

# Effect of Test Anxiety on Some Physiological and Biochemical Parameters of High School Students During and After Exam

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## ABSTRACT

The current case study is based on semi structured interviews. The psychological effects of stress can impair the students' ability to think, behavior and emotions during exams. Also, stress can cause restlessness; lack of motivation and irritability, the research tested the effects of examination anxiety on 200 male and female high school students with effects on cardiac rhythm and vascular regulations with using a Hamilton Anxiety Scale questionnaire. The results showed a statistically significant difference ( $p < 0.05$ ) in groups' systolic blood pressure during the test compared to both participants after the examination. The experiment aimed at knowing the impact of anxiety/stress on the cardiovascular system, for example, blood pressure, random blood sugar and pulse levels during and after exam on high school students and their sexual predominance. This condition negatively impacts their motivation and academic performance, minimizes their interest in education, and leads to the incidence of anxiety in both academia and the family. This depression can have a destructive impact on students' professional and personal lives, leaving them anxious, exhaustive and socially isolated at low academic levels, blood pressure. The hazardous factors that can alter the arterial pressure and cardiac frequency include age, gender, ethnicity, family history, obesity, smoking and alcoholism.

**KEY WORDS:** Anxiety Test, Blood Pressure, Blood Sugar, Pre-Examination Stress, Pulse Rate

## 1. INTRODUCTION:

Anxiety disorder has been recognized as excessive fear and distress regarding actual or hypothetical circumstances. The needless worry will damage the aptitude to act to resolve a problem. Anxiety is associated with students' knowledge for the duration of study, specifically study anxiety that impacts on educational achievements. Anxiety is documented most commonly; however complete positive feelings have

been no less recurrently described than negative sensations (Pekrun, *et al*, 2002). Devoutness is considered as one of the complications of psychophysiology (Callahan, 2001), encouraged by inadequate instruction or a disproportionately multifaceted syllabus. Therefore, it will motivate students in the direction of the surface methodology as an approach to deal with pressure and nervousness owing to individual or household-associated complications and also contributes to anxiety (Carroll and Garavalia, 2004).

Furthermore, students typically poorly act when they sense problematic with their projects and when they come across with great levels of concern throughout their studies. All of them are the fatalities of anxiety in diverse methods (Lenka and Kant, 2012). The signs can be either corporeal or psychological ecological matters. There are numerous measures of anxiety: impatience, too much concern, and sense of fear, excessive sensitive respiration and negative reflection. Anxious people

Koya University Journal of Humanities and Social Sciences (KUJHSS), Volume 4, Issue 1, 2021.

Received 10 Mar 2020; Accepted 05 Dec 2020,

Regular research paper: Published 30 Jun 2021

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seem to be patient, but the brain never discontinues discerning. Anxiety gradually disrupts the quality of life. Historically, numerous definitions of anxiety have been presented. For example, APA defines anxiety disorder as an emotion characterized by feelings of tension, worried thoughts and physical changes like increased blood pressure (Kazdin, 2000). Breuer (1999) states that all anxiety conditions are defined by the double physical characteristics of emotive distress and physiologic hyper stimulations. Similarly, students with advanced anxiety stages incline to get lower marks at the end of examinations and semester assessment report. Various evidences demonstrate that anxiety is related to hypertension, individuals with anxiety who are a larger risk of hypertension than those lacking anxiety (Bacon *et al*, 2014). Furthermore, hypertension infected people have a developed danger of anxiety as compared to those deprived of hypertension (Grimsrud *et al*, 2009; Hamer *et al*, 2010). Though, some investigators do not elaborate the character of anxiety indications in reducing blood stress (Hildrum *et al*. 2011; Hildrum, *et al*, 2007). The approach between hypertension and anxiety is a compound method. Anxiety characteristically upsurges blood pressure, complete vascular confrontation, compassionate function, plasma adrenal hormones achievements, arrangement of homeostasis, and blood triglyceride.

