

Psychological Resilience and Immunity

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Published Date: April 15, 2015

ABSTRACT

Resilience is the capacity of individuals to respond positively even after having experienced situations of stress, such as trauma, diseases and other adversities, and also learn to come out of these events stronger than they were before. Resilience has been of great interest in the field of health, since its close relationship with mental health has been observed. Vulnerability includes physical and psychological components, with biologic vulnerability concerning a hypersensitivity of the limbic system, considered the neural substance of emotions, with alteration of the hypothalamo-hypophyseal-adrenal (HHA) axis. There is an association between psychiatric and physical disease, with depression being from 5 to 10 times greater in individuals who are physically ill. The comorbidity between psychiatric and physical disease aggravates the prognosis and makes the treatment and recovery of the patient difficult. Depression and stress are frequently confused due to hyperactivity of the hypothalamo-hypophyseal-adrenal (HHA) axis, common to both, leading to strong impact in the immunological capacity of individuals. In this chapter, a narrative review is made of the concepts and researches that are articulated with the scenario of resilience and health, in addition to offering an approach to resilience at the interface with

chronic disease, depression, anxiety and stress. Lastly, an approach is made to the question of resilience and need to develop strategies to improving resilience in the field of health.

Content: 1. Introduction; 2. Resilience and Factors of Risk and Protection; 3. Resilience and Health; 4. Depression and Chronic Disease; 5. Depression and Anxiety Disorder; 6. Trauma and Stress; 7. Resilience and Chronic Disease; 8. Measuring Resilience; 9. Emotional Aspects and Immune Function; 10. Conclusion.

Keywords: Resilience; Depression; Anxiety; Trauma and Stress; Immunity; Emotional Aspect.

INTRODUCTION

Resilience is the human being's capacity to recover from the experience of traumatic events, and to learn to come out of these events stronger than they were before them. Over the last few years, resilience has been the focus of different studies. It is a phenomenon common among persons who have faced adverse experiences and concerns the adaptive processes of the human being [1,2].

Initially, the study of resilience was proposed by the physicist, with one of its precursors being the English scientist Thomas Young who, in 1807, considering tension and compression, introduced the notion of the modulus of elasticity for the first time. Young described experiment about the tension and compression of bars, seeking a relationship between the force that was applied to a body and the deformation this force produced. Said in another way, resilience concerns the capacity of a material to recover its previous state, after having gone through some type of deformation [3].

This construct was incorporated into psychological science, especially the positive psychology, which investigates the potentially healthy aspects of human beings, differing from traditional psychology and its emphasis on psychopathological aspects.

Wagnild and Young (2009) identified and described five essential characteristics of RS: (1) self-confidence, belief in oneself and in one's capacity, (2) perseverance, the act of persisting in spite of adversities (3) equanimity, balance and harmony in the evaluation one makes of the experiences lived through, (4) have a purpose in life (5) feeling of freedom [4].

Resilience has been identified as a phenomenon of healthy life because it studies in some way tries to explain the process of overcoming, which in some persons, even in situations of social, economic and psychological adversity, are able to survive and achieve a certain well-being, while others do not [3,5]. Many of these persons are exposed to some type of violence or situation that threatens their life or that of their families at some time in their lives. Many times, they are confronted with losses of their relatives and friends. Some react with profound stress from which they are unable to recover, while others suffer less, and in a short period of time, they are capable of recovering. Others begin to present problems of health, concentration, or difficulty in feeling pleasure in life in their habitual manner [6]. This diversity is believed to arise not only from the

biologic constitution and environment, but also from the mechanism of perception of the world around one. This mechanism would be acquired due to the parental lifestyle during development and would accentuate a possible biologic sensitivity [7-9].

Resilience arises from protective processes that are related to four main functions: (1) reduce the impact of risks, (2) reduce the negative chain reactions that follow adversities (3) establish and maintain self-esteem and self-efficacy (4) create opportunities to revert the damaging effects (7) [10].

It does not concern being invulnerable to stress, or only returning to the state one was in before the trauma or damage, resilience also refers to the capacity of finding new meaning and constructing new pathways in the face of adversity [5,11].

