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*Identification of psychoemotional factors determining the therapeutic compliance of
psychosomatic patients*

PH.D. DISSERTATION SUMMARY

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List of abbreviations and symbols

Introduction

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General part

The percentage of patients with psychosomatic diseases is constantly increasing due to the increasing influence of stressful factors in their daily life. Psychosomatic diseases are complex diseases, which simultaneously affect functioning (in adequate parameters), of the body and also the patient's thinking and reasoning abilities.

In other words, psychosomatic disorder reflects the causal relationship between stressors and physical illness. At the same time, it should be noted that the psychosomatic disorder can manifest itself at three intensity levels: medium, major, and aggressive.

Over time, researchers have tried to define and outline the structure of the characteristics of patients with psychosomatic disorders and their impact on the disease progress in time.

Singh believes that the two-way approach to psychosomatic disorders contributes to their correct diagnosis. Also, it should be noted that psychosomatic disorders, by their nature, have physiological components that stem from the the patient's emotional state (Singh, 2013). Basically, psychosomatic disorders are characterized by physiological changes determined by emotional factors.

On the other hand, the psychosomatic approach is an interdisciplinary science that involves an interdisciplinary collaboration between several specialties of medicine and psychology in order to study the effects of social and psychological factors on the organic processes of the body and the well-being of people (Ponciano et al., 2020).

In other words, psychosomatic diseases are therefore determined by the difficulties of the body in adapting to changes related to the individual's internal and/or external environment (Denburg, Carbotte and Denburg, 1997).

Among the major causes associated with the onset of psychosomatic diseases, the psychoemotional trauma suffered by patients has a special role. Thus, due to the traumas suffered, future patients may develop a predisposition towards symptoms specific to other disorders: endocrine, gastrointestinal, cardiovascular, neoplastic, dermato-venereal, autoimmune diseases, etc. (Fink, 2016).

Somatic symptoms frequently encountered in patients suffering from psychosomatic disorders are: difficult expression of emotions, depression, chaotic lifestyle, addiction to prohibited substances (alcohol, drugs), history of childhood trauma, etc.

According D'Souza and Hooten (2021), psychosomatic disorder can be classified as a diagnosis in the following situations: physiological disorders at the level of which the evolution is affected by psychological suffering; pseudo neurological symptoms that have no apparent organic relation; stress and its effects on organ systems and their behavior; psychiatric disorders with strong physiological correlates.

The immune system can respond to certain specific phenomena perceived as threatening for a person in conditions where immunosuppression occurs. In this context, psychosomatic disorder represents a type of stress that precipitates a specific physiological reaction as a learned immunosuppression reaction. A relevant example is given by the situation where chronic anxiety can trigger the onset of cancer (Fernando, 2019).

Rubinstein believes that most psychosomatic patients go a long way towards discovering their correct diagnosis. Thus, they go through a series of consultations, with different medical specialties, during which symptoms specific to the psychosomatic disorder they suffer will onset (Rubinstein, 2015).

Researchers Fava, Cosci and Sonino (2016) mention that the medication used in the treatment of psychosomatic diseases can have a beneficial effect compared to the inappropriate prescription of psychotropic drugs in medical practice for clinical depressions.

The goal of psychosomatic therapy is to provide patients with a perspective regarding the interaction of psychosocial factors in relation to their somatic sufferings, in order to encourage patients to regain control over their own health, through self-management and necessary and beneficial behavioral changes (Wortman et al., 2019). Nisar and Srivastava (2018) appreciate that mental state impacts the body's organs through three interdependent components: the neural system, the immunological system and the hormonal system.

Approaching from a psychiatric point of view, psychosomatic disorders can be broken down - based on the Classification of Mental and Behavioral Disorders (ICD-10)-, according to the existence of a dysfunction for the affected tissue or organ (World Health Organization, 2021):

- psychological conditions that are determined by mental factors;
- psychological factors interdependent with the evolution of the disease.

Therefore, addressing psychosomatic disorders involves taking into account psychological and emotional states, the latter undeniably influencing the evolution of pathophysiological diseases (Sarno, 2006).

