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Original Research Article

Effect of technostress on job performance and coping strategies among academic staff of a tertiary institution in north-central Nigeria

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Abstract

Background: Technostress is a general feeling of anxiety and negative impact on thoughts, behaviours, attitudes and body when a person is expected to deal with technology. It can lead to poor job performance and decreased productivity among workers. Coping strategies for technostress include: getting adequate user friendly software; encouragement of employees to communicate, discuss and share their knowledge about computers; encouraging people to "experiment" and innovate in the context of computer use amongst others. This study aimed to assess its effect on job performance as well as presence of coping mechanisms among academic staff of University of Jos, Nigeria.
Methodology: This was a descriptive, cross-sectional study involving 144 academic staff selected from all the 12 faculties of the University of Jos via multi-stage sampling technique. A self-administered questionnaire was used to collect data which was entered and analyzed using Epi-info version 3.5.4 statistical software. A 95% confidence interval was used and a probability value of $p \leq 0.05$ was considered statistically significant.
Results: Seven-eight (54.2%) respondents said they experienced technostress while the others said they did not. Technostress significantly affected the job performance of 57 (39.6%) respondents to some extent, 47 (32.6%) to a very little extent, 27 (18.8%) to no effect and 13 (9.0%) to a great extent. Commonest symptoms of technostress experienced were neckache 66 (45.8%) and blurred vision 61 (42.4%). The respondents ranked technology-based training 87 (60.4%) and effective time management 87 (60.4%) the highest as strategies for coping with technostress.
Conclusion: Stress management and technology-related training should be organized for the staff of the university. Easily accessible high speed internet network with wide coverage could be made available to all academic staff of the university in all campuses. Employment of more technological experts that can assist in result collation, data analysis and other technological supports is required to ease the burden of techostress on the academic staff.
Keywords: Technostress, academic staff, job performance, coping mechanisms.

1. Introduction

In recent times, there has been a steady advancement in technology and the role it plays in our day-to-day activities. Thus, there is a growing perception that rapid advancements in technology are responsible for inducing stress in our lives.[1]

This technology-related stress, often called technostress has been defined as "any negative effect on human attitudes, thoughts, behaviors, and psychology that directly or indirectly results from technology"[2]. Literally, technostress is a feeling of anxiety or mental pressure from

overexposure or involvement with technology (computer).[3]

Some of the causes of technostress include the quick pace of technological change, lack of proper training, an increased workload, lack of standardization with technologies and the unreliability of hardware and software.[4]Four aspects of technostress include physical, emotional, behavioural and psychological.[4] Physical aspects of techno stress could be eye strain, backaches, headaches, stiff shoulders, increased blood pressure, chest pain amongst others. Emotional aspects of technostress include irritability, loss of temper, having high state of anxiety when separated from computer monitor, frustration, depression, paranoia that leads to avoiding computers amongst others. Behavioural aspects consists of overly comfortable with computers, overspending on computers, insomnia, uncooperativeness and unwillingness, using computer terms in non-computer conversations, smoking, drinking alcohol amongst others. Psychological aspects of technostress could be information overload to find, analyse, evaluate and apply it in right context of resources; under work and routine jobs leading to frustrations when under employed or when the work done involves only routine operations; job security, where people have a fear that computer may replace human roles; professional jealousy produced by technological competency; de-motivation due to prolonged periods of any technologic activity; and uncertainty about job role caused by an increased time working with technology amongst others.

On the global scene, the burden of the effects of technostress on workers in different countries has been expressed by some studies. People, especially adults, are spending increasingly more and more time connected to their computers. Employees are often on call twenty four hours a day, seven days a week and 365 days a year. The combination of intensive computer use and work demands has resulted in an increase (epidemic) of illnesses.[5-7] For example, more than 30% of employees who work at the computer experience neck and back pain; hand and arm pain, tingling and numbness; and exhaustion.[8] The European Agency for Safety and Health at Work in 2014 reported that more than a third of European workers complained of back-ache. The largest increase were seen among computing professional and technicians.[9] More than 25% of Europeans experience work-related neck-shoulder pain and 15% experience work-related arm pain.[10] This report suggests that the complaints are most prevalent among people who spent more time on the computer and work continuously without breaks.

