

Correlation Analysis of Demographic Variables, Job Stress and Productivity of Workers in Electrical Occupations

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Abstract: The study analysed the correlation between demographic variables, productivity and occupational stress of workers in electrical occupations. Two relevant research questions were answered while two hypotheses formulated were tested at 0.05 level of significance. The study adopted a correlational research design and was carried out in North Central States. The population for the study was 301 workers in electrical occupations. The instrument for data collection was questionnaire titled Demographic Variables, Job Stress and Productivity Questionnaire (DVJSPQ). Three experts face-validated the instrument. The internal consistency of the questionnaire items was determined using Cronbach alpha reliability method and coefficients of 0.89 was obtained for Occupational Stress, 0.94 for Productivity of workers in electrical occupation. The overall reliability coefficient of the questionnaire was 0.96. Out of 301 copies of DVJSPQ administered, only 295 copies were completed representing 98.01 percent return rate. Point –biserial correlation and regression analysis were employed to analyse data for answering research questions and hypotheses. The findings of the study revealed that: (i) demographic variables have weak and moderate relationship ($r = -.140, -.226, -.130, .659$) with job stress of workers. (ii) demographic variables have strong relationship ($r = 973, 812, 933, 871$) with productivity of workers in electrical occupations. (iv) demographic variables influenced job stress and productivity of workers in electrical occupations. Findings on hypotheses include that: (i) age and educational qualification were a significant moderator of the relationship between occupational stress and productivity of workers in electrical occupations (ii) year of experience and marital status were not a significant moderator of the relationship between occupational stress and productivity of workers in electrical occupations. Recommendations include that workers in electrical occupations should be sensitized through workshops and seminars on how demographic variables influence their productivity and job stress in their occupations.

Keywords: productivity, Occupational stress, workers, electrical occupations, demographic variables

I. INTRODUCTION

Occupational or job stress is a type of strain one experiences as a result of unfavourable environmental conditions in an occupation. Andrew, Emma, George and Tim, (2000) defined Job stress as an aversive characteristic of working environment, and this has often led to stress being grouped with hazards. Musaka (2013) described occupational or job stress as a type of strain or pressure that affects an individual due to the nature of the environmental factors related to the type of job one does. Occupational stress therefore is a strain that electrical workers

experience due to unfavourable work environment. Occupational stress is of two types: physiological stress and psychological stress. Both physiological and psychological stresses affect individuals at workplace. Occupational stress according to Fountain and Krulewitsch (2010), leads to deviant behaviors of electrical workers in their workplaces.

Electrical occupation is concerned with the use of acquired knowledge, skills and attitudes to perform such operations as repair, servicing, design, production and construction of electrical/electronic related equipment for man's use. Onifade (2005) stated that some of the job performed in electrical occupation includes power generation, transmission, distribution and utilization. College Board (2008) also explained that in electrical/electronics technology, one is expected to use learnt skills to operate, install and repair electrical and electronic equipment. There are different trades in electrical occupation. These include domestic installations, battery charging, domestic and industrial installation, cable jointing and winding of electrical machines. Nwokike (2014) stated that domestic installation involves making electrical working diagrams, domestic surface wiring, domestic conduit wiring, protecting of electrical devices, inspecting and testing of domestic installations, electrical fittings among others. In industrial installation, electrical installation and maintenance of all kinds of factories and industrial machines and equipment are carried out. Cooksley (1996) stated that controlling and maintenance of electrical machines and equipment and installation of different types of ducts and trunkings are performed in electrical occupation. Bakare (2009) confirmed that trades in electrical technology cover electrical and electronic maintenance and repairs, electrical workshop practices, electrical installation, battery charging and electronic appliance repair. All these activities in electrical occupation or trade are technical in nature and virtually all of them give both mental and physical stress to workers. For example, workers engaging in electrical installation and termination of cables in an uncertain or unfriendly environment can receive severe burn or electric shock and these can in turn give fever, headache, body-ache and eye problem even death to workers. Before faults are cleared in an electrical installation or equipment, the workers conduct series of tests to ascertain the nature of faults, some such test demands the use of delicate measuring instruments such as multimeter, voltmeter, ohmmeter among others and this which ones can lower the productivity of electrical/electronic workers. The economic benefits of this occupation have been threatened by the nature of the work and operating environment leading to high levels of attrition of quality electrical workers and loss of productivity costs (Malcolm, 2004). Electrical workers are persons that carry

out responsibilities in specific electrical/electronic appliances. They are employees found in electrical companies, organizations or workplaces. Electrical workers in this study are skilled individuals working in electrical/electronic related workplaces for the purpose of earning a living. Wood (2014) reported that workers generally experience low productivity as a result of occupational stress.