Vulnerability includes physical and psychological components, with biologic vulnerability concerning a hypersensitivity of the limbic system, considered the neural substance of emotions, with alteration of the hypothalamo-hypophyseal-adrenal (HHA) axis and its relations with stress and depression [12,13].

The HHA is the main system responsible for the response of a body to a stressful stimulus. Many patients with depression present increased concentrations of cortisol (the endogenous glycocorticoid in humans) in plasma, urine, cerebrospinal liquid (CSL), an exaggerated cortisol response to the Adrenocorticotrophic Hormone (ACTH), and an increase in the hypophysis and adrenal glands, which demonstrates the association between depression and stress. However, not all patients with depression present these changes.

Some researchers believe that depression may be a symptom of pathologic stress, due to the reactivity of the HHA axis, which is also one of the stress axes, which sometimes makes the differential diagnosis between stress and depression difficult. When the need for adaptation exceeds the internal resources of the person, the condition of stress develops to the phase of near exhaustion, and afterwards to exhaustion, when depression generally arises.

Hypercortisolemia in some cases of patients with depression depends on the type, severity of the disease, genotype, history of trauma during childhood and on resilience. These factors determine aendophenotype vulnerable to depression [14].

RESILIENCE AND FACTORS OF RISK AND PROTECTION

Resilience involves the dynamic understanding of the so called factors of risk and protection. The risk factors are those events that increase the probability of the individual's presenting physical, psychological and social problems. They are individual or environmental obstacles whose presence is harmful to childhood development. According to Pesce and collaborators 2004, "risk" must be seen as a process, and variables such as the number of risk factors to which the child was exposed, duration of this exposure, and the time and context of exposure must be considered [15]. Whereas the protective factors are those that change or improve responses to

the situation of maladaptation (dispositional attributes of persons, affective ties in the family context and other contexts, and the social support system) [5,16].

To Brooks (1994) and Emery and Forehand (1996) the factors of protection may be divided into three categories: Individual factors (positive self-esteem, self-control, independence, affectionate and flexible temperament), family factors (cohesion, stability, mutual respect and support) and those related to support/backing offered by the environment (good relationship with friends, teachers and other significant persons that may offer a safe reference to make one feel loved). The interaction of these factors in different context, with the peculiarities of individuals themselves, may result in skills for coping with adversities [17,18].

Within this dynamic perspective a person may be resilient in the face of one situation, and not be so at another time, with this being capable of being changed depending on the circumstances and the combination of two or more stressors increasing the impact of other stressors present on the individual [3,10,19].

In this chapter, resilience refers to the capacity of adaptation in the face of situations of diseases and stress generating situations associated with this condition.

RESILIENCE AND HEALTH

There is growing interest in the influence of resilience on health and health promotion. Resilience was identified by the Committee on Future Direction for Behavioral and Social Sciences as a research priority for the National Institutes of Health [20]. The Committee considered the importance of the psychological and behavioral processes in the etiology of disease, well-being and health promotion [21]. The Medical Research Council and The Economic and Social research Council in the UK consider it an important factor for lifelong health and well-being [22].

Resilience is intimately related to mental health and is considered an important component for psychosocial adjustment [23]. There is an association between some psychiatric diseases such as depression and anxiety, and physical diseases with percentages ranging from 0 to 70% [24,25]. Depression is 5 to 10 times greater in individuals who are physically ill [26]. The comorbidity between psychiatric and physical disease aggravates the prognosis and makes the treatment and recovery of the individual difficult.

There is a tenuous line separating physical disease from major depression, as shown in the Stage 1 study for the treatment of neoplasms with recombining cytokines. Patients exposed to these cytokines develop symptoms very similar to those of major depression [27]. A body of evidence has pointed out the activation of proinflammatory cytokines that follows the administration of interferon alpha in the treatment of neoplasms and infectious diseases such as Hepatitis C [28,29]. Activation of proinflammatory cytokines (TNF-alpha, IL-1 and IL-6) occurs in clinical conditions such as autoimmune diseases, neoplasms and infections. [28]. The action of these cytokines on the central nervous system (SNC) would probably be due to induce changes in

behavior that lead to symptomatological similarities to those of condition of depression. Only due to being ill, a person may present with fatigue, loss of appetite, loss of pleasure, social isolation, changes in weight and sleep patterns, reduction in libido [30], which is frequently called “sick person’s behavior”, and makes depression an under- diagnosed condition in these situations.

