

# Psychological Distress Based on Cognitive, Metacognitive, and Meta-Emotional Components in Cancer Patients

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## Abstract

**Objective:** The role of cognitive, metacognitive, and meta-emotional factors in psychological distress has been clearly confirmed. The current research aims to examine a psychological distress model based on intolerance of uncertainty and emotional schemas of cancer patients with the mediating role of metacognitive beliefs and cognitive avoidance.

**Method:** Regarding the methodology, the present study was correlational based on structural equation modeling. The study sample included 300 cancer patients who visited various hospitals in Tehran and completed the questionnaires of uncertainty intolerance, stress, depression, anxiety, emotional schemas, metacognitive beliefs, and cognitive avoidance.

**Results:** Findings demonstrated that the proposed model has appropriate fitness among cancer patients. Also, the relationship between mediating variables and endogenous and exogenous variables is significant. The variables under investigation explained 46 percent of psychological distress variance in the patients.

**Conclusion:** Psychological distress in cancer patients is affected by the interaction of excessive emotional states, intolerance of uncertainty, such as metacognitive beliefs, and emotional schemas.

**Keywords:** Cancer, Psychological Distress, Emotional Schemas, Metacognitive Factors, Cognitive Factors.

## Introduction

Experiencing cancer is often unpredictable jeopardy that, alongside stressful and ambiguous remedies, constantly threatens the individual patient's mental and physical conditions (Langford et al., 2020) leading to increased psychological distress in the patient. Psychological distress refers to unpleasant mental states of depression, anxiety, and stress that have emotional and physiological symptoms

(Zakeri et al., 2017). Depression, anxiety, and stress that are caused by facing pain and suffering incurred by the disease are amongst the most important issues that patients of chronic illnesses, especially those affected by cancer, have to deal with (Chen et al., 2021; Hammermüller et al., 2021; Yang et al., 2020). According to the existing body of research, the majority of psychological disorders in cancer-affected patients incorporate adjustment disorders including adjustment disorder with depression, anxiety, and depression and anxiety together. The second most prevalent psychological diagnosis in this group of patients is essential depression disorder, so depression and anxiety are the two major complaints of cancer patients (Boakye et al., 2020; Hammermüller et al., 2021; Zheng et al., 2020).

The uncertainty inherent in the process of diagnosis

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and treatment of cancer together with a fear of disease progression are widespread problems and constitute the main causes of psychological distress in affected patients. Concerns about illness progression and uncertainty of treatment methods affect various dimensions of a patient's life such as interpersonal, vocational, and functional relationships, leading to the development and multiplication of stress. Lingering stress, by itself, gives rise to anxiety and depression (Manafi & Dehshiri, 2017). Moreover, psychological distress has a positive correlation with death rates among cancer patients (Hammer et al., 2009). Although psychological distresses are quite common in cancer, very few theoretical models can be found to explain them.

As Curran et al.'s (2017) model for cancer patients' anxiety suggests, the interaction of past experiences of cancer, intolerance of uncertainty, preexisting schemas, and metacognitive beliefs about worry about the inherent nature of cancer plays a significant role in spawning overwhelming distress. Psychological distress activates those cognitive processes that are identified with vigilance, mental worry, and rumination. Attempts to get along through reconstructing control and vigilance patterns or avoiding cancer-related symptoms bring about the intensification of anxiety in cancer patients.

Negative prejudice against uncertainty and ambiguity, confusion in applying problem-solving skills, and overestimating the probability of unfavorable consequences are characteristic of individuals with a low tolerance for uncertainty (Alschuler & Beier, 2015). Research studies indicate that intolerance of uncertainty relates to depression, anxiety, and stress (Abdolpoor et al., 2018; Asnaashari et al., 2017; Bokuniewicz, 2020; Carleton et al., 2012; Hill & Hamm, 2019; Mahmoodaliloo et al., 2011; Rettie & Daniels, 2020; Yao et al., 2020). According to previous findings, intolerance of uncertainty influences patients' experience of pain through intensifying their worry and catastrophizing (Lauriola et al.,

2019); maladaptive cognitions and some methods of incongruity emotion regulation such as catastrophizing, also, lead to psychological distress in cancer patients (Bovbjerg et al., 2019). According to Dugas's cognitive model (1998) - intolerance of uncertainty causes worry by way of cognitive bias and processes related to metacognitive beliefs (positive beliefs about worries) - negative bias toward problem-solving and cognitive avoidance (Davey & Wells, 2006) can explain patients' psychological distress (Eisenberg et al., 2015; Tan et al., 2016) and increase the risk of anxiety and mood disorders (Abdolpoor et al., 2018; Asnaashari et al., 2017; Chen et al., 2018).

