with an assessment with a psychiatrist, pain was assessed
232 using the McGill pain questionnaire, SCID, the Endicott criteria and HAMD were then used.
233 ^[37] It was found that 49% of patients had current depression using SCID, 29% were identified
234 using the Endicott criteria and 28% were found using both scales as having major depression
235 associated with cancer. Lifetime depressive disorders were identified in 9 patients and the
236 pain results showed that 37% of patients were experiencing pain with their conditions. ^[13] In
237 Ciaramella and Poli study, depression increased in male patients, which is contrary to other
238 studies by Gurevich and Akechi (2004)
239 where females were more likely to develop major depression, 50% of patients with
240 metastasis were clinically depressed.

241 One study by Mehnert and Koch in 2007 looked at identifying psychiatric conditions such as
242 PTSD and other mental disorders within 127 breast cancer patients. This study utilised SCID
243 and reviewed patients' post-surgery and after 6 months to gauge the long-term effects of
244 mental illness. The interviews focussed on lifetime PTSD, cancer related PTSD, anxiety
245 disorders, major depression and cancer related anxiety. ^[15] It was found that most patients
246 (87%) found the cancer diagnosis as unexpected and overwhelming and that 23% of patients
247 believed that the diagnosis and surgery were not the most distressing aspects of the disease,
248 and were fearful of the future prognosis. This however improved with time and it was found

249 that in the 6 months follow up patients were more accepting of their conditions and treatment
250 outcomes. ^[15]

251 A shortened version of SCID was utilised by Burgess in 2005, who looked at a 5-year
252 observational assessment of females with breast cancer post diagnosis. Of the 222 eligible
253 patients only 70 completed the follow-up interviews up to either five years' post diagnosis or
254 post recurrence. ^[14] ^[15] The primary analysis showed that the baseline level of depression in
255 patients was 33% of the sample cohort, however, this decreased after the first follow-up at 3
256 months to 24%. At a 5-month interview the study looked at the effects of social stress, and it
257 was found that up to 4 months' post diagnosis the levels of stress decreased in patients. ^[15]
258 The consensus of this study also concluded that depression decreased with time and this was
259 attributed to acceptance by patients, as well as increased level of coping with their diagnosis.
260 ^[15] It was also found that after remission the levels of stress, depression and anxiety in
261 women who had breast cancer decrease to the levels of that within the general female
262 population. ^[15] However, it was also noted that on-going treatment is essential, and adequate
263 psychological support may decrease the prevalence of chronic depression and anxiety in
264 women who lack a confiding relationship within their personal lives. ^[15]

265 **The Beck Depression Inventory (BDI)**

266 Beck and Worthen's 1972 Beck Depression Inventory (BDI) factors in various symptoms of
267 depression such as irritability, hopelessness, cognitions such as guilt or negative thoughts and
268 physical symptoms such as fatigue, weight loss and anhedonia. ^[38] Whilst the inventory is
269 excellent self-completed questionnaire to diagnose depression, accordingly, the results can be
270 easily affected by the person completing the scale. ^[38]

271 A study by Berard in 1998 combined the BDI with a structured interview to determine the
272 depressive disorders found in patients with breast cancer, head and neck cancer and
273 lymphoma. ^[12] The main factor within BDI that was stressed was patient self-loathing and

