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The role of metacognitions in predicting anxiety and depression levels in cancer patients ongoing chemotherapy

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Abstract

Cancer patients often have to deal with numerous side effects and psychological distress during chemotherapy. Research has shown that dysfunctional metacognitive beliefs are the basis for the development and maintenance of emotional disorders. The present research is a first attempt to explore how metacognitions influence anxiety and depression in cancer patients undergoing chemotherapy. A sample of 175 cancer patients undergoing chemotherapy completed a demographic questionnaire, the Metacognitions Questionnaire-30 (MCQ-30) and the Hospital Anxiety and Depression Scale (HADS). Medical information about the stage of disease and the history of treatment was obtained. Linguistic analysis (Stansfield et al 1992) was employed to ensure that the form had been correctly translated because the Italian form of the MCQ-30 was utilized (Quattropani, et.al, 2014). Negative beliefs, the need to control thoughts, and positive beliefs explained up to 89% of variance of anxiety in cancer patients during chemotherapy. The negative beliefs about worry and the gender explained up to 81% of variance of depression in cancer patients during chemotherapy. In fact, female gender was positively correlated with depression level of patients. The negative beliefs about worry and the need to control thoughts explained the 81% variance for the overall distress of patients during chemotherapy. In conclusion, some metacognitive factors have a crucial role both for anxiety and depression in cancer patients ongoing chemotherapy. It is suggested that the psychological intervention for cancer patients should assess such factors and try to address them in clinical practice.

Statistical analysis was conducted by Massimo Mucciardi.

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1. Problem Statement

Patients confronted with a diagnosis of cancer face many problems: physical symptoms, psychological reactions of fear, sadness and preoccupation for the family and their future, and the search for a tolerable meaning for the disease in the spiritual domain (Holland, 2003). Patients and family members can suffer from clinical levels of depression and severe levels of anxiety and stress reactions (Edwards and Clarke, 2004). Cancer patients often have to deal with numerous side effects and psychological distress during chemotherapy, often resulting in a decrease in the patients' quality of life (Luebbert et al., 2001). However, not much is known about mood disorders in cancer patients.

Results of meta-analysis have demonstrated the great impact of depression on mortality in cancer patients but not on mortality. (Satin et al., 2009). In particular, depression is strongly associated with mortality in younger patients with early stage breast cancer (Vodermaier et al., 2014).

Nevertheless, the overall prevalence rate of depression reported in literature remains uncertain. Varying conceptualizations of depression, different criteria used to define depression, differences in methodological approaches to the measurement of depression, and different populations studied can explain the differences of results (Massie, 2004).

Anxiety-based symptoms in response to a cancer diagnosis often occur in patients. The prevalence of anxiety and resulting depression with a cancer diagnosis is unclear. Reasons for these significant differences in literature include the definition of morbid anxiety, the range of self-report measures being applied without a clear understanding of their relation to morbid anxiety, social or demographic factors, and aspects of cancer diagnosis and treatment (Stark et al., 2002). The results of a recent meta-analysis pointed out the following: the prevalence of all types of depression occurred in 20.7% of patients, depression or adjustment disorder occurred in 31.6% , and any other mood disorder in 38.2% (Mitchell et al., 2011).

In the last decades, significant research has demonstrated that a subgroup of chemotherapy patients is vulnerable to post-treatment cognitive changes, even though not exclusively correlated to chemotherapy. Results of a recent review showed that cognitive changes associated with cancer and cancer treatments can be viewed in the context of factors that affect the trajectory of normal aging (Ahles, 2012). However, there is no association between subjective and objective evaluations of cognitive functioning for patients in cancer treatment. In fact, neuropsychological compromise and self-perceived cognitive dysfunction are independent phenomena in cancer patients (Hermelink et al., 2010).

On the basis of these two different sides of psychological factors involved in cancer patients undergoing chemotherapy, a thorough understanding of the cognitive functioning of these patients is necessary. In fact, studies from many fields of research have shown that an integrated psychological and medical approach together increase the efficacy of the treatments (Lenzo and Quattropani, 2013).

