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Doctoral Thesis

THE PSYCHOLOGICAL IMPACT OF THORACIC SURGERIES UPON PATIENTS

ABSTRACT

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CONTENT

Key words: coping, anxiety, depression, pain, thoracic surgery

INTRODUCTION

One of the most stressful moments of life is represented by the period of hospitalization. The patient's fear related to the surgical procedure generates stress; this non-specific adaptive response varies in intensity depending upon the character and personality of each patient. The subject of this doctoral thesis aims to study the interaction between depression, anxiety, predominant coping style, dyspnea and pain, and their resulting psychological impact on the thoracic surgery patient. The study offers strategies for patient evaluation, observation and swift categorisation into a certain coping style with bearing upon the postoperative evolution.

The success of the thoracic surgical treatment is conditioned by a complex psychological evaluation of the patient pre-operatively and post-operatively, with the help of an individualised psychotherapy hinged upon the predominant coping style revealed by means of specialised questionnaires.

Until now, it has been known that the surgical approach influences the duration of hospitalisation, the post-operative pain, as well as patient recovery depending on the evolutionary stages of the disease. The persistence of chest pain in some patients as well as the lack of implementation of a post-operative pulmonary rehabilitation program contribute to late socio-professional reinsertion, which in turn, engenders increased costs for health insurance companies.

Psychological rehabilitation in thoracic surgery, both pre-operatively and post-operatively, has a beneficial effect by increasing the quality of life due to the improvement of clinical symptoms.

A multidisciplinary team is the key to psychological rehabilitation in which each member of the team has well-defined duties and roles. From the pre-operative period, the designing and implementation of a psychological rehabilitation program is vital to the patient, so as to prevent the occurrence of pulmonary or psychological complications post-operatively.

GENERAL PART

There is evidence that many of the patients present pre-operative nervousness and anxiety states that are associated with high suffering, engendering slower post-

operative recovery. The fear of the unknown, data related to anesthesia, surgery, diagnosis and post-operative recovery, promote an increased level of psychological suffering in thoracic surgical pathology as well.

Pre-operative education is essential to providing good medical care. It allows catering to the information needs of patients and lessens the level of anxiety. These interventions are aimed at approaching the patient on a cognitive and emotional level, thus aiding the surgical procedure.

Personalised information based upon the patient's coping style comprises data related to the surgical procedure, post-operative recovery and treatment. Nevertheless, depending upon the patient's preferences, the type and amount of information provided will be tailored accordingly.

Cognitive-behavioral techniques offer strategies to reduce stress, anxiety and post-operative pain. The most common psychological interventions comprise relaxation techniques, individual or group counseling, hypnosis and cognitive-behavioural therapies. These interventions are focused on increasing the level of self-efficacy, cognitive restructuring and self-regulation - relaxation techniques (progressive muscle relaxation, breathing exercises and hypnosis).

The doctor-patient relationship must provide psycho-emotional stability in relation to: the disease, the surgical intervention and the subsequent therapeutic conduct. This must be founded upon mutual respect, trust in the therapeutic decisions made by the doctor and the exchange of information during patient consultation. The doctor must provide clear information that the patient can understand, and if required, he may establish a communication strategy with the support of a psychologist.

Depending upon the length of the incision and its anatomical site, the surgical approach is divided into several types: thoracoscopic approach (2-3 cm), cervicotomy (from 3 cm), mini-thoracotomy (3-7 cm), thoracotomy (over 7 cm), sternotomy (which can be partial or total).

Nowadays, the most common mental disorder is anxiety, a diagnosis that until 35 years ago was particularly seldom reported. The World Health Organization (WHO) estimates that the number of people suffering from anxiety is on the rise, becoming a commonly present disease in the contemporary world. Till today, there is no existence of a clear definition supported by all experts, of this complicated as well as multi-faceted condition. The American Psychological Association (APA) defines anxiety as "an intense emotional response caused by the recognition that a conflict is about to arise in consciousness". Some of the main clinical manifestations of anxiety can be:

headache, fatigue, hyperventilation, appetite and sleep disturbances, numbness, tremors, increased heart rate and palpitations.

Anxiety negatively influences patient recovery; for instance, the symptomatology of diabetes mellitus can be influenced by anxiety and/or depression.