274 negative attitudes. The BDI scale was then also conjoined with the HADS scale, which
275 focussed on the physically ill who had anhedonia. The cohort who undertook BDI amounted
276 to 245 patients, of which 100 went on to have structured interviews.^[12] Patient recruitment
277 occurred within the waiting area of a clinic in South Africa where many patients had to wait
278 for up to two hours to be seen by a clinician. This was seen to be a factor that influences their
279 negative responses.^[12] However, 70% of patients had high score, 24% of patients' low score
280 and only 6% obtained a score of zero for both HADS and BDI. It was noted that although
281 effort was taken to obtain more males for the study, 75% of the patients who agreed to the
282 interview were female, which could increase the results seen.^[12] There were 54% of patients
283 in remission. Although the study results were favourable when compared with other studies,
284 this study used a lower cut-off score for HADS (8 or under), which meant that more patients
285 would be classified as depressed. It was noted that misclassification occurred within less than
286 10% of patients, indicating that the lower cut-off is generally successful. A total of 18% of
287 patient tested positive on both the HADS and BDI scales, and the results from this study led
288 way to the BDI scale being proposed as a tool for diagnosing patients in hospital and clinic
289 waiting areas.^[12] Berard's study did exclude patients who were unable to function due to
290 their disease state, and this would have altered the levels of stress and depression seen.
291 Furthermore, the samples of patients not interviewed or tested may have shown more cases of
292 depressive disorders as reported by their clinicians.^[12] As this was only an outpatient
293 department, there may have been more cases within the inpatients. The study did show
294 however that cancer might not be the sole reason for depression within patients, as other
295 elements such as finances, relationships and social support are all contributing factors.^[12]

296 **The Schedule for Affective Disorders and Schizophrenia (SADS)**

297 The schedule for affective disorders and schizophrenia is a collection of psychiatric
298 diagnostic criteria and symptom-rating scales originally founded by Endicott and Spitzer in

1978, and is organised as a semi-structured interview rather than a questionnaire.^[24] The interviews look for specific sets of symptoms and screen based on patient positivity towards these symptoms, by looking at the same set of disorders regardless of the patients presenting problem.^[24] Unlike full structures interviews, SADS is flexible as it allows the interviewer to rephrase the questions based upon patient understanding and scores are based on clinical judgement. It also can be used with research diagnostic criteria (RDC) to allow for more accurate diagnosis.^[25] Much as the name suggests the interview screens for schizophrenia, but also screens for major depression, anxiety and bipolar disorder. In recent years, however it has been replaced largely by fully structured interviews, but a research paper by Chochinov et al in 2004 used the SADS and RDC structure to help diagnose patients.^[39] The study was initialised by a simple yes/no answer to the question ‘are you depressed?’ This simplicity allowed patients to be quickly screened for the SADS interview, 197 patients were enrolled. Within this cohort 94 patients were males, and the rest were females. The SADS interview process was completed both without and with the RDC criteria to accurately determine the effectiveness of the SADS interview. The BDI and a visual analogue test were also administered to controls.^[39] Results showed that a total of 24 patients were found to have some form of depression. It was noted that the SADS interview, without the RDC criteria, misdiagnosed 4 patients as not depressed. The analogue test was the worst at diagnosis by misclassifying 7 patients as not depressed and 87 patients that were not depressed as depressed.^[39] It was found that results were similar to another study (Lloyd-Williams et al, 2003) that found that SADS is capable of accurately diagnosing patients following a simple initial question of if they were depressed.^[39] These studies show that SADS is capable of being a great screening tool, and by combining it with the RDC criteria and BDI it can screen and diagnose patients quickly and effectively.

323 **The Brief Edinburgh Depression Scale (BEDS)**

324 The brief Edinburgh depression scale (BEDS) by Lloyds-Williams et al in 2007 is a 6-item
325 questionnaire that is based off the commonly used Edinburgh depression scale (EDS),
326 however it excludes the somatic symptoms of depression, and focuses mainly on feeling of
327 worthlessness, sadness and suicidal ideation. ^[40] The brief scale in this study was used for
328 brevity and was tested on patients in a palliative care centre with 6 months or fewer
329 prognoses of their terminal cancers. ^[40] The only exclusion criteria for this study were
330 patients with cerebral metastases or those with a prognosis of one week or less. Patients who
331 completed the BEDS questionnaire were then interviewed using MMSE to confirm diagnosis.
332 Initially 246 patients were identified, however after loss due to patient's declination and
333 exclusion due to cognitive impairment, only 180 patients remained (139 female and 41 male).
334 ^[40] It was found that a valid cut off for the BEDS scale would be scores of 6 or more, and
335 through utilisation of the scale it was found that 34 % of patients were diagnosed with
336 depression. This was analysed against the full 10 item EDS, and it was found that results are
337 similar. ^[40] The BEDS questionnaire was shown to have great selectivity and specificity
338 within the sample patients, however does require further research to validate findings in other
339 cohorts. ^[40]