DEPRESSION AND CHRONIC DISEASE

The association between depression and physical disease or non psychiatric diseases is a relevant, complex association that compromises persons presenting with this association in different ways. It may worsen the clinical diagnosis, and interfere in the recovery of patients, in addition to harming their adhesion to treatment, and have a direct effect on the immunological capacity of individuals [31-33]. It becomes more difficult to identify the depressive condition and makes the depressive condition more resistant to therapeutic interventions.

Depression assumes a fundamental role in the etiology, course and response of patients to the treatment of chronic disease [33].

Epidemiological studies have shown that among patients with diverse clinical diseases, of those who presented depressive symptoms, only a third of these cases have been diagnosed by doctors, and of these only 10 to 30% received adequate treatment [34]. Depressive disorder is an overload that precipitates the chronic disease, and the chronic disease exacerbates the symptoms of depression. Depression has been recognized as being of growing importance in public health, and it has been estimated that in 2020 it would be ranked the second disease, falling behind cardiac diseases only, which is of greater concern globally, due to leading to harm to patients’ quality of life [34]. Depressive disorders are the most prevalent psychiatric diagnostic group in the general hospital. Depression may increase the time of hospitalization [35], morbidity in the post-operative period [36] and mortality after infarction of the myocardium [37].

Botega (2006) has considered some of the challenges that depressive disorders present to doctors who work in general hospitals [38]:

- To recognize depression as something “additional”, to the patient’s clinical condition.
- To determine its cause, paying attention to the depressive potential of some medications and diseases.
- To indicate adequate treatment, considering the nuances of the clinical condition, indications, contraindications and interaction of antidepressive medications those used for other diseases.

Moreover, according to Botega, the depression of the patient in the clinic differs from that described in patients in psychiatric services from the following aspects [38]:

- Greater importance of stress in triggering and in the severity of depression. Among

the main stressing factors, there are: severity of the clinical disease, incapacity, pain, discomfort and impact of the diagnosis [39-41].

- Lower incidence of mood disorders in family members, when compared with patients that present mood disorders alone [42].
- There is greater difficulty in diagnosis due to the confounding factors between the depressive symptoms and those of the clinical disease.
- Particularity of treatment, with greater risk of medicamentous interactions and good response to psychostimulant medications [43].

The association between depressive disorder and the other clinical condition may occur under the following conditions:

Reaction of Adjustment to Depressive Mood

Considered a partial syndrome of a specific mood disorder, between the normal and the major depressive disorder, corresponds to symptoms of an undifferentiated nature, with excessive worries, anxiety, depression and insomnia. These symptoms improve with psychological support.

Secondary Depression

Occurs due to physiopathological alterations resulting from a clinical condition. Depressive disorder presents itself irrespective of subjective questions, or the impact of physical transformations resulting from becoming ill. For example: Depression that occurs due to CVA.

Medication-Induced Depressive Disorder

Reserpine, Anabolic Steroids and Corticosteroids are drugs most frequently associated with depressive manifestation, because they directly or indirectly interfere in neurotransmission and neuronal physiology leading to depressive symptoms [44].

Depressive Episode

The major depressive episode may be aggravated or triggered by disease. In this case it does not concern adjustment to the crisis of becoming ill, and it is not due to the use of medications.

It concerns a disease or triggering of a depressive disorder of the patient. Stress contributes to the manifestation of a pre-existent or latent pathology.

Medical Condition Triggered or Aggravated by Depressive Disorder

Depressive disorder, in addition to other risk factors (cholesterol, hypertension, smoking) may trigger an acute infarction of the myocardium. An increase in sympathetic tonus and reduction in the variability of cardiac frequency are factors associated with depression, which may increase the risk of infarction. In the field of chronic pain, depression is known to lead to pain (and pain leads to depression). Whereas the medical condition may also occur concomitantly, without there

being an association, from the clinical point of view, between the two.

Table 1: Diseases and medications that may cause depression.