Regarding the role of metacognitions, many lines of evidence indicate that there is a strong relationship between emotional processes, cognition, metacognitive beliefs and behaviors. In this perspective, Wells and Purdon (Wells and Purdon, 1999) define metacognition as "the aspect of information processing that monitors, interprets, evaluates and regulates the contents and processes of its organization". According to Wells' theoretical model, dysfunctional metacognitive beliefs are the basis for the development and maintenance of psychological disorders (Wells, 1996). In particular, vulnerability and psychological maintenance of disorder are associated with a non-specific style of thinking which is known as the Cognitive-Attentional Syndrome (CAS) (Wells, 2007, 2009). In fact, CAS consists of positive beliefs about worry, negative beliefs about worry concerning uncontrollability and danger, and cognitive resource limitations and beliefs about the need to control thoughts. Wells constructed a metacognitive theory for emotional disorders, and also developed self-reporting instruments for assessing dysfunctional beliefs.

The Metacognitions Questionnaire (MCQ) and its short version (MCQ-30) both are measures for a range of metacognitive beliefs and processes relevant to vulnerability and maintenance of emotional disorders (Catwright-Hatton and Wells, 1997, Wells and Cartwright-Hatton, 2004). The short version (Wells and Cartwright-Hatton, 2004) of the Metacognitions Questionnaire (Catwright-Hatton and Wells, 1997) was chosen to assess dysfunctional metacognitive beliefs because it is the quickest and most utilized instrument in the area of metacognitions research.

Moreover, it assesses some related metacognition factors that could be critical in cancer patients undergoing chemotherapy.

If there are emotional disorders related to anxiety and depression, they can increase dysfunctional metacognitive beliefs resulting in a further increase in anxiety and depression. Regarding the assessment of anxiety and depression symptoms, Hospital Anxiety and Depression Scale (Zigmond and Snaith 1983, 1994) was chosen because it is widely employed in the cancer literature (Costantini et al., 1999). A clinical group of patients undergoing chemotherapy participated in this study and the hypothesis was examined.

2. Purpose of Study

The goal was to examine the relationships between metacognitive beliefs, anxiety, and depression during chemotherapy. The hypothesis that significant and positive correlations exist between some metacognitive factors, anxiety, and depression was the basis of this research.

3. Methods

3.1. Participants

A sample of 175 cancer patients undergoing chemotherapy in an oncological department of a university hospital in southern Italy participated in this study. All patients were native Italian speakers and Italian nationals. Socio-demographics and medical characteristics of the sample are presented in Table 1. The sample consists of 141 women (81%) and 34 men (19%). The mean age was 58.21 years (SD = 11.66; range = 27-85), and the level of education in years was 10.87 (SD = 4.39; mode = 13; median = 13). Sixty-six percent were married, and in terms of occupation, 69% were unemployed.

With regards to medical status, patients had been diagnosed with various forms of cancer. Most of them reported a diagnosis of breast cancer (46%). Other diagnoses included colorectal (30%) and other (24%). The majority of the patients (89%) had cancer in stage I. Thirty-three percent of the patients had been undergoing chemotherapy for 6 months (mean = 8.40; SD = 9.63).

Exclusion criteria included pre-existing psychopathology or neurological disorders that would interfere with the completion of the measures.

Table 1. Demographic and medical characteristics of the sample

Demographic and medical characteristics	%	Mean (SD)
Age		58.21 (11.66)
Gender		
Male	19	
Female	81	
Status		
Single (or separated/widowed)	34	
Married	66	
Education		
Less than high school		
High school or more		
Employment status		
Employed	69	
Unemployed	31	
Type of cancer		
Breast	46	
	54	

Colon and other	
Stage	
I	89
II and III	11
Months undergoing chemotherapy	8.40(9.63)

3.2. Measures

The following data was gathered and then statistically analysed:

