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REVIEW

Stress and memory loss

Estrés y pérdida de memoria

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ABSTRACT

Stress is estimated as a manifestation process that starts when the individual realizes a difficult event or in which he finds himself intimidated or overwhelmed by his means. Normally the events that set it in motion are those that are linked to variations that demand too much care from the person and therefore put their individual well-being at risk. Selye was the one who initially originated the somatic stress paradigm. He identified three stages or phases in the organic-vital response to stress, being factors of the 'General Adaptation Syndrome' The three stages are: alarm reaction, resistance and exhaustion. Regarding work stress, it is a pattern of reactions that originates when workers face work demands that are not equivalent to their expectations; Stressors can be present in any work sector, in any position or level and in any circumstance in which the person or load to which they cannot adapt quickly may be subjected. Memory is defined as the ability to retain, consolidate, and retrieve data. There are different areas of the brain involved in this function and that events such as stress can change their functionality.

Keywords: Stress; Memory; Disorder; Consequences.

RESUMEN

El estrés se estima como un proceso de manifestación que se pone en marcha cuando el individuo se da cuenta de un acontecimiento difícil o en el que se encuentra intimidado o desbordado de sus medios. Normalmente los eventos que la ponen en marcha son aquellos que están ligados a variaciones que demandan demasiado cuidado por parte de la persona y por lo tanto ponen en riesgo su bienestar individual. Selye fue quien inicialmente dio origen al paradigma somático del estrés. Identificó tres etapas o fases en la respuesta orgánico-vital al estrés, siendo factores del 'Síndrome General de Adaptación' Las tres etapas son: Reacción de alarma, resistencia y agotamiento. En cuanto al estrés laboral es un patrón de reacciones que se origina cuando los trabajadores se enfrentan a exigencias laborales que no son equivalentes a sus expectativas; los estresores pueden estar presentes en cualquier sector de trabajo, en cualquier puesto o nivel y en cualquier circunstancia en la que pueda estar sometida la persona o carga a la que no pueda adaptarse rápidamente. La memoria se define como la capacidad de retener, consolidar y recuperar datos. Hay diferentes áreas del cerebro involucradas en esta función y que eventos como el estrés pueden cambiar su funcionalidad.

Palabras clave: Estrés; Memoria; Trastorno; Consecuencias.

INTRODUCTION

Talking about stress is, unfortunately, a fashionable topic nowadays, in addition to the fact that in today's world, the difficulties contrary to the good development of the circumstances of daily life are mainly the causes of stress and its constant proceeding on the person to other circumstances becomes the causes of multiple diseases.[1,2]

The term stress came about in the 1930s by a young medical student after he analyzed the state of the sick and found that they had symptoms in common, attracting his attention later through a series of studies and experiments on animals such as mice, taking as a result that various well-known diseases such as emotional disorders, heart disease, and hypertension were the result of persistent episodes of stress present in their organs.[3,4] Later, he discovered how only the energies of the environment are not the cause of stress acting on the animal's organism. However, in the case of people, the social requirements and the risks of the environment that demand adaptive skills cause stress. From there, this disorder has linked the participation of different biological, medical, and psychological subjects, assigning different superior technologies.[5]

Some theories define stress as response-adjusted paradigms or internal agents, and others designate modular agent interactionists, which assess the relationships between stressor stimuli and stress effects.[6] On the other hand, there are stimulus-based theories in the study of stressors; such theories are based on the engineering reference of the principle of elasticity.[7] These theories define stress in terms of the stimulus that generates it; likewise, we have the theory that has generated the most research and refers to life events, events that are prominent in the lives of individuals, carried out by various authors.[8] The beginning of the systematization of life events, suggesting a dissimilarity between these and everyday events; while the former occur eventually and are related to high levels of stress due to their traumatic nature, the latter are perceived routinely and are not linked to chronic stress or from a clinically significant point of view.[9,10,11] Life events are, therefore, discrete events that manifest themselves at a specific moment in life and are detrimental to the mental and physical health of those who experience them; from this, authors differentiate between age-prescriptive life events, linked to environmental and biological determinants that are related to age, and non-prescriptive life events, which are decisive biopsychosocial events that are not common within the same cultural setting; Among the various life events with disastrous effects for the explained, the most important are the death of the partner or spouse, divorce and migration, which denotes the highest level of damage.[12,13]

Stress is then presented to us as the event that prefigures a peculiar way of linking the individual and the environment.[14] It presents different "levels" that include progressively complicated changes of emotions; the outcome of the interrelation in a set which are linked to the needs of the person, the matrix of his valuations about his person, the tendency of the stress-generating demands in the environment, the complexity of the circumstances of the situation, the means to face it and the estimate that the person makes in front of the sense of such circumstance, for the execution of his essential needs.[15]

This article will review the main triggers of stress as well as the different consequences that stress produces in the special health of the brain-mind of the human being, as well as the diverse affectations that it entails for memory and its influence on the loss of memory or amnesia at an early age; this article will be made through different investigations rescued from the web and from books emphasized in this topic in which we will base and deepen to be able to solve our questions and show diverse results.

