STRESS LOAD AND STRESS RESILIENCES ON CARDIORESPIRATORY ENDURANCE (VO_2MAX) IN ELDERLY GROUP

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Abstract

Stress both psychologists and nonpsychological always found in everyday life. Stressors obtained in every activity of our daily activities both in low to severe stresses. Good stress adaptation can also affect a person in coping with the stress he experiences in adaptive coping person. Stress is also feared can adversely affect the physiological conditions. In this study conducted a regression analysis between stress load and stress resistance to VO_2max of elderly group. The participants recruited by 116 professors, in elderly group. We included individuals with clinical evidence as based upon medical interview, physical examination, and physical fitness test. On statistical result of multiple regression analysis data showed very low correlation interpretation based on correlation stress load and stress resilience on cardiorespiratory endurance (VO_2max). Its mean the data also showed that 0,8% contribution of dependent variable (VO_2max) and independent variable affect (Stress Load and Stress Resilience). On the result study showed no significant effect on Stress Load and Stress Resilience on cardiorespiratory endurance (VO_2max) in elderly group. The result of partial regression coefficient test shows that is no significant effect between stress load and cardiorespiratory endurance (VO_2max) of the elderly group (t = -1.112< t table =1.975). The stress resilience variable partially is no significant effect between stress load and cardiorespiratory endurance (VO_2max) of the elderly group (t=-0.115 < t table =1.975). Based on our study, it can be concluded that stress load and stress resilience have not affected the cardiorespiratory endurance (VO_2max) of the elderly group of Padjadjaran University Professors.

***Keywords**: Regression analysis, stress load, stress resilience, VO2max*

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INTRODUCTION

Stress is an essential adaptation necessary for homeostasis, performance and survival.[7] The stress response (stress load or stress resilience) occurs whenever an individual is faced with an endogenous or exogenous challenge perceived as unpleasant, adverse or threatening. It can be induced by physical, physiological or psychological stimuli.[1,7] Intense exercise implies adaptive processes involving affective, physiological, biochemical, and cognitive-behavioral response in an attempt to regain homeostasis.[1,17] Therefore, it is difficult to differentiate between the effects of the physical stress of exercise and the effects of the psychological stress during exercise.[1,15] Therefore, both the physical and psychological demands during intense exercise are referred to here as "stress". Stress are some of human needs, but it's not too much or not too little for adaptation of healthy life and free from risk of disease.

Although the risk of disease and disability increases with age, poor health is not an inevitable result of aging. A healthy lifestyle, which can be achieved by practicing regular physical activity, healthy diet and early detection of diseases, could slow the effects of age.[12] As long as the elderly population continues to increase, it will be essential for family physicians to keep in mind that sedentary patients have to practice physical exercises regularly.[19] Physical exercise improves health by improving cardiorespiratory fitness, body composition, and psychosocial well-being. In addition, physical exercise is an important tool in the prevention and treatment of obesity.[3,10,24,16] Physical exercise improves body composition and metabolic activity, thereby reducing excess weight and related comorbidities.[14,16]

In physical exercise, VO_2max measures the maximal oxygen consumption during exercise to the point of exhaustion of physical strength and is one of the best methods of predicting cardiorespiratory endurance and aerobic preparation. Maximal oxygen consumption (VO_2max) is the maximum capacity to transport and utilize oxygen and is often used as a measure of an individual's aerobic capacity. The amount of energy needed by individuals is associated with body mass, and VO_2max is associated with body weight. Regular aerobic physical activities increase VO_2max and indirectly reduce the effects of many diseases.[4,16] The respiratory system plays an important role in providing the energy required by different body systems for metabolism. Therefore, the respiratory system is greatly affected by short- and long-term exercise. Owing to its important role in physical activities, the respiratory system is studied by many researchers.[16,23] The level of cardiorespiratory fitness varies with the condition of the respiratory, cardiovascular, and musculoskeletal systems, and its evaluation is important because of its relationship to health and wellness. Poor cardiorespiratory fitness increases the rate of all causes of premature death, and especially that due to cardiovascular diseases. Improvement in cardiorespiratory fitness is associated with reduced premature death rates due to all causes.[9,16,18] The aim of this research to study regression analysis of stress load and stress resilience on cardiorespiratory endurance (VO_2max).

METHOD

Enrollment criteria

116 participants, aged 46-86, were recruited among the Professors of Universitas Padjadjaran. We included individuals with clinical evidence as based upon medical interview, physical examination, and physical fitness test. Written informed consent was obtained before enrollment. The following

criteria were used to define cardio-metabolic risk factors: diabetes mellitus (fasting blood glucose ≥126 mg/dL or antidiabetic treatment); hyperlipidemia (total cholesterol > 200 mg/dL and/or triglycerides > 200 mg/dL or lipid lowering drugs use); hypertension (systolic blood pressure ≥ 140 mmHg and/or diastolic blood pressure ≥ 90 mmHg or antihypertensive treatment); body mass index (BMI) (overweight 25 ≤ BMI < 30 Kg/m2; moderate or class I obesity 30 ≤ BMI < 35 kg/m2; severe or class II obesity BMI ≥ 35 kg/m2); current smoking.

