

The Awareness and Incidence of Repetitive Strain Injuries in The Computer Graphic Industries in Lagos State, Nigeria

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Abstract

In this paper, the awareness and incidence of repetitive strain injuries (RSI) in the computer graphic industries were examined using data collected from 30 computer graphic designers across different firms in Lagos State, Nigeria. The study shows that 36.7% of the designers were not aware of RSI, and only 33.3% of those that were aware were taking conscious effort on reducing the symptoms. Most of the designers, 73.4%, make use of their computers 8 to 10 hours per day and very few (3.3%) take time to observe breaks while working. Majority get so immersed in their work on the computer that they forget about time. The study also shows that a lot of the designers do not maintain good posture while working. Overall, ignorance was observed to be the major risk factor for RSI. Hence, it is necessary to educate and raise alertness on the incidence of RSI in the computer graphic industry in order to prevent further increase of the problem.

Keywords: repetitive strain injury, computer graphic industry, Lagos state, Nigeria

1. Introduction

In the recent years, repetitive strain injuries have become a major issue of concern across various industries around the globe. According to IOM (2001), nearly 1 million people each year left work to treat and recover from RSI due to overexertion or repetitive motion either in the low back or upper extremities. The Chartered Society of Physiotherapy (2008) reported that the pervasiveness of the condition of RSI in the North-East of the UK alone is 1.24 per 100 workers, with the lowest report rate of 0.69 per 100 workers in London. This increase in RSI coincides with the increase of personal computer use. Decades ago, Bammer (1987) observed that with the increase of personal computer use, the incidence of RSI is on the rise. Though, the computer graphic industry is one of the newly emerging computer-related industries, the incidence of RSI in this industry has also become a major area of interest to researchers.

RSI is the umbrella term for a number of upper limb disorders. The two major groups of RSI are RSI Type 1, which shows measurable physical symptoms, and RSI Type 2 which shows no apparent physical symptoms. Some medical experts do not accept the existence of RSI Type 2 (StrategyOne for Microsoft, 2008). A study by Bernard (1997) noted that RSI were related to typing, use of tools, and repetitive placing, grasping, or moving of objects. Pascarelli and Quilter (1994) discovered that sitting position, the type of chair, and the use of footrest affects the lower back of computer users. Numerous studies link overuse of computers, whether in the work environment or leisure activities, with the increased of Repetitive Strain Injury (Herbert, et al 2005). More often than not, these users spend long hours in front of the computer system and this has led to a situation where users are exposed to problems associated with working with these equipments (Cheung et al., 2008).

Lagos, being the most industrial state in Nigeria, with a population of 17 million (CBN Presentation, 2012), has become a place of interest for research work in the country. Presently, computer graphic design is a fast growing business in Lagos state. With the increase in the number of Information Technology training and certification centers in Nigeria, some of the youth has become practically skillful in using and designing software. Hence, it is not surprising to see a number of them being actively involved in computer graphic designs. This study is designed to examine the awareness and incidence of repetitive strain injuries in the computer graphic industries in Lagos state, Nigeria. The study also examined how often the computer graphic designers make use of their computers and the work intensity in the computer graphic industries. Finally, the study investigated the attitude and interest of the designers in ergonomics.

2. Literature Review

2.1 Brief overview on the different types of RSI

Since RSI Type 2 shows no apparent physical symptoms, this section will focus on RSI Type 1, which shows measurable physical symptoms (StrategyOne for Microsoft, 2008). The New York Committee for Occupational Safety and Health (2002), observed that there are different types of RSI, based on their symptoms. One of these is Bursitis, which is caused by continual friction on the bursa and is also known as “beat” condition. It most frequently occurs in the shoulder, and also in the elbow, the knee and the foot. It occurs when there is a forced, awkward, repetitive movement of joints, usually during typing. Carpal Tunnel Syndrome is another most commonly known Repetitive Strain Injury types. This develops when the median nerve which is located inside of the wrist becomes compressed (Smith, 2008). When this occurs, the afflicted individual will experience feelings of numbness and tingling within their wrist, sometimes causing them to awaken in the middle of the night due to the pain. Similar to the Carpal Tunnel Syndrome is the Cubital tunnel syndrome. Those with a case of Cubital Tunnel Syndrome experience compression of the ulna nerve which is located within the elbow. Though it is common among those that repetitively deal with mouse, it may result in a limited range of motion of the elbow, as well as a feeling of burning and numbness present within the elbow. Tendonitis is another type of RSI that affects the elbow, wrists, arms, shoulders, legs, knees, ankles and hips. It is a very common RSI type that occurs when a tendon within the body becomes inflamed. Similar to tendonitis is Tenosynovitis. Those with tenosynovitis develop an inflammation of the sheath that surrounds the tendon. In most cases, this syndrome develops within the fingers and it is, therefore, also known as “trigger finger”. Those suffering from this condition may experience limited range of motion within the fingers, and may feel a cracking when they try to straighten the affected fingers.