METHOD

To carry out this research, we have studied and analyzed various research and findings which we have found both in articles on the web and different books, all of them referring to the different discoveries, studies, and experiments that have been carried out throughout history regarding what it is, how it acts, its consequences, what produces it and how it affects individuals this phenomenon called stress.[16]

As for the instruments, we used different articles from magazines mainly focused on the health sector; we have also taken the hand of different articles on surveys and experiments conducted on various groups of workers in different occupations who are exposed to considerable levels of stress, which have been published in different educational platforms and social information, in addition to this we have taken information from different books on human behavior, brain development over time and in effect to stress, as well as research on the effects and multiple diseases resulting from this disorder; all these taken from different web pages present in the network.

The compilation of abundant information was carried out with a focus on history as well as experimental and investigative, taking an evaluation of all this information deepening us in the central theme of our article, the effects of stress and its influence on the loss of memory, so we took use of the most relevant data in a subdued evaluation, studying them in depth to thus manage to answer the above-mentioned central question with total success.

RESULTS AND DISCUSSION

The results of a large number of investigations show that stress is one of the main causes of job dismissals, between 50 % and 60 %, being one of the main inconveniences faced by 35 % of the people who work.[17] It has been shown that in various work environments, there are multiple causes of stress for working people, among which we can point out the following: poor management skills, poor work and reluctance, shift work, mismatch of tasks, immoderate work, disparity of wages, interpersonal affinity in the workplace, the condition of the

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tools, the physical insecurity to which they are exposed and uncertainty about the future of their careers.[18]

It has also been shown in such research that shift work is one of the most common causes of occupational stress, mainly affecting mental efficiency, body energy, and accumulation of glucose in the blood, as well as altering the functionality of the nervous system, thus inciting certain stress-related diseases.[19]

As for the influence of stress on memory loss, different studies have shown that events such as stress can affect its functions since memory involves in its functions different parts of our brain, such as the temporal lobes, the amygdala, and the prefrontal cortex, then stressful episodes lead to a response of both behavior and emotion and also causes the release of various substances, such as glucocorticoids that have effects on memory when facing these episodes, these substances which act in different parts of the brain which help the person to respond effectively to the stressful episode, leading to various counterproductive reactions to the normal functioning of memory and go through different stages, as well as the brain also has substances that carry out the function of counteracting the harmful effects of stress and thus mitigate the possible long-term neuronal damage, of course, everything is based on the levels of stress to which the person is exposed.[20,21,22,23,24]

Concept of stress

Various definitions have been given to the term stress, some of them denoted below.[25] Selye defined it before the World Health Organization (WHO) as the undetermined concentration of the set of organs to any requirement of the environment and the condition generated by a determined sign that lies in the entirely undetermined changes that influence within an organismic-vital structure.[26]

A widely accepted definition is that it is the response given by the organism in front of some effort, it is a position of psychological rigidity, it is the conditioning for the assault or escape, and it is also composed of two elements. Stress-generating stimuli and stress reactions are responses of the person to these elements.[27]

Authors stated that stress is generated by means of physical-social intensives that impose on individuals efforts that do not manage to please correctly the place where the demands of pleasing it arise, thus producing an inequality of environmental efforts and usable goods.[28]

Researchers defined it as a complex of peculiar links between the individual and the circumstance valued as so much that exceeds its corresponding means and places at risk the individual tranquility.[29] They highlight the psychological or cognitive causes and the appraisal litigation.[30]

Stress is a complicated event that involves physical energies, responses, and psychological procedures that intervene between both; it presumes a condition being determined by physical overdemand; it is an energetic procedure that comprises different cases that act at different magnitudes and interact with each other, external and internal factors.[31] Cognitive estimation procedures, confrontation planning, psychological and physiological repairs modifiable articulators associated to tendency components and population factors.[32]

Stress is considered a manifestation process that is triggered when the individual perceives a difficult event or occurrence in which he/she is intimidated or overwhelmed beyond his/her means; according to its delimitation, it is a collective event and in itself is a psychophysiological event.[33] Normally, the events that trigger it are those that are linked to variations that demand too much care from the person and, therefore, put his/her well-being at risk.[34]

The interaction between the person and the environment is transformed into emotions depending on specific personal factors and person-centered demands of the person, his self-assessment, his means and plans to counteract them, which are carried out in the course of his life practice.[35,36]

Selye was the one who initially gave rise to the somatic paradigm of stress, understanding it as a network of stages or phases.[37] He managed to identify three stages or phases in the organic-vital response to stress as factors of the General Adaptation Syndrome.