The anxiety disorder is accompanied by various physical symptoms, behavioural changes, and panic attacks; which appear as the first of the symptoms impacting the body. Untreated anxiety has harmful effects upon the cardiovascular, respiratory and immune systems. A disturbance of the general state of the patient is manifested through the appearance of signs of fatigue, disruption of sleep patterns and response to threats (in our case, the illness and the imminent procedure), triggering an increased release of hormones and chemical mediators at cerebral level, in the so-called reaction of " fight or flight" response.

Depression is a common disease and worldwide affects 3.85% of the population, corresponding to approximately 280 million people suffering from depression. Depression varies with mood and different emotional responses throughout the day; it is in fact, a mood disorder. The person is hindered from leading a normal life from professional, social as well as familial perspectives.

Exposure of a subject to a large number of traumatic life events may give birth to depression. In fact, any profession that can create high levels of stress, constitutes a potential trigger for depression. Moreover, it has been found that people with chronic diseases have a higher risk of developing depression compared to those who do not suffer from such long-lasting conditions.

Depression presents with psychological manifestations (i.e: ideas related to death and suicide, loss of interest in usual activities, low self-esteem, lack of self-confidence, lack of concentration, negative expectations) as well as somatic manifestations (i.e: fatigue, loss of sexual desire, weight loss or loss, insomnia, psychomotor agitation or inhibition).

According to Lazarus and Folkman, coping is a bidirectional process, such that, when a person encounters a stressful situation, it is evaluated, generating an emotion; this is how emotion-focused and problem-focused coping are brought about. Finally, a new emotional quantification is produced, coping also having a role as a mediator in the emotion-situation-emotion relationship.

The choice of coping strategy is dependent upon personal characteristics. The individual self-evaluates when a stressful life situation arises, such that problem-

focused strategies and emotion-focused strategies stand closely related; in women, the result is usually emotion-centred.

Dyspnea, in fact, can be defined as a subjective experience of breathing discomfort; a source of significant fear and anxiety for patients.

Functioning as a distinctly important warning system for several different body systems in danger, dyspnea is experienced either by patients having high pulmonary vascular pressures (for instance, congestive heart failure), or by those with increased respiratory activity (asthma, COPD), or furthermore, by those suffering from oxygen transport anomalies and metabolic disorders.

The bio-psycho-social approach describes pain as a multi-dimensional, dynamic interaction between physiological, psychological and social factors that have bearing upon each other and result in chronic pain syndromes.

In medical literature, it is suggested that a more optimistic perspective positively influences pain; as a consequence, an optimistic patient tends to describe relatively lower levels of pain severity.

SPECIAL PART

PATIENTS, MATERIALS AND METHODS

We conducted a prospective study in the thoracic surgery department of the Municipal Clinical Emergency Hospital of Timişoara between November 2018 and November 2019. In this cross-sectional study, we examined 97 patients with thoracic surgical pathology. On the day of admission, patients were informed about the objectives and methods of the research and agreed to be enrolled in this study through written informed consent. Later on, all 97 patients underwent surgery.

From the patients' observation sheet, the following were noted: name, age, sex, region of origin (urban or rural), marital status, study level, occupation, living and working conditions (ex: smokers), admission date and discharge date (duration of hospital stay in days), complications, set of laboratory analyses. Moreover, the surgical approach as well as the later obtained anatomopathological results were also noted.

This study was divided into two stages:

1. In the first -pre-operative- stage, the 97 patients completed the following specialised questionnaires: demographic questionnaire, COPE questionnaire (Crasovan, Sava, 2013); the PHQ-9 questionnaire; the GAD-7 questionnaire; the CIRS questionnaire; the DSQ-60 questionnaire; the DAS questionnaire forms A and B; the CD-McGill pain questionnaire; the NPRS pain severity scale and the mMRC dyspnea scale.
2. In the second -post-operative- stage, that is, after a period of one month, we applied the same questionnaires similar to the first stage, but only 90 patients out of the 97 accepted to complete the specialised questionnaires.
   According to the anatomopathological result, we divided the group of patients (90) post-operatively into:

   I. Non-cancer (50 patients)
      - Benign tumours (17 patients)
      - Inflammatory diseases (33 patients)

   II. Cancer (40 patients)
      - Primary bronchopulmonary neoplasm (24 patients)
      - Current bronchopulmonary neoplasm and previous neoplasm (10 patients)
      - Current inflammatory lung diseases and neoplasm in the medical history (6 patients)

In the inclusion criteria we included the following patients:

- Patients who filled the informed consent form;
- Patients who were aware of the study procedures and were willing to sign and take part;
- Patients diagnosed by means of chest CT, who needed a planned thoracic surgical intervention of curative intention;
- Patients hospitalised at least one day prior to the surgical procedure;
- Patients over 18 years old and under 70 years old at the time of inclusion in the study.