Initially, depression upsurges blood pressure in the short duration, and anxiety derivative white coat consequence is a distinctive example (Spruill *et al*, 2007; Ogedegbe *et al*, 2008). Next, anxiety is meticulously interconnected to the renin angiotensin structure, and increases angiotensin levels (Saavedra *et al*, 2005; Braszko *et al*, 2003). Long-standing anxiety may decline vascular changeability, so that insistent vascular opposition results in hypertension (Lambert *et al*, 2010). Then, some particular experiments confirmed that sick people with anxiety commonly have compassionate physiological indications of motivation, and can powerfully motivate sympathetic anxious outflow and syncope reaction. Lambert, *et al*, (2010) and Rozanski *et al* (1999) struggle that nervousness can trigger the sensitive nervous scheme, upsurge cardiac productivity, tighten blood vessels, and advance major blood pressure. Despite, based on some investigations, the connection between sex and anxiety has been explained recurrently: the female students encounter advanced rates of test anxiety in comparison with males (Bandalos, Yates, & Thorndike-Christ, 1995). Finally, several researches conducted by Hembree (1988), confirmed that the high level of feminine test anxiety is characteristically not supplemented by lower activities' marks. As then, nevertheless, insufficient experimentation has been conducted, specifically relating to students of post-graduate levels.

## 2. METHODOLOGY

### 2.1 Setting and Participants

This research was conducted in the Koya and Taq Taq High Schools, affiliating to Koya Directorate of Education. At the final examination of the first semester, 200 tall school understudies of both genders were chosen as the test of understudies who smoked, rationally, and psychiatrically sick pharmaceutical amid the examination and those who did not concur were expelled from the investigation.

The experiment was accepted by the institution's ethical committee and all of the students received informed consent. Two weeks before and at the beginning of the professional test, a questionnaire was distributed among the students that included age, sex, and anxiety prevalence assessment, a Hamilton Anxiety Scale with a cut off a score or different levels of anxiety.

The scale of anxiety contains 14 items, each of which is characterized by a series of symptoms and measures both psychic anxiety (mental agitation and psychological distress) and somatic anxiety (anxiety-related physical complaints).

Each element is scored on a scale of 0 (not present) to 4 (severe), with a range of 0-56 overall score, where <17 indicates mild severity, 18-24 mild to moderate severity, and 25-30 moderate to severe anxiety.

The radial pulse, blood sugar, and arterial pressure were reported before and after the test, and at the beginning of the first test, during the academic period. After 30 minutes of rest, pulse, and blood pressure were recorded, two readings were done with an interval of two minutes according to the American Heart Association cardiology guidelines, and an arithmetical mean value of cardiac frequency, systolic and diastolic arterial pressure was created.

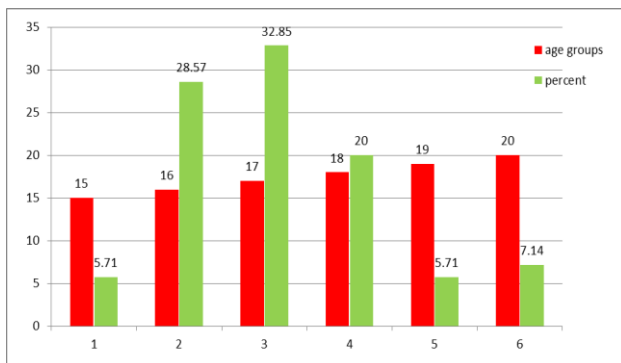
## 3. RESULTS

The research, which was conducted in Koya and Taq Taq high schools, included a total of 200 high school students. During and after examination statistical data of the students were shown. The results of graph 1 show the highest age group of 17 years and therefore the lowest age group of 15 and 19 years. Data of graph 2 show the percentage of high school participants with highest level of education is twelve and eleven graders. The lowest is the 10 graders. Bar chart of graph 3 illustrates distributions of anxiety type levels from Hamilton Anxiety Rating Score of the high school students, it shows that the mild anxiety is higher than moderate and severe. Also graph 4 clarifies gender distribution of anxiety type levels, it shows that mild anxiety in females is more than in males, it is also true to moderate and severe anxiety. The result of data analysis (table 1 and graph 5) shows statistically significant

