

The role of emotions in time to presentation for symptoms suggestive of cancer: A systematic literature review of quantitative studies

Short title: The role of emotions in seeking help: A systematic review

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ABSTRACT

Background: Emotions may be important in patients' decisions to seek medical help for symptoms suggestive of cancer.

Objectives: The aim of this systematic literature review was to examine quantitative literature on the influence of emotion on patients' help-seeking for symptoms suggestive of cancer. The objectives were to identify: (1) which types of emotions influence help-seeking behaviour; (2) whether these form a barrier or trigger for seeking medical help; and (3) how the role of emotions varies between different cancers and populations.

Methods: We searched four electronic databases and conducted a narrative synthesis. Inclusion criteria were studies that reported primary, quantitative research that examined any emotion specific to symptom appraisal or help-seeking for symptoms suggestive of cancer.

Results: Thirty-three papers were included. The studies were heterogeneous in their methods and quality and very few had emotion as the main focus of the research. Studies reported a limited range of emotions, mainly related to fear and worry. The impact of emotions appears mixed, sometimes acting as a barrier to consultation whilst at other times being a trigger or being unrelated to time to presentation (TTP). It is plausible that different emotions play different roles at different times prior to presentation.

Conclusions: This systematic review provides some quantitative evidence for the role of emotions in help-seeking behaviour. However, it also highlighted widespread methodological, definition and design issues among the existing literature. The conflicting results around the role of emotions on TTP may be due to the lack of definition of each specific emotion.

Keywords

Oncology; cancer; emotion; help-seeking; symptoms

Word Count: 5971

INTRODUCTION

Diagnosis of cancer at an early, localised stage is important to improve survival rates [1-3]. Most types of cancer are more often detected through patient presentation with symptoms rather than via screening programmes, and therefore timely help-seeking for symptoms suggestive of cancer is vital to improve patient outcomes [4]. We therefore need to improve our understanding of patients' decisions to seek medical advice for symptoms suggestive of cancer and of factors associated with the time to presentation (TTP). We define TTP as the period of time between an individual's first detection of a change in their body and the first consultation with a healthcare professional. This time interval has previously been described as 'patient delay' [5], but the Aarhus Statement [6] recently recommended that this term should be replaced by TTP as 'delay' indicates that patients waited to seek help, whereas some consult immediately after noticing symptoms [7]. Various factors such as demographics (e.g. age) and clinical factors (e.g. symptom type) have been shown to affect TTP [8, 9]. However, an individual's appraisal of a symptom and their subsequent help-seeking behaviour are also based on individual decision-making, which is informed by symptom interpretation [10, 11] and an individual's knowledge of cancer [12], and possibly emotions [13, 14].

The role of emotions seems less straightforward than that of cognitions: various studies have suggested that emotions such as fear are a barrier to seeking help [9, 15, 16], whereas others have indicated that emotions could promote prompt help-seeking for cancer symptoms [17, 18]. A previous systematic review of 15 studies explored the impact of fear on 'delay' in help-seeking for symptoms of cancer and myocardial infarction [19]. The authors concluded that emotions (worry, fear and death anxiety / panic), defined by the reviewers as 'different intensities of fear', had contradicting roles in TTP [19]. In a narrative review, including qualitative studies, Facione [20] reported a list of various specific fears in relation to the discovery of breast symptoms (e.g. fear of chemotherapy, or fear of illness), and showed that different specific fears had different effects on TTP for breast cancer. The reasons for why and how specific fears may trigger or inhibit help-seeking for symptoms have not been studied [20]. In a qualitative synthesis by Smith and colleagues [9], a fear of cancer and a fear of embarrassment (including the fear of being labelled as a time-waster and embarrassment about sensitive bodily areas), were identified as main barriers to seeking help for symptoms of various cancer types [9]. Like the other reviews, this review only identified emotions labelled as fear as playing a role in TTP with symptoms of cancer, but does show the potential relevance of other emotions (e.g. embarrassment).

Previous literature reviews have not explored the contradictory role of fear or the role of other emotions on TTP. The inclusion of qualitative studies in the previous reviews limits the generalisation of conclusions regarding the impact of emotions on TTP. Furthermore, there has been little exploration of similarities and differences between populations and cancers.

The aim of this systematic literature review was to examine the worldwide quantitative literature to explore how emotional factors influence patients' help-seeking for symptoms possibly suggestive of cancer. We were particularly interested in how, and to what extent, emotions contribute to TTP. The objectives were to identify: (1) which types of emotions influence help-seeking behaviour; (2) whether these form a barrier or trigger for seeking medical help; and (3) how the role of emotions varies between different cancers and populations.

METHODS

We systematically searched the databases PubMed, PsychINFO, IBSS and ASSIA up to 30th September 2013, with no earliest year of publication or language restrictions. Reference lists of all included papers were searched, and all lead authors from publications after 2000 were contacted for further research findings (of which the latter did not lead to any further relevant papers). Search terms were focused on four main themes: emotion(s), help-seeking, cancer and symptoms, see Figure 1. There is a surprisingly broad range of definitions of what constitutes an emotion [21]. For this review we considered the following definition the most relevant: emotion is a '*response to a certain event, which can be external or internal to the individual*' [14]. We have only considered patients' subjective experiences of emotion as relevant (omitting facial expressions and physiological changes [22]). The search terms for emotion included synonyms for emotion as well as a wide range of emotions, and we selected emotions for inclusion based on emotions listed in Scherer's affect categories [22]. These categories were based on emotions reported by people who were asked which emotions they had experienced the day before, as well as emotions measured in published emotion measures and included positive as well as negative emotions [22]. An example of an affect category is anxiety, which included 'anguish*', 'anxi*', 'apprehens*', 'diffiden*', 'jitter*', 'nervous*', 'trepida*', 'wari*', 'wary', 'worried*', 'worry*'. We included relevant emotions after reaching mutual consensus on inclusion between the authors, and we validated our selection with an international expert on early detection of cancer. We differentiated between emotion constructs (e.g. fear, anxiety and worry as separate constructs) to be able to explore their individual impact on help-seeking, and looked at a wider range of emotions and at specific emotions. We included original research papers published in peer-reviewed journals, which examined any emotion specific to symptom appraisal or help-seeking for symptoms of cancer (all types) or symptoms potentially indicative of cancer. Manuscripts were excluded if they were non peer-reviewed, conference abstracts, reviews, or reported studies with participants previously diagnosed with the same type of cancer, studies on screening, or set among non-symptomatic individuals.