Multi-faceted conceptual metacognition incorporates knowledge (beliefs), processes, and strategies that monitor, assess, and evaluate cognition (Wells & Cartwright-Hatton, 2004). In Wells' metacognitive approach, metacognitive beliefs direct thought functions and contrastive style while being influenced by them (Wells, 2011). Numerous studies have shown that metacognitive beliefs including negative metacognitive beliefs about uncontrollability and danger of worrying, cognitive competence, positive beliefs about worry, and cognitive self-consciousness can significantly predict anxiety and depression (Abdolpoor et al., 2018; Asnaashari et al., 2017; Capobianco et al., 2020; Cook et al., 2015; Dashtban Jami et al., 2014; Fisher et al., 2018; Leahy et al., 2019; Lenzo et al., 2020; Papageorgiou & Wells, 2001; Poornamdari et al., 2012; Quattropani et al., 2016; Salarifar & Pooretemad, 2011). Interference of metacognitive beliefs with self-regulatory processes can redouble anxiety, stress, and depression; bias in self-regulatory processes may frustrate monitoring threats and applying adaptive coping strategies, thus escalating further psychological distress (Abdolpoor et al., 2018). Capobianco et al. (2020) and Lenzo et al. (2020) systematically examined the relationships between metacognitive beliefs and anxiety and depression and found that positive

and negative metacognitive beliefs demonstrate a significant correlation with anxiety and depression in all physical diseases.

As already noted, the association between intolerance of uncertainty and cognitive avoidance plays a vital role in the formation of emotional problems (Davey & Wells, 2006). Cognitive avoidance is a sort of mental strategy based on which individuals may change their thoughts in different situations (Sexton & Dugas, 2008). An intensive effort to repress thoughts takes paradoxical effects giving rise to a vicious cycle that by itself, multiplies worrying thoughts and subsequently, psychological distress (Bartone & Homish, 2020; Mihailova & Jobson, 2020; Rahimian Boogar et al., 2013; Rezaei et al., 2016). Cognitive avoidance inhibits effective responsiveness to emotional stimuli and augments psychological distress by replacing efficient strategies of emotion management (Atai et al., 2013). Some scholars insist that negative cognitive evaluations and the need to control disturbing negative thoughts, alongside using maladaptive emotion regulation strategies (like mental rumination and cognitive avoidance) induce psychological distress (Bartone & Homish, 2020; Mihailova & Jobson, 2020).

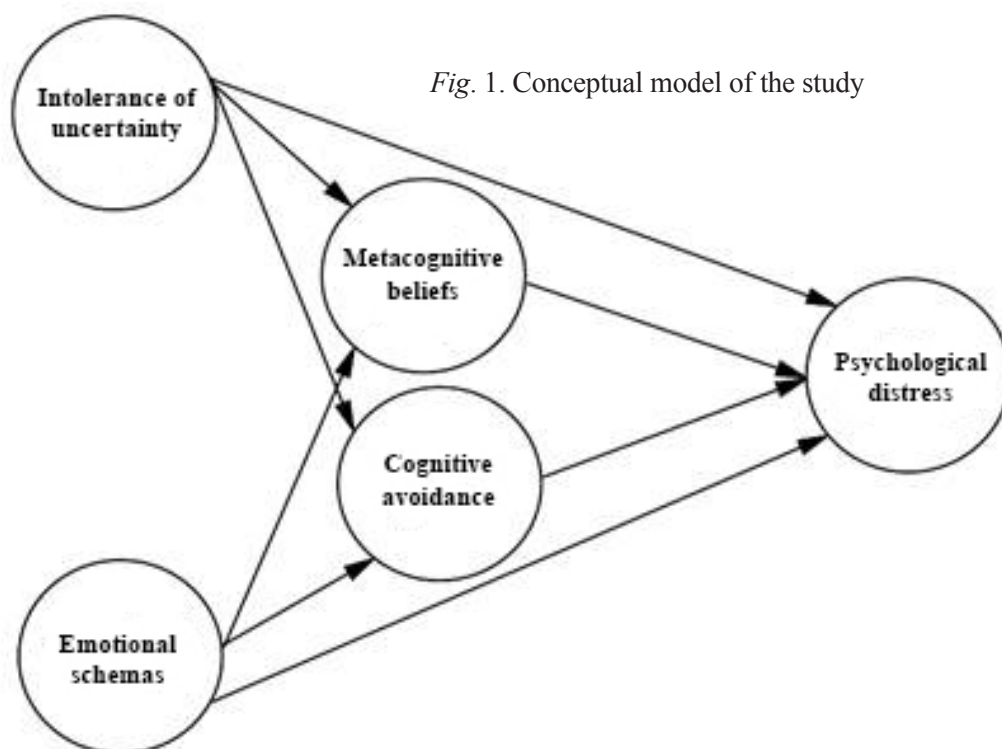
In addition to cognitive and metacognitive factors, emotional elements affect psychological distress, too. One of these elements is the emotional schema. This model was designed by Leahy (2007) by way of combining the metacognitive model (Wells, 1999) and the emotion-based model. In this model, emotional schemas are normally defined as models, methods, and strategies utilized to respond to an emotion. According to the model, an individual's specific self-oriented thought and his/her evaluation of his/her thoughts and emotions impact the assessment and strategies of maladaptive emotion regulation. Emotional schemas result in the continuation of maladaptive coping strategies (Leahy, 2007). After the emergence of emotion, taking note of it and avoiding it both cognitively

and emotionally constitute the next two consecutive steps in Leahy's meta-emotional model that affect psychological distress and are linked to anxiety, depression, and stress as well (Ahadianfard et al., 2017; Dashtban Jami et al., 2014; Karami et al., 2017; Leahy et al., 2019; Mazloom et al., 2016). Researchers have suggested that people with maladaptive emotional schemas are more likely to engage in avoidance strategies (Dashtban Jami et al., 2014; Leahy, 2002). Moreover, it has been shown that emotional schemas can significantly predict the amount of depression and anxiety in cancer patients (Karami et al., 2017).