In the African sub-region and in Nigeria, awareness of technostress and its effects on job performance is now being appreciated as indicated by the increasing number of studies being carried out among workers and professionals in different institutions. The results of some of these studies have shown significant effects of technostress on the job performance of librarians, academic staff, ICT workers amongst others. Lecturers need to conduct out research and also keep abreast with advances in their respective fields. They need to go through a number of articles, journals, electronic books, prepare lectures, write books and keep in touch with their students and professional colleagues too via emails and other social networking platforms. They also use computers for computing, collating and compiling students' results. All these result in them spending a reasonable length of time on their computers, tablets or smart phones. Academic staffs that are undergoing post-graduate training also need to go through materials online that are relevant to their studies in order to carry out research and write dissertations and other publications. This can cause them to spend a great deal of time on their computers and smart phones in search of information and other resources on the internet. They also make use of softwares of different kinds to analyse their data. Lecturers are also not exempt from malfunctioning of computer software and hardware. This compounds the psychological and even physical stress that they are already going through, especially because most of them have a limited knowledge on sophisticated and up-to-date computer operations and maintenance. All these predispose the academic staff to increased stress levels capable of interfering with their performance at work leading to less efficiency.

Ways of eliminating technostress are staying healthy and proper dieting, taking frequent breaks, time management, taking a technology time-out, awareness of technostress amongst others. Recogized coping strategies for technostress include: getting adequate user friendly software; encouragement of employees to communicate, discuss and share their knowledge about computers; encouraging people to "experiment" and innovate in the context of computer use amongst others.[10] This study aimed to assess the effects of technostress on job performance among the academic staff of University of Jos as well as their coping mechanisms.

2. Materials and Methods

This was a cross-sectional study conducted among the academic staff of the University of Jos, Jos in North-central Nigeria. The university currently has a total of 12 faculties and 87 Departments with about 21,374 students comprising both undergraduate and postgraduate students. The school offers courses in Law, Medical Sciences, Pharmaceutical Sciences, Natural Sciences, Social Sciences, Management Sciences, Education, Environmental Sciences

as well as Arts and Humanities. Other recently added faculties are Veterinary Medicine, Agriculture and Engineering.[11] These are located in four major campuses on Bauchi Road, Gangare, Lamingo and Farin Gada (where the permanent site is located), all in Jos, Plateau State. Statistical figures obtained from the university administration indicate that there is a total of 2600 staff of the university as at the first quarter of the year 2016; 1241 of whom are teaching staff in the 12 faculties, 88 are teaching staff in the other departments and units in the university and 1271 are non-teaching staff.[12]

The study population comprised the academic staff of the University of Jos who gave consent to participate in the study. Academic staffs in departments and units that were not under the 12 faculties of the university were excluded. Using a prevalence rate of 10%[9], an absolute standard error of 0.05 and a standard normal deviate of 1.96, a minimum sample size of 138 was calculated using appropriate formula for cross sectional study.[13]

A multistage sampling technique was used to select the participants. In stage one, the number of academic staff in each faculty to be studied was obtained by proportionate sampling. This was done by dividing the total number of academic staff in each faculty by the total number of academic staff in the 12 faculties in the university and multiplying by the obtained minimum sample size. Stage two involved the selection of the departments within each of the faculties from which the calculated number of lecturers were to be selected. Departments were chosen through simple random sampling technique by balloting. The selection of the individual respondents from the chosen department was also done by simple random sampling technique by balloting.

Approval for the study was obtained from the Ethics and Research Committee of Jos University Teaching Hospital, (JUTH). Informed verbal consent was obtained from each respondent before being enrolled into the study; after being assured of confidentiality and given the option to opt out of the study at any time, without any loss of benefits or penalty.

Data collection was through a semi-structured self-administered questionnaire divided into sections;
(A) Socio-demographic data**,**
(B) Assessment of prevalence of technostress**,**
(C) Assessment of effect of technostress on job performance**,** and
(D) Strategies of coping with technostress. The questionnaire was pretested among 10 academic staff of Federal College of Forestry, Jos.

Scoring and Grading Of Responses

Responses to the first ten items in the section on assessment of the prevalence of technostress were gathered through a 5-point Likert scale anchored as 1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly Agree. The maximum score for each item was five. This was done in order to estimate the degree or level to which those who experienced technostress did. The total score of all the items was obtained for each respondent with a maximum score of 50 and a minimum of 10. A respondent with a total score of 10 – 20 was considered to have a low level of technostress and one with a total score between 21 and 30 was considered to have a moderate level of technostress. Respondents with a total score of 31 – 40 were considered to have a high level of technostress and those with a total score within the range of 41 – 50 were considered to have a very high level of technostress.