***** Insert Figure 1 about here (or as supplementary file online)*****

Data extraction was undertaken by all authors. Extracted data included demographics of the study sample, the definitions of included emotion and TTP, and data related to TTP. We also extracted data concerning whether the emotion was a barrier or a trigger, and how the emotion affected TTP. We chose to use a descriptive, narrative approach [23] to synthesise the papers because of the heterogeneity of study methods. For instance, there was a lack of definition or consistent use of emotion terms (for example fear was 'fear of treatment' in one study and 'fear of cancer' in another).

Quality assessment

Each author used the Dixon-Woods criteria to rate the overall relevance of each included paper as: Key Paper, Satisfactory paper, Unsure, Fatally Flawed (indicating mistakes or contradictions in results), and Irrelevant [24]. This approach was chosen based on Malpass et al's recent critique of approaches to quality assessment [25]. 'Key' and 'Satisfactory' papers were included. 'Unsure' papers were discussed until we reached agreement, and papers judged 'Fatally Flawed' and 'Irrelevant' were excluded, as it was not possible to make valid or relevant conclusions from these papers. This assessment of the relevance of the data on emotion and TTP in the paper was important in our review. Rather than focusing solely on the overall quality of the paper using the guidelines such as the Critical Appraisal Skills Programme (CASP) [26, 27], we chose to be inclusive, to be able to thoroughly review all the

data available on emotions and TTP, and to explore methodological issues to address the limitations in the studies.

RESULTS

From the initial 13,191 unique abstracts identified via the systematic search, 33 papers were included in the review (see **Figure 2** for the PRISMA flow diagram). One paper was excluded based on the Dixon-Woods criteria (fatally flawed) as results in text and tables were contradictory [28], and two included papers were rated as a key paper as their results were highly relevant [29, 30]; the remaining studies were considered to be satisfactory.

*****Insert Figure 2 about here*****

Study and participant characteristics

Details of the 33 included papers can be found in **Table 1**. The sample size of the studies ranged from 48 [31] to 2154 [32]. Twelve studies conducted the emotion analyses on only part of their sample¹ [15, 16, 30, 33-41], usually on the group with long TTP (except for one study which only reported emotion data from the participants aged 35 years and older [39]). The majority of studies were set in the United Kingdom (n=9) or United States (n=9). Most studies (n=24) were conducted among individuals with breast symptoms [16, 17, 29-32, 34-39, 42-53], two studies were among patients with colorectal cancer symptoms [54, 55], three studies reported data from a variety of cancer types [15, 40, 56], while there were a single report each concerning uterine cancer [57], prostate cancer [33], melanoma [58] and penile cancer [41]. The majority of studies recruited diagnosed cancer patients [15, 16, 31-33, 36, 37, 40-46, 49, 51, 52, 55-58], ranging from immediately [49] to several years after diagnosis [42, 58]. Eleven studies were conducted among symptomatic individuals prior to diagnosis [17, 29, 30, 34, 35, 39, 47, 48, 50, 53, 54]: in six of these papers the cancer diagnoses of these individuals became available after data collection [29, 30, 35, 39, 47, 50]. As most studies reported symptoms of breast cancer, their samples were exclusively female; studies on other cancer types included both males and females (except for the studies on uterine [57], prostate [33] and penile cancers [41]). The mean age in the studies ranged from 37.5 years [17] to 77.6 years [43]. Ten studies reported a mix of two or more ethnicities [17, 29, 33, 37, 39, 45, 47, 48, 54, 57], whereas three studies specifically looked on differences in emotions and TTP between two ethnicities [33, 45, 57]. Two predominantly focused their study on one ethnicity (African American) [31, 42] and the other studies did not report specifically on ethnicity.

*****Insert Table 1 about here*****

Methodology of studies

Only one study [42] clearly stated that identifying the role of emotion (*worry*) was a study aim, and in another study the authors specifically stated hypotheses about the role of emotions in TTP [30]. Most studies aimed to identify the TTP and/or factors related to TTP without specifying the role or range of emotions. Sixteen papers reported solely descriptive data, while uni- or multivariate data were reported in 16 papers [17, 29-31, 42-45, 47-50, 54, 55, 57, 58] (see **Table 5** for a summary). There were two main strategies for measuring emotions. Either qualitative data was collected from participants through open questions,

¹ The number of participants included in the emotion analysis is displayed in *italics* in the column 'sample size' of **Table 1**

which were then quantified and grouped into an emotion category as defined by the researcher, or the selection of a certain emotion was decided prior to the study and measured using a questionnaire. Meechan and colleagues [29] developed a four-item measure for emotional responses to a cancer symptom. Two other studies [48, 49] used an adapted version of this measure.

In measuring TTP, 19 studies adopted cut-off points indicating ‘long TTP’, which ranged from one week to three months. The most common cut-off was three months, but in ten papers authors used a different approach [16, 33, 36, 37, 39, 46-48, 54, 59]. Five studies measured TTP as a continuous variable [31, 42, 45, 57, 58].

Range and types of emotions reported in the studies

None of the studies provided definitions of the emotions that they reported, and some used emotion terms interchangeably, for instance, in three studies *worry* was used interchangeably with *concern* [17, 45, 57]. Twenty-six studies studied *fear* (or closely related emotions such as being *scared*, *afraid* or having had a *frightening experience*) in relation to TTP, see **Table 2** [15-17, 29-35, 37-41, 43, 44, 46-48, 50-53, 55, 56], while *worry* (or closely related emotions such as *concern*) was reported in ten studies (see **Table 3**) [17, 34, 36, 42, 45, 48, 50, 54, 57, 58]. Three studies reported *embarrassment* [34, 41, 56], one reported *shame* [51], another studied *distress*, *depression* and *anger* [48], and three studies reported general *emotional response to the discovery of a symptom* (see **Table 4**) [29, 48, 49].

Non-specific and specific emotions

Some studies reported *non-specific emotions*, that is, emotions without details of the context or reason for this emotion, such as *fear* [16, 17, 31, 33, 34, 39, 51], or *embarrassment* [34, 41]. In other studies more detailed information about the emotion was given, being more specific about the reason for the emotion. These ‘*specific emotions*’ (as previously defined by Facione [20]) varied greatly between studies (see **Tables 2-4**).

****Insert Tables 2-5 about here (or as supplementary file online)****

The impact of emotions on TTP

Fear (see Table 2)

The proportion of patients who cited fear as a reason for not presenting earlier was generally low (below 30%), with the exception of 3 studies on breast cancer: *Scared² of financial costs* (75%) in a study in Egypt [38], non-specific *fear* (44%) in a study in the UK [34], and *Fear of mastectomy* (45%) in a study in Nigeria [32]. In the majority of studies, fear was only studied among patients with long TTP and some studies only reported the proportion of patients of the whole sample who cited fear.