Although several studies have dealt with cognitive, metacognitive, and meta-emotional elements and examined the relationships among various variables, attempts are still going on to answer this essential question: Which cognitive, metacognitive, and meta-emotional variables can directly or indirectly, affect psychological distress in cancer patients? After considering the association among the aforementioned structures, the conceptual model of the current study was proposed. Testing this proposed model can subject Curran et al.'s (2017) model to empirical scrutiny. Furthermore, regarding the significant contribution of cognitive, metacognitive, and meta-emotional factors, it seems warranted to offer a model in order to explicate psychological distress in cancer patients to identify influential elements in their psychological distress. Thus, the present research study seeks to answer the following question: Does the psychological distress structural model based on intolerance of uncertainty and emotional schemas in cancer patients with the mediating role of metacognitive beliefs and cognitive avoidance achieves appropriate fitness with empirical data?

## Method

The present study is a basic research study of descriptive type that employed correlational



methodology by using structural equation modeling (SEM). The population of the study included all patients between 30 and 65-year-old who visited one of the hospitals in Tehran and were diagnosed with cancer during the winter and spring of 2020. Some researchers take 100 as the minimum sample size and consider a sample size of 200 or more to be optimal and desirable (Meyer et al., 2006). Therefore, regarding the potential mortality effect, 300 individuals were recruited according to the principles of purposive sampling. The necessary criteria to enter the sample were: diagnosis with cancer, capability to complete data collection instruments, holding a high school diploma or higher academic degree, minimum of three months of cancer experience after initial diagnosis, and being between 30 to 65 years old.

The participating patients answered the questionnaires individually during one single session. All the required explanations about the reasons and aims of the research, confidentiality of the obtained information, and non-compulsoriness of participation were provided. Also, the participants' consent to take part in the study was obtained.

#### **Ethical statement**

In order to abide by research ethics, all participants were fully informed about the significance of the study after they consented to take part in the project. Additionally, they were told that they are free to stop cooperation upon their decision. Also, they were reassured that the collected data would be treated as confidential information and that the questionnaires are anonymous. It was emphasized that integrity and confidentiality would be observed in the analysis and presentation of the results.

#### **Measures**

*The short form of the Depression, Anxiety, and Stress Scale is a self-report questionnaire (Lovibond & Lovibond, 1995).* It contains 21 items to measure negative emotional states of depression, anxiety, and stress. Respondents should use a four-point Likert scale ranging from zero to three (0= never, 1= little, 2= medium, 3= very much) to state their experience of every state during the previous week. In a study on a normal sample, remarkable internal consistency was found for the sub-scales of depression, anxiety, and stress (.91, .84, and .90 respec-

tively) (Lovibond & Lovibond, 1995). Additionally, in research studies with a clinical population, the internal consistency of the same sub-scales was estimated to be around .96, .89, and .93 respectively (Brown et al., 1997). Anthony et al. (1998) subjected the scale to factor analysis. Their results, too, indicated that three factors of depression, anxiety, and stress could be clearly observed. Their statistical calculation showed that 68% of the total scale variance could be explained by these three factors. Alpha coefficients for stress, depression, and anxiety were .97, .92, and .95 respectively. The validity and reliability of this questionnaire were also estimated in Iran (Samani & Jokar, 2007) yielded .80, .76, and .77 for depression, anxiety, and stress respectively. Moreover, Cronbach's alpha was reported to be .81, .74, and .78 for the sub-scales in the same order. In the present study, the reliability of the scale was shown to be .86 for depression, .78 for anxiety, .81 for stress, and finally, .89 for the whole scale.

*Intolerance of uncertainty scale (IUS)*: this scale was devised by Freeston et al. (1994) to measure respondents' tolerance in uncertain and ambiguous situations. It contains 27 items on a five-point Likert scale consisting of never (1), seldom (2), sometimes (3), often (4), and always (5). The scores of each respondent can range from a minimum level of 27 to a maximum of 135. Score 54 is the cut-off point whereby scores are split into two parts, with scores above the cut-off point indicating intolerance of uncertainty. There are four sub-scales within the scale as pointed out by Buhr and Dugas (2002): 1) Conception of ambiguity and uncertainty leads to the inability to take action, 2) Uncertainty is overwhelming and confusing, 3) Unforeseen events are negative and must be avoided, and 4) ambiguity and uncertainty are unfair.

