

# **MATHEMATICAL ANALYSIS OF THE EFFECT OF STRESS ON STUDENTS' HEALTH (A CASE STUDY OF KEN SARO-WIWA POLYTECHNIC, BORI)**

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## **Abstract**

*The aim of this paper is to examine the effect of stress on students' health. Ten students from different departments in Ken Saro-Wiwa Polytechnic, Bori were selected depending on their workload (number of course offered) and were examined of their systolic blood pressure. The data obtained was analysed using Pearson product moment correlation coefficient and t-test statistic. The result of the study reveals that work overload increases the systolic blood pressure of students causing hypertension which is detrimental to their health. Based on the findings, there is need to reduce stress by reducing work overload by planning, eating diet that reduces stress and rest.*

*Keywords: Stress, students, health, work overload, workload, hypertension, systolic blood pressure, effect.*

## **Introduction**

Stress is produced when the events of life, whether physical or psychological, are greater than the ability to cope.

Stress has repercussions on the body. Stress causes increase in systolic blood pressure (hypertension). Hypertension is a silent killer disease. It does not produce symptoms, but rather slowly deteriorates the arteries and various organs. Students are faced with stress as a result of academic work overload.

Stress is as old mankind. Even our forefathers experienced stress in one way or the other. Ekwe (1989), reported that stress is not a new phenomenon in man's history as our ancestors who lived in caves experienced stress whenever they came in contact with the sabre-toothed tigers outside their caves, or pythons in thick forests.

Stress is an adaptive response, mediated by individual characteristics and/or psychological processes that is, a consequence of any external action, situation or event that places special physical and/or psychological demands upon a person (Ivancevich & Matterson 1980).

Stephen (1991), viewed stress as a dynamic condition in which an individual is confronted with an opportunity or demand related to what

he/she desires for which the outcomes is perceived to be both uncertain and important. Stress is a tendency that relates to a pathological human response to psychological, social, occupational and/or environmental pressure. Stress in an education system may be seen as a non specific response made by a person when the demands of the said person exceeds his adaptive resources. Stress and its management is a critical issue that has attracted the attention of many.

Robbins (1996), said stress is associated with constraints and demands. In a school environment, when one undergoes an annual review of school performance, one feels stressed as he confronts opportunity, constraints and demands. A good performance review may lead to success while a poor review might result in failure and the scenario can be stressful. Stress is not necessarily bad in itself despite the fact that it is often discussed in the negative context. It has some elements of positivity as it spurs students to action.

Dunham (1976), reported that there are two main types of stress responses among students, the first is frustration and the second is anxiety.

Selye (1974), posited that stress may conjure a negative image but may be differentiated into what he termed as “eustress” (good stress) and “distress” (bad stress). Eustress stimulates the students to perform the functions or duties more effectively, while distress obstructs or limits the students’ effectiveness and efficiency. Some students perform better under stress while others do not, but the fact remains that positive expectations such as getting trained, developed and promoted demands stress Shoaf (1989).

Stress can not necessarily be avoided due to the dynamic and complex nature of the education system.

According to Uzoeshi (2004), life problems such as insufficient finance, poor interpersonal relationship, noise, not having enough rest, unhealthy diet, work overload, improper planning, assignments, examination, illness, insecurity on campus, poor accommodation, stressful learning condition and economic difficulties are all potential sources of stress. These stressors if not checked could cause health problems, especially hypertension which might result to death. The existence of stress in education system is a fact which demands attention with the view to reducing its occurrence since stress is inevitable.

### **Hypothesis**

The following hypotheses were used to direct the study:

H<sub>0</sub>: Work load does not induce stress.

H<sub>A</sub>: Work load induces stress.

**Decision Rule:** If t-calculated value >t-critical then H<sub>0</sub> will be rejected and H<sub>A</sub> will be accepted.

## Procedure

The design of the study is a correlation research with compares recorded students' systolic blood pressure with their work load. A sample of ten students from different departments in Ken Saro-Wiwa Polytechnic, Bori whose work load are suspected of causing high blood pressure were collected and subjected to statistical analysis using Pearson product moment correlation coefficient and t-test statistic.

## Data Analysis and Result

**Table 1: Data on students' workload (number of courses offered in a semester) for 10 representatives and stress.**

S/N	Workload X	Stress Y	X <sup>2</sup>	Y <sup>2</sup>	XY
1	3	129	9	16641	387
2	4	130	16	16900	520
3	5	132	25	17424	660
4	6	135	36	18225	810
5	7	136	49	18496	952
6	8	139	64	19321	1112
7	9	140	81	19600	1260
8	10	145	100	21025	1450
9	11	150	121	22500	1650
10	12	160	144	25600	1920
	<b>∑X=75</b>	<b>∑Y=1396</b>	<b>∑X<sup>2</sup>=645</b>	<b>∑Y<sup>2</sup>=195732</b>	<b>∑XY=10721</b>

### Using Pearson product moment correlation,

$$r = \frac{n \sum xy - (\sum X)(\sum Y)}{\sqrt{[n \sum X^2 - (\sum X)^2][n \sum Y^2 - (\sum Y)^2]}}$$

#### Where,

r = Sample correlation coefficient

n = Sample Size

x = Independent variable (workload)

y = Dependent variable (stress)

$$r = \frac{10(10721) - (75)(1396)}{\sqrt{[10(645) - (75)^2][10(195732) - (1396)^2]}} = \frac{2510}{\sqrt{(825)(8504)}}$$

$$= \frac{2510}{\sqrt{7015800}}$$

$$= \frac{2510}{2648.74}$$

$$r = 0.9476$$

Test statistic for correlation

$$t = \frac{r}{\sqrt{\frac{1-r^2}{n-2}}}$$

df = n - 2, where

t = number of estimated standard deviations

$r$  = Sample correlation coefficient

$n$  = sample size

$df$  = degree of freedom

$$t = \frac{0.9476}{\sqrt{\frac{1-(0.9476)^2}{10-2}}} = \frac{0.9476}{\sqrt{\frac{0.1021}{8}}} = \frac{0.9476}{\sqrt{0.0128}}$$

$$t = \frac{0.9476}{0.1131} = 8.3784, \therefore t \text{ calculated} = 8.3784$$

$$t_{0.05, 8} = 2.306$$

$$t\text{-critical} = 2.306$$

$t_{\text{cal}} > t_{\text{crit}}$ ,  $\therefore$  we reject  $H_0$  and accept  $H_A$ .

### Discussion

From the hypothesis,  $H_0$  denotes workload does not induce stress.  $H_A$ , denotes workload induces stress. The decision rule is if  $t$ -calculated value is greater than  $t$ -critical value, the researcher rejects  $H_0$  and accepts  $H_A$ .

From the result,  $t$ -calculated is greater than  $t$ -critical, therefore  $H_0$  is rejected and  $H_A$  is accepted. Hence, workload induces stress which causes students' ill-health.

### Conclusion

Based on the findings of this study, it could be concluded that stress is an inherent factor in our education system. At its best, the pressure of stress can be a motivation that urges the students to strive for academic success. However, the excess amount of stress can lead to poor performance, ill-health and inability to perform routine tasks. When left unchecked, stress can cause high blood pressure (hypertension), a silent killer disease which can lead to death.

### Recommendations

- It is necessary that students check their Bp from time to time.
- Students should eat fruits that can control Bp like apple, guava, onions etc.
- Students workload should be reduce by planning to avoid work overload.
- Students should engage themselves in regular exercise and rest.
- Government should create conclusive learning environment.
- Stress should not be totally avoided.

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