Three studies [17, 39, 41, 56] descriptively compared the proportion of patients who cited fear as a barrier or trigger between those with long versus short TTP. However, the number of patients involved in these descriptive comparisons was extremely low (maximum n=12 [39]) making conclusive interpretation difficult. Ten studies [17, 29-31, 43, 44, 47, 50, 53, 55] explored levels of fear in relation to TTP using uni/multivariate statistics. One study reported that levels of non-specific *fear* were not significantly associated with TTP [31]. *Fear on*

² In the abstract of the paper *scared* was used interchangeably with fear, and therefore included in the section on fear

discovery of symptoms was found to be unrelated to TTP in three studies [43, 44, 48], whereas a fourth study reported *fear on discovery of symptoms* was associated with shorter TTP in patients with benign disease but not those diagnosed with cancer [30]. This study also found *fear on discovery of symptoms* to be related to shorter ‘appraisal delay’ for those with benign disease and shorter ‘utilisation delay’, which is the same as the help-seeking interval [60]’, for those diagnosed with cancer.

With regard to specific fears, there were mixed results. Fears about *diagnosis* [55], *cancer* [17], or *disease* [53] were found to be unrelated to TTP, with the exception of one study [47] that reported *fear of cancer diagnosis* to be associated with longer TTP. Li et al [30] reported that *fear of implications (possibly cancer)* was associated with longer ‘utilisation delay’ (but not TTP) for those diagnosed with cancer (but not those with benign disease).

Burgess et al [43] found women who had longer TTP were more *fearful of the consequences of diagnosis or medical treatment of cancer*, yet in three studies *fears about treatment or consequences (e.g. dying, breast loss)* were reported to be unrelated to TTP [29, 50, 53].

Worry (see Table 3)

One study on breast cancer reported *being too worried to approach the GP* as a barrier to presentation, although this was only reported by 3% of those with long TTP [36]. In contrast, *worry about cancer* [17] and non-specific *anxiety* [50] were cited as *reasons for* consultation, and having *nothing to worry about* was a reason for later presentation in 9-43.9% (n=25) of those with long TTP [34, 36].

In descriptive comparisons, *worry or anxiety about symptoms* was reported more often by those with short TTP (44-85%) compared to those with long TTP (15-34%) [48, 50, 54]. This was supported in univariate comparisons in five studies [45, 48, 50, 54, 57], where *worry or anxiety about symptoms* was reported to be associated with shorter TTP, but was unrelated to TTP in two studies [42, 58]. *Worry about breast cancer diagnosis* was only investigated by one study, which found no association with TTP [42].

Other emotions (see Table 4)

Being *embarrassed at being examined by a doctor* was reported as a reason for later presentation by 13% of British patients with breast symptoms with long TTP (> 3 months), whereas none of the patients with short TTP reported this barrier [56]. Non-specific *embarrassment* was cited as a reason for not presenting earlier for 4% of those with short TTP and 16-25% of those with long TTP (or those who were ‘reluctant’ to see a doctor) [34, 41]. No papers used uni/multivariate statistics to study the impact of embarrassment on TTP.

Shame was a reason for later presentation for only 4.5% of the total sample in a study of breast cancer among Libyan women [51] but this was not investigated in relation to TTP. In a study on breast cancer in Ireland, levels of *distress*, *depression*, and *anger on discovery of breast symptoms* were found to be low (reported by less than 20% of patients) and were unrelated to TTP [48].

Two studies looked at a *general emotional response to symptom discovery* that consisted of the combined level of a range of non-specific emotions (e.g. afraid, anxious, distress, scared, concerned) in response to either discovering symptoms of breast cancer [29] or potentially malignant oral symptoms [49]. This *general emotional response to symptom discovery* was not associated with TTP in the study on oral cancer [49] but higher emotional response was associated with shorter TTP in the study on breast cancer [29]. However, when the levels of emotional response were compared between those who sought help promptly (<3 months) and those who waited (> 3months) no significant differences were found.

The role of emotions between different cancers and populations

Some emotions were only reported in certain countries, for example, *scared of the financial cost of malignant disease and its consequences* was only reported in an Egyptian study [38]. Other emotions were more widespread. For instance, *fear about breast cancer treatment (e.g. operations, mastectomy and/or disfigurement)* was reported in studies from the UK [35, 43, 50, 56], Pakistan [46], Nigeria [32, 52], Germany [37], New Zealand [29] and Australia [53]. There appeared to be no differences for the role of emotions in TTP between age groups. For instance, the results from a study among elderly women [43] corroborated with the findings from a similar study set among younger women [44]. One study specifically investigated significant differences in reporting of being *afraid of diagnosis* as a barrier between the age groups <60, 60-74 and 75+, and found no significant differences [55]. No studies reported differences between sexes. No differences were found between the findings from pre- and post-diagnosis studies.

Differences between cancer types were rarely explored within the studies as only 3 of the 33 papers studied more than one cancer type. Mor [40] reported the percentages of participants that gave *fear of discovering the cause of their symptoms* as their reason for later presentation specifically for breast (20.7%), lung (10.5%) and colorectal cancer (16.9%), but did not compare the cancer types using statistical tests. Coates and colleagues tested the association of *worry / concern* with TTP in patients diagnosed with breast cancer [45] and uterus cancer [57]. In both studies *worry and thinking it was serious* was associated with timely consultation, however *worry and thinking it was cancer* was only associated with short TTP among the breast cancer patients [45].

There were no differences between ethnicities in Coates et al.'s studies [45, 57], but Talcott reported that *fear* was more often a reason to present late with prostate symptoms for African American men (11.1%) compared to Caucasian men (7.4%, $p < 0.01$) [33].

Comparing cancer and non-cancer patients, *fear of a cancer diagnosis* was more often a reason for later presentation for patients who received a cancer diagnosis (11.5%) than patients whose diagnosis was benign (4%), including when only individuals with long TTP were considered (cancer 22.2% vs non-cancer 5.1%, $X^2 = 10.8$, $p = .001$) [47]. In a multivariate analysis by Li et al. [30] low *fear on symptom discovery* was related to longer appraisal interval and total TTP in the benign sample but not in the cancer sample. In contrast, low *fear on symptom discovery* and high *fear of implications (possibly cancer)* was related to a longer utilisation interval in the cancer sample, but not the benign sample [30].