We excluded patients according to the following criteria:

- Minor patients or over 70 years old;
- Patients unwilling to undergo surgery;
- Patients disinclined to participate in the study;
- Patients unable to comprehend what the study procedures entail;

- Patients diagnosed with stage IV broncho-pulmonary neoplasm;
- Thoracic surgical emergencies that could not be delayed;
- Patients having several comorbidities and lowered life expectancy;
- Patients who exhibited psychiatric disorders that could interfere with the research methods.

Patients who were diagnosed using other invasive methods were excluded from the study.

The exclusion criteria comprised diagnosing via:

- Biopsy by mediastinoscopy;
- Bronchial biopsy by fibrobronchoscopy;
- Adenopathic incisional/excisional biopsy;
- Transthoracic CT guided puncture;
- Positive cytology.

RESULTS

We analysed the questionnaires, with the demographic characteristics of the 90 patients. We observed that age was significantly higher in neoplastic patients.

Following data obtained with the COPE scale, we analysed the patients' scores and grouped them into three categories, depending on the dominant coping style they presented. Thus, they were divided into patients with problem-focused coping (n=37), emotion-focused coping (n=33) and social support-focused coping (n=20).

Coping scores have a normal distribution for the entire study group (Shapiro-Wilk test, $p>0.05$) and are represented by mean standard deviation: problem-centred coping (35.87±7.58), emotion-centred coping (34, 99±5.94) and social support-centred coping (32.40±6.78).

Regarding anxiety, we observed notable differences between people in the three categories, that is, between people with problem-focused coping, emotion-focused coping, and social support-focused coping. GAD-7 anxiety values are significantly increased in facing social status, as opposed to emotions and coping problems (Kruskal-Wallis, $p = 0.028$). Comparisons of coping styles also showed the following:

• GAD-7 anxiety values are non-significantly higher for problem-focused coping than for emotion-focused coping (Mann-Whitney, $p=0.644$).

• Problem-focused coping has significantly lower GAD-7 scores than social support-focused coping (Mann-Whitney, p=0.048).

• Emotion-centred coping shows significantly lower GAD-7 values than social support-centred coping (Mann-Whitney, p=0.026).

In the post-operative period, pain intensity measured with the NPRS was significantly increased for the social support-oriented coping style compared to the other two styles (Kruskal-Wallis, p = 0.022).

Upon comparing the three coping styles with each other, we notice that:

• NPRS pain scores are non-significantly lower for problem-focused coping compared to emotion-centred coping (Mann-Whitney, p=0.362).

• NPRS pain scores in problem-centred coping are significantly lower than in social support-oriented coping (Mann-Whitney, p=0.006).

• NPRS pain scores in emotion-focused coping are significantly lower than in social support-oriented coping (Mann-Whitney, p=0.042).

According to age, we divided the patients into 3 categories (under 35 years, between 35 and 65 years, and over 65 years). We correlated age with coping style, anxiety and pain intensity and observed that pain intensity increased significantly with age (Spearman's rho=0.256, p=0.015).

We investigated the 40 patients by comparing PHQ9 and GAD7 between women and men, both pre-operatively and at one month post-operatively. Pre-operatively, PHQ9 values were non-significantly increased in men (Mann-Whitney U Test, p = 0.861); however, they were significantly increased post-operatively (p = 0.049).

Pre-operatively, GAD7 values were non-significantly increased in males (Mann-Whitney U-test, p = 0.697), while, on the other hand, being significantly increased post-operatively (p = 0.042).

In addition, both pre-operatively and post-operatively, anxiety as well as depression were higher in men than in women, and these differences were notably significant post-operatively. Post-operatively, we correlated the 15 coping mechanisms with GAD7 and PHQ9 separately for males and females, noting that in males, depression was significantly positively correlated with mental disengagement, turning to instrumental social support, and seeking emotional social support.

Furthermore, anxiety was positively correlated with mental disengagement, denial, and seeking social emotional support.