Addressing the implications of alexithymia in the psychosomatic symptomatology of mental and physical disorders, it can be ascertained that the negative events leading towards disruptions of affective regulation induce a background of cognitive and affective risk. More specifically, the implications, previously exposed, determine the relationship between mental processes and somatic events (Torrado, Eusébio, & Ouakinin, 2018). Specialist Rita Cerutti and her colleagues (2017) conducted a study on the relationships between somatic symptoms, alexithymia and functional impairment in school-age children. Researchers used a questionnaire that measures the level of alexithymia in children and demonstrated that there is a statistically significant correlation between somatic symptoms and alexithymia. Currently, however, there is a risk that the person suffering from psychosomatic illness is hindered by the social stigma assigned to psychosomatic illness. Thus, the person will be reluctant to seek specialized treatment.

Settineri and his collaborators (2019), in the study "Emotional Suppression and Oneiric Expression in Psychosomatic Disorders: Early Manifestations in Emerging Adulthood and Young Patients", demonstrated two aspects related to people with psychosomatic disorders: there are statistically significant inverse correlations between rational composition, repressive function, and illness denial. Thus, diminishing the level of rational judgment and suppressing feelings correspond to a high level of denial; Also, different psychosomatic syndromes have a significant and positive correlation with dream phenomena (this also includes pathologically diagnosed groups).

Thus, specialist Settineri and his collaborators (2019) recommend taking into account the analyzed particularities of participants' in the early phases of symptoms specific to psychosomatic disorders. In this way, a sufficiently conclusive psychotherapeutic index could be obtained in order to eliminate a possible crystallization as a case of a dysfunctional defense mechanism. This is beneficial in broadening ways of coping and managing the disease by the patient (Settineri et al., 2019). When the negative potential increases beyond the limit of human capacity, psychosomatic diseases are triggered. As examples of psychosomatic diseases Taheri and Bayyazi (2013) list: peptic ulcer (as a result of the inner projection of negative feelings); heart disease (as a result of agitation and worries); hypothyroidism (as a consequence of sadness and pain); ulcerative colitis – intestinal (as a result of internal conflicts). In this regard, psychosomatic manifestations caused or whose symptoms can be aggravated by mental or emotional problems are understood as psychosomatic conditions.

The concept of psycho-emotional status is collective and includes a number of psycho-emotional elements, such as (Maksimenkova et al., 2020): loneliness, depression and neurosis.

Through the lens of the evolutionary process, health and disease are respectively seen as adaptive responses (successful or unsuccessful) to the demands of the external environment. Thus, psychoemotional suffering generates and/or amplifies somatic symptoms. Social factors are indispensable for successful adaptation, while emotions are valid signaling means about the state of the organism and physiological responses to environmental challenges. Thus, the importance of a biopsychosocial model of health and disease arises (Dragoş and Tănăsescu, 2009).

The appearance of psycho-emotional states (embodied in neurosis, loneliness or depression), is largely due to a complex of triggering mechanism, including somatic diseases, psychological trauma, personality traits, psychological difficulties, the specifics of interpersonal interaction, (including in the virtual environment), or disturbances in the system of personal relationships (Bochaver et al., 2019).

Psychosomatic disorder is a condition in which psychological stress negatively affects physiological / somatic functioning. The psychosomatic symptom appears as a physiological concomitant of an emotional state (Alexander, 1965).

However, if the person exhibits persistent inhibited aggression (which he cannot openly express), the emotional state remains unchanged (although not expressed in overt behavior). Therefore, the physiological symptoms associated with anger as a emotional state still persist. Nevertheless, after a period of time, such a person becomes aware of a physiological dysfunction. Often, the same type of person may develop the specific physical signs and symptoms, but often deny or are unaware of the emotional state associated with symptoms.

Psychosomatic disorders can affect almost any part of the body, although they are usually found in systems that are not under voluntary control. Psychiatrist Franz Alexander and his colleagues at the Institute of Psychoanalysis in Chicago specified that certain personality traits and specific conflicts may trigger certain psychosomatic illnesses, although it is generally believed that the form a disorder takes is due to individual vulnerabilities (Alexander, 1965).

On the other hand, emotional stress can influence evolutions of preexisting diseases and in individuals predisposed can also precipitate diseases such as: cancer or diabetes (Alexander, 1965). Also, psychosomatic disorders arising as a result of stress manifestation can include (Alexander, 1965): hypertension, respiratory disorders, gastrointestinal disorders, migraines and tension

headaches, pelvic pain, impotence, frigidity, dermatitis and ulcers. Furthermore, Franz Alexander pointed out that patients suffering from psychosomatic diseases respond positively to a combination of drug therapy, psychoanalysis and behavioral therapy, and in less severe cases, patients can manage stress without drug treatment (Alexander, 1965).