Productivity is the quality of being productive or having the power to produce using available resources. Eze (1981) defined productivity as a measure of how well resources are brought together in organisations and utilised for accomplishing a set of results. Microsoft (2009) defined productivity as the rate at which a company produces goods or services, in relation to the amount of materials and number of employees needed. Nwachukwu (2014) stated that productivity is a combination of effectiveness and efficiency. Productivity may be conceived of as a matrix of the technical or engineering efficiency of production. Productivity in electrical occupations therefore is a combination of effectiveness and efficiency of workers in constructing/developing electrical/electronic circuits, maintenance of equipment and installation. In performing most of the tasks in electrical occupation, workers experience occupational stress which in turn leads to their low performance and productivity of the industries (Health and Safety Executives 2017). There are factors that suggest serious occupational or job stress such as handling multiple tasks, low wages and poor working environment to mention just but a few.

Other demographic or characteristic factors that can affect productivity of electrical/electronic workers include lack of experiences, illness/sickness, low qualification and experience, level of education, age of workers and marital status. The variations in the demographic characteristics of electrical workers are also possible factors that may affect the performance and productivity. Marital status may increase or reduce productivity. Marital status could affect productivity of industries and electrical/electronic workers. Patrick (2016) explained that personal issues such as marital problems can divide electrical workers' attentions and in turn affects productivity of workers. Ng & Feldman (2010) stated that it is hard to focus on work when home issues need to be resolved. Cainley (2014) stated that married men or women with family problems can easily experience occupational stress and low productivity in their workplace and these can also result to low output of the entire industry. Bano (2008) stated that unmarried workers with year of experience may be productive than other married workers with less years of experience.

Year of experience of electrical workers in the occupation may affect their performance and productivity. McNair (2011) stated that it is generally known that electrical workers with many years of experience in occupation/discipline tend to have a lot of skills or competence than those with less years of experience. Most of the aged workers are experienced and productive in electrical/electronic occupations. Age is the period of time someone has been alive or something has existed. According to Williams (2015) age is the length of time that a person has lived or a thing has existed. Age is the period of life at which a person becomes naturally or conventionally qualified or disqualified for something. In electrical occupation, age of workers and occupational stress are one of major factors that may

determine performance and productivity. Aged workers can be easily affected by occupational stress and low productivity sometimes could be the result of employing many aged workers in an occupation (Kelleey, 2017). Occupational stress does not respect anybody (John, 2016). Aged workers with high educational qualifications tend may loss their energy as they grow old and this in turn may reduce their performance on the job.

Educational qualification may also predict performance and productivity in an occupation. Najam-us-Sahar (2016) stated that educational qualifications have a significant bearing on job performance. The higher the education level or qualification, the more are the effects of education and skill on job performance. As such workers ability to understand and use advanced technology may to an extent be determined by the level of their educational qualifications (Stoeber, Mutineli & Corr, 2016). A worker with higher educational qualifications tends to have quality working methods and having these methods enables one to work with ease without experiencing occupational stress and low productivity. Most of the workers with low educational qualifications stay more on assigned duties due to lack of quality working methods and such workers can easily stress up and have low productivity. Well educated electrical workers may be more responsive in receiving instructions and doing new tasks and easily adopt new technology, which increases their ability to innovate and improve productivity (Yolles, 2009). However, the main factors considered to limit the positive effect of educational qualifications on job performance at the workplace include the quality of the work environment, organizational structure and processes, the assignment of employees to posts which did not match their qualifications and the lack of incentive systems.