1. Socio-demographic information including age, gender, educational degree, nationality, marital status;
2. Medical information including data on the stage of the disease and treatment history;
3. Metacognitions Questionnaire-30 (Wells and Catwright-Hatton, 2004). This is a 30-item, self-reporting questionnaire, which measures a range of metacognitive beliefs and processes relevant to vulnerability and maintenance of emotional disorders. The items are rated on a 4-point Likert scale from 1 ('do not agree') to 4 ('completely agree'). The items are grouped into five subscales, as in the original version (Cartwright-Hatton and Wells, 1997). Factorial analysis of this questionnaire has identified five factors: cognitive confidence, which measures confidence in attention and memory (Cognitive confidence, CC); cognitive self-consciousness, which measures the tendency to monitor one's own thoughts and focus attention inward (Cognitive self-consciousness, CSC), positive beliefs about worry, which measures the extent to which a person thinks that perseverative thinking is useful (Positive beliefs about worry, POS), negative beliefs about worry concerning uncontrollability and danger, which assess the extent to which a person thinks that perseverative thinking is uncontrollable and dangerous (Negative beliefs about uncontrollability and danger, NEG), beliefs about the need to control thoughts, which assesses the extent to which a person believes that certain types of thoughts need to be suppressed (Need to control thoughts, NC). All items refer to general ideas and a high score on each factor is considered dysfunctional. The MCQ-30 is a brief, reliable and valid self-reporting measure of metacognitions (Wells and Catwright-Hatton, 2004; Spada et al., 2008). In this study, a validated Italian version of the MCQ-30 was used to assess metacognitive beliefs (Quattropani et al., 2014). Results of the Italian version of MCQ-30 indicated, as in the original version, direct correlations between metacognitive factors (except for CSC) and state and trait anxiety, pathological worry, and obsessive-compulsive symptoms. Reliability of all five factors in the present clinical group was acceptable to good, with Cronbach's α ranging between 0.70 and 0.84 for the different scales.

3.3. MCQ-30 validity for Italian translation

Because the MCQ-30 was originally written in English, and the present study was conducted in Italian, it was necessary to translate the instrument in a way that was both linguistically and culturally accurate. Comparable results and reliability depend on an accurate translation. This section explains the process of translation.

3.3.1. Translation defined

Translating any document is a challenge, but the task of translating psychological test questions from one language and culture to another is a daunting feat. The literature regarding translation is almost endless: definitions of translation, procedure, technique, evaluation, checks for cultural accuracy...the list goes on and on. Translation is defined as "the act or process of translation of something into a different language" (Merriam Webster, 2015). R. Jacobson (1950) stated that "interlingual translation or translation proper is an interpretation of verbal signs by means of some other language". Translation has also been defined as the "transfer of thoughts and ideas from one language (source) to another (target) (Brislin, 1976). It is necessary to be able to understand and process the source language, in terms of syntax, "pragmatic understanding and analytical processing" (Newmark, 1981: p. 7). Another consideration is the relationship between language and culture. Due to the fact that culture is "the collective programming of the mind that distinguishes the members of one group or category of people from one another"

(Hofstede, 2000: p. 9) it seems obvious that language is the vehicle of culture and that culture would have an extremely strong impact on translation. Culler (1976) stated that languages are not “nomenclatures” and because of this concepts can be radically different from language to language, since each language articulates experience differently, and languages do not simply name categories; they articulate their own (p.21-2). Therefore, it seems logical to assume that core differences between languages add to the difficulty of rendering an accurate translation. Language is also a strong vehicle of cultural transmission, and culture and language are considered inseparable by many experts and researchers.

3.3.2. *Translation evaluation*

The literature contains varying definitions about what constitutes an accurate translation. According to the results of a study carried out for the U.S. Federal Bureau of Investigation (FBI) to create tests to evaluate translation ability, effective translation can be described in two words: accuracy and expression (Stansfield et al., 1992). Accuracy deals with the source document (SD) content transfer; expression includes form and linguistic quality. The information from the source document (SD) must be transmitted into the target document (TG) as accurately as possible. The term ‘as possible’ opens a debate between linguists and professional translators as to how close a translation can actually be to the original text.

3.3.3. *Error analysis*

Error analysis is a method used in translation to ensure that accuracy is achieved to the maximum level. It was employed to ensure that the MCQ-30 translation was as accurate as possible. The error analysis list used for this translation included (Hurtado Albir, 1995):

- text comprehension errors (addition, omission, inappropriate linguistic variation, contradictions, meaningless expressions, mis-translation, misinterpretation)
- expression errors: spelling, grammar, lexicon, text, style
- function transmission errors

3.3.4. *Culture specific concepts*

Another important aspect of any translation is culture. Culture-bound terms have been defined as terms referring to “concepts, institutions and personnel which are specific to the SL culture” (Harvey, (p.2), Harvey (2000:2-6). Newmark (1988, pp. 83) offered different techniques. His idea about ‘functional equivalent’ (use of a culture-neutral word) was appealing when doing this translation. His idea of ‘shift’ or ‘transposition’ was also useful since English and Italian syntactical structures are frequently very different from each other. ‘Descriptive equivalent’ was also used when meanings had to be explained in several words and were not directly translatable (Harvey, 2000).