The cognitive model of the disease, valid for all psychosomatic diseases, was created by Leventhal and his collaborators (1980) and is intended to structure the individual's beliefs about the disease on five levels, represented by:

- the identity of the disease;
- the triggering factors of the disease;
- timeline/development;
- the perception of the effects of the disease on a physical, social, emotional and economic level;
- the perception of the extent to which the disease is curable and manageable.

Psychosomatic disorders in patients with cardiovascular diseases are manifested as the appearance of mental disorders that echo the somatic suffering, at the level of the cardiovascular system. The development of atheroma plaque (both peripherally and cerebrally) as well as the decrease in cardiac output that has repercussions on cerebral flow in patients with heart failure can induce the process of chronic cerebral hypoxia. These are the causes for symptoms onset such as asthenia, fatigue, pain head and sleep disorders, which over time can lead to a decrease in cognitive performance such as (Suciu and Cristescu, 2017): attention, memory and learning.

For patients diagnosed with psychosomatic diseases (such as cardiovascular diseases), where psychological factors play an important role in triggering or aggravating these conditions, numerous studies have demonstrated that the cognitive representation of the disease is a significant predictor of the patient's recovery and social reintegration (Suciu and Cristescu, 2017).

The cardinal syndrome of rheumatic diseases is a painful restriction of movement. Both phenomena (movement restriction and movement pain), give psychosomatics a multitude of possible interpretations. The psychosomatics of rheumatic diseases has always been based on rheumatologically defined core syndromes such as rheumatoid arthritis, Bechterew's disease or psoriatic arthropathy (Eich et al., 2004).

According to field clinical studies, most patients diagnosed with rheumatoid arthritis also presented psychological problems (depression, trauma, etc.) and approximately one year before

the onset of the disease, these patients were strongly affected by psychological stress factors or family conflicts (Baker, 1982).

According to the psychosomatic theory regarding the immediate allergy sensitization process, the allergic systems are sensitized, the local defense function being deficient at the level of the mucous membranes of the respiratory tract. Approaching endocrinological psychosomatics, many types of psychological stress (both acute and chronic), have been shown to involve the hypothalamic-pituitary-adrenal axis.

Hontschik (1999) demonstrated, through three examples from everyday surgery practice, how psychosomatic thinking can change and enrich surgical practice through the prism of: indications, reflections on appendectomy, the operative-surgical area (the phenomenon of self-destructive behavior), experience in treatment in the case of osteomyelitis. Therefore, psychosomatics must be recognized as a way of thinking and integrated as such into surgery.

It is important to note that cancer is not necessarily associated with mental disorders. Thus, many survivors experience high levels of stress and anxiety associated with the fear that the oncological disease may reoccur, but also with a number of other psychological problems, including (Visser, 2013): body image disturbances, sexual dysfunction and loss of fertility. The researcher also mentions that uncertainty about how to properly interpret and treat symptoms often leads to (Visser, 2013): excessive worry, avoidance of symptom complaints or somatic vigilance.

Special part: Personal contributions

In the special part, are addressed the implications of diseases in changing the psychoemotional status of patients or people who had specific symptoms. Also, in this part, are presented the hypotheses and general objectives, as well as the general methodology of the study regarding the identification of psychoemotional factors determining the therapeutic compliance of psychosomatic patients. And last but not least, the conclusions, recommendations, and research limits are also included.

Working assumptions

Hypothesis 1: "Sociodemographic factors determine the presence of psychosomatic diseases."

Hypothesis 2: "Psycho-emotional factors determine the presence of psychosomatic diseases."

The purpose of the doctoral study

This study aims to quantify the relationship of interdependence between the determining psychoemotional factors and therapeutic compliance in the case of psychosomatic patients.

General Objectives

1. Describing the sociodemographic characteristics of patients diagnosed with psychosomatic diseases, enrolled in the study.
2. Correlational analysis between sociodemographic variables and the presence of psychosomatic diseases in patients enrolled in the study.
3. Verification of the validity of the hypothesis "Sociodemographic factors determine the presence of psychosomatic diseases".
4. Studying the sociodemographic characteristics of patients diagnosed with psychosomatic diseases, enrolled in the study.
5. Determination of existing correlations between psychoemotional variables and the presence of psychosomatic diseases in patients enrolled in the study.
6. Testing the validity of the hypothesis "Psycho-emotional factors determine the presence of psychosomatic diseases".
7. Evaluation of emotional intervention in therapeutic compliance in psychosomatic patients.