Buhr and Dugas (2002) reported the Cronbach's alpha coefficient as a measure of internal consistency of the scale to be .94. Also, test-retest reliability was reported to be around .78 with five weeks' interval. The coefficient of correlation of the scale

was calculated to be .60 with the worry questionnaire, .59 with the Beck depression scale, and .55 with the Beck anxiety scale. These results were significant at 0.001. In Iran, Hamidpoor and Andooz (1996, as cited by Asnaashari et al., 2017) estimated internal consistency by using Cronbach's alpha to be .88 and through test-retest .76 within three weeks' intervals. The reliability of the scales of this instrument for inability to take action, the overwhelming effect of uncertainty, negativity of ambiguous events and avoiding them, and unfairness of uncertainty achieved indexes of .75, .78, .83, .88 respectively, and .89 for the whole scale.

*Emotional schema scale* was developed by Leahy (2002) as a self-report questionnaire based on the emotional schemas model. This measure generally determines how a given individual has dealt with his/her own feelings and emotions during the previous month. The instrument contains 22 items on a six-point Likert scale from completely incorrect to completely correct. It includes instances of reversed scoring as well. The range of scores varies from zero to 110. Correlation among different dimensions of the questionnaire indicated that it enjoys acceptable validity (Leahy, 2002). A Cronbach's alpha coefficient of .86 and a split-half index of .70 was reported for the scale (Yavuz et al., 2011). Shahvarani and Khormaei (2018) examined the factor structure and psychometric characteristics of the emotional schema scale in the context of Iran. Some of the statements were revised and some were removed after they were checked for the form and content because they were considered to be unintelligible by the majority of people, or because they showed either weak factor loading or excessive overlapping. Through factor analysis of the emotional schema scale, six factors were extracted including understandability and controllability, thought rumination, general agreement, rationalization, acceptance, and emotional simplification. Cronbach's alpha coefficient for the whole scale was estimated at .70 and for the sub-scales, they were reported as follows: .79 for understandability and controllability, .75 for thought rumination, .65 for

general agreement, .60 for rationalization, .72 for acceptance, and finally, .60 for emotional simplification. Moreover, the results of confirmatory factor analysis and internal correlations implied acceptable construct validity. In addition, strong correlations between this scale and the State-Trait Anxiety Inventory and attachment styles questionnaire confirm high convergent validity, and the internal correlation of the items substantiates the remarkable construct validity of the scale. As all these findings suggest, the emotional schema scale can be used in Iran to achieve research and medical objectives. In the present research study, the reliability of the scale for the sub-scales of understandability and controllability, thought rumination, general agreement, rationalization, acceptance, and emotional simplification were calculated to be .75, .76, .64, .61, .70, and .63, respectively. Also, the reliability index for the whole scale as a unitary instrument was .78.

*Internal consistency of the questionnaire* was estimated by using Cronbach's alpha, and according to Wells and Cartwright-Hatton (2004), it turned out as .93. Also, the test-retest reliability estimate was .78 in their report. Its correlation with Spielberger State-Trait Anxiety Inventory was .53, with the Pennsylvania State Worry questionnaire .53, which proved statistically significant. Shirinzadeh Dastgiri et al. (2008) translated and prepared this questionnaire for the Iranian population. Exploratory factor analysis confirmed the five factors mentioned above. Besides, internal consistency via Cronbach's alpha was calculated at .91 for the whole scale, and for the sub-scales of uncontrollability, positive beliefs, cognitive self-consciousness, cognitive confidence, and need to control negative thoughts the obtained measures were .87, .86, .81, .80, .71, respectively. Split-half reliability estimate for the whole scale was .90 and for the multi-item sub-scales ranged from .69 to .89. Also, the test-retest estimate for the whole scale was .73, and for the sub-scales, the measures reached numbers from .59 to .81. In the current research study, the validity of the questionnaire for positive beliefs about worry,

negative beliefs about uncontrollability and danger of thoughts, cognitive competence/confidence, beliefs about the need to control thoughts, and cognitive self-consciousness was obtained as .85, .87, .81, .80, .71, respectively, and for the whole instrument, the obtained statistic was .88.

*Cognitive avoidance questionnaire* was devised and developed by Sexton and Dugas (2008). There are 25 items that constitute five factors: thought substitution, the transformation of images into thoughts, distraction, avoidance of threatening stimuli, and thought suppression. The items were designed on a five-point scale from completely incorrect to completely correct. The sum of scores on all items for each individual respondent can range from 25 to 125 with lower scores denoting lower cognitive avoidance and higher scores meaning higher cognitive avoidance.

findings of Sexton and Dugas (2008) demonstrated that this questionnaire enjoys strong internal consistency (Cronbach's alpha = .95) and that its test-retest index within a six-month interval reached .85. The reliability index of the scale was reported between .7 to .91 (Sexton & Dugas, 2008). In Iran, the reliability index of the instrument was measured and yielded an estimate of .86. Also, the test-retest index with two months' interval equaled .80 (Mahmoodaliloo et al., 2011). In Basaknejad et al.'s (2011) investigation, using Cronbach's alpha index, the reliability index for the total scale was measured to be .91, and with the sub-scales, the measurements reached .71 for thought substitution, .84 for the transformation of images into thoughts, .89 for distraction, .90 for the avoidance of threatening stimuli, and finally, .90 for thought suppression. In the present study, the reliability indexes for the sub-scales were calculated as follows: .74 for thought substitution, .83 for the transformation of images into thoughts, .87 for distraction, .75 for the avoidance of threatening stimuli, and finally, .85 for thought suppression. For the whole instrument as a unit, the reliability estimate reached .89.

