

# A Systematic Review of Work Done on Stress: An Approach towards NCDs

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**Abstract:** *Stress is an unavoidable state in current scenario of changed lifestyle, It is a major issue of concern especially in field of research to understand the development of various NCDs which are the major group of disease load today, for this purpose reviews of various works available on databases such PUBMED, SCOPUS, MEDLINE, EMBASE were scanned through, first by searching for stress and its effects followed by more precise search using MESH TERMINOLOGY from 1993 to 2021. **Result and Conclusion:** Majority of work done was found on healthy individuals but there is still an uncertainty on proving the exact factor to be alleviated in order to decrease the future possibility of development of NCDs, drugs addicted patients and chronic diseases have found less acceptance amongst research on stress. Thus there is still the need for more studies in the field of stress related disorders to understand more precisely ways to decrease the morbidity and thus providing healthy lifestyle.*

**Keywords:** Stress, NCDs

## 1. Introduction

Psychological stress influences immunobiological functions [Armbrorst D & Bitterlich N 2021]<sup>1</sup> such that hemostatic factors are reported to be associated with coronary heart disease (CHD). Socioeconomic status (SES) is 1 of the determinants of the hemostatic profile, but the factors underlying this association are not well known. [Wamala SP, Murray MA 1999]<sup>20</sup>The health consequences of rapid cultural and economic change have been explored for adults in a range of low - income countries, but comparable research in children and adolescents is currently lacking. Concurrently, the immunosuppressive effects of psychosocial stress have been documented in Western populations, but have yet to be considered in cross - cultural contexts. [McDade TW 2001]<sup>2</sup>Atherosclerotic damage of cardiovascular system, including kidneys, is an increasing problem not only in the modern cardiology but also in nephrology and dialysotherapy [Wierzbicki P, Prokopiuk M, Kade G]<sup>18</sup>Psychological stress is associated with increased oxidative stress, a pro - inflammatory state, increased rate of infection, and cardiovascular disease [Hapuarachchi JR, Chalmers AH]<sup>16</sup> Psychosocial stress, as well as health behaviours, are important predictors of inflammatory activity in a population - based sample and should be considered in future research on inflammation and CVD. [McDade TW, Hawkey LC]<sup>2</sup> Chronic stress is estimated to increase the risk of cardiovascular (CV) events two - fold. Although stress reduction has been linked to a reduction in CV events, little is known regarding its exact mechanism of benefit. [Sivasankaran S, Pollard - Quintner S]<sup>13</sup>Modern scenario highly supports Yoga and meditation will improve parameters of endothelial function but still supportive research work is still less.

## 2. Objective

For the concerned review I have followed PICO system for the review of the various databases like PUBMED and SCOPUS to find the lacunae in the field of my interest and promote future possibilities in the field of research especially in stress and its consequences in modern lifestyle.

## 3. Methodology

I have screened through about 100 abstracts available from past 20 years (1993 to 2021) published in various science journals in english language as per the requirement of my field preferably work done by various health workers.

This will cater to our need of various prospectives and importance of modification of lifestyle to alleviate burden of associated damage to various organ systems. The review process is planned to reduce biases and eliminate irrelevant and low - quality studies. The steps for implementing a systematic review include (i) correctly formulating the clinical question to answer (PICO), (ii) developing a protocol (inclusion and exclusion criteria), (iii) performing a detailed and broad literature search and (iv) screening the abstracts of the studies identified in the search and subsequently of the selected complete texts (PRISMA)

## 4. Results

### Stress in healthy individual

In the parachute test significant positive correlations were found, e. g. between the changes of cortisol and C - reactive protein and between anti - diuretic hormone and interleukin - 1 beta. This suggests that there is an interaction between the endocrine and the immune systems in the response to a psychological stress. [Dugué B, Leppänen EA]<sup>21</sup> Educational attainment was used as a measure of SES. Low educational level and an unfavorable hemostatic profile were both associated with older age, unhealthful life style, psychosocial stress, atherogenic biochemical factors, and hypertension. Levels of hemostatic factors increased with lower educational attainment. Independently of age, the differences between the lowest (mandatory) and highest (college/university) education [Wamala SP, Murray MA]<sup>20</sup> his study uses lifestyle incongruity (inconsistency between a household's material style of life and its socioeconomic status) as a model of culture change and stress Controlling for potential confounders, adolescents from households with a material style of life that exceeds its socioeconomic status have reduced cell - mediated immune function, indicating an increased burden of psychosocial stress. [McDade TW]<sup>2</sup>Two