340 **Conclusion**

341 The incorporation of a psychiatric screening method for cancer patients has yielded increased
342 diagnosis of mental health issues, and therefore it should be recommended as part of the
343 holistic approach to patient care. ^{[11], [15], [27]} It is well understood that the diagnosis and
344 treatment of cancer can be a stressful endeavour, and is it natural to assume that a patient will
345 experience some level of stress throughout their journey. Many of the studies in this review
346 focussed mainly on depression, as it is common within patients with cancer. ^[11]
347 When analysing results from various studies, it was found that HADS is effective in
348 diagnosing depression accurately in cancer patients. ^[12] Studies that have utilised the DSM

349 criteria have also found great success in accurately diagnosing depression in cancer patients
350 (Desai *et al.*, 1999; Ciaramella and Poli, 2001; Burgess *et al.*, 2005; Breitbart *et al.*, 2012).
351 ^{[7],[13],[14],[29]} It is crucial that the correct cut-off criteria and scores are used in order to avoid
352 having bias within results and allow comparison of results. The average cut-off for SCID is
353 around 12 and this was used by most studies. ^[35] When looking at more complex issues such
354 as PTSD it can be hard to differentiate from a previous un-diagnosed issue. ^[15] It was found
355 that there are very few scales that help to diagnose PTSD within cancer patients. ^[17] Research
356 from Matsuoka *et al* in 2002 however found that there were few patients who had PTSD from
357 their cancer diagnosis, and many people who did have confirmed PTSD which was un-
358 diagnosed after traumas occurred many years ago. ^[15]

359 As the patient progresses throughout their cancer journey they may also go through the stages
360 of grief outlined by Kubler-Ross in 1969, where acceptance of their fate and cancer diagnosis
361 can also mean that levels of depression may improve with the progression of treatment or the
362 disease. ^{[11], [13], [14]} As there are many different types of cancer, each patient journey is
363 different, and therefore mental health can differ from patient to patient. The variation
364 between genders has also been realised, whereby females were more likely to develop a
365 depressed mood and exhibit greater levels of stress, anxiety and depression than within the
366 male population. ^[13] Patients who were in palliative care also displayed similar levels of
367 depression, anxiety and adjustment disorders than with those with new diagnosis, however, it
368 was found in studies that patients soon come to terms with their terminal status and
369 improvements in their mental health are noticed due to this acceptance. ^{[14] [15]} There is a need
370 for adequate screening services specific to oncology patients.

371 **Study limitations**

372 There were few papers found regarding stress and cancer. The papers analysed were on
373 psychiatric disorders that can stem from stress, such as depression, anxiety and PTSD.

374 **Practical implication:** this review reveals that while stress and mental health issues are
375 common in patients diagnosed with cancer. Future studies will be required to modify the
376 tools proved to be effective to suite cancer patients. By improving cancer patients' mental
377 state, adherence to treatment including pharmacological therapy may improve leading to
378 better health outcomes.

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497 used in palliative care?. *Palliative Medicine*. 2003;17(1):40-43.

498 **List of figures**

499 **Figure 1:** Diagnostic prevalence of depression in cancer patients from various studies
500 discussed in table 1.

501 **Figure 2:** Diagnostic prevalence of PTSD in cancer patients from various studies discussed
502 in table 1.

503 **Table 1:** Results for the selected papers obtained using the search strategy outlined in
504 methodology section