

ERGONOMICS AND STRESS REDUCTION IN ORGANIZATIONS

Prof. AYANDELE, ISAAC AYANYINKA
Dr. OBIALOR, DONATUS CHUKWUEMEKA
Department of Business Management, University of Uyo, Uyo
08034092759

<https://doi.org/10.37602/IJSSMR.2022.5302>

ABSTRACT

Implementing ergonomic solutions can make employees more comfortable and increase productivity. This study focused on examining the impact of ergonomics on stress reduction in Globacom and MTN Organizations. The study adopted a survey research approach in its design. The study was made up of a sample size of 95 samples drawn from a population of 109 using the Taro Yamane formula. The study used the simple percentage, Pearson product-moment correlation, and simple regression with the aid of SPSS version 20. Findings of the study include that ergonomic work design variables have a significant impact on employee stress reduction. The Study, however, recommends that; to enhance employees well being, organization need to balance work demands, employees' skill, and the nature of the equipment used in completing a task. The study concludes that ergonomics has an enormous impact on the performance of employees in Globacom and MTN organizations.

Keywords: Ergonomics, Stress Reduction, Employee, productivity, Performance.

1.0 INTRODUCTION

An uncomfortable work environment can affect productivity and increase the likelihood of work-related muscle strains and eye strain. Incorporating ergonomics in the workplace of your business can remedy an uncomfortable atmosphere. These simple changes help decrease stress levels and improve employee performance (www.Uncagedergonomics.com). In an effort to curb employees' disengagement from the workplace, it has become a new challenge for top management to develop a work environment that attracts, retains and motivates its workforce.

Organizations are stepping outside their time-tested policies and comfort zones to develop a new work environment that satisfies both the psychological and the physical needs of the employees at its core. They are creating a work environment where people enjoy what they do, feel like they have a purpose, have pride in what they do and can reach their potential. This paradigm may not be unconnected with the new thinking that the work environment affects employees' morale, productivity and engagement positively and otherwise (Zafir, Nor & Zizah 2013).

Ergonomics is a science concerned with the "fit" between people and their work. The study of people in their work environment puts people first, taking account of their capabilities and limitations. Ergonomics aims to make sure that tasks, equipment, information, and the environment fit each worker. By assessing people's abilities and limitations, their jobs,

equipment, and working environment, and the interaction between them, it is possible to design a safe, effective, and productive work system (Roeloelofsen, 2002). The goal of ergonomics is to eliminate discomfort and risk of injury due to work (dictionary.cambridge.org).

Implementing ergonomic solutions in organizations' workplaces does not only affect commitment, competence, and cost-effectiveness but also has long-term effects on the physical health, and mental health longevity of life of employees (Taiwo,2009) cited in Zafir et al 2013). According to the Washington state department of labor and industries (2002) ergonomics improvements to the work environment are not only primarily used to a healthful work environment, increased work quality, reduced turnover, reduced absenteeism, increase productivity and morale. Muchhal, (2014) posits that performance is important for organizations as employee performance lead to business success and employees accomplish tasks as a result of satisfaction. Ergonomic is important because when you're doing a job and your body is stressed by an awkward posture, extreme temperature or repeated movement, your musculoskeletal system is affected. The goal of ergonomics is to eliminate discomfort and risk of injury due to work.

Stress occurs in almost all Organizations, however, stress is often ignored and considered an unimportant issue by employers (Loveday 2012). Work stress can affect employers in any number of ways, from lowering resistance to illness and depriving them of sleep, to interfering with their concentration so that more injuries and accidents occur. According to Tarcan, Varol, & Ates (2004), an effective ergonomic process minimizes work stress at the workplace. Derived from the Greek words, ergo (Work) and nomos (natural laws), ergonomics literally means the laws of work. According to Rowan & Wright (1995) cited in zafir, et al (2013) ergonomics refers to the complex relationship between workers and their work that permeates every aspect of the workplace.

2.0 STATEMENT OF THE PROBLEM

Due to increasing work stress in Nigeria and other parts of the world, organizations are experiencing incredible pressure to become more efficient, while simultaneously maintaining a high level of responsiveness to environmental changes. These pressures are translated into intense demand of employees resulting to increase in work stress. However, the right process and facilities required to meet the work demands are in most cases lacking. Hence, employee's creative capacity cannot be maximized if the management fails to provide the right behavioral environment for innovativeness to strive. For employees to be efficient, organizations need to achieve certain level of environment-employee-job-fit. The challenge before this study is therefore to examine how organizations can reduce work stress through ergonomic practices.