**Table 1.** Mean, Standard Deviation, Kurtosis, and skewness

variables	mean	Standard Deviation	Kurtosis	Skewness
Psychological distress	35.76	10.67	.69	-0.06
Metacognitive beliefs	66.21	11	.18	-0.97
Cognitive avoidance	73.69	12.46	.38	-1.01
Intolerance of uncertainty	78.70	14.52	.66	-0.42
Emotional schemas	60.51	22.82	.61	-0.38

**Table 2.** Correlation matrix of variables

variable	1	2	3	4	5
1 Psychological distress	1	**0.306	**0.296	**0.374	**0.417
2 Metacognitive beliefs		1	**0.167	**0.288	**0.356
3 Cognitive avoidance			1	**0.358	**0.163
4 Intolerance of uncertainty				1	**0.411
5 Emotional schemas					1

**Table 3.** Path Coefficients of the Structural Model

Path	$\beta$ Standard Coefficient	Critical value	P value
Intolerance of uncertainty→psychological distress	0.32	5.84	<0.01
Intolerance of uncertainty →cognitive avoidance	0.29	3.86	<0.01
Intolerance of uncertainty →metacognitive beliefs	0.19	3.08	<0.05
Emotional schemas→psychological distress	0.21	3.69	<0.01
Emotional schemas→cognitive avoidance	0.25	3.88	<0.01
Emotional schemas→metacognitive beliefs	0.17	2.43	<0.05
Cognitive avoidance→psychological distress	0.33	5.42	<0.01
Metacognitive beliefs→psychological distress	0.27	4.24	<0.01
Intolerance of uncertainty →metacognitive beliefs→psychological distress	0.051	3.31	<0.01
Intolerance of uncertainty →cognitive avoidance→psychological distress	0.095	3.37	<0.01
Emotional schemas→metacognitive beliefs→psychological distress	0.046	3.02	<0.05
Emotional schemas→cognitive avoidance→psychological distress	0.082	3.18	<0.01

The collected data were analyzed employing SEM and Sobel test (for determining the exclusive role of moderator variables). The utilized programs included SPSS and Amos version 21.

## Results

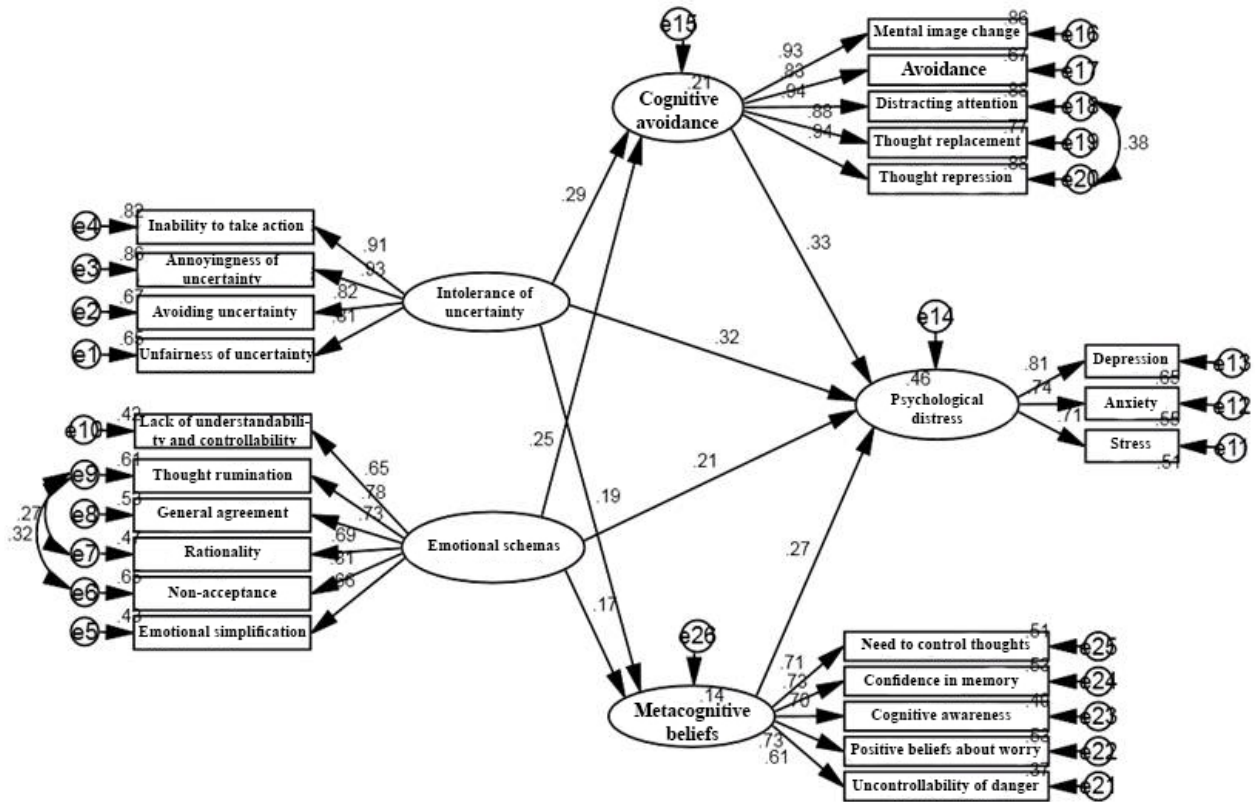
The present study was conducted on a sample of