CONCLUSIONS

Principal findings

This is the first systematic literature review of quantitative evidence examining the role of a wide range of emotions in TTP for potential cancer symptoms. The review provides some – seemingly contradictory - evidence for a role for emotions in TTP. A key finding was that few studies had their main focus on emotions. Furthermore, there are several methodological and conceptual limitations, which limit the interpretation of the existing literature. Nevertheless, we believe that the findings provide some evidence for the impact of a range of non-specific and specific emotions on TTP for symptoms suggestive of cancer.

Although we purposely looked for a wide range of emotions, we only found studies reporting a limited range of emotions, mainly related to fear and worry. Whilst these emotions may have been chosen for investigation because of their known and anticipated impact on individuals' help-seeking decisions, this does not necessarily reflect the actual range and importance of emotions that affect peoples' decisions to seek help. Other emotions could be important too: three studies indicated *embarrassment* may be a reason for long TTP, but at present only descriptive quantitative data (and some qualitative data [9, 61, 62]) exist. There are other emotions such as *guilt* [63] that may play a role in help-seeking for symptoms but have not been studied quantitatively in this context.

The impact of emotions appears mixed, sometimes acting as a barrier to consultation whilst at other times being a trigger to presentation or being unrelated to TTP. Consideration of theoretical explanations of help-seeking behaviour may help to explain these inconclusive findings. The Model of Pathways to Treatment described by Walter and colleagues is a framework based on Safer et al.'s (1979) and Andersen et al.'s (1995) Model of Total Patient Delay [5, 64] that identifies different intervals, events, processes and contributing factors within TTP and beyond) [60]. The 'Appraisal Interval' is the '*time from detection of a bodily change to perceiving a reason to discuss symptoms with a Health Care Practitioner (HCP)*' and the 'Help-seeking Interval' is the '*time from perceiving a reason to discuss symptoms with a HCP to the first consultation with a HCP about their symptoms*' [59]. Only one study [30] in the review deliberately divided between two intervals of TTP ('appraisal delay' and 'utilisation delay', which are roughly equivalent to the appraisal and help-seeking interval). This study indicated that higher *fear on symptom discovery* was associated with shorter appraisal delay (for the benign sample, but not for the cancer sample) and shorter utilisation delay (in the cancer sample, but not in the benign sample). A different specific fear (*fear of implications of the possibility of cancer*) was associated with a longer utilisation delay but unrelated to appraisal delay. This indicates that it is plausible that different emotions could play different roles at different times prior to presentation with a HCP. It also shows the importance of taking possible differences in the role of emotions in TTP between populations and contexts into account.

Although none of the other studies measured emotions specifically associated within the appraisal interval or help-seeking interval per se, a number of studies reported emotions about symptoms or in response to the discovery of symptoms. Generally, *worry or anxiety about or upon discovering symptoms* was reported to be a reason for consulting a HCP, and was associated with shorter TTP. *Fear on discovery of symptoms* appeared to have contradictory impact: some studies found no effect whereas others reported this emotion to be associated with shorter TTP.

Regarding the help-seeking interval, fears that were *about* seeking help, diagnosis, treatment and its consequences were generally barriers to seeking help [43, 47] prolonging TTP, or did not have a relationship with TTP [29, 42, 50, 53, 55]. The Model of Pathways to Treatment provides a theoretical framework to underpin and explain how different non-specific and

specific emotions play a role across different stages of the TTP [59, 60] Future research could purposefully apply this model to test this hypothesis

Strengths and limitations of the review

Strengths of our review were the systematic search of literature including a wide range of emotions and that initially identified 13,180 papers in four databases, and rigorous data extraction conducted by three authors from complementary disciplines (medicine, psychology and social science). We could not perform a meta-analysis of the study results, as there was a lack of consensus on emotion definitions and study methods. Meta-analysis could have provided more insights into the actual impact of emotions on TTP, and could have provided information on the size of the effect of emotions in TTP. However, a descriptive synthesis of the heterogeneous studies allowed exploration of the possibility of different effects of different *specific emotions* on TTP.

Methodological issues in existing research

We have identified various methodological limitations of the included studies. Firstly, very few of the studies had emotion as the main focus of the research. In fact, only two studies stated the aim to explore the relationship between emotion and TTP, Bradley [42] and Li, Lam [30] formulated specific hypotheses.

Secondly, there was little homogeneity in the way emotions were defined and measured in the studies. This makes it difficult to evaluate their construct validity and to compare seemingly similar emotions between studies. The conflicting results around the role of emotions on TTP may be due to the lack of definition of each specific emotion. Closely related to this is that none of the studies have used validated questionnaires – an issue considered important in researching TTP according to the Aarhus statement [6]. This means that it is not possible to know if the emotions measured were actually reflecting these specific emotions, and to which extent the results were comparable across studies.

Thirdly, studies tended to explore ‘reasons for later presentation’ rather than focusing on exploring all possible directions of the relationship between TTP and emotion [65]. This aspect of study design led many studies to only study emotions in those who waited prior to seeking help, omitting the potential role of emotions in reducing TTP.

Furthermore, as with all research into help-seeking the majority of the studies are retrospective, with some studies including patients who had been diagnosed with cancer for many months or years. It is likely that this may have biased their recall of emotions during the TTP with their symptoms. This recall bias may also differ between patients diagnosed with cancer and people who were still awaiting their diagnosis at the time they participated in the study, or those diagnosed with a benign condition.

Finally, few studies focused on the size of the impact of the emotion(s) on TTP, and with the current knowledge in this review, we cannot be sure how important it is to look at the role of patients’ emotions in help-seeking decisions: a difference in TTP of 1 day is likely not to be clinically relevant, but a difference of 2 weeks or more might be.

Implications

There is a need for further well-designed studies guided by the Aarhus statement [6], including clear definitions of specific emotions as well as non-specific emotions to identify the patient groups at risk for later presentation and the impact of emotions which may increase or decrease this risk. This may help in the development of relevant interventions targeting these patient groups and specific emotions, and emotions associated with symptom appraisal or help-seeking and its consequences. Exploring the link between cognitions and

emotions as suggested in the Common-Sense Model by Leventhal [13] could unpack the role of emotions in symptom appraisal, and more specifically the concept of symptoms being 'worrisome'. Qualitative studies could also improve our understanding of why, and under which circumstances, emotions play a role in people's decisions to seek help for symptoms suggestive of cancer.

It will also be important to take differences between populations, settings, cancers and symptoms into account in future studies. For example, *fear of treatment* may have a more negative impact on TTP if the treatment is perceived as particularly harmful, for example in a country where radical mastectomy is the most common treatment for breast cancer compared with a lumpectomy as the most common choice in other countries. As the majority of the studies in this review researched breast cancer, future research could also include other cancer types which are equally common among the population and causing higher mortality, such as colorectal cancer and lung cancer [66].