The data collected was analyzed using Epi-info software version 3.5.4; quantitative data were presented using means and standard deviation while qualitative data was presented using frequency tables, percentages and charts. Tests of statistical significant relationships were carried out using Chi-square test. A 95% confidence interval was used and probability values of ≤ 0.05 were considered statistically significant.

3. Results

A total of 144 respondents participated in this study. From Table 1, the highest proportion of respondents, 59 (40.9%) were aged 41 – 50 years. Their mean age was 45.31 ± 8.84 years. There were more males 113 (78.5%) than females. More than half of the respondents, 80 (55.6%) had spent 10 years or less of service in the university while mean duration of service was 11.61 ± 9.03 years. Study participants were gotten from all the twelve faculties of the university. The faculty with the highest proportion of respondents was Natural Sciences, 33 (22.9%).

Seventy-eight respondents (54.2%) had gone through a form of technology-related training. A third of the respondents, 52 (36.1%) had been using computers for between six to 10 years and mean duration of computer use by respondents was 12.27 ± 4.95 years. Ninety-three respondents (64.5%) spent 5 hours or less every day on the average on a technological device while 44 (30.6%) spent 6 – 10 hours per day on a technological device. The mean time duration spent by respondents per day on a technological device was 5.12 ± 3.03 hours. Only 22 respondents (15.3%) had attended a form of stress management training.

Table 1: Socio-demographic data of the respondents

Variable	Frequency (n=144)	Percentage (%)
Age (years)		
≤30	4	2.8
31 – 40	44	30.5
41 – 50	59	40.9
51 – 60	25	17.4
61 – 70	9	6.3
Missing	3	2.1
Gender		
Female	31	21.5
Male	113	78.5
Duration of Service (years)		
≤10	80	55.6
11 – 20	37	25.7
21 – 30	22	15.3
31 – 40	5	3.5
Faculty of Respondents		
Agriculture	3	2.1
Arts	21	14.6
Education	20	13.9
Engineering	5	3.5
Environmental Sciences	3	2.1
Law	12	8.3
Management Sciences	4	2.8
Medical Sciences	18	12.5
Natural Sciences	33	22.9
Pharmaceutical Sciences	9	6.3
Social Sciences	13	9.0
Veterinary Medicine	3	2.1
Hours spent on a technology device per day		
≤ 5	93	64.6
6 – 10	44	30.6
11 – 15	5	3.5
16 – 20	2	1.4
Respondents with technology-related training		
No	66	45.8
Yes	78	54.2
Duration of computer usage (years)		
≤5	15	10.4
6 – 10	52	36.1
11 – 15	47	32.6
16 – 20	21	14.6
21 – 25	7	4.9
Missing	2	1.4
Respondent with stress management training		
No	120	83.3
Yes	22	15.3
Missing	2	1.4

Table 2: Prevalence of technostress among respondents

Variable	Frequency (n =144)	Percentage (%)
Experience of technostress		
No	66	45.8
Yes	78	54.2
Level of Technostress		
Low	37	25.7
Moderate	74	51.4
High	31	21.5
Very high	2	1.4
Technostress related symptoms*		
Neckache	66	45.8
Blurred vision	61	42.4
Overspending on computers	45	31.3
Information overload to find, analyze, evaluate and apply it in the right context of resources	45	31.3
Sleep problems	44	30.6
Anxiety	41	28.5
Frustration	22	15.3
Irritability	14	9.7
Poor apetite	8	5.6

* Multiple responses allowed

Table 2 shows that prevalence of technostress was found to be 54.2% (95% CI 45.7% 62.5%) among the respondents as more than half of the respondents admitted that they experienced technostress. This was corroborated using the mean values gotten from the technostress assessment questions as 78 (54.2%) respondents had technostress scores above the mean of 25.6 ± 6.7. Thirty-seven respondents (25.7%) had a low level of technostress with scores ranging from 10 to 20. The highest proportion of respondents, 74 (51.4%) had a moderate level of technostress with scores of 21 – 30, 31 (21.5%) had a high level of technostress with scores of 31 – 40 and 2 (1.4%) respondents had a very high level of technostress with scores ranging from 41 – 50. The most common symptom of technostress was neck ache as it was experienced by 66 (45.8%) respondents. Other symptoms experienced included blurred vision 61 (42.4%), overspending on computers 45 (31.3%), information overload to find, analyze, evaluate and apply it in the right context of resources 45 (31.3%) amongst others.