Exercise Protocol

Exercise was performed between 8:00 and 9:00 am, during which time enrolled individuals performed a run on an electronic treadmill (h/p/ cosmos T150, Nussdorf–Traunstein, Germany) for 20 min at approximately 70% of their VO_2max, at a speed and grade set to keep the participants at their target heart rate (~80% of theoretical maximum heart rate (cHRmax), calculated as 220-age).[21] No adjustments were needed for HRmax prediction on the basis of BMI.[6] Exercise intensity during the sessions was monitored by the use of a heart rate signal from a polar transmitter around the participant's chest, until 3 minutes after recovery. All subjects were able to complete the exercise session.

Statistical Analysis

Data were expressed as mean and standard deviation (Mean+SD). The Normal distribution of variables was analyzed by Kolmogorov-Smirnov test. Pearson's correlation test and regression analysis were performed to evaluate the correlation between clinical and laboratory parameters. A P value< 0.05 was considered statistically significant. Data were analyzed using the SPSS software version 16.0 for Windows

RESULT

Table 1 Distribution Data

Variable	Category	Mean±SD	*P*-value
Stress load	Low Moderate Severe Normal	1.74 ± 1.061	0.000
Stress Resilience	Low Moderate Severe	1.43 ± 0.508	0.000
VO2max level	Excellent Good Above Average Average Below Average Poor Very Poor	1.82 ± 0.968	0.000

Tabel 2 Regression Analysis Report of stress load and stress resilience to cardiorespiratory endurance (VO_2max) (α= 5%)

Variable	R	R^2	F	t-test
Stress Load	0.088	0.008	0.636	-1.112
Stress Resilience				-0.155

Analysis of statistical data on this research using computer software SPSS 16.0 for Windows. The results show that were normally distributed after the data distributions normality test with the Kolmogorov-Smirnov test (P=0.000) (table 2). From the analysis results obtained by the multiple regression equation $Y=1.990-0.079X_1-0.023X_2$. Multiple regression analysis data showed very low correlation interpretation based on correlation coefficient test (R=0.088). Multiple regression analysis data also showed that 0,8% contribution of dependent variable (VO_2max) and independent variable affect (Stress Load and Stress Resilience) based on result of a determination analysis ($R^2=0.008$).

The result of regression analysis after regression coefficient test showed no significant effect on Stress Load and Stress Resilience on cardiorespiratory endurance (VO_2max) in elderly group Padjadjaran University Professors (F=0.636 < F table =2.4275). In this study, it can be concluded that stress load and stress resilience have not affected the cardiorespiratory endurance (VO_2max) of the elderly group of Padjadjaran University Professors. Multiple regression analysis on partial regression coefficient test shows that is no significant effect between stress load and cardiorespiratory endurance (VO_2max) of the elderly group of Universitas Padjadjaran Professors (t = -1.112< t table =1.975). The stress resilience variable partially is no significant effect between stress load and cardiorespiratory endurance (VO_2max) of the elderly group of Universitas Padjadjaran Professors (t=-0.115 < t table =1.975).

DISCUSSION

Exposure to psychological stress can rapidly activate the autonomic nervous system where the activation of the sympathetic nervous system (SNS) can result in numerous cardiovascular responses including a rise in heart rate, blood pressure, cardiac output and total peripheral resistance.[20,22] Physiological responses to psychological stressors are generated due to anticipation of a possible disruption of physiological homeostasis, rather than to a genuine threat. Therefore, the stress response generated in such instances is "anticipatory".[8,20] While it is essential to sufficiently activate the SNS in response to stress (to facilitate an adaptive response to the stressor encountered), unnecessary over activation of the SNS can be detrimental and may lead to chronic diseases including cardiovascular disease, type 2 diabetes and psychological disorders.[5,13,20]

Maximal oxygen consumption (VO_2max) is the maximum capacity to transport and utilize oxygen and is often used as a measure of an individual's aerobic capacity. Generally, VO_2max decreases gradually with advancing age, and the rate of decline is approximately 10% per decade after the age of 25 years, and more specifically was suggested to be 15% between the ages of 50 and 75.[11] On statistical result of multiple regression analysis data showed very low correlation interpretation based on correlation stress load and stress resilience on cardiorespiratory endurance (VO_2max). Its mean the data also showed that 0,8% contribution of dependent variable (VO_2max) and independent variable affect (Stress Load and Stress Resilience).

The level of cardiorespiratory fitness varies with the condition of the respiratory, cardiovascular, and musculoskeletal systems, and its evaluation is important because of its relationship to health and wellness. Poor cardiorespiratory fitness increases the rate of all causes of premature death, and especially that due to cardiovascular diseases. Improvement in cardiorespiratory fitness is

associated with reduced premature death rates due to all causes. [9,16,18]

On the result study showed no significant effect on Stress Load and Stress Resilience on cardiorespiratory endurance (VO_2max) in elderly group. The result of partial regression coefficient test shows that is no significant effect between stress load and cardiorespiratory endurance (VO_2max) of the elderly group (t = -1.112< t table =1.975). The stress resilience variable partially is no significant effect between stress load and cardiorespiratory endurance (VO_2max) of the elderly group of Universitas Padjadjaran Professors (t=-0.115 < t table =1.975).

CONCLUSION

Based on our study, it can be concluded that stress load and stress resilience have not affected the cardiorespiratory endurance (VO_2max) of the elderly group of Universitas Padjadjaran Professors.

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