Conclusion

This systematic review provides some quantitative evidence for the role of emotions as barriers as well as triggers in TTP, and suggests a role for a wider range of emotions including specific emotions. However, it also highlighted widespread methodological, definition and design issues among the included papers, therefore more quantitative well-designed research is needed to be able to draw stronger conclusions on the different roles of specific emotions in the pathway to presentation for potential cancer symptoms.

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Table 1: Characteristics of included studies

Studies		Participants			Data collection			Aims
Author & year	Country	Cancer type	Sample size (C: cancers) (E: emotion analyses)	Gender (% Female)	Age: mean (SD) Range	Method	Timing	To identify...
							Pre diagnosis	Post diagnosis
Adam 1980 [36]	UK	Breast	n=162 (C:162) (E: 66)	100%	-	Interview ³	□ (at treatment)	Not stated
Ajekigbe 1991 [32]	Nigeria	Breast	n=2154 (C:2154) (E:2154)	100%	-	Self-administered survey	□	Reasons for lateness in presenting suspicious breast lumps for diagnosis and treatment
Arndt 2002 [37]	Germany	Breast	n=287 (C:287) (E: 103)	100%	57.3	Interview-administered survey	□ (50% 3 weeks; 90% 8 weeks)	Extent, nature and length of duration of symptoms; Factors related to longer TTP; Association of patient delay ⁴ and stage at diagnosis
Bhosai 2011 [15]	Thailand	Various	n=264 (C:264) (E: 75)	68.3%	-	Self-administered survey	□	Patient and healthcare factors in patient delay
Bradley 2005 [42]	US	Breast	n=60 (C:60) (E: 60)	100%	49.3 (9.9) 24-75	Interview-administered survey	□ (2-348 months)	Delay and worry experiences; Relationship between delay and worry; Relationship between delay, demographic and illness-related factors
Brochez 2001 [58]	Belgium	Cutaneous melanoma	n=130 (C:130) (E:130)	68%	53 18-89	Interview-administered survey	□ (1-52 months)	Diagnostic pathway; Patient and physician delay; Definition of factors related to delay
Burgess 1998 [44]	UK	Breast	n=185 (C:185) (E: 175)	100%	54	Interview	□ (+/- 8 weeks at treatment)	Patient and GP delay; Contribution of tumour-related and psychological factors to each phase of delay
Burgess 2006 [43]	UK	Breast	n=69 (C:69) (E: 69)	100%	77.6 (8) 65-96	Interview	□ (4-8 weeks at follow up)	Whether risk factors for delayed presentation apply in older women
Cameron 1968 [50]	UK	Breast	n=83 (C:57) (E:83)	100%	-	Self-administered survey	□	Relation between aspects of mammary tumour, patients' personalities or social background and delay in consultation with a breast lump
Coates 1992 [45]	US	Breast	n=735 (C:735) (E: 735)	100%	-	Interview	□ (65% 3 months; 87% 6 months)	Differences between black and white women in extent of delay; Extent to which other factors associated with length of delay may explain racial differences

³ Interview = quantified interview data

⁴ The term 'delay' is used in the tables if used in study aims by the reported study

Coates 1998 [57]	US	Uterus	n=331 (C:331) (E: 331)	100%	-	Interview	□ (Median: 89 days black; 82 days white)	Differences between black and white patients in their TTP; Extent to which differences in consultation rates might contribute to racial differences in stage
Elzawawy 1999 [38]	Egypt	Breast	n=182 (C:182) (E: 78)	100%	43.8 19-76	Interview	□ (Up to 6 months)	Not stated
Ermiah 2012 [51]	Libya	Breast	N=200 (C:200) (E: 200)	100%	45.4 22-75	Interview	□ (22.5% within 4 weeks; 77.5% within 8 weeks)	Extent and reasons behind diagnosis delay of breast cancer
Greer 1974 [35]	UK	Breast	n=157 (C:69) (E: 40)	100%	-	Interview	□	Factors related to delay in help seeking
Harirchi 2005 [16]	Iran	Breast	n=200 (C:200) (E: 132)	100%	46.8 20-79	Interview-administered survey	□	Extent and determinants of patient delay
Hashim 2010 [54]	Malaysia	Colorectal	n=80 (C: unknown) (E: 80)	43.8%	61.1 41-86	Self-administered survey	□	Proportions of patients with rectal bleeding who delayed in seeking medical advice; Factors associated with delay
Henderso n 1966 [56]	UK	Various	n=50 (C:50) (E: 50)	96%	26-76	Interview-administered survey	□ (After treatment)	Not stated
Ibrahim 2012 [52]	Nigeria	Breast	n=201 (C:201) (E:201)	100%	49.8 (13.6) 23-104	Interview administered survey	□	Influence of socio-demographic factors on late presentation; The reasons for delayed reporting of breast cancer patients
Lauver 1995 [17]	US	Breast	n=138 (C: unknown) (E: 138)	100%	37.5 19-76	Interview	□	Factors that influenced women with breast changes to seek care; Women's difficulties in seeking care for breast changes
Li 2012 [30]	Hong Kong	Breast	n=425 (C: 135) (E: 87/425)	100%	51.97 (12.8) 29-90	Interview-administered survey	□	Appraisal, Utilization, and Total Delay and variables associated with each; Hypotheses specifically on emotion: -Appraisal Delay is a product of symptom interpretation, emotional response, and disclosure of symptoms to others -Symptom presentation, symptom attribution, and emotional responses to symptoms are interrelated
Magarey 1977 [53]	Australia	Breast	n=53 (C:unknown) (E:53)	100%	-	Self-administered survey and coded video	□ (At least a day before biopsy)	A rational basis for cancer education and management of patients with cancer symptoms
Malik 2003 [46]	Pakistan	Breast	n=138 (C:138) (E: 138)	100%	46.1	Interview-administered survey	□ (up to 3 months)	Perceptions of patients regarding breast lump; Frequency and reasons for delay; The influence of the practice of CAM to treat symptoms on clinico-pathological characteristics of the disease