difference ( $p < 0.05$ ) in the mean value of systolic blood pressure of participants during exam when compared with that after exam in both sexes, the blood sugar raised during exam in both sexes, and the systolic and diastolic blood pressure during exam is more than after the exam. As for the results of table 2 and graph 6, a statistically significant difference ( $p < 0.05$ ) was noticed between mean value of diastolic blood pressure of the male students during and after exam. Meanwhile, a statistically significant difference ( $p < 0.05$ ) was also noticed between mean value of systolic blood pressure of the female students in (table 3 and graph 7).

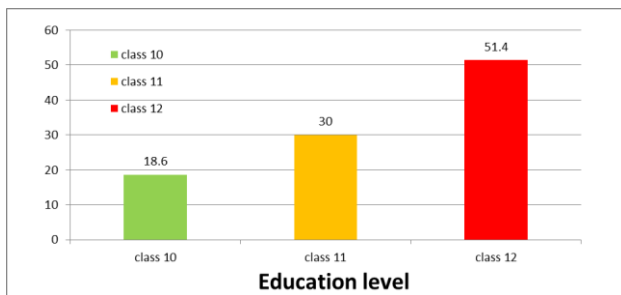
GRAPH 1

Demographic data show percentage of age groups of the high school students



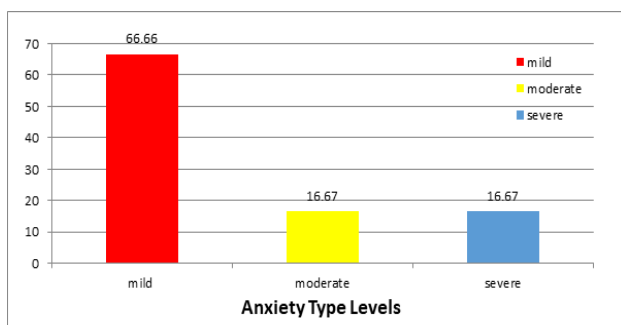
GRAPH 2

Percentage of education levels of the high school participants



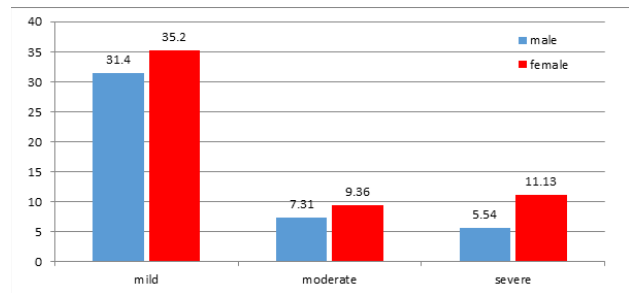
GRAPH 3

Distribution of anxiety type levels from Hilton anxiety rating score of the high school. Students



GRAPH 4

Distribution of anxiety type levels from Hamilton anxiety rating score of the high school students in both male and female gender



GRAPH 5

Comparison in mean value and S.E of mean for blood sugar, heart beat rate, systolic and diastolic blood pressure of the high school students during and after exam

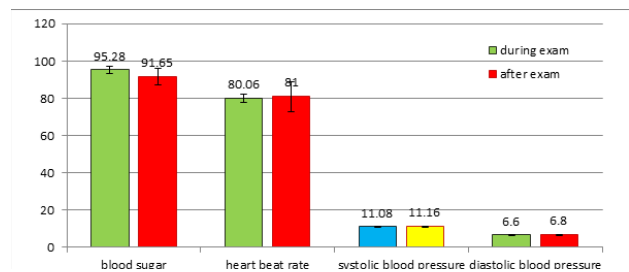


TABLE 1

Comparison in mean value plus/minus S.E of mean for blood sugar, heart beat rate, systolic and diastolic blood pressure of the high school students during and after exam