Cerebrovascular disease	Deficiencies: folate, B2, B12
Frontal tumors	Electrolytic imbalance
Epilepsy (mainly of the temporal lobe)	Wilson's Disease
Huntington's Disease	Chronic pain
Parkinson's Disease	Acute Infarction of the Myocardium
Alzheimer's Disease	Hepatic Insufficiency
Multiple Sclerosis	Chronic renal insufficiency
Progressive supranuclear palsy	Heavy metal poisoning
Subarachnoid Hemorrhage	Systemic Erythematosis Lupus
Endocrinopathies	Medications
Hyper and Hypothyroidism	Nalidixic Acid
Cushing's Syndrome	Amphetamines, cocaine (abstinence)
Diabetes mellitus	Anti-hypertensive drugs (reserpine, methyl dopa)
Addison's Disease	Clonidine, Nifedipine, Hydralazine, Prazosin
Hypopituitarism	Diuretics
	Non steroid anti-inflammatory medications
Neoplasms	Antipsychotic medications
Carcinoma of the pancreas	Benzodiazepines
Carcinoma of the lung	Beta blockers
Tumors of the CNS	Cimetidine
	Cinnarizine
Infectious Diseases	Oral contraceptives
AIDS	Corticosteroids
Encephalitis	Digitalis drugs
Influenza	Flunarizine
Hepatitis	Interferon
Mononucleosis	Isoniazid
Viral Pneumonia	Levodopa
Tertiary Syphilis	Metoclopramide
	Metronizadol
Other Diseases	Ranitidine
Alcoholism	Vinblastine
Anemia	Vincristine

Depressed patients are frequently not diagnosed due to the belief that depressive symptoms are a normal response to physical diseases that threaten, or significantly change someone's life, and on the other hand, the diagnosis of depression is made in patients who are sad or have physical symptoms caused by the base disease [45,46]. The patient may present a combination

of symptoms (depression, anxiety, worries, fatigue, insomnia) accompanied by various physical complaints such as dizziness, pain, ringing in the ears, and weakness, which may confuse the doctor, and thus the problem is not detected and no adequate treatment is offered. Frequently, the doctor has prejudices as regards depression and mental disturbances in general [47].

Chart 1: Attitudes that may lead to errors in diagnosis and treatment of the depressed patient.

"In his/her place I would also be depressed"
"Being depressed is understandable, I am not going to treat it"
"Depression only occurs in those who have a weak character"
"He is only stressed, because he does not present sadness or melancholy"
"Depression is a natural consequence of aging"
"It only depends on you, will power cures depression"
"Antidepressive medications are dangerous, I will only prescribe one tablet per day"
"Anyone who wants to kill himself/herself doesn't make threats"
"First let's try some vitamins for stress..."
"Come back here in about two months, and we will have a longer chat about it"

Different approaches have been proposed in an attempt to solve the question of physical symptoms that are confused with those of depression. Cavanaugh (1955) has suggested that symptoms such as fatigue and alterations in sleep, appetite, weight, and psychomotricity help to elucidate the diagnosis when [48]:

- They are excessive as regards those expected for the physical condition.
- They are temporarily associated with the cognitive and affective symptoms of depression.

According to a study with Brazilian patients hospitalized due to physical disease, symptoms such as loss of weight of interest, pessimism (discouragement), indecision, irritability and anhedonia appear to better discriminate between patients with moderate and serious depressive disorders. Patients with symptoms such as indecision, insomnia, low self-esteem, despair or anhedonia have a worse prognosis during hospitalization, irrespective of the initial physical severity [49].

According to Botega (2006), the diagnosis of depression in patients with physical diseases must consider the following aspects [38]:

- Evaluate the level of consciousness to avoid the confusion that occurs between dysphoria and irritability of the initial conditions of delirium and depressive mood.

- Observe the presence of cognitive symptoms of depression (ideas of guilt, low self-image, feeling of helplessness, pessimism and ideas of suicide).
- Verify the presence of anhedonia, characterized by the patient's incapacity to feel pleasure, even with small things (a chat, an unexpected visit, reading or a television program). When apathy is predominant, there is probably an organic mood disorder.
- Somatic symptoms must not be considered if they are easily and completely explained by the physical disease and hospitalization, unless they are temporarily related to depressive mood and/or anhedonia and of intensity out of proportion to that expected in a given physical condition.
- Personal and family history is frequent in mood disorders.
- The presence of organic pathology needs to be carefully investigated. Etiological determination has important implications in the treatment.