Meechan 2003 [29]	New Zealand	Breast	n=85 (C:7) (E: 85)	100%	38.9 (1.5) 20-71	Interview Self-administered survey	□	Association between delay and type of breast symptom, initial emotional response to the symptom, perceived risk of breast cancer, role of talking to others about symptoms, demographic and clinical factors
Mor 1990 [40]	US	Lung Breast Colorectal	n=625 (C: 625) (E:123)	Lung: 33.9% Breast: 100% Colorectal: 47%	45-90	Interview	□ ('newly diagnosed'; average after 11 wks)	Relationship between socio demographic and disease related variables with cancer patients' recognition of symptoms diagnosis and subsequent delay; Patients' reasoning regarding symptom experiences to understand the role of gratitude and misconception in patient delay
Nichols 1983 [34]	UK	Breast	n=1175 (C: unknown) (E: 400)	100%	-	Interview Interview- administered survey	□	Reluctance to, and reasons as to why patients see a doctor about breast symptoms
Nosarti 2000 [47]	UK	Breast	n=692 (C:62) (E: 692)	100%	51.8 (9.8) 40-75	Interview Interview- administered survey	□	Risk factors for women who tend to have long delays
O'Mahon y 2009 [48]	Ireland	Breast	n=99 (C: unknown) (E: 99)	100%	40 (11.8) 18-75	Self-administered survey	□	Extent of delay; Factors influencing women seeking help from a HCP on self-discovery of a breast symptom
Prohaska 1990 [55]	US	Colorectal	n=254 (C:254) (E: 254)	52%	67.0 31-89	Interviews	□ (Within 6 months)	Symptom perceptions and illness behaviours prior to cancer diagnosis to determine age patterns and effect in self-care activities
Reifenstei n 2007 [31]	US	Breast	n=48 (C:7) (E: 48)	100%	40 (9.5) 22-64	Self-administered survey	□ (Less than 1 yr since symptoms)	Relationship between fear, denial, utility, social norm, and delay in care seeking; Relationship between having a health provider, accessible healthcare services, and delay; Whether the effect of fear on delay was mediated by denial; Whether the effect of social norm on delay was moderated by utility; Relationship between denial and escape-avoidance coping
Skeppner 2012 [41]	Sweden	Penile	n=59 (C:59) (E: 48)	0%	37-73	Interview- administered survey	□	Insight into patients' perception of initial symptoms and factors associated with patients' delay; Whether and to what extent there is doctors' delay; Whether tumour stage is associated with delay
Sugar 1961 [39]	US	Breast	n=50 (C:11) (E: 26)	100%	-	Interview	□	-
Scott 2008 [49]	UK	Oral	n=80 (C:67) (E: 80)	70%	53 (15.2)	Self-administered survey	□ (directly after diagnosis)	Theoretically guided insight into patient delay; Clinical factors, patient socio-demographics, and health-related behaviours <i>not</i> related to patient delay
Talcott 2007 [33]	US	Prostate	n=555 (C:555) (E: 39)	0%	40-75	Interview- administered survey	□ (Aim before treatment (often not))	Range of potential explanatory factors that might account for racial disparity (socio-demographic factors, access to care, attitudes and beliefs regarding prostate cancer screening and diagnosis, and trust in physicians)

Table 2: Impact of ‘fear’ on TTP

Author & year	Definitions		Results				
	Cut-off point long TTP	Specific fear ⁵	Descriptive results			Uni- or multivariate results	
			Reported as reason for...	Short TTP % (n)	Long TTP % (n)		Total sample % (n)
Sugar 1961 [39]	> 1 week (n=27)	Fear of cancer	consultation by:	30% (7)	31% (5)	-	- ⁶
		Fear	consultation by:	4% (1)	0% (0)	-	
Talcott 2007 [33]	> 3 weeks (n=39)	Fear	not presenting earlier by:	-	9.3% (4)	-	-
Arndt 2002 [37]	> 1 month (n=103)	Fear of diagnostics, surgery	not presenting earlier by:	-	8.7% (9)	-	-
Harirchi 2005 [16]	> 1 month (n=136)	Fear	not presenting earlier by:	-	18.4% (25)	-	-
Malik 2003 [46]	>1 month (n=73)	Fear of surgery, mastectomy	not presenting earlier by:	-	-	22% (30)	-
		Fear of cancer	not presenting earlier by:	-	-	6% (8)	
Bhosai 2011 [15]	> 3 months (n=75)	Fear of seeking treatment	not presenting earlier by:	-	34.7% (26)	-	-
Mor 1990 [40]	> 3 months (n=123)	Fear of discovering the cause of their symptoms	not presenting earlier by:	-	16.8% (14) [20.7% breast ⁷ 10.5% lung 16.9% colorectal]	-	-
Skeppner 2012 [41]	Four groups: < 3 months; 3-6 months; 6-12 months; >1 year	Fear of severe disease	not presenting earlier by:	< 3 months: 0% (0) 3-6 months: 0% (0)	6-12 months: 2.08% (1) >1 year: 2.08% (1)	-	-
Ajekigbe 1991 [32]	No cut-off	Fear of mastectomy	not presenting earlier by:	-	-	44.7% (963)	-

⁵ ‘Fear’ indicates that the study only reported a non-specific fear

⁶ ‘-’ indicates uni- or multivariate results were not available in the study.

⁷ n presenting late for each cancer group was not given

Ermiah 2012 [51]	No cut-off	Fear	not presenting earlier by:	-	-	10% (20)	-
Elzawawy 1999 [38]	>3 months (n=78)	Scared of the financial cost malignant disease and its consequences	not presenting earlier by:	-	75% (59)	-	-
Greer 1974 [35]	> 3 months (n=40)	Fear of diagnosis	not presenting earlier by:	-	25% (10)	-	-
		Fear of disfigurement / mastectomy	not presenting earlier by:	-	17.5% (7)	-	-
		Fear of hospitals / anaesthesia / surgery	not presenting earlier by:	-	5% (2)	-	-
Henderson 1966 [56]	>3 months (n=38);	<i>Frightening experience</i> with patients who died of cancer	not presenting earlier by:	16.6% (2)	7.9% (3)	-	-
		Fear of doctors	not presenting earlier by:	0% (0)	10.5% (4)	-	-
		Fear of hospitals	not presenting earlier by:	0% (0)	13.1% (5)	-	-
		Fear of operations	not presenting earlier by:	0% (0)	10.5% (4)	-	-
		Fear of dying	not presenting earlier by:	8.3% (1)	2.6% (1)	-	-
		Fear of what will be told	not presenting earlier by:	0% (0)	21% (8)	-	-
Ibrahim 2012 [52]	> 3 months	Fear of mastectomy	not presenting earlier by:	-	-	29.3% (48)	-
Nichols 1983 [34]	Medium 4-12; long >12 (not used in results)	Fear	not presenting earlier by:	-	44%⁸	-	-
Prohaska 1990 [55]	No cut-off	Afraid of diagnosis	not presenting earlier by:	-	-	18% (44)	<i>Afraid of diagnosis</i> was not significantly associated with delay (r=0.04, n.s.)
Lauver 1995 [17]	> 3 months (n=32)	Fear about cancer	not presenting earlier by:	-	-	5.3% of total responses	There was no significant difference in the proportion reporting fear as a barrier between the those with short and long TTP (statistical information not given)
Reifenstein 2007 [31]	No cut-off	Fear	-	-	-	-	There was no significant association between fear and TTP (r=-0.3, p-value not given)

⁸ Of the 'reluctant' group. Being reluctant was associated with with longer TTP (p<0.005).