300 cancer patients (57% male and 42% female) who were between 30 to 65 years old (mean= 46.89, SD= 6.34).

Table 1 presents the means, standard deviations, kurtosis, and skewness of the research variables. None of the variables showed any serious deviation from the univariate normal distribution. According

**Table 4.** Indexes of Structural Model Goodness of Fit

	RMSEA	NFI	CFI	GFI	P	$\chi^2/df$
Proposed model	0.06	0.91	0.92	0.91	0.000	2.46



**Fig 2.** The experimental model of the study with standardized path coefficients

to the majority of sources, kurtosis and skewness of the distribution between (-2 and 2) can be assumed as normal (Gravetter & Wallnau, 2014) (see Table 1).

As Table 4 suggests, the proportion of  $\chi^2/df$  was computed at 2.46 which is less than 3 and indicates the acceptable fitness of the model. Additionally, Indexes of (GFI= 0.91), (CFI= 0.92), (NFI= 0.91) were above 0.90, which ensures appropriate fitness of the model with the obtained data. Also, the index of residuals (RMSEA=0.06) appeared less than 0.08 which is a good value for the fitness of the model. The proposed model managed to explain 46% of the variance in psychological distress. Intolerance of uncertainty and emotional schemas explained 21% of the variance in cognitive avoidance and 14% of the variance in metacognitive beliefs.

### Discussion and Conclusion

The present study was conducted with the aim of investigating the fitness of the structural model of psychological distress based on intolerance of uncertainty and emotional schemas in cancer patients with mediating role of metacognitive beliefs and cognitive avoidance. Results demonstrated that the proposed model achieved appropriate fitness with the collected data.

This model can be explicated in line with Dugas's (1998) cognitive model evidence: in accordance with Dugas's cognitive model, it is assumed that intolerance of uncertainty a) leads to worry through cognitive bias, and b) increases worry through processes related to positive beliefs about worrying, negative direction toward problem-solving, and cognitive avoidance (Asnaashari et al., 2017; Davey



& Wells, 2006). This process brings about increased anxiety and psychological distress. Intolerance of uncertainty affects individuals' decision-making. In ambiguous situations, those who possess higher intolerance of uncertainty experience more intense anxiety and faltering self-confidence (Asnaashari, 2017; Bokuniewicz, 2020; Rettie & Daniels, 2020). Moreover, intolerance of uncertainty impacts people's cognitive information processing and may result in psychological distress via frustration of cognitive evaluations and diminishing coping skills (Dugas et al., 2004). It seems that in individuals who are highly intolerant of uncertainty, uncertainties due to cancer and various treatment methods can potentially escalate in individual patients a feeling of doubt and misgiving in decision-making skills, and give rise to worry (Lauriola et al., 2019), maladaptive cognitions (such as catastrophizing), maladaptive emotion regulation strategies (such as blaming oneself or others) (Bovbjerg et al., 2019), maladaptive coping strategies (drinking alcohol, isolation, ...), the experience of pain (Lauriola et al., 2019), and finally, further psychological distress. Findings of the current study concerning the direct impact of intolerance of ambiguity on psychological distress (depression, anxiety, and stress) corroborate those of other studies (Abdolpoor et al., 2018; Asnaashari et al., 2017; Carleton et al., 2012; Hill & Hamm, 2019; Lauriola et al., 2019; Mahmoodaliloo et al., 2011; Yao et al., 2020).