Methodology

Method

In order to carry out a statistically representative study, it is necessary to test and correct the existing extreme values and the database errors. Thus, to ensure the integrity and validity of the data, as well as the items of the questionnaire involved in the study, the statistical software SPSS v 23 was used.

Another step is to test the normality of the data using the Kolmogorov-Smirnov test. According to the test the data is normally distributed under conditions where the value associated with the p-value is greater than 0.05, i.e. the decision threshold.

Checking the internal consistency (using the Alpha Cronbach index) represents the next testing step. Internal consistency is assured by a positive correlation coefficient for the items in relation to the scale used.

Also, is subsequently analyzed the existing correlational situation between the determining factors (sociodemographic and psychoemotional) and the presence of psychosomatic diseases considered in the study. Testing the proposed hypotheses is another objective to be achieved.

Also, we calculate the probabilistic estimation of the occurrence for psychosomatic illness according to the manifestation of positive and negative emotions, but also according to childhood trauma. The artificial neural network Multy Layer Perceptron model is used.

The multilayer perceptron has in its composition an input layer (which has only the role of data distribution), hidden layers and an output layer. The connections between the layers in both cases are only unidirectional, thus being no reaction connections. Also, this type of artificial neural network is based on linear neurons in the output layer. Therefore, the calculation units are non-linear in the hidden layer.

On the other hand, the multilayer perceptron is trained through a supervised algorithm in making input-output mappings that estimate single variable or multivariable functions (Stancu and Constantin, 2014). We continued with the mediation analysis (Popa, 2015) that explains the intervention of the studied emotions in the relationship between the presence of diseases (as an independent variable) and therapeutic compliance (as a dependent variable). To estimate and test the mediation relationships, we used the PROCESS v3.5 macro developed by Andrew Hayes

(2019) with bootstrapping procedures (the number of samples is set to 1000 in order to calculate 95% confidence intervals).

Sampling instrument

The questionnaire designed to carry out the proposed study has the following structure:

The socio-demographic items allow the collection of information regarding: age, gender, last level of education completed, socio-professional category, profession, social responsibility, environment (urban/rural), domicile, monthly income, marital status and nationality. Using the sociodemographic items, a descriptive picture of the respondents involved in the study can be rendered.

The items for detecting the clinical diagnosis of the patient's were made according to the Clinical Guidelines approved by the Ministry of Health (Ministerul Sănătății, 2022) and taking into account the diseases presented in the doctoral thesis. At the same time, in the questionnaire used, there are diagnostic *items related to the patient's parents*. Thus, the patient is asked to specify the diseases suffered by his parents as well. The Adverse Childhood Experiences Assessment items are an adapted form of questions from the Adverse Childhood Experiences Questionnaire developed by psychiatrist Felitti and colleagues (Felitti et al., 1998).

Another component of the questionnaire used is given by: *items regarding the evaluation of emotions and items for the evaluation of the current emotional state*; based on an adapted form of the emotional assessment tool, called "Multidimensional emotion questionnaire" (MEQ) by Klonsky and his team (Klonsky et al., 2019).

The items on the assessment of experiences in adulthood represent an updated form of the "International Trauma Questionnaire (ITQ)", developed by Cloitre and his team (Cloitre et al., 2018).

For the assessment of *therapeutic compliance*, another component of the constructed questionnaire, items based on the elements of the "Drug Attitude Inventory-10 (DAI-10)", in the updated form by Aydin and his collaborators (Aydin et al. , 2017).

Addressing the items *regarding the evaluation of the benefit/effort/time ratio in therapeutic compliance*, the items regarding the communication and the relationship with the attending physician, but also those related to the evaluation of satisfaction with the treatment, are based on the elements related to the evaluation tool " Topical Therapy Adherence Questionnaire (TTAQ)" (Zschocke et al., 2014).

The last component of the questionnaire, consisting of *items regarding the positive/negative emotional history* before and after the start of treatment, aims to determine: the state of health, the frequency of positive emotions and the frequency of negative emotions (before the triggering event, between the trigger event and treatment, and after re-evaluation).