- Phase 1. Alarm reaction: This reaction expresses that during the first confrontation with a stressful event, the physiological strength in existence decreases a little. At the same time, the organism gathers its forces to tolerate it. This phase is distinguished by a low level of resistance to the factors that produce the stress.
- Phase 2. Resistance: It is mainly based on the capacities and strength of the person. Physical and mental clinical signs distinguish this phase.
- Phase 3. Exhaustion: inability to cope with the stressor for a longer time, internal (homeostatic) and organic-vital imbalance in the body, and the being collapses and collapses in front of the disease. As a result of constant stress during this phase, various disorders may manifest themselves, such as heart attacks, strokes, hypertension, ulcers, migraine, cancer, asthma, and skin alterations, among others.

Any circumstance that the individual perceives as overexerting, intimidating, or demanding rapid change is stressful.[38] Still, it should be noted that not all conditions or all stressors are negative.[39] For example, achieving a good result on an academic exam or being promoted at work can positively cause stress.[40] Also, depending on the way in which various stressors are received, different impacts are generated in individuals.[41]

There are two fundamental origins of stress:

Stress: first, there are the stressors that come from external circumstances such as the environment, work, family, studies, and so on.[42]

Stress at work

Let us talk about work stress and its implications for the specifically mental and neuronal health of the individual. We have to say that. This phenomenon is a pattern of reactions that originates when workers are faced with work demands that are not equivalent to their skills, knowledge, or abilities and pose a challenge to their abilities to confront such situations then a series of circumstances that may include physiological responses such as increased blood pressure or heart rate, increased respiratory rate as well as excretion of adrenaline and cortisol (the stress hormones), emotional responses such as feeling irritated or nervous, cognitive responses such as decreased perception and attention, poor memory and behavioral reactions such as impulsivity, aggressiveness, among others. When the individual is in a state of stress, he/she generally feels tense, less attentive, worried, less vigilant, and less efficient in the performance of his/her work.[43,44,45]

We have two types of occupational stress: Episodic stress, which appears momentarily, is a condition that is not postponed for too long and then is confronted or solved, and all the symptoms that caused it to disappear; a model of this type of stress could be the one that arises through the event in which the individual is fired from his job.[46]

Chronic stress: This type of stress appears recurrently when the individual is continuously subjected to a stressor. Hence, the symptoms of stress appear every time the situation arises, and as long as the person does not avoid the problem, the stress will not disappear.[47]

Causes of stress

Every day, we find people who dedicate a large part of their time to their work, living in anguish and overwhelmed by the search for perfection in their area of work, leaving aside very important aspects of their lives, such as family and friends.[48] These are the circumstances that often lead people to become addicted to their work, and therefore, these same circumstances are the ones that generally cause work stress.[49]

Stressors can be present in any work sector, at any position or level, and in any circumstance to which the person may be subjected or load to which he/she is unable to adjust quickly, with which he/she is unable to feel competent or, conversely, with which he/she accepts too many positions of responsibility.[50]

Job stress is present when the individual begins to experience negative experiences at work related to the work environment, such as job demands or organizational problems.[51] Stressors include those intrinsic to the job itself, factors related to interpersonal relationships, those related to career advancement, and those related to the organizational climate and configuration.[52]

In other circumstances, work stress can originate for various reasons; a very important cause is the fear of the unknown since the worker repeatedly faces unknown situations that cause distrust and the impression of not being prepared to face a problem in society so this kind of situation does not allow the full development of the person due to the fear of making a mistake. An example of the above is seen when changes occur at the level of administration or management in the organization.[53,54]

As for the usual life generates apathy, tiredness, discouragement, etc., in people who are part of an organization, and these are manifestations of the phenomenon called stress, so that individuals, when they find themselves subjected to circumstances like these, are unable to develop their full potential, which are limited to carry out specifically what they are ordered, thus hindering the full development in the workplace.[55,56]