Table 3: Extent to which technostress affected job performance of respondents

Variable	Frequency	Percentage (%)
Great extent	13	9.0
Some extent	57	39.6
Very little extent	47	32.6
Has no effect on my job performance	27	18.8
Total	**144**	**100.0**

Table 3 shows to what extent technostress affected their job performance; The highest number of respondents, fifty-seven (39.6%) said that technostress affected their job performance to some extent, 47 (32.6%) said it affected their job performance to a very little extent, 27 (18.8%) said that technostress had no effect on their job performance and the least number of respondents, 13 (9.0%) said that technostress affected their performance at work to a great extent.

Table 4: Strategies of coping with technostress among respondents

Strategies of coping with technostress*	Frequency	Percentage (%)
Technology-based training	87	60.4
Effective time management	87	60.4
Exercise	76	52.8
Having an awareness of technostress and its levels	76	52.8
Regular break intervals while using technology	67	46.5
Sharing knowledge with colleagues	67	46.5
Only attending to the most relevant, personally useful and necessary emails and alerts on the various media and technological gadgets	58	40.3
Use of good office furniture	53	36.8
Buying more user friendly hardware/software	50	34.7
Team work	49	34.0
Proper diet	46	31.9
Listening to music	26	18.1

* Multiple responses allowed

Table 4 shows the coping strategies of respondents with respect to technostress; technology-based training 87 (60.4%), effective time management 87 (60.4%), exercise 76 (52.8%), having an awareness of technostress and its levels 76 (52.8%), regular break intervals while using technology 67 (46.5%), sharing knowledge with colleagues 67 (46.5%) amongst others.

Table 5: Relationship between technostress experienced by respondents and its effects on their job performance

	Effects on job performance Frequency (%)				
Technostress	Great extent	Some extent	Very little extent	No effect	TOTAL
Yes	12 (15.4)	43 (55.1)	20 (25.6)	3 (3.8)	**78 (100.0)**
No	1 (1.5)	14 (21.2)	27 (40.9)	24 (36.4)	**66 (100.0)**
Total	**13 (9.0)**	**57 (39.6)**	**47 (32.6)**	**27 (18.8)**	**144 (100.0)**

$\chi^2 = 40.7207$; df = 3; p < 0.0001

Table 5 shows that there was a statistically significant relationship between technostress and the extent to which it affected the job performance of respondents (p < 0.05).

4. Discussion

The prevalence rate of technostress in this study was consistent with that of a study carried out among university librarians in the South-West of Nigeria that showed that 54% of respondents experienced technostress as an occupational frustration variable.[14] Another study with a similar prevalence was the one carried out among library staff in college and research libraries in the United States of America that showed that about half (51%) of the respondents experienced technostress.[15] However, the prevalence of technostress was higher in a study among librarians in Covenant University, Nigeria which revealed that most of the respondents (79.4%) experienced technostress.[16] Another study conducted in Eastern and Southern Africa among librarians also showed a high prevalence of technostress (76%) among respondents.[17] The relatively lower prevalence of technostress found in this study among academic staff of University of Jos as compared with those of the other cited studies, most of which were among librarians, could be as a result of the greater level of usage and exposure to computer technologies among librarians, especially in modern 21st century libraries.

In this study, various physical, psychological and behavioural symptoms related to technostress were identified among respondents such as neck aches, blurred vision, overspending on computers, information overload to find, analyze, evaluate and apply it in the right context of resources, sleep problems, anxiety, frustration, irritability and poor appetite (in order of decreasing frequency of respondents experiencing them). Development of these symptoms could be as a result of physical strain from sitting and facing computers to work for a long period of time and generally poor ergonomics. Factors like poor power supply, poor internet network amongst others could have contributed to the manifestation of these symptoms. In tandem with our study findings, a study conducted among managers in selected countries by Reuter Business Information Services found out that 33% reported ill-health due to information overload and majority (66%) reported increased tension with work colleagues and diminished job

satisfaction caused by information overload related to technostress thus showing that information overload is an important psychological effect of technostress with a great tendency to reduce job performance of workers.[18] Our study findings are also in keeping with a study conducted in the Philippines among professional university librarians that revealed the most common physical symptoms experienced among them to be- eye strains, back aches, headaches and neck pain generally more often experienced by respondents while working. The most experienced psychological/ emotional symptoms were- irritability, loss of temper, anxiety and frustration which were generally seldom experienced. All of these were capable of reducing respondents' job performance.[19]

This study has revealed that technostress affects the job performance of respondents to varying extent, most of which are negative. The greatest proportion of the respondents, more than a quarter of them, reported that their job performance had been affected to some extent by technostress. A lesser proportion of respondents, still more than a quarter, affirmed that their job performance had only been affected to a very little extent. A little less than a quarter of the respondents felt that technostress had no effect on their job performance and the least percentage of respondents was of the opinion that technostress had affected their job performance to a great extent. A statistically significant relationship was found to exist between technostress and job performance of respondents. Most respondents that had technostress had alluded to it having a higher degree of effect on their job performance.