DEPRESSION AND ANXIETY DISORDER

In major depression, there are three especially important comorbidities: anxiety disorders, substance abuse and eating disorders.

Anxiety disorders are the most prevalent mental disturbances among patients with depression, both in population [50] and in clinical samples [51].

The comorbid situations are associated with major morbidity, higher levels of functional compromise, greater use of health services (doctors in general, specifically of mental health and social services), greater harm to work, insufficient response to usual treatments, and higher incidence of suicide [52-55].

Anxiety is a state of uncomfortable mood, negative apprehension as regards the future, and an unpleasant internal inquietude [56]. Because this is a normal feeling in the face of unknown situations, in this case it is generally diffused, it presents as a physical and psychic feeling of being unwell, accompanied by apprehension, palpitation, sweating and even intermittent diarrhea. It is considered normal if it were a passing and bearable unwellness. When it becomes a persistent emotional state, it may present physical symptoms due to stress, such as for example, headache and tachycardia, and one could think of an important anxiety.

Pathological anxiety may interfere in normal development, with harm to self-esteem, socialization, acquisition of knowledge and memory, in addition to predisposing the individual to greater vulnerability. It is possible to distinguish pathological anxiety from normal anxiety in response to a stressing situation, by means of four criteria:

- Independence: anxiety occurs without an apparent cause, or if there is a cause, the reaction is disproportional.

- Intensity: elevated, with a high level of suffering and low capacity to tolerate it.
- Duration: Maintained or recurrent.
- Behavior: maladaptive, use of rituals, compulsions, avoidance, with overall compromise of functioning.

There may be many factors responsible for the high rates of comorbidity. One could think of comorbidity between two disorders in two ways:

- From the lumpers perspective, that is, that both conditions represent the same nosological entity, but are considered in a distinct manner by the classification system. What strengthens this way of thinking is the presence of common susceptibility factors such as genetics [57], personality traits [58], changes in the hypothalamo-hypophyseal-adrenal axis [59,60] superimposed family history [61], presence of life stressors and traumas, and the fact that anxiety disorders in childhood increases the chances of having depression in adult life [62-64].
- From the splitters perspective, the conditions present in the comorbidity present distinct risk factors, however, a psychiatric disorder is a risk factor for the other condition to occur. Although there are differences, the clinical conditions may be different, and in addition, anxiety disorder begin earlier while the depressive type begin at a later stage [65].

Treatment

Major depression must be treated with antidepressive drugs and/or non pharmacological techniques, such as psychotherapies with different approaches. Even if the results are not as effective in the short term, studies have indicated that the association between pharmacological and non pharmacological methods is more effective than the interventions in isolation. But the patient's motivation for psychotherapy must be considered. Psycho education must always be present, because this will inform the patient about subjective aspects, such as fears and the need to face them, and may improve adhesion to treatment.

When there is comorbidity with anxiety, the depression must be treated in a more aggressive manner [66]. It is important to treat the two conditions, however, the treatment of depression has priority over that of anxiety [67,68].

Thyroid and parathyroid diseases, Cushing's syndrome, Addison's disease, epilepsy, multiple sclerosis and Huntington disease, in a psychiatric and medical comorbid condition, may be associated with a depression refractory to medication and resistant to conventional treatment. Resistant depressions are a great problem in psychiatry, since depression is very prevalent in the general population. The expense it causes is one of the serious problems for public health.

When the treatment does not follow in an adequate manner with respect to duration and dosage,

one speaks of pseudo-resistance. There are various nuances related to resistant depression, but these will not be explored in this chapter.

TRAUMA AND STRESS

The root of the Greek etymology of the word “Trauma” means a lesion caused by an external agent, and it occurs when the natural psychological defenses are transgressed.

Psychic trauma is characterized by an influx of excitation that is excessive as regards the individual’s tolerance and his/her capacity to dominate and elaborate these excitations.