To validate the items, the Cronbach's Alpha test was used. As its value is $0.881 > 0.7$, the significant validity of the items used is thus established.

Conclusions and personal contributions

Following the description of the sociodemographic characteristics of the patients diagnosed with psychosomatic diseases, enrolled in the study, the following characteristics were observed:

- The average age of male patients is 2% higher than the average age associated with female participants.
- In the case of female participants, only 9.4% are retired, while in the case of male participants, 10.1% of them are retired.
- 15.2% of male participants and 21.6% of female participants come from rural areas.
- The subset of female participants is characterized by significant percentages for the following age categories: between 35 and 45 years, respectively, between 45 and 55 years.
- At the level of the subgroup related to female participants, the lowest share (7.9%) is given by patients over 65 years of age, while in the subgroup related to male participants, the lowest share (7.6%) is given by patients aged between 55 and 65 years.
- In the case of the subgroup of female patients, the highest percentage (45.3%) is given by the category of those with the civil status of "married". The same behavior can be found in the subgroup of male participants, the percentage being 49.4%. The category associated with the status of "Widow" is represented by the lowest percentage values, both in the case of the subgroup of female patients (5.0%) and in the case of the subgroup of male patients (1.3%).
- The highest percentage value for patients in both subgroups (female and male) is associated with those who "have no children" (54.7% for the subgroup of female patients and 60.8% for the subgroup of male patients).

- However, the lowest percentage value for patients from both subgroups (female and male) is associated with those who "have 3 or more dependent children" (4.3% for the subgroup of female patients and 3.8% for the subgroup of male patients).
- The highest percentage value for patients in both subgroups (female and male) is associated with those who have "University Education" (39.6% for the female patient subgroup and 31.6% for the male patient subgroup).
- The lowest percentage value for patients in the subgroup of female participants is the one associated with those who are "without education" (0.7%). However, for the subgroup of male participants, the minimum percentage value is the one associated with those with "High school studies".
- For the category of those with "Postgraduate Studies", the percentage value related to the subgroup of female participants is 11.7% higher than the percentage value related to the subgroup of male participants.
- In the case of the subgroup of female participants, the highest percentage is given by the category of those who work in the field of "Services" (27.3%), followed by those who work in the field of "Education". Also for the subgroup of female participants, the lowest percentage is associated with the category of those who work in the legal field (2.2%). For the subgroup of male participants, the highest percentage value is the one related to the "Services" field (40.5%), and the lowest percentage value is the one associated with the "Legal" field (1.3%).
- Most of the participants in the female subgroup have net incomes in the range "Between 1524 and 3000 lei" (34.5%), and for the male subgroup, the highest percentage value is associated with the range "Between 3000 and 5000 lei".
- As results of the correlational analysis between the sociodemographic variables and the presence of psychosomatic diseases in the patients enrolled in the study, the following important aspects should be mentioned:
 - The negative correlation between the level of completed studies and the presence of diseases: rheumatic, neurological, congenital, but also cancer is also present in the specialized literature (Matingwina, 2018).
 - At the level of the subgroup of female participants, the negative correlation between the level of completed studies and the presence of diseases: rheumatic, neurological, congenital,

but also cancer can be explained by the fact that these diseases impact the possibility of progressing towards the next level of study.

- The negative values of the correlations between the field of activity and the presence of diseases: cardiological, hepatic, rheumatic and skeletal are also presented in the specialized literature (Cillekens et al., 2022).
- So, it can be said that, at the level of the subgroup of female participants, the negative correlation between the field of activity and the presence of diseases: cardiological, hepatic, rheumatic and skeletal is explained by the fact that the risks and stress in demanding fields lead to triggering comorbidities.
- In the case of the positive correlation between the environment of origin and the presence of respiratory disease there is a wide range of scientific studies, Wang and his collaborators developing one of the most recent researches (Wang et al., 2021).
- Female participants from the urban environment are more vulnerable than those from the rural environment in terms of respiratory comorbidities. In another venue of research, the negative correlation between marital status and occupational diseases reveals that a failure in terms of marital status (i.e. divorce), can favor the onset of occupational diseases, a fact also addressed in the specialized literature (Johar et al., 2020).
- The negative correlation between education level and the presence of occupational disease is also present in the specialized literature (Andrejiova et al., 2021). At the level of the subgroup of male participants, the negative correlation between education level and the presence of occupational disease impacts the possibility of progressing in completing the next level of study.
- Also, the stress caused by the desire to advance professionally, through the completion of advanced education, may increase the possibility of triggering a liver disease among male participants.
- Addressing the negative correlation between the place of origin and the presence of diabetes among male participants, it can be said that reducing the risks of migration from the rural to the urban environment favors the probability of having diabetes. The correlation between the place of origin and the presence of diabetes was also studied by researchers (Dendup et al., 2018).