These findings are similar to that of the study conducted among library staff of Covenant University, Nigeria on the effects of technostress on their job productivity. The study revealed that 14.7% of respondents were of the opinion that technostress could affect their job productivity to a great extent, 44.1% (the highest proportion of respondents) noted that their job productivity was affected by technostress to some extent, 23.5% expressed that technostress had very little effects on their job productivity and 17.7% noted that technostress did not in any way affect their job productivity.[16] Another study with similar findings that was carried out among library personnel in some federal universities in Nigeria showed a statistically significant relationship (p<0.05) between technostress and job burnout experienced by respondents (high technostress led to high job burnout) which has a great tendency of reducing the job performance of respondents.[14] Also, a study carried out in Obafemi Awolowo University, Ile-ife, Osun State among academic and non-academic workers showed that about half (53%) of the respondents reported that the effect of technostress on their productivity was high.[8] Another study done among

ICT users from two public sector organizations in the United states had findings in line with this study which demonstrated that productivity and technostress were inversely related based on the mean values obtained, thus implying that higher technostress experienced culminated into low job productivity.[15]

In this study, technology based training was the coping strategy which ranked highest with majority of respondents thinking that it would help in coping with technostress. Other strategies considered very important and highly ranked by respondents included: effective time management, exercise, having an awareness of technostress and its levels, regular break intervals while using technology, sharing knowledge with colleagues and only attending to the most relevant, personally useful and necessary emails and alerts on the various media and technological gadgets. The least ranked was listening to music with less than a quarter of respondents considering it relevant. This finding was similar to that by a state wide survey of community college libraries in the United States of America that revealed that a strong state wide training made available to community library personnel made them feel that technology had not increased their workplace stress. Majority of the respondents agreed that the quality of the training provided was moderately good to excellent which showed the importance of training in alleviating technostress.[15] In another study conducted among librarians in Eastern and Southern Africa, respondents proposed some similar strategies to help minimize technostress including- continuous training of librarians to develop skill in the emerging technologies.[17] Also in line with the findings of our study, the study among library staff of Covenant University, Nigeria showed the highly ranked strategies for coping with technostress as proposed by respondents to include: regular technology training, regular break intervals and in addition competent and friendly network systems and use of good furniture and better practice of ergonomics.[16] Another study carried out among university librarians in Edo and Delta states included the following among the highly ranked coping strategies with technostress: taking frequent breaks when working with technology and, buying more adequate and user friendly hard ware and software.[20] Similar findings were also gotten in a study among professional librarians in Philippines where exercise was ranked as the most important coping strategy for reducing the physical effects of technostress. Other similar strategies highly ranked included- effective time management and teamwork. In contrast to our study findings, however, listening to music was ranked the most important coping strategy in reducing emotional and behavioural symptoms of technostress.[18]

5. Conclusion

It was discovered in this study that the prevalence of technostress among respondent was slightly above half. The major symptoms of technostress experienced by academic staff of the university were mostly physical including- neck ache and blurred vision. However psychological and behavioural symptoms were also common mainly- overspending on computers, information overload and sleep problems. Also, it was discovered that technostress experienced by academic staff of University of Jos significantly affected their job performance to various extent. The main strategies found in this study that could help academic staff of the University of Jos in coping with technostress were organizing technology based trainings, effective time management, exercise, having an awareness of technostress and its levels, regular break intervals while using technology and sharing of knowledge among colleagues.

We recommend that programmes like seminars should be organized to educate and inform staff about technostress. Technology related training on how to use computer gadgets, relevant software and new hardware and good ergonomic practices should be regularly organized. This will help individuals to be more conversant with using the relevant and available hardware and software in a bid to make them less predisposed to experiencing technostress. Easily accessible high speed internet network with wide coverage should be made available to all academic staff of the university in all campuses as a means of reducing the impact of poor internet quality causing technostress on the staff. These will increase productivity and reduce stress.

Acknowledgement

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