3.3.5. *Translation procedures for the MCQ-30*

The procedure for translating the MCQ-30 was based on a classical modal (Nida, 1964, pp.241-45). This procedure included analysis of the English source text, thorough study and comprehension of the questions and their underlying meaning. The target ‘audience’ and application was also considered. Analysis of the semantic and syntactic structures was conducted.

3.3.6. *Summary of potential problem areas*

The English version of the MCQ-30 Short Form consists of five metacognitive areas (Factors) which measure beliefs, judgements and monitoring tendencies. (Wells, Cartwright-Hatton, 2003). The statements are composed of fairly short one-verb clauses. A literal translation is not very difficult since the concepts and vocabulary used are quite simple and targeted to a general audience. At first glance the translation appears to be very simple. If in fact

all languages were nomenclatures, it would be very simple. However, this is an example of a deceptively simple text which is totally embedded in culture. The following table summarizes the most challenging areas of the translation.

Table 2. The most challenging areas of the translation

English	Italian	Comment
Factor 1 Cognitive Confidence		
“I have a poor memory”	“Ho poca memoria” This is not translated directly.	Culturally the use of the Italian word for ‘poor’ would have negative connotations and imply a value judgement while the goal is to illicit information.
“I have little confidence in my memory” for (actions, places, words and names)”	“Ho poca fiducia nella mia capacità di ricordare.....” This is not translated directly.	The Italian word “confidenza” which would be the direct translation based on cognate theory, has a completely different meaning. Direct translation would be “I have little faith in my ability to establish an intimate relationship with my self”.
Factor 2 Positive Beliefs		
“Worrying helps me to get things sorted out in my mind.”	“Preoccuparmi mi aiuta a sistemare le cose nella mia mente.”	The tendency would be to use the word ‘organize’ but the word ‘organize’ in Italian is almost always used to refer to the planning of an event or meeting.
“Worrying helps me to cope.”	“Preoccuparmi mi aiuta a fronteggiare situazioni disastrose.”	Here is an example of cultural differences. The English meaning ‘cope’ ranges from the ability to “contend or strive especially on even terms or with success” (http://www.thefreedictionary.com/cope). Another definition is “he process of contending with life difficulties in an effort to overcome or work through them”. http://medical-dictionary.thefreedictionary.com/Coping It would seem to the native English speaker that the use of the word ‘disastrose’ is very emphatic, whereas in Italian culture it is considered less so.
Factor 3 Cognitive Self-Consciousness		
“I monitor my thoughts.”	“Controllo i miei pensieri.”	Monitor: to observe and check the progress or quality of (something) over a period of time (Oxford Dictionaries.com, 2015). The word ‘controllo’ is a false cognate in English. It means inspect, check, keep a close watch on in Italian (http://www.collinsdictionary.com/dictionary/italian-english/controlare)

<p>Factor 4 Uncontrollability and Danger</p>	<p>“Le mie preoccupazioni mi possono fare diventare matto.”</p> <p>mad/insane/crazy= matto/pazzo</p> <p>(Oxford Dictionaries, 2015)</p>	<p>The literal meaning and cultural meaning of the words “mad” and “crazy” are the same.</p> <p>The definition of “mad” is “insane or angry”; the definition of “crazy” is “insane or mad” (Merriam-Webster, 2015). The use of “mad” to express the state of being angry is more frequent than the use of “mad” to express “crazy”. And again in American English, “crazy” occurs more frequently than “mad”. What this means is that the authors, who are from the U.K., chose to use the word “mad” to express “insane”; perhaps the vernacular use of “mad” is softer than “insane”. This brings up an observation on the cultural stigma of being mentally ill; whether it is better to label oneself in the vernacular or with a higher register medical term.</p> <p>In Italy there is still a stigma attached to those who seek psychological help. Consequently the word “matto” was chosen because it is slightly lighter than “pazzo” even though they have the same meaning.</p> <p>Here is an example of words with identical meanings according to the dictionary but with slightly different shades of meaning according to region.</p>
<p>Factor 5 Need to Control thoughts</p>	<p>“Non essere in grado di controllare i propri pensieri e’ un segno di debolezza“</p>	<p>‘Control’ (“Controllare”) in this sense has the same meaning in Italian as in English: to dominate, to have something under control http://www.dizionario-italiano.org/Controllare. One would question whether the phrase used by the authors of the test is culturally bound. It is common knowledge that the British culture historically promoted ‘keeping a stiff upper lip’ and would prefer not to be considered weak. (Telegraph, April 19, 2015) <one could perhaps extend that to the U.S. and other English-speaking countries. In Italy perhaps the definition of ‘weakness’ is different and not as frightening.</p>