According to the metacognitive model (Wells, 2006), metacognitive beliefs, metacognitive evaluations, and thought control strategies are the major causes of the development and continuation of emotional disorders (Karimi Moghaddam, Sadeghi-Firoozabadi, Imani & Zakeri, 2020). Positive metacognitive beliefs about the necessity of thought rumination as a means of overcoming negative emotions and finding solutions to problems, negative metacognitive beliefs about the uncontrollability of thought rumination and worry, the psychological vulnerability of self, reduction of

meta-consciousness about thought rumination and attention-cognitive syndrome (thought rumination, threat surveillance, and maladaptive coping behaviors) are significant elements in the pathology of emotional disorders like depression and anxiety (Wells, 2006). While negative metacognitive beliefs and evaluations give rise to more intensive experiences of negative emotions, individuals, in an attempt to avoid situations that provoke negative emotions and prevent their perilous consequences, attempt to control their thoughts by using behavioral and thought control strategies. It is possible that cancer patients turn to false reassurance, or resort to thought control strategies like cognitive avoidance and thought suppression; in the long run, events and consequences associated with applying such strategies empower psychological distress. Abdolpoor et al. (2018) believe that interference of metacognitive beliefs with self-regulatory processes can potentially raise anxiety, depression, and stress by disrupting self-regulatory strategies, monitoring threats, and using coping strategies. This explanation is reminiscent of several other researchers' findings that confirmed the relationship between metacognitive beliefs and depression and anxiety (Abdolpoor et al., 2018; Capobianco et al., 2020; Dashtban Jami et al., 2014; Fisher et al., 2018; Leahy et al., 2019; Lenzo et al., 2020; Pournamdarian et al., 2012; Quattropiani et al., 2016; Salarifar & Pooretamad, 2011). Similarly, Lenzo et al.'s (2020) findings suggest that inefficient metacognitive beliefs are associated with the procedure of adjustment to diseases. In the same vein, Kargar et al. (2019) found a negative correlation between metacognitive beliefs and following treatment prescriptions in cancer patients, a fact that substantiates the results of the current study.

The findings of the present study confirm the direct effect of cognitive avoidance on psychological distress. This is in agreement with the findings of some other scholarly studies (Bartone & Homish,

2020; Mihailova & Jobson, 2020; Rabieinejad et al., 2016; Rahimian Boogar et al., 2013; Rezee et al., 2016). Thought suppression and avoidance of threatening stimuli through increased annoying thought ruminations (Rabieinejad et al., 2016) result in psychological distress. Empirical evidence has illustrated that anxious people use explicit or implied cognitive avoidance (e.g., thought suppression, replacement of worrying thoughts with positive ones, distracting attention, and automatic avoidance of threatening mental images). Cognitive avoidance, as maladaptive coping behavior, perpetuates negative beliefs and evaluations about worries and deteriorates psychological distress by disrupting self-regulatory processes (Wells, 2011). The resulting worsened anxiety and depression hinder performance improvement and reinforce negative and worrying thoughts (Weiner & Carton, 2012).

According to Leahy's emotional schema model, emotional schemas can affect psychological distress through mechanisms such as experiential avoidance (e.g., suppression, senselessness, avoidance, and evasion), maladaptive cognitive strategies (e.g., worry and thought rumination), seeking social support (Leahy et al., 2011). Findings of the present study support this model. These findings are consistent with numerous studies regarding the association between emotional schemas and psychological distress (e.g., Ahadianfard et al., 2017; Dashtban Jami et al., 2014; Karami et al., 2017; Leahy et al., 2019; Mazloom et al., 2016). As a case in point, Mazloom et al. (2016) showed how emotional schemas impact post-trauma stress through emotion regulation strategies.

As the results of the current study suggest, the indirect effect of intolerance of uncertainty on psychological distress with mediating role of metacognitive beliefs has been confirmed. They are consistent with Dugas's cognitive model (1998) regarding the role of intolerance of uncertainty in increasing the risk of anxiety and mood disorders

(Abdolpoor et al., 2018; Asnaashari et al., 2017; Chen et al., 2018) with the mediating effect of metacognitive beliefs. It seems that cancer patients who are highly intolerant of uncertainty develop specific metacognitive beliefs that lead to psychological distress. For instance, these individuals apply thought rumination as a strategy in order to control their emotions, find meaning, and reduce uncertainty. Also, it is possible that they consider emotions and worries uncontrollable hence forming negative metacognitive beliefs toward controllability of emotions that by itself increase the patients' vulnerability against emotional disorders like depression and anxiety. Moreover, according to the metacognitive approach, people suffer from emotional problems because their metacognition makes their negative emotions and negative beliefs perpetuate as a result of maladaptive models of responding to inner experiences (cognition-attention syndrome including worry, thought rumination, fixed attention, and self-regulatory strategies or maladaptive coping behavior) (Leahy et al., 2019). According to the metacognitive approach (Wells & Cartwright-Hatton, 2004), when cancer patients are in situations of negative emotions and their executive function system determines the method to cope with emotions, their metacognitive beliefs about thought rumination become activated. This process takes place to meet the need for clarification and uncertainty reduction through getting involved in thought rumination about the meanings and reasons of events. However, this process intensifies psychological distress in cancer patients due to overusing maladaptive strategies such as thought rumination, self-regulatory strategies, or maladaptive coping behaviors.

In agreement with Asnaashari et al. (2017), the present findings substantiate the indirect effect of uncertainty intolerance on psychological distress with mediating role of cognitive avoidance. Dugas (1998) found that intolerance of uncertainty precipitates people into cognitive avoidance.