3.0 OBJECTIVES OF THE STUDY

The objective of the study is to examine how Globacom and MTN Organizations can reduce work stress through ergonomic practices. The specific objectives include to:

1. Examine the impact of work design variables on work stress reduction in Globacom and MTN Organizations.

2. Evaluate the effect of machine variables on work stress reduction in Globacom and MTN Organizations.
3. Assess the influence of human variables on work stress reduction in Globacom and MTN Organizations.

3.1 Research Questions

1. What is the impact of work design variables on work stress reduction in Globacom and MTN Organizations?
2. Do machine variables have a significant effect on work stress reduction in Globacom and MTN Organizations?
3. What is the influence of human variables on work stress reduction in Globacom and MTN Organizations?

3.2 Research Hypotheses

1. Work design variables have no significant impact on work stress reduction in Globacom and MTN Organizations.
2. Machine variables have no significant effect on work stress reduction in Globacom and MTN Organizations.
3. Human variables have no significant influence on work stress reduction in Globacom and MTN Organizations.

4.0 REVIEW OF RELATED LITERATURE

4.1 Ergonomics: Work-Related Factors

The extreme and unremitting exposure to stress lessens the competency of individuals to perform at work. Thus, concern among researchers to identify a significant relationship between organizational factors and work stress escalates as stress becomes a major factor affecting productivity (Wilson, 2000). When designing work environments, the main variables of ergonomic considerations involve the work design, (in regards to working hours, working chair, and table), work area design, and environment, (which include factors such as humidity, acoustics, lighting, shift work), the machine variables, (in terms of tools suitability maintenance), the human, (in regards to body posture and health) (Wilson,2000).

Tarcan et al (2004) posit that body posture can lead to work stress, for example, prolonged static movement can reduce body flow to tendons, which is likely to cause fatigue and strain (Zafir et al 2003). Additionally, stress related to body posture may be triggered by the neck, shoulder, arm, thigh, and knee problems (Magnusson & Pope, 1998 cited in Zafir et al 2013). Related to machines, research demonstrates that injuries at the workplace occur because of tools used by employees in performing their tasks (Wickers, lee, Liu & Beckers 2004). Pain and stress could be minimized, as well as the work environment is made more comfortable, if minor adjustments to the tools are introduced, such as a table, chair, machine, and other apparatus (Wojcikiewicz 2003). For example, chairs used by workers to perform their tasks fulfill three principal functions: increasing individual effectiveness; minimizing fatigue and stress at the workplace, and fitting the body posture (Wojcikiewicz 2003).

However, adjustable chairs and chairs with armrests will help to minimize strain on the neck, shoulder and arm muscles (Cook, Burgess-Limerick & Papalia 2004). An ergonomic chair will not only allow employees to perform their tasks, and most importantly, minimizes work stress. This is further supported by epidemiology research that acknowledges the importance of the physical environment of ergonomic work environment in minimizing stress, including factors such as lighting, anthropometry control, and improving work conditions (Areas, Horgen, Bjorset, Ro & Walsoe. 2001). Extreme factors in the working environment can also act as stressors. For example, extreme heat in the workplace creates mental depression and affects employee and work performance (Clark 2002).

Similarly, extreme cold impedes mental abilities and eventually leads to absenteeism and nonperformance (Smith, Thomas & Whitney, 2000). It is common for workers to complain about discomfort resulting from extreme environments and the failure of the employer to address these complaints may lead to job dissatisfaction (Leaman 1995). Work stress resulting from uncomfortable work environments should be avoided because it affects workers' abilities to perform well and thus affect performance levels. Extreme noise is another common stress in the work environment and minimizing noise levels will definitely reduce work stress (Fair brother & Warn 2003). The shift work system is another stress related to the work environment. About 20-to-30 percent of workers dislike the shift system because it causes insomnia, problems in the digestive system, and impedes mental functions which will all result in stress (Zafir et al 2013). Long working hours and insufficient rest can result in chronic fatigue and consequently stress which is a contributing factor to accidents at the workplace (Savery & Luks 2000).

Principles of Ergonomics include working in neutral postures, reducing excessive force, keeping everything in reach, reducing excessive motion, minimizing fatigue and static load, minimizing pressure points, provides clearance. Implementing ergonomic solutions can make employees more comfortable and increase productivity. The Benefits include; reducing costs (by systematically reducing the ergonomic risk of injury), improving productivity, improving quality, creates a better safety culture.