3.3.7. *Validity of translation*

The translators of the MCQ-30 utilized the above analytical items. They also utilized the a list, taken from Larson, (1984). The five areas included: comparison with the English MCQ-30 text, back-translation from Italian back to English, comprehension checks, readability and naturalness and consistency tests. In addition to that, as noted in the above table, cultural differences were considered as a main question of importance. The differences in communication styles, use of idiomatic structures, strength of words and innuendos were analyzed in the comparison.

They also considered the fact that text reception also depends on the receivers, their expectations, social background, world knowledge and communicative needs (Nord, 1991, 2005 p. 17). The final test was the comparison of the actual statistical results. Satisfactory internal consistency, convergent validity, and good test-retest reliability were noted. Also, the five-factor solution was confirmed. (Quattropani, et. al, 2014). Therefore because the MCQ-30 has good psychometric properties it was used in this clinical research. The authors attest to the concept of the “faithful translation” which according to (Newmark, pp. 45-47, 1988) attempted to produce the precise contextual meaning of the original within the constraints of the Italian target language structures.

3.4. Hospital Anxiety and Depression Scale

This is a 14-item self-reporting scale that is divided into two dimensions, each composed of 7 items. The two subscales provide a measure of anxiety (HADS-A) and depression (HADS-D). The HADS is specifically designed for assessing physically ill patients and is used with medical outpatients. Respondents choose one from four responses to each item. Their responses are then summed within dimensions and a total score for each dimension, as well as both dimensions, are obtained. Scores can range from 0 to 21 for each subscale with high scores indicating higher levels of anxiety and depression. According to the authors of the HADS, scores for the anxiety dimension and the depression dimension can be categorized as follows: 0–7, normal; 8–10, mild; 11–14, moderate; 15–21, severe. Moreover, scores for the entire scale assess overall emotional distress and range from 0–42, with higher scores indicating more distress. The HADS has been employed among a wide range of clinical groups. Results of an Italian study with a sample of breast cancer patients indicated a total score for both dimensions of 10 points, 10 being the cut-off score for psychological distress (Costantini et al., 1999). Reliability of the two factors in this present sample was good, with Cronbach's α of 0.73 for depression scale and 0.81 for anxiety scale.

3.5. Data analysis

Data obtained from this research was checked and subsequently analyzed by a descriptive statistical analysis and modeling. Descriptive statistics were calculated for MCQ-30, HADS, and for sociodemographic and medical information. Pearson correlation coefficients were calculated to examine the bivariate associations among study variables.

4. Results

Table 3 shows the mean scores, and zero-order correlations for all the observed variables. Regarding metacognitive factors, results showed that negative beliefs had the strongest correlation both with anxiety ($r = 0.74$; $p < 0.01$) and depression ($r = 0.58$; $p < 0.01$). There were no other significant correlations between the metacognitive factors and anxiety or depression, with the exception of cognitive confidence and positive beliefs factors. Cognitive confidence showed low correlation coefficients with anxiety ($r = 0.24$; $p < 0.01$) and depression ($r = 0.22$; $p < 0.01$). Positive beliefs had a low significant correlation with anxiety ($r = 0.20$; $p < 0.05$) but not with depression. The total score of MCQ were positively related with all the other observed variables. Correlation coefficients were low to high, with the lowest for depression ($r = 0.32$; $p < 0.01$). Finally, the total score of HADS showed significant and positively correlations with negative beliefs ($r = 0.69$; $p < 0.01$) and cognitive confidence ($r = 0.26$; $p < 0.01$), but not with the other metacognitive factors.