- Among the male participants, the negative correlation between marital status and occupational diseases reveals that a failure in terms of marital status (i.e. divorce), can favor the onset of occupational diseases, a fact also addressed in the specialized literature (Johar et al., 2020).

As a result of testing the validity of the hypothesis: "Sociodemographic factors determine the presence of psychosomatic diseases", **it can be concluded that it is statistically valid.**

As a consequence of the study of psychoemotional characteristics in patients diagnosed with psychosomatic diseases, the following conclusions were drawn:

- Less than half of the number of female participants (41%) has a null ACE ("Adverse Childhood Experiences") score. Worryingly, the remaining 59% of the subset of female participants experienced at least one trauma, that is, at least one adverse childhood experience.
- 45.6% of the subgroup of male participants suffered at least one trauma (i.e. at least one adverse experience in childhood). Thus, female participants are more exposed to trauma than male participants.
- The proportion of female participants who have at least eight adverse childhood experiences (1.4%), respectively the proportion of male participants who have at least eight adverse childhood experiences (1.3%), are very close in value.
- Both in the subgroup of female participants and in the male subgroup, negative emotion is predominant. Negative emotions can therefore be a determining factor in the presence of psychosomatic diseases. Based on these, individuals may develop a series of symptoms that change the functioning mechanism of the organs, increasing the risk of psychosomatic illness.
- Major proportions of the case of "Relationship disturbances" among participants from both subgroups are: 69.8% for female participants, respectively 84.8% for male participants.
- Thus, the percentage data for the "Affective disorder" case, the proportion is higher for the subgroup of female participants (25.9%) than for the subgroup of male participants (15.2%). It should be noted that in the subgroup of male participants there is no case characterized by "Low self-esteem".

- But there is 4.3% of the total cases is represented by "Low self-esteem" in the subgroup of female participants. This proportion is also due to the high number of cases exposed to trauma among female participants.
- The percentage of male participants who feel threatened is higher compared to the proportion of female participants who feel threatened. On the other hand, the percentage data for the "Avoidant" and "Reexperimental" cases are higher for the subgroup of female participants (14.4% and 10.8%, respectively) than for the subgroup of male participants (8.9%, respectively 5.0%).
- For the "Disturbance in relationships" case, the following percentages were obtained among participants: 69.8% for female participants, respectively 84.8% for male participants.
- The positive emotion "Joy" is represented by the highest proportion, both for female participants (38.1%) and for male participants (27.8%). Also, male participants carry more "Gratitude" (25.3%) compared to female participants (19.4%).
- The highest percentage values for the present negative emotion are concentrated around the case of "Worry" for both participants subgroups (28.1% for the subgroup of female participants, respectively 25.3% for the subgroup of males).
- On the other hand, the structural number of cases characterized by the negative emotion "Agitation" for the subgroup of male participants (15.2%) is double compared to the number of cases for the subgroup of female participants (7.9%).

As results of determining correlations between the psychoemotional variables and the presence of psychosomatic diseases in the patients enrolled in the study, the following aspects were highlighted:

- The negative correlation between the level of completed studies and the presence of diseases: rheumatic, neurological, congenital, but also cancer is also present in the specialized literature (Matingwina, 2018).
- ACE score increases the risk of kidney disease (Pearson correlation coefficient is 0.202). In other words, in female participants if the ACE Score increases by 1%, then the risk of kidney disease increases by 20.2%. The ACE score also increases the risk of mental illness (Pearson correlation coefficient is 0.389). In other words, in female participants if the Score increases by 1% then the risk of mental illness increases by 38.9%. Similarly, the ACE

Score also increases the risk of any psychosomatic illness considered in the study (Pearson correlation coefficient is 0.209). Thus, the ACE Score increases by 1%, then the risk of any psychosomatic disease considered in the study increases by 20.9% among female participants.