Li 2012 [30]	Appraisal: > 60 days; Utilisation: > 14 days; Total: > 90 days	Scared / Fear on symptom discovery	not presenting earlier by:	-	6.8% (6) (of those with appraisal interval > 1 week)	-	A <u>low</u> fear on discovery was related to: <u>longer appraisal interval</u> (whole sample: X ² (1)=18.116, p<0.001; benign sample: OR 6.28, 95% CI 1.88-21.03, p<0.05; cancer sample=n.s.); <u>longer utilisation interval</u> (whole sample: X ² (1)=10.458, p<0.05; cancer sample: OR 43.11, 95% CI 3.39-548.20, p<0.05; benign sample=n.s.); <u>longer total TTP</u> (benign sample (OR 3.03, 95% CI 1.14-8.09, p<0.05; cancer sample=n.s.).	
		Fear of implications (possibly cancer)	not presenting earlier by:	-	8.2% (7) (of those with utilisation interval > 14 days)	-	High <i>fear of implications (possibly cancer)</i> predicted longer <u>utilisation interval</u> (cancer sample: OR 3.56, 95% CI 1.16-10.97, p<0.05; benign sample=n.s.).	
Magarey 1977 [53]	No cut-off	Conscious fear of dying	-	-	-	-	There was no relationship between TTP and <i>conscious fear of dying</i> (r=0.018, p<0.05 ⁹)	
		Conscious fear of breast loss	-	-	-	-	There was no relationship between TTP and <i>conscious fear of breast loss</i> (r=0.032, p>0.05)	
		Conscious fear of disease	-	-	-	-	There was no relationship between TTP and <i>conscious fear of disease</i> (r=0.135, p<0.05).	
Meechan 2003 [29]	> 3 months (n=18);	Fear of breast cancer treatment	-	57.7 (Mean)	65.9 (Mean)	-	There was no significant difference in mean level of <i>fear about breast cancer treatment</i> between the short and long TTP groups (p=0.37); <i>Fear of treatment</i> was not associated with TTP (r=0.06, p>0.05)	
Nosarti 2000 [47]	> 27 days (n=242)	Scared / Fear of cancer diagnosis	-	-	6.5% (17)	4.9% (34)	<i>Scared/ Fear of cancer diagnosis</i> was associated with longer TTP (OR=4.79 CI=2.25-10.24)	
Burgess 1998 [44]	>3 months (n=36)	Fear on discovery of symptom	‘Mild/no’	-	71% (99)	89% (31)	-	Long TTP group reported less fear than short TTP group (but not significantly different, p=0.05)
			‘Marked/ moderate’	-	29% (41)	11% (4)	-	Fear was not an independent predictor of late presentation (statistical information not given)

⁹ This was not considered as significant in the study as they corrected for type-1 error (only p < 0.001 was considered significant)

Burgess 2006 [43]	>12 weeks (n=29)	Fear in response to symptom discovery	‘Mild/no’ ‘Marked/ moderate’	- -	70% (28) 30% (12)	86% (25) 14% (4)	- -	There was no significant difference in levels of <i>fear on discovery of symptom</i> between the long TTP and short TTP group (Fisher exact test, p>0.05).
		Fear of consequences of diagnosis or medical treatment of cancer	‘Some’ ‘None’	- -	8% (3) 93% (37)	28% (8) 72% (21)	- -	
O’Mahony 2009 [48]	> 1 month (n=26)	Afraid on discovery of breast symptom(s)	-	-	32.9% (24)	23.0% (6)	-	There was no significant association between <i>Afraid on discovery of breast symptom(s)</i> and TTP (statistical information not given)
		Scared on discovery of breast symptom(s)	-	-	30.1% (22)	19.2% (5)	-	There was no significant association between <i>Scared on discovery of breast symptom(s)</i> and TTP (statistical information not given)
Cameron 1968 [50]	> 3 months (n=17)	Fear of operation	Very confident	-	-	-	7%	There was no significant association between <i>Fear of operation</i> and TTP (statistical information not given)
			Confident	-	-	-	24%	
			Fairly confident	-	-	-	18%	
			Nervous	-	-	-	27%	
			Very nervous	-	-	-	23%	
	> 1 year with cancer (n=6)	Fear of malignancy	not presenting earlier by:	-	-	4.4% (1)¹⁰	-	
			Fear of the consequences	not presenting earlier by:	-	4.4% (1)	-	
Fear of hospitals			not presenting earlier by:	-	4.4% (1)	-		
	Fear of operation	not presenting earlier by:	-	-	4.4% (1)	-		

¹⁰ Those who acknowledged presenting late

Table 3: Impact of ‘worry’¹¹ on TTP

Author & year	Cut-off point long TTP	Definitions		Reported as reason for...	Descriptive results		Total sample % (n)	Uni- or multivariate results
		Specific worry			Short TTP % (n)	Long TTP % (n)		
Adam 1980 [36]	> 2 weeks (n=66)	Too worried to approach GP		not presenting earlier by:	-	3% (2)	-	-
		Nothing to worry about		not presenting earlier by:	-	43.9% (29)	-	-
Lauver 1995 [17]	> 3 months (n=32)	Fear/concern/worry: Feelings associated with symptoms		Consultation by:	-	-	17.1% of total responses	-
		General worry or fear about cancer in particular		Consultation by:	-	-	14.2% of total responses	-
Nichols 1983 [34]	12 weeks	Nothing to worry about		not presenting earlier by:	-	9% (36) ¹²	3.1% (12)	-
Brochez 2001 [58]	No cut-off	Worry / anxiety about the lesion		consultation by:	-	-	40% (52)	Worried patients tended to have longer TTP but worry/anxiety about the lesion was not significantly associated with TTP (p>0.05)
Bradley 2005 [42]	No cut-off	Worry about initial breast cancer symptom		-	-	-	-	There was no significant association between worry about initial breast cancer symptom and TTP (statistical information not given)
		Worry about breast cancer diagnosis		-	-	-	-	There was no significant association between worry about breast cancer diagnosis and TTP (statistical information not given)
Cameron 1968 [50]	> 3 months (n=17)	Anxiety on discovering the lump in the breast	Very, moderately or mildly worried	-	85% (56)	15% (10)	Very: 43%, Moderately: 29% Mildly: 10% Slightly: 11% Not at all: 6%	More worry among the short TTP group than long TTP group (X ² =6.4, p<0.02).
			Slightly or not worried	-	50% (7)	50% (7)		
O’Mahony 2009 [48]	> 1 month (n=26)	Anxiety		Consultation by	24.4% (10)	-	-	-
		Anxious on discovery of breast symptom(s)		-	43.8% (32)	23.0% (6)	-	Anxious on discovery of breast symptoms was associated with shorter TTP (r=-0.31, p<0.01)
Hashim 2010 [54]	> 2 weeks (n=48)	Worry/concern of rectal bleeding	‘Not/little’	-	16.7% (7)	83.3% (35)	-	‘Not/little’ worried/concerned was a predictor of long TTP (Adjusted OR 4.7; CI 1.36-16.71)
			‘Worried/ very worried’	-	65.8% (25)	34.2% (13)	-	