5.0 THEORETICAL REVIEW

5.1 Participatory Ergonomics Theory (PET)

Haines, Wilson, Vink, & Koningsveld (2002) developed a conceptual framework for understanding Participatory Ergonomics Theory (PET) by identifying seven dimensions, and each category explains its range. The dimensions: for example; "FOCUS" following categories: "Designing equipment or tasks", "Designing jobs, teams or work organization", and "Formulating policies or strategies". This framework is very useful for researchers in understanding specific Participatory Ergonomics Schemes (PES). For practitioners, it may serve as a reflective tool when designing PE schemes in companies. The Study argues, however, that the framework would benefit from a clearer distinction between two basic topics addressed in participatory ergonomics.

The first dimension is a completely new installation. Kuorinka (1997) makes this distinction, pointing to the first dimension as the most common in PE, but also acknowledging the other dimension. In an analysis of user-centered design, Eason (1995) widens the dimension of PE

to include: establishing design processes in which the end-user themselves can influence the design so that it is compatible with their goals and beliefs. Similarly, Sundin, Christmansson, & Larsson (2004) claim that it is not enough to improve workplaces and the production systems themselves; it is also necessary to involve "the earlier step that affects the production system. They coin the term participatory ergonomics design" for such activities.

In line with PES, Sundin & Medbo (2003) maintained that the P.E. framework of Haines et al (2002) would benefit from introducing the "tools and methods" dimension. Such dimensions should include tools and methods for participatory ergonomics design. However, the focus on the design and planning of new installations or production systems as a goal for P.E triggers a new question: How can workers and other workplace end-user participate in setting up measures for ergonomics, when the new work does not exist? This question is about representations of workplaces and work processes in design processes. If the ergonomist has the role of guiding the P.E process, he also has to consider what kinds of representations are useful in the design process. Studies of P.E processes indicate that quite a number of different kinds of objects are used to represent features of the non-existing workplace and work process in design processes.

By objects, the framework initially refers to such different things as written documents, drawings, prototypes, and CAD systems (Haines et al 2002). The representations constitute means of communication and are enablers of participatory design processes. For an ergonomist guiding a P.E process, the involvement of objects should make it easier for participants in the design process. This raises the question of whether some objects are better than others for doing this job. In this study, the researcher introduces the concept of "boundary objects", which was originally developed within the science and technology studies field. Boundary objects can translate meaning across different knowledge domains and work practices. This ability is highly sought in P.E to facilitate design processes involving workers, designers, and ergonomists.

6.0 METHODOLOGY

The study adopted the survey research design. The Taro Yammeh formula was used to determine a sample size of 95 samples from a population of 109 personnel consisting of staff of Globacom and the two MTN area offices in Owerri. Pearson product-moment correlation and simple regression analysis were used for data analysis with the aid of SPSS version 20. And used P-value as the basis for decision making at 0.05%.

7.0 RESULTS

7.1 Research Question One

What is the impact of work variables on work stress reduction in Globacom and MTN Organizations?

Table.1. Responses on research question one

S/N	SA	A	U	D	SD	TOTAL
1.	57	28	10	0	0	95

2.	48	32	10	3	2	95
3.	42	33	14	3	3	95
4.	44	37	13	1	0	95

Source: Field survey 2022

Ho1: Work design variables have no significant impact on work stress reduction in Globacom and MTN Organizations

$$WDV = 2.949 + 0.827 WSR$$

The R2 which is the coefficient of determination measures the proportion of variation in the dependent variables which is explained by the independent variables. The value of R2 = 0.892 shows that 89% of the variation in work design variables is explained by the work stress reduction in organizations (see table 3). The adjusted R2 is 89% and it's also significant. Since T-calculated is 66.09 and is greater than F-tabulated at n-1 degrees of freedom respectively; reject Ho1 and conclude that work design variables have a significant impact on work stress reduction in Globacom and MTN Organizations.

Table.2 ANOVAa

Model	Sum of squares	df	Mean square	F	Sig.
Regression	1901.796	1	1901.796	66.091	.000 ^b
1 Residual	230.204	8	28.775		
Total	2132.000	9			

- a. Dependent variable: work stress reduction
- b. Predictors: (constant), work design variables

Since the P-value or Sig. (0.000) < the alpha level (0.05), reject the null hypothesis and accept the alternative hypothesis which states that work design variables have a significant impact on work stress reduction in Globacom and MTN Organizations.