- In terms of dominant emotions, both in the subgroup of female participants and in the subgroup of male participants, negative emotion are predominant. Negative emotion can therefore be a determining factor for the presence of psychosomatic diseases. Based on these, the individual may develop a series of symptoms that change the functioning mechanism of the organs, increasing the risk of psychosomatic illness.
- The negative correlation between positive emotions before the trigger event and the risk of vascular disease, demonstrates the role of positive emotions in decreasing the risk of vascular disease in female participants. This benefit regarding the intensity of positive emotions on ailments is also addressed by the literature (Ma, Li, & Feng, 2015). Similarly, the benefit of positive emotions before the trigger event is also reflected in the decreased risk of diabetes, skeletal disease and digestive disease amid female participants.
- Addressing positive emotions, between the triggering event and treatment (in relation to the presence of diseases such as: skeletal, hematological, vascular, cancer), it is worth appreciating the existing benefit of positive emotions among female participants. On the other hand, positive emotions, after the re-evaluation and the second (following) treatment(s) also have a beneficial role, which is reflected by the decrease in the risk of diabetes and digestive disease amid female participants.
- In other words, in female participants if the intensity of negative emotion between the trigger event and the treatment increases by 1%, then the risk of neurological disease increases by 18.4%. Increasing the intensity of negative emotion after (first) treatment increases by 1% increases the risk of mental illness increases by 24.5% among female participants. Similarly, negative emotions after re-evaluation and second (subsequent) treatment(s) increase the risk of developing mental illness (Pearson correlation coefficient is 0.174).
- The negative value of the correlation between positive emotions before the triggering event (-0.275) and the risk of endocrinological disease, demonstrates the benefits of positive emotions in reducing the risk of endocrinological disease, among male participants. In

other words, if the intensity of positive emotions increases by 1%, then the risk of developing an endocrinological disease decreases by 27.5%.

- Similarly, the benefit of positive emotions before the trigger event is also reflected in the decreased risk of skeletal disease and hematological disease, for the subgroup of male participants. Also, positive emotions after re-evaluation and the second (following) treatment(s) decrease the risk of diabetes (with the Pearson correlation coefficient of -0.267), but also of hematological disease (the Pearson correlation coefficient is -0.259), amidst male participants.

As the p-value associated with the model (which estimates the impact of psychoemotional factors on the presence of psychosomatic diseases), is $0.001 < 0.05$, it can be concluded that the hypothesis "Psychoemotional factors determine the presence of psychosomatic diseases" is **statistically valid**.

The conclusions based upon the characteristics of therapeutic compliance in patients diagnosed with psychosomatic diseases are the following:

- 63.3% of all female participants responded positively to therapeutic compliance; the remaining percentage (36.7%) of all female participants is not compliant. On the other hand, 72.2% of the total male participants responded positively to therapeutic compliance, and the remaining percentage (27.8%) of the total male participants are not compliant.
- Approximately 50.4% of the total female participants consider the effort/time benefit ratio in compliance as unfavorable, while the remaining percentage (49.6%) of the total female participants consider the effort/time benefit ratio in compliance as favorable. Also, 45.6% of all male participants consider the effort/time benefit ratio in compliance as unfavorable, while the remaining percentage (54.4%) of male participants consider the effort/time benefit ratio in compliance as being favorable.
- In other words, 48.2% of all female participants consider the treatment to be ineffective, and 38.1% of all female participants consider the treatment to be of acceptable effectiveness. However, only 6.5% of all female participants consider the treatment to be highly effective. Also, 44.3% of all male participants consider the treatment to be ineffective, while 46.8% of all male participants consider the treatment to be of acceptable effectiveness. It should be noted that only 5.1% of all male participants consider the treatment to be highly effective.

- Approximately 46% of all female participants consider the doctor-patient relationship to be unsatisfactory, and 33.1% of all female participants consider the doctor-patient relationship to be satisfactory. The percentage of female participants who consider the doctor-patient relationship to be very good is 20.9%. Thus, 32.9% of all male participants consider the doctor-patient relationship to be unsatisfactory, and 46.8% of all male participants consider the doctor-patient relationship to be satisfactory. The lowest percentage obtained is the percentage of male participants who consider the doctor-patient relationship to be very good (20.3%).