Cancer and its various treatment methods cause huge amounts of uncertainty, consequently giving rise to further anxiety in patients. A combination of uncertainty intolerance and ambiguous conditions caused by treatment, prognosis, etc. makes less tolerant individuals turn to cognitive avoidance as a coping strategy. They would strive to change their thoughts and utilize repression of worrying thoughts, thought replacement, distracting attention to cut the flow of worries, and avoiding worry-provoking situations and activities. Nevertheless, since thought rumination resulting from cognitive avoidance spawns further negative thoughts, disruption of problem-solving, and reduction of social support (Nolen-Hoeksema et al., 2008), in the long run, it would ultimately amplify psychological distress in cancer patients. Apart from cognitive avoidance, cancer patients may use behavioral avoidance strategies as well. For example, they might avoid threatening situations like chemotherapy and its side effects including hair loss, weakness, etc., and thus, procrastinate their treatment process. Similarly, it is possible that they ignore disease-related information and self-care behavior. Also, they may opt for maladaptive behaviors such as drinking alcohol or smoking that would certainly deteriorate their physical condition. Research findings have shown that cancer patients who cling to avoidance thinking experience more psychological suffering compared to those who refrain from that. Likewise, patients who confront cancer diagnosis by resorting to the anticipation of positive outcomes, display lower levels of depression and anxiety in comparison to those who avoid thinking about their illness or concentrate on negative possibilities thereof. A patient who is determined to overcome the disease and express their anger, anxiety, and depression, usually demonstrates better adaptability and displays lower levels of anxiety, depression, and hostility (Sanderson, 2012).

Results of the present study also confirm the indirect impact of emotional schemas on psychological

distress with mediating role of metacognitive beliefs. According to the metacognitive approach, if cancer patients face negative emotional situations with negative thoughts, their schemas decide on their methods of coping with the emotions and subsequently, activate their metacognitive beliefs. These beliefs aggravate cancer patients' psychological distress. These explanations are in line with other researchers' findings. Dashtban Jami et al. (2014), for instance, revealed that there is a significant and positive relationship between metacognitive beliefs (positive beliefs about worry and cognitive self-consciousness) and emotional schemas on one hand and depression on the other. Leahy et al. (2019) illustrated that negative metacognitive beliefs, uncontrollability, and risk-taking relatively mediate the relationship between negative beliefs about emotion (emotional schemas) and anxiety symptoms. Negative beliefs of uncontrollability and risk-taking and cognitive competence, too, partially mediate the association between negative thoughts about emotion and depression symptoms.

The indirect relationship between emotional schemas and psychological distress with mediating effect of cognitive avoidance was also supported by the findings of the present research study. Coping with negative emotions in individuals with maladaptive emotional schemas increases the probability of deploying avoidance strategies, and consequently, augments psychological distress (Dashtban Jami et al., 2014; Leahy, 2002). Paying attention to emotions and avoiding them constitute two consecutive steps in the meta-emotional model (Leahy, 2007). After an emotion is activated, if an individual possesses maladaptive emotional schemas that prevent him from accepting the emotions or construe them as meaningless or even detrimental, he/she would turn to cognitive avoidance (Mazloom et al., 2016). This results in worsened psychological distress or vulnerability to emotional disorders (Bartone & Homish, 2020; Mihailova & Jobson, 2020). Cognitive avoidance,

aside from disrupting the processing of emotions, can sustain negative beliefs about negative emotions (Asnaashari et al., 2017; Bartone & Homish, 2020; Mihailova & Jobson, 2020). It is likely that this situation leads to stability of emotional schemas because the emotion-experiencing cycle, activation of emotional schemas, and avoidance bring on the maintenance of cognitive beliefs about emotions. Continuation of this situation engenders further psychological distress. These findings and explanations are consistent with Rezaei et al.'s (2016) results that highlighted that cognitive avoidance mediates the link between emotional schemas and depression. In addition, Ahadianfard et al. (2017) concluded that emotional schemas are related to external inefficient emotion regulation methods.

It is necessary to interpret the results of the present study by taking into account some limitations. This research study was a cross-sectional one. Therefore, the configuration of the findings without considering the effect of time on the variables and their relationships is an important limitation of the study. The data were collected from a sample of cancer patients in Tehran province. Thus, generalization of the findings to other populations and groups, especially cancer patients in other cities or patients affected by other chronic illnesses, should be done with caution. As noted before, the development of the proposed model was inspired by Curran et al.'s (2017) model. Nonetheless, some other influential factors that can take part in the model were not examined. Thus, it is suggested that future studies take into account other variables predicting cancer patients' psychological distress and anxiety. Moreover, the moderating role of gender can be investigated in future studies. Findings of the current study indicated that intolerance of uncertainty, emotional schemas, metacognitive beliefs, and cognitive avoidance are significantly involved in predicting psychological distress among cancer patients. Accordingly, any effort to improve cancer

patients' psychological health and tolerance of distress must be accomplished with serious attention to intolerance of uncertainty, emotional schemas, metacognitive beliefs, cognitive avoidance, the interaction of these variables, and finally, their moderation and change.

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