¹¹ n presenting late for each cancer groups was not given

¹² Of the ‘reluctant’ group. Being reluctant

Coates 1992 [45]	No cut-off	Worry/ concern about breast symptoms	'Not worried'	-	-	-	-	'Worried and thinking it is serious' (median TTP=10days; RR 1.40; CI 1.09-1.80) and 'worried and thinking it is cancer' (median TTP=13days, RR 1.49; CI 1.23-1.79) had significantly shorter TTP than the patients who were ' <i>not worried</i> ' (median TTP=28days)
			'Worried but not serious'	-	-	-		
			'Worried and serious'	-	-	-		
			'Worried and cancer'	-	-	-		
Coates 1998 [57]	No cut-off	'Worry'/'Concern'	'Not worried'	-	-	-	-	Those ' <i>worried and thinking it is serious</i> ' (RR 1.43; CI 1.02-2.01) had a significantly shorter TTP than patients who were ' <i>not worried</i> '.
			'Worried but not serious'	-	-	-		
			'Worried and serious'	-	-	-		
			'Worried and cancer'	-	-	-		

Table 4: Impact of other emotions on TTP

Author & year	Definitions		Results				
	Cut-off point long TTP	Specific embarrassment or shame	Descriptive results			Uni- or multivariate results	
			Reported as reason for...	Short TTP % (n)	Long TTP % (n)		Total sample % (n)
Henderson 1966 [56]	>3 months (n=38)	Embarrassed at being examined by a doctor	not presenting earlier by:	0% (0)	13.1% (5)	-	-
Nichols 1983 [34]	Medium >4-12 Long 12wks (not used in results)	'Embarrassment'	not presenting earlier by ¹³	-	16% (63)	5.5%	-
Skeppner 2012 [41]	Four groups: < 3 months; 3-6 months; 6-12 months; >1 year	'Embarrassment'	not presenting earlier by:	< 3 months: 2.08% (1) 3-6 months: 2.08% (1)	6-12 months: 6.25% (3) >1 year: 18.75% (9)	-	-
Ermiah 2012 [51]	No cut-off	'Shame'	not presenting earlier by:	-	-	4.5% (9)	-
O'Mahony 2009 [48]	> 1 month (n=26)	Distressed on discovery of breast symptom(s)	-	16.4% (12)	11.5% (3)	-	There was no significant association between <i>Distressed, Depressed or Angry on discovery of breast symptom(s)</i> and TTP (statistical information not given)
		Depressed on discovery of breast symptom(s)	-	4.1% (3)	7.7% (2)	-	
		Angry on discovery of breast symptom(s)	-	2.7% (2)	3.8% (1)	-	
Meechan 2003 [29]	> 3 months (n=18)	Emotional response to symptom discovery. Sum of: Afraid, anxious, distressed, scared		10.5 (mean)	9.3 (mean)	-	Higher levels emotional response were associated with shorter TTP (r=-0.29, p<0.05); Emotional response was a significant independent predictor of TTP (continuous variable) (B=-0.32; t=-3.03; p<0.01); There was no significant difference in mean emotional response between the short and long TTP group (p=0.36)
Scott 2008 [49]	>31 days (n=43)	Initial emotional response to the detection of an oral symptom. Sum of: Afraid, anxious, distressed, scared, concerned.		10.6 (mean)	10.4 (mean)	-	Initial emotional response was not associated with TTP (OR 0.99; CI 0.90-1.09)

¹³ Of the 'reluctant' group. Being reluctant correlated with long TTP (p<0.005)

Table 5: Summary of the role of emotions in TTP from uni- and multivariate studies.

Emotion construct	Impact on TTP			Study	Site
	Longer TTP	No significant relationship	Shorter TTP		
<i>1. Non-specific emotions</i>					
Fear		√		[31]	Breast
Worry/concern (+ thinking it was serious) ¹⁴			√	[57]	Uterus
<i>2. Specific emotions</i>					
Fear of cancer treatment	√			[43]	Breast
		√		[29]	Breast
Fear of mastectomy, operation or breast loss		√		[53]	Breast
		√		[50]	Breast
Fear of dying		√		[53]	Breast
Fear (or afraid) of diagnosis	√			[47]	Breast
		√		[55]	Colorectal
Fear about cancer or malignancy		√		[17]	Breast
Fear of disease		√		[53]	Breast
Worry about breast cancer diagnosis		√		[42]	Breast
Fear about implications	√ ¹⁵			[30]	Breast
<i>3. Emotions in response to symptom discovery</i>					
Worry or anxiety about symptoms or lesion			√	[50]	Breast
			√	[48]	Breast
			√	[45]	Breast
			√	[54]	Colorectal
		√		[42]	Breast
		√		[58]	Cutaneous melanoma
Fear/afraid/scared in response to symptom discovery		√		[43]	Breast
		√		[44]	Breast
		√		[48]	Breast
			√ ¹⁶	[30]	Breast
General Emotional response to symptom discovery (scale)		√		[49]	Oral
			√	[29]	Breast
Distressed in response to symptom discovery		√		[48]	Breast
Depressed in response to symptom discovery		√		[48]	Breast
Angry in response to symptom discovery		√		[48]	Breast

¹⁴ In comparison to ‘Not worried/concerned’, ‘Worry/concern and thinking it was not serious’ and ‘Worry/concern and thinking it was cancer’ [57]

¹⁵ Fear of implications was associated with longer ‘utilisation delay’ (but not TTP) for those diagnosed with cancer (but not those with benign disease)

¹⁶ For those with benign disease but not those diagnosed with cancer. This emotion was related to shorter ‘appraisal delay’ for those with benign disease and shorter ‘utilisation delay’, for those diagnosed with cancer.