There are no one-directional results on the effects of demographic variables of workers to their performance, productivity and occupational stress. Some studies found that the workers marital status (Ng & Feldman, 2010), year of experience (McNair, 2011), age and educational qualifications (Stoeber, Mutineli & Corr, 2016) determine their emotional intelligence and productivity. Hence there is need to investigate the relationship between occupational stress and productivity of workers in electrical occupations.

Statement of the Problem

Electrical is one of the technical occupations where workers in it make use of acquired knowledge and skills, tools and equipment to develop, construct, install and maintain all kinds of faulty/malfunctional electrical/electronic equipment and machines. This occupation is expected to be less freed stress for workers engaging in it for livelihood. Workers in electrical/electronic occupation are expected to work with different types of technologies plus experiences or skills and knowledge acquired for maintenance and construction of electrical/electronic equipment. The workers are also expected to work for hours and still be productive. Nwokike (2014) stated that workers employed in electrical occupation work for 8-10hours a day during technical assignment in order to contribute to overall productivity of the industry.

In performing these tasks, most of the workers in electrical/electronic experience occupational stress which in turn leads to their low performance and productivity in the industries.

Occupational stress has negative implications on worker's health, trajectory functions, harmony and productivity. Such negative health consequences may include: chronic blood pressure which can lead to death, anxiety, depression, sleeplessness (insomniamia), absenteeism, hostility, psychosis, aches, pains among many others. **Up to 3million workers have health challenges as a result of poor working condition and job stress yearly in a developing nation (Amenger, 2020).** Most of the workers in electrical/electronic occupations are now leaving the occupation for others where there is less occupational stress and where working environment is favourable such as sale and marketing of electrical equipment and parts

In North Central States, there is little or no statistical data to reveal the existence and extent of occupational stress especially among workers in electrical/electronic occupations. There is also a problem of poor working environment, high attrition rate of workers, massive alcohol consumption, high morbidity and mortality rates in the recent years which suggest excessive and prolonged stress. **There many studies on workers and their workplaces and how they can manage the job stress as a result of poor working condition but to the knowledge of the researchers, no studies have been conducted on correlation analysis of demographic variables, job stress and productivity of workers in electrical occupations.** This therefore becomes worrisome and researcher sees it necessary to conduct this study in order to provide empirical evidence that can establish the reality on the ground as it relates to the relationship between emotional intelligence, occupational stress and productivity. Therefore the problem of this study is that there are no empirical evidences on the relationship between demographic variables, occupational stress and productivity of workers in electrical occupations in North Central States of Nigeria.

Purpose of the study

The purpose of the study was to carry out correlation analysis of demographic variables, job stress and productivity of workers in electrical occupations. In order to achieve this stated purpose, the following research questions were answered:

1. What is the relationship between demographic variables and job stress of workers in electrical occupation?
2. What is the relationship between demographic variables and productivity of workers in electrical occupation?

Hypotheses

The following hypotheses were tested at 0.05 level of significance:

1. Significant relationship does not exist between demographic variables and productivity of workers
2. Significant relationship does not exist between demographic variables of workers and occupational stress

II. METHODOLOGY

The study employed a correlational survey design. Correlational survey design in the opinion of Leedy and Ormrod (2010) is concerned with establishing relationships between two or more variables in the same population or between the same variables in two populations. It sometimes uses questionnaires, interview and observation in order to establish relationship between variables. Correlational survey design was found

appropriate for this study because it determined the moderating influence of demographic variables on productivity and job stress of workers in electrical occupations

The area of the study was North Central Nigeria, which comprised Kwara, Niger, Plateau, Nasarawa, Kogi, Benue and FCT Abuja. The choice of the study area was informed by the strategic location of the North-central zone which serve as an interface between the core north and the south. There are enough electrical industries in the north central states and FCT Abuja where workers engage in electrical occupations.

