Effects Of Stress On The Body: How It Affects Physical And Psychological Health

Everyone feels stressed at some point in their lives. In fact, some people feel stressed out every single day. This is because there are so many things in people's daily lives that require their undivided attention and they start worrying when things start to get overwhelming. Some of the most common things that generate stress are relationships, starting a new job, moving to a new house, and etc. Everyone copes with stress differently because the way people experience it varies from person to person. It is impossible for us to measure this negative emotion because everyone has different definitions when it comes to the word "stress. " However, just because we are unable to measure stress doesn't mean we ignore the science behind it as it is very important to understand how our body reacts to stress. As part of the central nervous system (CNS), the brain plays a major role in terms of reacting and coping with stress. This is due to the fact that the hippocampus, amygdala, and some areas of the prefrontal cortex regulate the physiological and behavioral stress processes of a person, which can either promote short-term adaptation (allostasis) or maladaptive wear-and-tear (allostatic load) (McEwen & Gianaros, 2010).

When we encounter a stressful situation, the HPA axis which consists of the hypothalamus and pituitary glands in the brain along with the adrenal glands are triggered as a fight-or-flight response to deal with the stressor. The hypothalamus at the bottom of the brain sends a message to the front of the pituitary, sparking the production of adrenocorticotropic hormone (ACTH) at the front of the pituitary gland. The ACTH will then prompt the release of hormones through the adrenal glands, with cortisol being the primary stress hormones being released. Epinephrine is also one of the hormones released by the adrenal glands. Cortisol alters our immune system, raises the glucose amount in the bloodstream, and etc. to help us face high-stress situations more efficiently while epinephrine prepares us for any dangerous situation by inducing a racing heart, heavy breathing, and more to increase our survival chances. There are various types of stress but the primary ones are acute stress and chronic stress. Chronic stress can severely affect one's health because excessive stimulation of the adrenal glands will negatively impact the body and the immune system as it takes a toll on the body. One of the biggest health risks that stress poses is cardiovascular disease (CVD). This is because chronic stress increases the blood pressure and vascular hypertrophy, which means that the muscles constricting the vasculature become thicker, elevating the resting blood pressure and response stereotypy, requiring a vascular response to every stressor (Schneiderman, Ironson, & Siegel, 2005). Hypertrophy of the left ventricle, which is caused by overworking the heart, could eventually damage the formation of arteries and plaque because the blood pressure level is

constantly changing so quickly between resting and elevated blood pressure level. Mechanistic studies have been done to prove the role of stress in hypertension, a type of CVD.

According to Spruill (2010), researchers proposed the cardiovascular reactivity hypothesis that suggested people who display exaggerated cardiovascular responses when they face stressors have a greater risk for hypertension than people who show less reactivity so they carried out an investigation that proved to be an important contribution to back up this hypothesis by demonstrating the stress-hypertension relationship by measuring the BP reactivity of air traffic controllers to job stress over a course of 20 years. Through studies of laboratory stress, it has been proven that poor BP recovery or even failure for BP to return to resting levels can lead to hypertension. CVD isn't the only physical health issue caused by stress. Stress can also weaken the immune system, exposing people to autoimmune diseases. Evidence discussed by Schneiderman et al. (2005) mentions how the acute stress response involves the activation and migration of cells in the innate immune system and this is mediated by proinflammatory cytokines so cortisol eventually suppresses proinflammatory cytokine production in a healthy person when they face chronic stress but that's not the case when someone has an autoimmune disease because stress will continue to promote prolonged activation of proinflammatory cytokine production which will eventually lead to the exacerbation of pathophysiology and symptomatology. An overactive immune system is also responsible for paralysis and blindness as it destroys the myelin surrounding nerves in multiple sclerosis (MS) (Schneiderman et al. , 2005). Chronic stress doesn't just damage one's physical health, it can also be extremely strenuous on the mind, exposing people to psychological issues such as depression.

As mentioned earlier, stress can weaken the immune system and in terms of mental health, various biological mechanisms have linked depression with inflammatory processes, autonomic nervous system dysfunction, and impaired coronary flow reserve that increases the risk of myocardial ischemia (Cohen, Edmondson, & Kronish, 2015). To study the depression-stress circuit, studies have been done on depressed people and cancer patients receiving interleukin-1 to fight cancer. The results revealed that the cancer patients started developing depression and people with depression had elevated cytokine levels (Azar, 2001). This study proves that the brain and the immune system is a loop and it points back to the previously mentioned CVD, as depression is prevalently found in patients with CVD too. In terms of hypertension, studies suggested that depression could increase the risk of cardiovascular problems because it decreases nighttime blood pressure dipping (Cohen et al. , 2015). It is vital to understand that prolonged exposure to cortisol can cause depression symptoms and that physiological arousal leads to maladaptive patterns of behavior, and over the long haul it could influence a person's attitude, some might even refuse to seek help as a result. Anxiety is also a prominent mental health issue caused by stress.

Together, these systems regulatephysiological and behavioral stress processes, which can be adaptive in the short-term and maladaptive in the long-term. Importantly, such stress processes arise from bidirectional patterns of communication between the brain andthe autonomic, cardiovascular, and immune systems via neural and endocrine mechanisms underpinning cognition,experience, and behavior. In one respect, these bidirectional stress mechanisms are protective in that they promoteshort-term adaptation (allostasis). In another respect, however, these stress mechanisms can lead to a long-termdysregulation of allostasis in that they promote maladaptive wear-and-tear on the body and brain under chronicallystressful conditions (allostatic load), compromising stress resiliency and health. This review focuses specifically onthe links between stress-related processes embedded within the social environment and embodied within the brain,which is viewed as the central mediator and target of allostasis and allostatic load.