Table 3. Descriptive statistics (mean with standard deviations in parentheses) and zero-order correlations for all the variable observed

Variable	M (SD)	1	2	3	4	5	6	7	8
1. HADS Anxiety	6.88 (4.32)								
2. HADS Depression	5.76 (3.70)	0.69**							
3. HADS total score	12.42 (7.49)	0.93**	0.90**						
4. MCQ-30 Positive beliefs	10.24 (4.57)	0.20*	0.01	0.12					
5. MCQ-30 Negative beliefs	12.84 (4.53)	0.74**	0.58**	0.69**	0.12				
6. MCQ-30 Cognitive confidence	10.54 (4.27)	0.24**	0.22**	0.26**	0.10	0.19*			
7. MCQ- 30 Need to control	15.06 (3.47)	0.09	0.05	0.10	0.26**	0.28*	0.00		

thoughts

8. MCQ-30 Cognitive self-consciousness	18.71 (3.38)	0.06	-0.02	0.05	0.19*	0.14	-0.13	0.43**	
9. MCQ-30 total score	67.39(11.54)	0.50**	0.32**	0.46**	0.62**	0.64**	0.45**	0.64**	0.51**

HADS, Hospital anxiety and depression scale; MCQ-30, short version of the Metacognitions Questionnaire.

*p < 0.05.

** p < 0.001.

5. Conclusion and Recommendations

In this study, our aim was to explore the role of metacognitions in cancer patients undergoing chemotherapy. The hypothesis was to explore the association between the metacognitive factors and emotional distress (anxiety and depression).

Consistent with present studies on metacognitions and emotional distress (Spada et al., 2008a,b; Wells, 2009) some dysfunctional metacognitive beliefs were positively associated with both anxiety and depression (Table 3). Specifically, the negative beliefs about worry concerning uncontrollability and danger showed a strong correlation with anxiety. During chemotherapy, the extent to which a patient thinks that perseverative thinking is uncontrollable and dangerous is strongly related to the presence of a negative emotion, such as anxiety. Negative beliefs were also related to depression, but with a lower intensity. It seems that the presence of depression symptoms can be mediated by other characteristics of the patient.

Another metacognitive factor, cognitive confidence, was related both to anxiety and depression but with a low intensity. Cognitive confidence that reflects the levels of cognitive esteem in attention and memory contributes to emotional distress limiting the choice of effective coping strategies available to the patient in chemotherapy.

In this regard, positive beliefs about worry showed a low relation to anxiety but not depression. It seems that the extent to which a patient believes that perseverative thinking is useful can be associated only with the presence of anxiety symptoms.

Beliefs about the need to control thoughts did not relate with anxiety or depression. It is possible to hypothesize that the great preoccupation and anxiety of patients in chemotherapy cause them to give less relevance to the need to control all their thoughts.

Finally, cognitive self-consciousness that reflects the tendency to focus attention on thought processes was not related to negative emotions. Consistently with previous studies on metacognitions, the tendency to monitor one’s own thoughts and focus attention inwards has a marginal role in the metacognitive model of psychopathology.

The present study is a first exploration of the role of metacognition in cancer patients undergoing chemotherapy. However, there are a number of limitations that should be addressed by future research. A major limitation was the heterogeneous characteristics of the sample (e.g., different types of tumor and time elapsed after diagnosis; the time that patients underwent chemotherapy (Massie 2004; Mitchell et al., 2011). Moreover, the percentage of males in the sample was less than that of females and results can be influenced by this. In fact, past studies showed that women report more distress than men due to anxiety and depression (Olliffe 2008; McLean 2009). For these reasons, this study needs replication to further examine the role of some medical aspects of cancer.

If confirmed by future research, results of this study would have implications in clinical practice. In literature there is confusion about what “psychological intervention” means in clinical practice. Starting from the relationship between metacognitions and negative emotions, “psychological intervention” based on the metacognitive approach (Wells, 2007, 2009) could have positive effects on patients undergoing chemotherapy.

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