The manner in which individuals process the stressor event is fundamental for the determination of trauma, or not. The difficulty in synthesizing, categorizing and integrating traumatic memory in a narrative may be related to the diminished volume of the hippocampus, relative reduction in the activity of the prefrontal cortex, anterior cingulum and Broca’s area [69,70]. The lower levels of cortisol may influence the formation and processing of traumatic memory. Memory and perception are intrinsically related to the construction of adaptive processes [71].

Many studies have shown the relationship between psychopathologies in adults and adversities experienced at an early age, such as traumas that occurred in childhood, physical and psychological abuse, loss of parents in childhood, inadequate parental care, divorce, etc., and concluded that the experience of stressors at the beginning of life is associated with greater risk of mood, anxiety and personality disorders in the adult stage of life [14].

Recent studies have demonstrated that depressed patients with a history of childhood trauma and chronic forms of major depression have greater probability of presenting hyperactivity of the HHA axis. They usually have symptoms more resistant to standard antidepressive medications, but may benefit from concomitant treatment with psychotherapy [72]. Variables such as the individual’s age at the time he/she suffered to maltreatment, parental responsiveness, subsequent exposure to stressors, types of maltreatments and type of psychopathology or behavioral change might influence the degree and pattern of HHA disorder.

Studies that have evaluated the relationship between maltreatments in childhood, psychopathology and the HHA axis have reached various conclusions. While the majority have reported imbalance in the HHA axis associated with maltreatments, major depression and anxiety, there are those that have shown negative results. Further studies must be conducted to evaluate the type of stressor as well, which might make a difference to the results [14].

Researchers have considered the impact of stressful events beside individual characteristics of protection, such as the capacity of coping [73] and social support network [74] and spirituality. It is believed that protective factors can be developed to work as a mediator between biologic vulnerability and stressful life events [75].

Another important aspect to consider in this relationship are the personality characteristics, such as behavioral inhibition and neuroticism, both linked to mood and anxiety disorder [76-78].

Neuroticism, characterized by the tendency to experience negative affection, and major depression also share genetic risk factors [70,80].

Behavioral inhibition, defined as the tendency towards withdrawal and avoiding new situations, has been associated with anxiety disorders in family studies and in prospective longitudinal studies with small children followed-up from childhood through to adolescence [81]. Different lines of research have pointed out the possibility that personality or temperament may be responsible for associations between stress, depression and hyperactivity of the HHA axis. Personality influences the probability of exposure to stress and may also attribute sensitivity to the stressors. Similarly, some personality characteristics, such as neuroticism and personality inhibition may result from psychological or physiological sensitivity to the stressor [82].

RESILIENCE AND CHRONIC DISEASES

Various studies have suggested that resilience has an impact on the treatment of different chronic diseases, such as diabetes, rheumatoid arthritis, systemic erythematous lupus, Chagas disease, HIV etc. [5,83-86] and it could interfere in the immune function, leading to an accentuation of vulnerability of the disease. This occurs due to the psychological process involved in becoming ill and the stress resulting from dealing with the disease and the effects of its impact on the person's life [33,87,88]. Coping, adherence to treatment and the possibility of seeking social support are aspects that are optimized with a greater capacity of resilience [89].

High RS scores are directly associated with better physical health and fewer symptoms, and are inversely related to depression and other psychiatric disorders, in addition to being related to better quality of life [4].

Aspects of resilience such as positive emotions, optimism, vitality and extroversion are related to increase in efficacy, physical activity and coping [85], and the acceptance of social support [90]. In a study with women with osteoarthritis and/or fibromyalgia, it was observed that the resources of resilience could help the treatment of pain or stress in a population with chronic diseases. Moreover, it was suggested that the team of health professionals should be trained to intervene in the sense that once they knew the resilience characteristics of patients, they could effectively help them to develop coping skills [85,91]. In the clinical field, it is possible to identify predisposing or risk factors for the psychopathology or pathology in question, and develop new intervention strategies that act in both a preventive and therapeutic manner [90].

Measuring Resilience

Although the measurement of resilience is a challenge, due to the difficulty in identifying its characteristics, it is important in psychological practice, because it may provide evidence with respect to which factors are more important for recovering and maintaining the mental health of different persons. In addition, in order to predict the ability to tolerate stress and its negative effects, this measurement would also be very useful in the field of research.