In women, depression was significantly positively correlated with behavioral disengagement as well as denial. In fact, anxiety also showed a similar correlation with positive construal, behavioral disengagement, and use of social emotional support.

Considerable differences between the two sexes - in terms of the degree of use of coping mechanisms - existed only for humour and restraint, with a greater use of them by men. No significant differences were observed between the two sexes in relation to the other coping mechanisms assessed with the COPE scale, apart from humour and abstinence.

DISCUSSION

As it appears from this study, psychological intervention in thoracic surgery has a well-defined role. Even if there are specialised studies that confirm the advantages of psychotherapy in patients undergoing surgery in different specialties, this study completes the existing data in medical literature and thoroughly analyses the effects of the coping mechanism upon the patient.

The results of our study indicate that any surgical approach (thoracotomy, mini-thoracotomy or minimally invasive) generates post-operative pain of variable intensity depending on the adaptation mechanism. Pre-operative psychological assessment of patients should be done regardless of the type of coping. Our study showed that patients with social support-oriented coping had both a higher anxiety score and an increased intensity of post-surgical chest pain.

Our research indicates that the way subjects manage stress—that is, the primary coping style that they employ—influences both the intensity of anxiety and the intensity of pain they experience.

There were described situations in medical specialty literature in which different coping styles influenced pain in different analysed aspects. As a matter of fact, Gil et al. (1989) observed a key difference between patients with passive coping and active coping; patients presenting a passive coping style (catastrophising) stated a greater intensity and frequency of pain than patients with active coping (self-verbalization and ignoring painful sensations). Therefore, passive coping proves to be

maladaptive, while patients with active coping adapt better to painful situations and experience diminished pain intensity.

In this research, the intensity of anxiety varied according to the dominant coping style. In the cases we studied, the level of anxiety in patients with social support-directed coping significantly exceeded that found in the other two coping categories (problem-focused coping and emotion-focused coping).

There is extensive research showing that coping plays a significant role in managing anxiety.

In our study of neoplastic patients, anxiety (assessed by GAD 7) and depression (assessed by PHQ9) both pre-operatively and post-operatively, were found to be higher in males than in females; these differences being statistically significant even post-operatively ($p = 0.049$, for depression; $p = 0.042$, for anxiety).

Our result is converse to most existing studies on gender differences when it comes to anxiety and depression in cancer or surgery patients; they reported a significantly higher prevalence or intensity of anxiety and depression in women compared to men, regardless of neoplasm or surgery.

However, our results are consistent with Van't Spijker et al.'s findings in cancer patients, in which women were found to have lower rates of emotional distress (anxiety and depression) than men.

In our study, we estimate that anxiety and depression assessed in the patient group are strongly correlated with two major stressful events: cancer diagnosis and surgery.

Regarding coping in the non-clinical population, men are thought to typically use problem-focused or instrumental strategies to manage stressful events, while women are inclined to use methods aimed at modifying their emotional reactions to stressful circumstances.

Post-operative depression in men with neoplasms was correlated with coping style focused on social support, whilst post-operative anxiety was correlated with denial (coping mechanism) and with social and avoidant coping. In women, post-operative depression was correlated with the following coping mechanisms: active, denial and avoidant approach. Post-operative anxiety correlated with the following mechanisms: active, avoidant approach, social support and social-oriented coping.

In men, depression was significantly positively correlated with mental disengagement, using instrumental social support, and emotional social support. In addition, anxiety was also significantly positively correlated with mental disengagement, denial, and use of emotional social support.

In women, depression was significantly positively correlated with denial and behavioural disengagement, whilst anxiety was significantly positively correlated with behavioural disengagement, positive construal, and use of social emotional support.

Empirical research supports that the use of a particular coping style varies by gender. The use of a coping style is a reaction to stress and is a focal parameter that directly contributes to the pathogenesis of depression and anxiety in women.

The use of social-emotional support as a coping mechanism was significantly positively correlated with both depression and anxiety in men, while it was only correlated with anxiety in women. This is a method of facing the stressful situation (i.e: the surgical procedure) in which the individual is inclined to seek understanding, consideration or moral support from friends, relatives as well as colleagues, in an attempt to reduce suffering. The use of instrumental social support was also significantly positively associated with the level of depression in men; in this context, it denotes a tendency to seek advice, information, as well as material support.