groups of four male subjects were confined 240 days (group 240) or 110 days (group 110) in two space modules of 100 or 200 m<sup>3</sup>, respectively. During confinement, none of the volunteers developed psychic stress as could be examined and verified by a current stress test. Because the delayed - type hypersensitivity skin reaction against recall antigens remained unaffected, it is to be presumed that confinement appears to induce distinct sympathoadrenergic activation and immunological changes but no clinically relevant immunosuppression. [Choukèr A, Smith L, Christ F, 2002]<sup>17</sup> There were 68 men in mean age 33.3 +/- 7.4 years, being employed in the state administration for mean 10.9 +/- 7.5 years. On the basis of the results of environmental questionnaire the studied group was divided into two subgroups: subgroup A "passive" (30 persons) which was physically passive (employed in the administration) and subgroup B "active" (38 persons) whose professional job was connected with physical activity. The following biochemical RfFA in the blood were examined: cholesterol and its fractions, triglycerides, urea acid, glucose, fibrinogen, C - reactive protein, homocysteine and antibodies against Chlamydia pneumoniae. On the basis of these preliminary results we presume, that potentially healthy men over - pressed with psychological stress because of decisive character of their professional job, are characterized - - independently on the proclaimed physical activity - - by high frequency of risk factors for premature atherosclerosis. [Wierzbicki P, Prokopiuk M 2001]<sup>18</sup> The results of the study showed that psychological stress is associated with pro - oxidant and pro - inflammatory states as evidenced by either decreased NT levels and/or increased CRP concentrations. The cross - sectional design and correlational approach used in this study preclude any inferences of causality but suggest several potentially useful avenues for future research. [Hapuarachchi JR, Chalmers AH 2003]<sup>16</sup> Blood, for the analysis of C - reactive protein (CRP) and von Willebrand factor (vWF) antigen, were significantly elevated following the stress period, and cardiovascular activity was increased during and after both tasks Multiple linear regression analysis adjusted for age, body mass index, and baseline levels revealed that men with higher effort - reward imbalance demonstrated greater CRP and vWF responses to the stress tasks but blunted cardiovascular responses. Inflammatory and cardiovascular responses to stress appeared to be unrelated. [Hamer M, Williams E]<sup>12</sup> Experiencing a high frequency of interpersonal stressors that are typical of adolescent life is associated with higher levels of inflammation even among a normative, healthy sample of adolescents. Additional work should focus on other daily experiences during the adolescent period and their implications for elevated risk for later cardiovascular disease [Fuligni AJ, Telzer EH2009]<sup>10</sup> research has shown that psychological stress may influence the magnitude of the CAR, however the findings have been mixed. The results suggest that psychological stress may be associated with a smaller cortisol awakening rise, a lower diurnal mean, poor lifestyle choices and high levels of psychological distress. These findings may have broader implications for future health risk and for an individual's ability to cope with imminent daily stressors and demands. [O'Connor DB, Hendrickx H]<sup>9</sup> The analyses of nocturnal change scores (difference scores) add substantial information compared with the traditional analyses of

morning levels of immune variables and catecholamines alone. Subjective well - being is significantly associated with a greater nocturnal decrease of interleukin - 6 and epinephrine. More research on nocturnal adaptation processes is warranted. [Rief W, Mills PJ, Ancoli - Israel S 2010]<sup>6</sup>

### Stress in chronic patients

Perceived impairment in sleep related to increased coagulation activity and endothelial dysfunction in all participants, whereas objectively impaired sleep related to inflammation activity in caregivers. The findings provide one explanation for the increased cardiovascular risk in elderly poor sleepers and dementia caregivers in particular. [von Känel R, Ancoli - Israel S 2010]<sup>8</sup> In stable CAD patients on aggressive statin therapy, hs - CRP levels may fluctuate over brief periods in the absence of changes in health, cardiac symptom status and medications, and without corroboration with other measures of inflammation. Accordingly, elevated hs - CRP levels should be interpreted with caution in this setting. [Blum A, Costello R, Samsel 2009]<sup>7</sup> Recent life events and childhood trauma were assessed at six and 12 weeks respectively. Raised inflammatory mediator levels may be risk factors for depressive symptoms in colorectal cancer patients and thus worth considering as a potential therapeutic target. These pilot data support recent findings demonstrating long - term effects of childhood adversity on adult health. [Archer JA, Hutchison IL 2012]

### Stress in Drug Addiction

Cigarette smoking, physical activity, alcohol intake, C - reactive protein, and hypertension were independently associated with psychological distress. The risk of CVD increased in relation to presence of psychological distress in age - and sex - adjusted models [Hamer M, Molloy GJ]<sup>11</sup>

### Interventional Study on Stress

Engagement with CBCT may positively impact inflammatory measures relevant to health in adolescents at high risk for poor adult functioning as a result of significant ELA, including individuals placed in foster care. Longer term follow - up will be required to evaluate if these changes are maintained and translate into improved health outcomes. [Pace TW, Negi LT, Dodson - Lavelle B 2013]<sup>3</sup> Stress interacted with caffeine and sex to alter cortisol, fibrinogen and systolic BP but not CRP levels. These results may shed light on sex - specific pathways that associate caffeine with CVD. [Bennett JM, Rodrigues IM, Klein LC.2013]<sup>4</sup> In the present trial, music listening is a more sensitive stress - reliever in terms of biological vs clinical response. The hypothalamus - pituitary adrenal axis stress axis is a quick sensor of music listening in responding mechanically ventilated intensive care unit patients, through a rapid reduction in blood cortisol. [Beaulieu - Boire G, Bourque S 2013]

## 5. Conclusions

So, in this systematic review I have tried to produce a provide a critical and reproducible synthesis of the available studies, for the thorough understanding of the concerned scientific question. At present there are still scarce resources

for the complete follow up and inferences from the studies because of still inappropriate proportion of interests in selection criteria of the study population as found from the comparative study of the works done till date.

This document highlights and summarizes the steps to follow for the realization of a correct SR. Conducting a review following the steps of the scientific method, relying on a protocol

### Conflict of Interest

I hereby declare that I have no conflict of interest and tried to overcome all sorts of biases during my review of the studies within human limits.

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