Table 3: Model Summary

Model	R	R. square	Adjusted R. Square	Std. Error of the estimate	R. square change	F – change	Df.1	Df.2	Sig. F Change
1.	.94	.892	.88	5.36	.89	66.09	1	8	.000

- a. Predictors: (constant) attitude towards entrepreneurship.

Since the p-value or sig. (0.000) < the alpha level (0.05), reject the null hypothesis and accept the alternative hypothesis which states that work design variables have a significant impact on work stress reduction in Globacom and MTN Organizations.

Research Question Two

Do machine variables have a significant effect on work stress reduction in Globacom and MTN Organizations?

Table.4 Responses on Research Question.2

S/N	SA	A	U	D	SD	TOTAL
5	48	27	13	7	3	95
6	32	37	22	3	1	95
7	35	33	21	6	0	95
8	39	33	19	2	2	95

Source: field survey 2022

Ho2: Machine variables have no effect on work stress reduction in Globacom and MTN Organizations.

The relationship of the model is $MV = 13.770 + 0.838 WSR$

The value of $R^2 = 0.460$ shows that 46% of the variation in machine variables is explained by work stress reduction. See table 5. The adjusted R^2 is 39% and is also significant as F-cal (6.827) is greater than F-tabulated (0.031). Thus, reject the null hypothesis and conclude that machine variables have a significant effect on work stress reduction in organizations.

Table.5 ANOVAa

Model	Sum of squares	DF	Mean of squares	F	Sig
Regression	1577.863	1	1577.868	6.827	.031 ^b
1.Residual	1849.032	8	231.129		
Total	3426.900	9			

- a. Dependent variable: work stress reduction.
- b. Predictors: (constant), machine variables.

Since the P-value or Sig. (0.031) < the alpha level (0.05), reject the null hypothesis and conclude that machine variables have a significant effect on work stress reduction in Globacom and MTN Organizations.

Research Question Three

What is the influence of Human Variables on work stress reduction in Globacom and MTN Organizations?

Table.6 Responses to research question 3.

S/N	SA	A	U	D	SD	TOTAL
9.	46	29	12	27	1	95
10.	39	30	18	5	3	95
11.	32	37	23	3	0	95
12.	31	43	10	7	4	95

Source: Field Survey 2022

HO3: Human variables have no significant influence on work stress reduction in Globacom and MTN Organizations.

Table.7 Descriptive Statistics

	Mean	Study Deviation	N
Human variables	21.5000	17.74041	10
Work stress reduction	22.4000	17.63960	10

Table.8 Correlations

	Objective feedback	Work stress reduction
Pearson correlation	1	.831.
Objective feedback sig. (2tailed)		.020
N	10	10
Pearson correlation	.831	1
Work stress reduction sig.(2tailed)	.020	
N	10	10

Since the P-value or Sig. (0.02) < the alpha level (0.05), reject the null hypothesis and conclude that human variables have a significant influence on stress reduction in Globacom and MTN Organizations.

8.0 DISCUSSION OF FINDINGS

Major findings revealed that ergonomics enhances the performance of employees. The result of the hypotheses tested in this study lends credence to the assertion above. The result of hypothesis one showed that the P-value (0.000) which is less than the significance level (0.05) proved that work design variables have a very significant effect on work stress reduction in Globacom and MTN Organizations. In testing hypothesis two, 0.05 level of significance was greater than the P-value of 0.031, therefore, the null hypothesis was rejected and the alternative accepted, proving that machine variables have a positive significant effect on work stress reduction in Globacom and MTN Organizations.

Hypothesis three results as analyzed with regression showed that the P-value (0.02) is lesser than the level of significance (0.05), thus concluding that human variables have a significant influence on work stress reduction in the study Organizations.

9.0 RECOMMENDATIONS

- i. To adequately enhance employees' wellbeing, organizations should balance work demands, employee skills, and the nature of the equipment used in completing a task.
- ii. Organizations should create enabling work environments that would reduce stress and promote organizational sustainability.
- iii. Managers of the workplace should endeavor to provide machine tools to assist the human variables in organizations to reduce employee labor and stress.