The following are some of the scales:

Brief Resilience Scale (BRS)

This appears to be a reliable means of measuring resilience, and the ability to recover from stress, while it suggests coping pathways with regard to stressors. There are criticisms as regards the strictness of the methodology and the capacity to control the variables involves, because evaluating resilience requires the exploration of personal (internal) and environmental (external) aspects, such as the family and social medium/environment that plays an important role in individual resilience [92].

The Connor-Davidson Resilience scale (CD-RISC)

This is a brief, self-evaluation scale, with psychometric properties, good internal consistency and reliable test-retest features. It consists of 25 items, each evaluated on a 5-point scale (0-4), with the highest score signifying greater resilience. Use of the CD-RISC, demonstrates the following issues:

- Resilience is influenced by the health status, that is, individuals with mental disease have a lower level of resilience than that of the general population.
- Resilience is changeable and may improve with treatment, and increase in resilience corresponds to an improvement in the general state of the patient [93].

Areas in which the CD-RISC may be used:

- In clinical practice, by means of interventions in which one seeks to identify the individual's strong points and positive attributes, which allow the individual to engage more readily in adaptive activities. The CD-RISC is compatible with the intervention, because it helps to identify resilient characteristics and also evaluates the response to the intervention.
- In researches that evaluate adaptive and maladaptive strategies for coping with stress, and for evaluating individuals for high occupational and high stress activities.

Resilience Scale for Adults (RSA)

This was evaluated with regard to its predictive value for pain and stress, and was considered a valid instrument for assessing these aspects. RSA is capable of detecting individual differences in experiences of pain, general levels of functioning, and possibilities with regard to medication of pain [94].

Scale of Resilience

The Wagnild and Young RS Scale [95], measures the degree of resilience. It was derived from a qualitative study conducted in 1987, with 24 women who experienced a recent loss (husband, health, job, etc.,) and knew how to cope with these losses; and from another qualitative study

with 39 caregivers of husbands with Alzheimer's disease. The scale of resilience contained 25 questions that comprised the aspects identified by the authors as components of resilience, as follows: Self-reliance, Purpose in life (Meaning), Equanimity, Perseverance, Existential aloneness (Come home to yourself).

Promoting Resilience

The purpose of improving resilience is to promote mental health and develop socio-emotional competence. Knowing the origin of resilience is a crucial and important precursor to the success of interventions, which must extend to groups such as the family, school and community in a preventive proposal. There are various reports of interventions (either psychotherapy or not) successfully used to develop resilience in patients with post-traumatic stress disorder (PTSD), psychosis, multiple sclerosis, aphasia, rheumatoid arthritis, etc., [96-100]. One study evaluated the effect of neurobiologic markers on the resilience of patients with PTSD. Physiological (heart rate, respiratory rate, cardiac vagal tone, sympathetic balance, and skin conductance) and neuroendocrine (cortisol and DHEA) variables and psychometric self-reporting measures (negative affect, resilience, PTSD symptoms, depression, anxiety, and social support) were evaluated before and after four months of psychotherapy. As a result, there was a reduction in heart rate, respiratory rate, sympathetic balance, skin conductance, and cortisol levels. The symptoms of PDST, depression, anxiety and negative affect score diminished after psychotherapy, and the resilience and social support scores increased [96]. Interventions in a non clinical sample were also performed for the prevention of mental and physical disease, with significant improvement observed in mental health and well-being [101].

Meditation has also been used as intervention, with satisfactory results in well-being, which was maintained after two months had passed [102].

EMOTIONAL ASPECTS AND IMMUNE FUNCTION

The relationship existent between body and mind is unanimously accepted, making it urgent to take a careful look at the body as the visible manifestation of the mind, and the mind as the expression of the way in which individuals face their experience of living. Therefore, disease can be translated, decoded and assimilated by the different systems of which man is composed, pointing out not only its etiology, but also the purpose, direction and meaning, thus contributing to an improvement in general health [103].