The population for the study was 301 workers in electrical occupations. This made up of the entire 301 workers with electrical background in registered small and medium scale industries in North Central Nigeria (National Bureau of Statistics (NBS), 2020). The minimum education level of the workers is either Ordinary National Diploma (OND) or Nigerian Certificate in Education (N.C.E) while their maximum is Ph.D degree. The workers must have been with the industries or in occupation for at least three years or above. This was necessary to ensure that workers with experiences of job stress and productivity are selected. The entire 301 workers were involved in the study because of their manageable size

The instrument for data collection was a structured questionnaire titled: Demographic Variables, Job Stress and Productivity Questionnaire (DVJSPQ). Some sections of the DVJSPQ were adapted Goodman and Svyanteks' (1999) job performance scale and Weiman (1978) occupational stress scale. The adapted sections of MIJSPQ were structured in order to achieve the purposes of the study. The entire questionnaire was made up of two parts. Part one focuses on demographic information such as age, year of experience, educational qualifications, and marital status of workers in electrical occupations while Part two consists of 84 items to cover items on productivity and job stress of workers in electrical occupations. Items in Part two are further structured into five response options of: Strongly Agree (SA), Agree (A), Undecided (UD), Disagree (D), and Strongly Disagree (SD) with corresponding values of 5, 4, 3, 2 and 1 in seeking the opinions of the respondents on moderating influence of demographic variables on job stress and productivity of workers in electrical occupations in the area of study

The instrument for data collection was face-revalidated by five experts. The experts were provided with the original scales that were adapted to enable them authenticate and suggest the level of adaptations made in this study. Three of these experts were lecturers in the Department of Industrial Technical Education, Faculty of Vocational and Technical Education, University of Nigeria, Nsukka. Two experts were selected from electrical industries. Each of the experts was given a copy of the instrument to vet and also requested to eliminate or indicate any ambiguous statement or item in the instrument. The experts made necessary suggestions for improving the quality of the instrument towards meeting the purpose of the study. In addition, the experts were asked to make sound judgments, suggestions and corrections on the scales where necessary. The observations and suggestions made by the experts were strictly incorporated to improve the final copy of the DVJSPQ

For the purpose of obtaining the internal consistency of the questionnaire items, Cronbach Alpha reliability method was used and reliability coefficient was obtained for each section of the MIJSPQ as follows: Job Stress of workers in electrical occupation- 0.88; Productivity of workers in electrical occupation-0.94. The overall reliability coefficient of the questionnaire items was 0.96.

The researchers collected data from the subjects using the adapted DVJSPQ. Out of 301 copies of the questionnaire administered, 295 copies were collected back representing 98.01 percent return rate. Pearson product moment correlation or point-biserial correlation and multiple regression was used to analyze data for answering research questions and for testing hypotheses. The responses to the items were interpreted by describing the strength of the correlation using the guide suggested by Evan (1996) for the absolute value of r as follows:

- Very weak Relationship = ± 0.00-0.19
- Weak Relationship = ± 0.20-0.39
- Moderate Relationship = ± 0.40-0.59
- Strong Relationship = ± 0.60-0.79
- Very Strong Relationship = ± 0.80-1.00

III. RESULTS AND INTERPRETATION

The data for answering research questions and hypotheses are presented in Tables 1-6

Research Question 1

What is the relationship between demographic variables and occupational stress of workers in electrical occupation?

Data for answering research question 1 are presented in Table 1

Table 1: Bivariate Correlation of Demographic Variables and Job Stress

Variables	1	2	3	4	5
1.Age	1				
2.Marital Status	.819**	1			
3.Year of Experience	.902**	.739**	1		
4.Educational Qualification	.889**	.728**	.814**	1	
5.Job stress	-.140	-.226	-.130	.659*	1

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

The results presented in Table shows the relationship among demographic variables and occupational stress of workers in electrical industries. It can be observed that there is a negative relationship between various demographic variables and job stress, a positive relationship was also observed, however the values (-.140, -.226, -.130, .659) shows that the correlation between the demographic variables and occupational stress of workers in electrical occupations is weak and moderate.

Research Question 2

What is the relationship between demographic variables and productivity of workers in electrical occupation?

Data for answering research question 2 are presented in Table 2

Table 2: Bivariate Correlation of Demographic Variables and Productivity

Variables	1	2	3	4	5
1.Age	1				
2.Marital Status	.819**	1			
3.Year of Experience	.902**	.739**	1		
4.Educational Qualification	.889**	.728**	.814**	1	
5.Productivity	.973	.8	.933*	1	.871**

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

The results presented in Table shows the relationship among demographic variables and productivity of workers in electrical industries. It can be observed that there is a positive relationship between various demographic variables and productivity, however the values (973, 812, 933, 871) show that the correlation between the demographic variables and productivity of workers in electrical industries is strong.