10.0 CONCLUSION

The findings of this study have influential effects in regards to the well-being of the employees and Organizational Management. Management should assess employee work environment factors being examined in this study, as the assessment could assist in reducing these elements that result in work stress outcomes. A thorough evaluation should be performed in relation to ergonomics factors such as work design variables, machine variables, and human variables, particularly as all these variables have a significant relationship with work-stress reduction outcomes.

An ergonomically designed working environment can reduce human resource problems, including fatigue, job dissatisfaction, and intention to quit. To guarantee the success of such a strategy, the management of the organization must ensure that work environments suit the workers by matching human resources anthropometry distinctiveness and employee demands. Similarly, for employees to maintain high performance on their job, they must be safe and healthy and their work and its ecological balance with their unique capacity.

REFERENCE

- Aaras. A, Horgen. G, Bjorset, H. S, Ro. O, & Walsoe, H (2001). Musculoskeletal, Visual and Psychosocial Stress in VDU operators before and after multidisciplinary ergonomic interventions. A 6 years' prospective study- part two. *Applied Ergonomics* 32: 559 - 571.
- Clark. J (2002). *stress-A management guide*. United States: Spiro Business Guides.
- Cook .C, Burgess-limerick, R, & Papalia, S (2004). The Effects of Wrist Rests and Forearm Support during Keyboard and Mouse Use. *International Journal of Industrial Ergonomics*.33:463-472.
- Eason. K.D (1995). User-centered Design: for users or by user? *Ergonomics* 38, 1667-1673.
- Fair brother. K & Warn.J (2003). Work Place Dimensions, Stress and Job Satisfaction. *Journal of Management Psychology* 18(1):8-21.
- Haines, H, Wilson, J.R, Vink. P & Konigsveld E (2002). Validating a Framework for Participatory Ergonomics (the PEF). *Ergonomics* 45, 309-327.
- Kuorinka. I (1997). Tools and Means of Implementing Participatory Ergonomics. *International Journal of Industrial Ergonomics* 19; 267-270.

- Leaman. A, (1995). Dissatisfaction and Office Productivity. *Facilities* 13(2):13-19.
- Loveday. A (2012). Tackling stress at work. *Occupational health* 64(3): 12-12.
- Muchhal . D. S (2014). HR Practices and Job Performance. *IOSR Journal of Humanities and Social Science (IOSR-JHSS)* 19 (4)
- Roeloeofsen. P (2002). The Impact of Office Environments on Employees Performance: the design of the work place as a strategy for productivity enhancement. *Journal of Facilities management: 1 (3), 247-264.*
- Rowan.M. P, & Wright. P.C (1995). Ergonomics is good for Business. *Facilities* 13(8):18-25.
- Savery. L.K & Luks. J.A (2000). Long Hours at Work: Are dangerous and do people consent to them? *Leadership and organization development journal* 21(6):307-310.
- Smith. A, Thomas .M & Whitney .H, (2000). After-effects of the common code on mood and performance. *Ergonomics* 43(9):1342 -1349.
- Sundin. A, Christmansson. M & Larsson. M (2004). A different perspective in participatory ergonomics in product development improves assembly work in the automotive industry. *International Journal of Industrial Ergonomics* 33, 1-14.
- Sundin. A & Medho. L (2003). Computer Visualization and Participatory Ergonomics as Methods in Workplace Design. *Human Factors and Ergonomics in Manufacturing* 13, 1-17.
- Tarcan. A, Varol. E.S & Ates.M, (2004). A Qualitative Study of Facilities and thier Environmental Performance. *Management of Environmental Quality: An International Journal* 15(2)154-173.
- Washington State Department of Labour and Industries (2002). Office Ergonomics: Practical Solutions for a Safer Work Place. <http://www.ini.wa.gov/IPUB/417-133-000pdf>.
- Wickens .C. D, Lee .J, Liu.Y & Becker .S.G (2004). *An Introduction to Human Factors Engineering*. 2nd ed. New Jersey: Pearson Education, Inc.
- Wilson. J.R (2000). *Fundamentals of Ergonomics in Theory and Practice*. Applied Ergonomicsn 31:557-567.
- Wojcikiewicz.K, (2003). Seven Key Factors for Ergonomic Work Station Design. *Manufacturing Engineering* 131(1):45.
- Zafir .M.M, Nor.L.A & Zizah .C.S (2013). *Ergonomics and Stress at Work Place: Engineering Contributions to Social Sciences*. *Journal Pengurusan* 37, 125-131. Universiti Kebangsaan Publication, Malaysia.