The correlational analysis between therapeutic compliance and the presence of psychosomatic diseases in the patients enrolled in the study has highlighted the following aspects:

- The most statistically significant correlation value is the one that describes the link between the therapeutic compliance score and mental illnesses, with a value of -0.198 ($p\text{-value } 0.019 < 0.05$). Therefore, for a 1% increase in the compliance score, the risk of the presence of mental illnesses decreases by 19.8%. This result has also been demonstrated in recent literature (Martin et al., 2021)
- For the subgroup of male participants, the most statistically significant correlation value is the one that describes the link between the therapeutic compliance score and digestive diseases, with a value of -0.293 ($p\text{-value } 0.009 < 0.05$). Hence, for a 1% increase in compliance score, the risk for a digestive disease decreases by 29.3%. The correlation between digestive disease and therapeutic compliance has also been addressed by recent literature (Lasa et al., 2020).

The conclusions regarding the evaluation of the intervention concerning emotions and emotional states for therapeutic compliance in psychosomatic patients are:

- The emotion "Sadness" effectively mediates the link between the presence of cancer diseases and Therapeutic Compliance. It is also interesting that this link has also been addressed in the recent literature (Nilssen et al., 2022). On the other hand, positive emotions after treatment effectively mediates the link between the presence of cancer and therapeutic compliance. This link has also been addressed in the recent literature (Xu et al., 2022).
- Also, the indirect effect of the presence of liver diseases on Therapeutic Compliance through the mediator (represented by the emotion "Sadness"), is statistically significant. The emotion "Sadness" effectively mediates the link between the presence of liver diseases and

therapeutic compliance. The relationship, previously described, has also been addressed in recent literature (Fu et al., 2022).

- Addressing the total effect of the presence of neurological diseases on therapeutic compliance, this effect is statistically significant ($p < 0.05$). On the other hand, the direct effect of the presence of neurological diseases on Therapeutic Compliance is also statistically significant ($p < 0.05$). The indirect effect of the presence of neurological diseases on Therapeutic Compliance through the mediator (represented by the emotion "Sadness"), is statistically significant. Therefore, it can be concluded that the emotion "Sadness" effectively mediates the link between the presence of neurological diseases and Therapeutic Compliance. Recent literature includes a different approach to this relationship (Franke et al., 2021).
- The indirect effect depicted by the presence of somatoform disorders on Therapeutic Compliance through the mediator, (represented by the emotion "Sadness"), is statistically significant. Therefore, the emotion "Sadness" effectively mediates the link between the presence of somatoform disorders and therapeutic compliance. It is worth noting that this link has also been addressed in the recent literature (Agarwal et al., 2020).
- Analyzing the indirect effect of the presence of mental illnesses on Therapeutic Compliance through the mediator (represented by the positive emotion after the first treatment), it is statistically significant. Thus, positive emotion after the first treatment effectively mediates the link between the presence of mental illness and therapeutic compliance. It is worth noting that this link has also been addressed in recent specialized literature (Forma et al., 2021).

As a final conclusion, the study carried out in this Ph.D. dissertation, showed the importance of both sociodemographic and psychoemotional factors in the therapeutic compliance of psychosomatic patients.

Recommendations

For a more extensive and strict analysis, for future studies it is recommended that as many participants as possible to be included in the sample volume. Secondly, in order to describe the interdependencies between emotions, disease and therapeutic compliance as close as possible to "reality", it is recommended to include other variables such as: periodic results of some medical tests (routine and/or specific), the results obtained through exposure to various emotional stimuli, the results of some personality tests, variables regarding family and living conditions, etc.

At the level of a future larger study, the involvement of doctors with expertise in: family medicine, dermatology, oncology, psychiatry, cardiology, gastroenterology, etc. is recommended for the early detection of people at high risk of developing diseases/disorders, in the presence of somatic comorbidities.

Research limitations

In the doctoral thesis, the type of cross-sectional design in the absence of causal inferences represents the main study limitation. Therefore, the main constrain exists in basing the existing links between predictor type variables and criterion variables on the basis of specialized literature in the field.

On the other hand, other limits of the research are:

- ❖ the lack of periodic medical laboratory analyses inclusion,
- ❖ taking into consideration other traumas that can favor the development of a psychosomatic illness, such as: abortion, suicide attempts, bullying, etc.

And last but not least, another limit is given by the non-consideration of other control variables such as personality variables. If these variables were included in the study, other statistical inferences can be found that explain the behavior of psychosomatic patients.

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