Hypothesis 1: Significant relationship does not exist between demographic variables and productivity of workers in electrical occupation

Data for testing hypothesis 1 are presented in Table 3

Table 3: Regression Analysis showing the relationship between demographic variables and productivity

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	17.750	17.620		1.007	.353
Age	-1.250	10.394	-.213	-.120	.908
Marital Status	-2.000	3.585	-.347	-.558	.597
Years of Experience	-2.750	5.561	-.449	-.495	.639
Educational Qualification	21.000	15.626	1.440	1.344	.228
Productivity	-3.000	13.293	-.643	-.226	.829

The Table above provides details of models parameters (Beta values) and significance of these values. The unstandardized Beta coefficient gives measures of the contribution of each variable to the model. It is clear from table that the value of standardized Beta is (β = -.213, -.347, -.449, 1.440,-.643) which represents the gradient of regression line. Therefore, if the value of predictor variable (demographic variables) is increased by one unit, there is a corresponding (β) unit increase in the dependent variable (productivity). However the influence of Age, Marital Status, Years of Experience, Educational Qualification, of electrical employees on their productivity is not significant (p>0.05). Therefore, the null hypothesis is accepted. It may be concluded that there was no significant relationship between the demographic variables and productivity of employees in electrical industries.

Hypothesis 2: Significant relationship does not exist between demographic variables of workers and occupational stress

Data for testing hypothesis 2 are presented in Table 4

Table 4: Regression Analysis showing the relationship between demographic variables and occupational stress

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	17.750	17.620		1.007	.353
Age	-1.250	10.394	-.213	-.120	.908
Marital Status	-2.000	3.585	-.347	-.558	.597
Years of Experience	-2.750	5.561	-.449	-.495	.639
Educational Qualification	21.000	15.626	1.440	1.344	.228
Emotional intelligence	2.750	10.238	.270	.269	.797

The Table above provides details of models parameters (Beta values) and significance of these values. The unstandardized Beta coefficient gives measures of the contribution of each variable to the model. It is clear from table that the value of standardized Beta is ($\beta = -.213, -.347, -.449, 1.440, .270$) which represents the gradient of regression line. Therefore, if the value of predictor variable (demographic variables) is increased by one unit, there is a corresponding (β) unit increase in the dependent variable (occupational stress). However the influence of age, marital status, years of experience, educational qualification, of electrical workers on their occupational stress is not significant. ($p > 0.05$). Therefore, the null hypothesis is accepted. It may be concluded that there was no significant relationship between the demographic variables and occupational stress of employees in electrical industries.

IV. DISCUSSION OF FINDINGS

The finding of the study revealed that there is weak relationship between job stress and productivity of workers in electrical occupation. That is, level of job stress of workers determines the levels of their productivity. This finding of this study agreed with the opinion of Critchley, Rotshtein, Nagai, O'Doherty, Mathias and Dolan, (2004) that occupational stress can turn down the efficiency or output of workers in electrical occupation if not properly checked or if adequate measures are not taken in time. This finding agreed with the opinion of Wood (2014) who reported that workers generally experience low productivity as a result of occupational stress and lack of emotional intelligence. The problem of occupational stress has been extensively studied mainly due to the negative effects it has on the organization, workers and their occupation. Some organizations have programs designed to help physical and mental health workers to prevent problems due to stress and to help "make do" with work-related stress. Stress management is an important part of maintaining good physical and emotional health and healthy relationships with others. Occupational stress can affect workplace output and productivity of each worker (Mansor, Fontaine and Chong, 2003). Stress, according to Ezeilo (2005) could lead to breakdown in productivity, sub-standard school performance of individuals including children, tense emotional atmosphere, mistrust, doubt, fear, sense of isolation, less feeling of closeness, sharing, intimacy, affection and impaired communication. These situations could further lead to threaten family cohesion and children's delinquent behaviour (temper tantrum, stubbornness) (Awo, 2012). Occupational stress can cause a significant state of disequilibrium and disorganization