Psychosomatic medicine proposes to understand the relations between the emotional states, somatic symptoms and different diseases. The term "psychosomatic" was created by a German psychiatrist, J.C. Heinroth (1773-1843), in 1818, when he was studying the influence of passion on tuberculosis, epilepsy and cancer, seeking to emphasize the importance of integration between the physical and psychic aspects of becoming ill. Years later he created the term "somatopsychic" 1828 with references to disease in which the organic factor affected the emotional [104].

Up to now, in both medicine and psychology, the term psychosomatic generally referred to a disorder without a clear organic diagnosis. However, the modern use of the term refers to a fundamental interdependence between body and mind in all the stages of disease and health. One can no longer think of diseases of purely organic, or purely psychological causes, but of pluralism in the observation of the phenomena [105], although one cannot always speak of a relation of causality, one can think of the body and psychism as absolutely integrated and indissociable instances according to their subjective dynamics, but without a reductionist causal hypothesis [106,107].

Some researchers have reported that psychosomatic patients presented a type of frailty in symbolic and emotional expression, they were unable to verbalize their emotions and found a type of immediate expression by intermediary of independent pathways, such as a type of “body language” [104]. This is a similar concept to that of alexithymia, that is, incapability of expressing feeling by means of discursive language [105,107]. According to this concept adopted by the School of Psychoanalysis of Paris, psychosomatic patients poorly present the symbolic world, and denote little psychic elaboration, with thinking of the operative type, set in concrete and in pragmatic orientation. To Ramos (2004) the fact that the patient somatizes does not mean that he/she does not symbolize, but that this symbolization becomes concretized in the somatic plane, in a more primitive, organicist language, a more restricted and compulsive symbolic life [105]. The patient who is unable to express his/her inner conflicts through fantasy, imagination and dreaming may find a psychotic hallucinatory, or organic solution. Therefore, organic symptoms contain psychic messages that do not have a verbal, symbolic representation. The symptom would be the symbolic representation of the disturbance or disconnection at the ego-self axis, or better said, the bodily symptom (disease) may be seen as a symbol that expresses the psyche-body relationship. The symptom is the expression of the need to integrate into a content in consciousness, because it is repressed or dis-integrated (partially integrated) [105].

To Jung, (apud Ramos) both in neurosis and psychosis the symptoms of a somatic or psychic nature originate in the complexes. The term complex corresponds to a collection of various ideas maintained together by an emotional tone common to all of them. Therefore, when a complex constellates, there is not only a physiological change, but one in the entire bodily structure, and this change may not be immediately perceived by the person as a bad feeling, or by means of a more defined symptomatology. The bodily self-image, and all the kinesthetic sensations present in the consciousness form part of the complex, forming a standardized structure. Self-image is defined as the image we mentally form of our body, and the way we see ourselves. This image goes beyond that which we see in the mirror, but comprises the vision we have of ourselves, not only physically, but also physiologically, sociologically and psychologically [108].

On the other hand, Lipowski (1985), has related some factors that may lead a physically sick person to a psychopathology [109].

- Aggravation of intrapsychic conflicts,
- Inadequacy of the defense mechanisms,
- Diminished self-esteem,
- Change in body image,
- Rupture of the sleep-awake cycle,
- Use of medications and procedures that affect the central nervous system.

Psychological follow-up/monitoring, irrespective of the technique used, or its theoretical foundation, may bring the patient benefits in the sense of greater adaptation to disease, reduction in pain and worsening of the disease, adhesion to treatment, coping skills, improvement of depression and anxiety, in addition to significant changes in the patient's self-esteem and quality of life scores [98,101]. Therefore, it may be an important tool, in the sense of being of significant help to the work of the medical team. This reinforces the importance of a multidisciplinary team working in hospitals and outpatient health clinics [110].

CONCLUSION

Depression, anxiety, stressful life events may influence the onset of diseases and immunosuppression, responsible for accentuating the individual's vulnerability. Depression and stress are frequently confused, due to the hyperactivity of the HHA axis.

Protective factors are considered more important than the risk factors for improving the individual's capacity of resilience. Strategies for developing or improving resilience are necessary in the field of health.

ACKNOWLEDGMENTS

SFC is currently receiving a scholarship from "Fundação de Amparo à Pesquisa do Estado da Bahia" (FAPESB) and MBS from "Conselho Nacional de Desenvolvimento Científico e Tecnológico" (CNPq).

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