Parameters	During exam	After exam	p-value
Blood sugar	95.28±2.09	91.65±4.59	P>0.05
Pulse rate/min	80.06±2.36	81.00±8.88	P>0.05
Systolic Bp	11.08±11.23	11.16±11.24	P<0.115
Diastolic Bp	6.60±0.18	6.80±0.25	P>0.05

GRAPH 6

Comparison in mean value and S.E of mean for blood sugar, heart beat rate, systolic and diastolic blood pressure of the high school students before and during exam in males

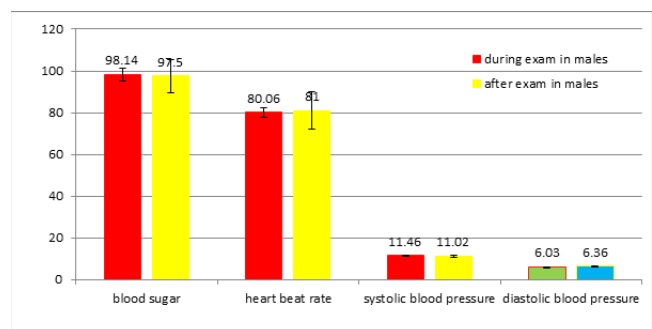


TABLE 1

Comparison in mean values and S.E of means for blood sugar, heart beat rate, systolic and diastolic blood pressure of the high school students during and after exam in males

Parameters	During exam	After exam	p-value
Blood sugar	98.14+2.94	97.50+7.75	P>0.05
Pulse rate/min	80.06+2.36	81.00+8.88	P>0.05
Systolic Bp	11.46+0.29	11.02+0.39	P>0.05
Diastolic Bp	6.36+0.23	6.03+0.27	P<0.05

GRAPH 7

Comparison in mean value and S.E of mean for blood sugar, heart beat rate, systolic and diastolic blood pressure of the high school students during and after exam in females.

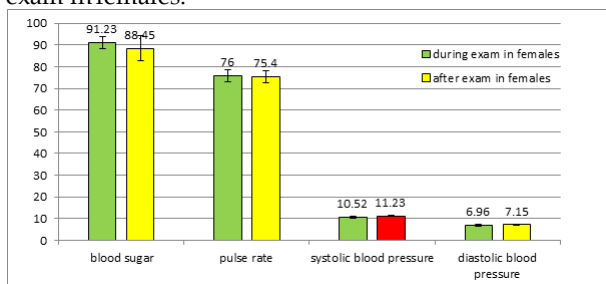


Table 3

Comparison in mean values and S.E of means for blood sugar, heart beat rate, systolic and diastolic blood pressure of the high school students during and after exam in females.

Parameters	During exam	After exam	p-value
Blood sugar	91.23+2.72	88.45+5.72	P>0.05
Pulse rate/min	76.00+2.789	75.4+2.81	P>0.05
Systolic Bp	10.52+0.34	11.23+0.31	P<0.05
Diastolic Bp	6.96+0.29	7.15+0.29	P>0.05

#### 4. DISCUSSION

The research was conducted on high school students, taking into account the physiological parameters and anxiety levels, during and after the first semester first trial tests. Our findings showed no significant increase in blood sugar, pulse rate, when subjected to stress from the examination. Meanwhile the tests of systolic and diastolic blood pressure were significantly increased ( $p<0.05$ ).