which can lead to a discontinuity in the workplace's trajectory of functions. Occupational stressors contribute to individual and organizational inefficiency, high staff turnover, and absenteeism due to sickness, decreased quality, and quantity of practice, increased costs of health care, and decreased job productivity and satisfaction. One of the organizational outcomes that affected by occupational stress is job performance. Christo and Pienaar (2006) also postulated that the causes of occupational stress include perceived loss of job, and security, sitting for long periods of time or heavy lifting, lack of safety, a complexity of repetitiveness and lack of autonomy in the job. Besides, occupational stress is caused by lack of resources and equipment; work schedules (such as working late or overtime and organizational climate are considered as contributors to employees stress. With these causes, one could, therefore, point out that stress, if not managed well, affects performance. The probability that employees not exempted from this menace may be high since there is the possibility of being burdened with excessive workloads, and long hours of work (overtime). A lot of studies have been conducted to examine the relationship between stress and performance. For instance, in a study conducted by Elovainio et al. (2002), it was found that occupational stress inadvertently contributes to low organizational performance. The findings of this study also agreed with the finding of Enyonam, Opoku, Addai and Batola (2014) whose their finding showed a significant positive relationship between employee stress and job performance ($r = 0.348$, sig. value=.000) which is an indication that as employee stress increases, their job performance also tends to increase and so on. The finding of the study on relationship between occupational stress and productivity agreed with the finding of Rubina Kazmi, Shehla Amjad, Delawar Khan (2008) that work stress of house officers impacts strongly and adversely on overall job performance.

The finding of the study revealed that demographic variables (marital status, year of experience, age, and educational qualification) of workers in electrical occupation influenced their productivity and job stress. Specifically educational qualification has a strongest relative influence on workers' emotional intelligence followed by marital status and year of experience. Also, year of experience has the strongest relative influence on workers' productivity, followed by marital status and educational qualification. In the study of Christo and Pienaar (2006), demographic characteristics such as (academic level, marital status and year of experience) are found to have relative relationship with career learning self-efficacy and work volition and this slightly agreed with the finding of this study. On the contrary, academic level and age among Electrical Technology Education students do not significantly predict their career behaviours and productivity. The finding of this study revealed that academic level, sex and age are not significant predictors of career behaviours, as well as the levels of psychomotor skills acquisition. This agrees with Hirschi and Henmann (2013) who found that career behaviors of students do not depend on their sex, age or academic level. This result disagrees with Aslam et al (2012) on educational qualifications and sex, as predictors of career outcomes among individuals. However, the findings revealed that educational qualification has a strongest relative influence on workers' emotional intelligence followed by marital status and year of experience.

V. CONCLUSION

Workers in electrical occupations make use of skills, experiences and tools to develop, construct, repair and service all kinds of electrical faulty equipment and machines. These workers are expected to work for hours without experiencing stress; but literature and researcher discovered that in performing these tasks, most of the workers in electrical occupation experience job stress which in turn leads to their low performance and productivity in the industries. This study was then carried out in order to generate data to justify acclaimed situation in the study area. The study therefore analysed correlation between demographic variables, job stress and productivity of workers in electrical occupations. The findings included that productivity had weak negative relationship with job stress of workers in electrical occupations. The study gives true results on correlation of demographic variables, job stress and productivity of workers in electrical occupation. The findings have implications for employers of workers in electrical industries. They will make sure that demographic variables of workers need to be considered during recruitment of workers into electrical occupation. They will also make sure that workers need to be provided with favourable working condition in order to avoid job stress because of its impact on productivity.

VI. RECOMMENDATIONS

Based on the findings made and the conclusion drawn, the following recommendations were made:

The employers of labour and business owners should be also given professional advices and measures to provide occupational stress free and enabling environment for their workers to improve their productivity and to reduce occupational stress. Government should also set standards for establishment of industries to make sure workers render their services in enabling environment to reduce stress and to improve productivity. Workshops and seminars should be organized for workers in electrical occupation or industries on the best ways to manage their job stress and ways to improve their productivity on the job

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