CONCLUSION

The predominant coping style of the patients remains the same regardless of the operative moment (pre-operative or post-operative). The total post-operative COPE score is increased in women which means that they have a better defense mechanism as compared to men. Coping style influences the level of anxiety, depression and post-operative chest pain; these, in turn, have bearing upon the swiftness of post-operative recovery and socio-professional re-integration. We mention that the surgical approach does not influence post-operative pain and anxiety.

The most intense levels of anxiety were in patients exhibiting a coping style centred upon social support, whilst the lowest levels were noted in those with coping centred on emotion. Patients who presented coping focused on social support had a less adaptive coping mechanism than those with other types of coping; they tend to be more expressive in the detailed description of post-operative pain. We recommend greater attention focus upon patients who present a coping mechanism centred on social support. Last but not least, we also observed that the BMI value is directly proportional to the level of anxiety.

We created a prediction algorithm through which we highlighted the intensity of the impact of the coping style on thoracic surgery patients.

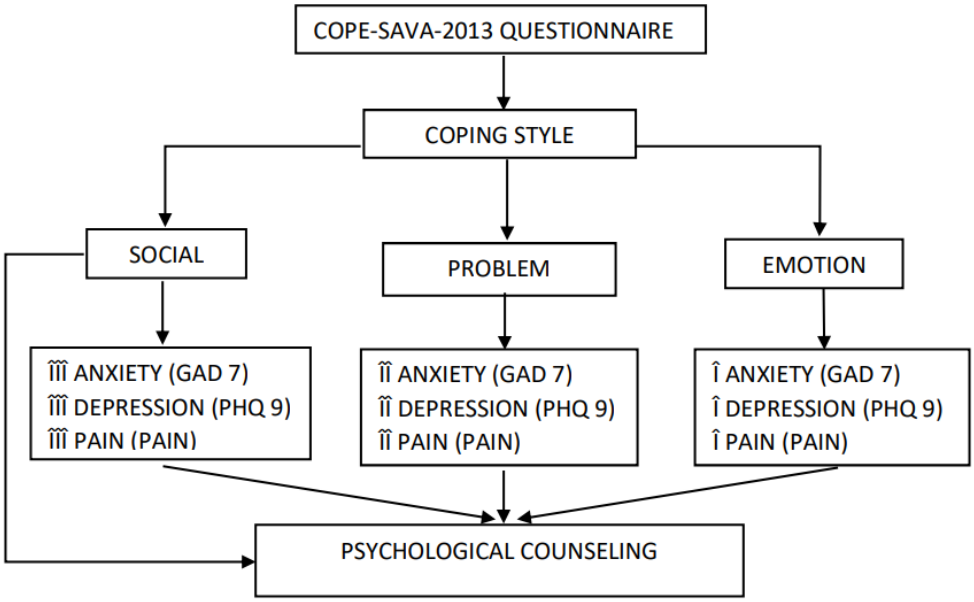

Figure 1. Prediction algorithm in the psychological counseling of patients with thoracic surgical pathology.

In fact, pre-operative depression was observed to be lower in those with partners. Furthermore, the degree of depression was in direct proportion to the BMI of the patient. Post-operatively, men tended to be more depressed than women, while depression was low in patients without re-intervention.

Patients from an urban environment had lesser pain intensity pre-operatively, as compared to those from rural regions. The intensity of pain increased with age; thus patients over 35 years of age complained of pain of greater intensity compared to those under 35.

Post-operative pain intensity was increased for patients with coping style focused on social support, compared to the other two coping styles (problem and emotion focused).

In men having neoplasms, both pre-operatively and post-operatively, depression and anxiety were higher as compared to women.

In terms of coping, men suffering from neoplasms typically use problem-focused or instrumental strategies to manage stressful events, while women are inclined to use methods aimed at modifying their emotional reactions to stressful circumstances.

Compared to women, men use humour and abstinence coping mechanisms more. We conclude that these two antagonistic mechanisms are characteristic of the two categories of people. The religious approach is the main coping mechanism used by both sexes without significant difference in this regard, such that all patients would potentially seek religious assistance. The consumption of substances as a coping mechanism was ranked last in both sexes in patient presenting neoplasms.

Post-operatively, the total COPE score decreased in patients- having neoplasms - with an emotional and social coping style, which signifies a decrease in the defense mechanism in these two coping styles; the psychological defense mechanism being stronger pre-operatively.