These results are consistent with several studies that demonstrated significant increases in pulse rate and blood pressure in students before and during examination mental stress (Yasar et al, 2011; Jadoon et al., 2010; Pagani et al, 1986). The researchers found 66.66 percent of students with a mild degree of anxiety, 16.67 percent of students with a moderate degree, and 16.67 percent with serious anxiety during exams. These results are in line with the study which has been conducted in

Coimbatore that showed 40% of the students with moderate, 36% students with low and 24% with severe examination anxiety. The female students were found to be more anxious than the boys during exam days. These results are in agreement with several other studies (Shamsuddin et al, 2013; Kumar et al, 2017). This shows a significant relationship between female students between anxiety and examination compared to the males. However, Reshugupta et al agreed with the results and showed low levels of anxiety during the exam period (cited in Gupta et al., 2014).

Academic achievement is more stressful relative to other variables and the discrepancy found in gender can be attributed to some unresolved emotional problems and constant pressure associated with negative effects on the female compared to males such as adult anxiety, depression, and behavioural disorders (Ibrahim and Abdelreheem, 2015; Wahed and Hassan, 2017).

Vitasari et al, (2010) discovered an important association between top-level anxiety and poor academic achievement. DordiNejad et al, (2011) have recounted that experimental anxiety damages students' academic proficiency.

The "psychological burden" can result from financial problems, modern life events, social isolation, work-related problems, family issues, or violence. These conditions adversely affect students in high school and display prior academic performance, lack of learning strategy, ingestion of unhealthy food during tests, breakdown of personal relationships, and even suicide (Casey et al, 2016; Munir et al, 2015). The responsive cardiovascular system, increased heart rate increases blood sugar levels and increased blood pressure is a physiological occurrence in stressful conditions as a result of hypothalamic-pituitary-adrenal axis activation the cytokine profile and vagal suppression (Deboer et al, 1988). The adrenal gland produces cortisol and increased levels of epinephrine and norepinephrine which in turn increase heart rate, blood sugar, and systolic blood pressure by their action on beta-receptors. Besides, lack of psycho-pedagogical support and flexibility of exam periods are also risk factors for stress resulting in anxiety, stress, and high frequency of depression among high school with some deleterious effect on student's mental health (Singh et al, 2012).

The increased level of cortisol has a permissive role with sympathetic activity on the blood vessel for the adrenergic response, however; impairment of the endothelial function may play an additional role (Hughes, 2005). The exacerbation of the sympathetic system acts as a risk factor for cardiovascular diseases, renal abnormalities (Paolopalatini, 2001).

This paper has suggested two motives for the gender alterations in test anxiety. One characterizes them to the dissimilar communal roles allocated to males and

females, the notion being that for the reason that woman is under superior pressure to prosper scholastically as compared to males, who are more anxious of worsening in a test condition. The other clarification recommends that men are more self-justifying in comparison with women when it comes to confessing anxiety, as acting so may be knowledgeable as intimidating their maleness (Nuñez-Peña et al, 2016).

Sexual anxiety differences were documented uniforms and such consistencies in gender differences across cultures indicate a biological component. Imperative sex dissimilarities have been stated in numerous brain and physical purposes connected with anxiety. Female reproductive hormones, such as estrogen and progesterone, have a tendency to have a noteworthy influence on the roles of anxiety-associated neurotransmitter structure and impact on the removal of anxiety (Lebron-Milad and Milad, 2012), (Pigott, 1999). Correspondingly, among the male reproductive hormones, testosterone has been presented to have anxiolytic impacts conceivably by plummeting receptiveness to pressure and overturning the action of the hypothalamic-pituitary-adrenal (HPA) axis (McHenry, et al, 2014). Consequently, gonadal hormones are to be expected to account for at least part of the wrinkled occurrence and rigorousness of anxiety syndromes in female variations in estrogen and progesterone during the course of the female menstrual progression appear to impact reactivity.

## 5. CONCLUSIONS

The school examinations had an effect on high school students' psychological state, homeostasis, steady condition of body, and many physiological parameters for example result of atrial blood pressure (systolic and diastolic) showed significant increase in females, that may lead to prior academic achievement. In order to improve their skills and academic achievement, awareness among high school students needs to be raised about the negative consequences of stress.

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