Main effects of work stress

Exposure to stressful situations is not in itself something negative or bad; only when stress responses are exaggeratedly intense, habitual, and long-lasting they can cause various alterations in the organism.[57] In life, each action that is carried out has a specific consequence. The pathologies resulting from work stress can be confronted in different ways by people since, at this level, aspects such as individual inequalities reflected in the current health condition and clinical records of individuals are considered so that a definite product of work stress will not occur in the same way in all people and what may be harmful for some may be mild for others.[58,59,60]

The diseases resulting from stress can be classified into two major groups: chronic stress disorders such as ulcers, post-traumatic neurosis, and shock, and acute stress disorders such as anxiety, dyspepsia, frustration, and accidents.[61,62]

Memory

Memory is defined as the capacity to retain, consolidate, and retrieve data, cellularly comprising a sequence of synaptic and molecular variations that support this mechanism. Memory is vital for human beings, and it is

important to know that there are different areas of the brain involved in this function and that events such as stress can change its functionality.[63,64]

Approximately fifty years ago, new ideas were put forward on how brain structures collaborate and shape the basis of learning; it was later recognized that the temporal lobes are fundamental to this process based on the study of the patient.[65,66] These findings showed that lesions in areas such as the hippocampus could affect declarative memory of recent events.[67] Likewise, several areas are also involved in this process, such as the amygdala and the medial prefrontal cortex.[68]

Different studies have evidenced the role of the hippocampus in memory and learning; for example, analyses with amnesic patients and animal experiments show its value in securing short and long-term memory events, as well as its deposit in the cortex.[69,70,71] Likewise, regional hippocampal functions are linked to the type of event, e.g., the ventral hippocampus has been linked to rejection learning and fear memory, while the dorsal hippocampus plays a critical role in environmental memory and learning.[72]

Effects of stress on memory

In addition, it has been shown how a stressful event leads to a behavioral and emotional response.[73,74] The region involved is the basolateral basal ganglia, a region of the amygdala that neuroanatomically connects with the caudate center (nucleus), the cortex, the basal nuclei, and the hippocampus. This converts a stressful event into a dynamic event of temporal consistency between different areas.[75,76]

A short stress event appears in the release of main noradrenaline (monoamines) and glucocorticoids, which carry out their genomic function for about one hour (all depending on the amount released) and make it possible for the individual to effectively respond to the stressful event.[77,78] Likewise, it has been noted how glucocorticoids under this type of event have a consequence on memory; for example, in the Morris maze, it has been described how glucocorticoids enable the neural mechanisms involved in the storage of information.[79,80]

While in the hippocampus, the early consequence of glucocorticoids increases the constancy of miniature postsynaptic tendencies and intensifies glutamate-bearing vesicles; on the other hand, catecholamines also promote instruments of excitation; in order to accumulate information, dependent on the stimulation of calcium conductances and B-adrenoreceptors.[81,82,83] Likewise, the decrease in postsynaptic conductance to potassium has been exposed. In line with these findings, it has been contemplated that excitability in CA1 is possibly enabled by the action of the corticoid mineral acceptor and serotonin (an adjunct inhibitory consequence of the receptor).[84] This series of events occurs in less than an hour.[85]

Authors show how likely miniature excitability is sustained when glucocorticoids are elevated.[86] This suggests that in the early stages of stress, hypothalamic excitability is promoted, and the targeting of HPA axis circuits is increased due to the targeting of membrane mineral corticosteroid receptors. The occurrence of this synaptic modulation leads to the following question: How can it be explained that during stress, information linked to the event can be anchored? This occurs thanks to temporal synchrony, provided that there is temporal synchrony between stimulation and hypofield activation in the release of glucocorticoids; this would drive excitability in the hypofield.[87] This occurs by means of the same molecules released by stress. These molecules modulate the hypo-field synaptic network at the time that mineral corticoid rays are major players in the first stage.[88] This idea is supported by research demonstrating that discharges in the hypo-field network that are not linked to the stressor, and thus to the incitement of glucocorticoid emancipation, produce less effective hypo-field synaptic consolidation.

CONCLUSIONS

The definition of stress is fundamental in the work field because the person can respond in different ways to an unexpected event; for some individuals, a circumstance can be very stressful, but for other individuals, the same circumstance could go unnoticed; these responses can activate pathophysiological instruments of a disorder.

According to the given evidence, neuroanatomical and functional variations in the medial prefrontal cortex, amygdala, and hippocampus are distinguished, and their potential association with the alteration of posttraumatic stress is a consequence of the chronic exhibition of glucocorticoids. It is necessary to take into account that due to the advances that are currently available in relation to structural and functional tests, we are close to understanding more conveniently the physiopathology of the posttraumatic stress factor, referring to the hyperexcitability of the hypothalamus-pituitary-adrenal axis.

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