Other types of RSI observed by the New York Committee for Occupational Safety and Health, (2002) include DeQuervain’s syndrome, also known as washerwoman’s sprain, which affects the thumb. It is associated with typing, and the affected people often experience a lack of ability to grip with the affected thumb. Dupuytren’s contracture is another type of RSI common with typing. Those suffering from this condition are unable to fully straighten their fingers into an open hand. Ganglion Cysts is a RSI type in which lumps are formed under the skin on tendons, most frequently on the wrist. It is caused by repetitive use of the joint or overloading of the joint which degenerates the tissue responsible for producing synovial fluid. Another type of RSI, which is often confused with DeQuervain’s syndrome, is Intersection syndrome. It is a painful Repetitive Strain Injury type that occurs mainly with keyboard and mouse users, when muscles within the forearm overlap with wrist tendons. Finally, Thoracic Outlet Syndrome is a type of RSI which is found in the thoracic region of the body. Those affected experience pain in the nerves and blood vessel around the plexus and axilla (between the base of the neck and the armpit). It is, however, more pronounced among basketball players than computer users.

2.2 General symptoms of RSI

According to Pascarelli and Quilter (1994), the main symptom of RSI is pain, which could be burning or, aching, in the upper extremities (fingers, palms, wrists, forearms, shoulders). This could be local (e.g., fingertips) or diffuse (e.g., the entire forearm) and it will typically be increased after a long session of computer use. They also noted weakness in hands or forearms; tingling, numbness or loss of sensation in arms; lack of control or coordination with hands; chronically cold hands; hypersensitivity in arms; pain that wakes you up at night; feeling a need to massage your hands, wrists, and arms as likely symptoms of RSI. In their study, Canadian Centre for Occupational Safety and Health (2004) stated that unlike acute trauma injuries that occur at once, RSI progresses in several steps. The early stages of RSI involve aching and tiredness of the affected area during work, but these symptoms soon disappear. It is rarely noticed because the symptoms do not affect work performance. This is followed by the early signs of chronic symptoms such as pains appearing during the work shift or at night. The symptoms start to limit the physical capacity of work performance. The final stage of RSI causes discomfort even at rest. At this level, the symptoms are so severe that they can cause permanent disability or malfunction of the body.

2.3 Prevention of RSI

According to Vranceanu et al., (2008), it is important to pay more attention to the muscles and joint that is used regularly. An individual needs to make sure that he/she doesn't overuse the most delicate area of his/her body, therefore regular breaks as at when due should be taken. If an individual begins to feel pains and fatigue in any part of his/her body that is been used to carry out a task, such pain or fatigue should be taken as a warning and the individual should step back from such activity for a moment.

Other studies by Bellis and Damany, (2001), reveal that maintaining good posture should be encouraged (that is, ergonomic seating), as it can be a great preventive measure for reducing the chance of RSI. A study by Peper and Gibney, (1998), suggests that preventive measures such as correct typing technique and posture, the right equipment setup, and good work habits are much more important for prevention than ergonomic gadgets like split keyboards or palm rests. Atroshi et al., (2007) suggested that while typing the wrists should not rest on anything, and should not be bent up, down, or to the side. The arms should move the hands around instead of resting the wrists and stretching to hit keys with the fingers (palm rests give a place to rest the hands only when pausing from typing, not while typing).

According to Bellis and Damany (2001), computer users should increase font sizes when necessary. Even with ever-larger monitors, many people favour tiny little fonts in their desktops and applications. This encourages one to hunch forward into the monitor to read things, putting pressure on nerves and blood vessels in the neck and shoulders. Microsoft Windows and Macintosh desktops and applications can easily be configured to use larger, easier-to-read fonts. Also consider using colour schemes that are easier on the eyes, particularly shades of gray for text documents. (When using Windows on UNIX or Linux, make the fonts in windows bigger by hitting Control and the right mouse button over the window for a menu of font sizes). Keys on the keyboard should not be pounded on; it is advisable to use a light touch. Both hands should be used to perform double-key operations like Ctrl-S or Alt-F4, instead of twisting one hand to do it. Move whole hand to hit function keys with strong fingers instead of stretching to reach them.

2.4 Treatment of RSI

Switching to a much more ergonomic mouse, such as a vertical mouse or joystick, or switching from using a mouse to using a stylus pen with graphic tablet may provide relief, but in chronic RSI they may only result in moving the problem to a different area. Most treatments including non-narcotic pain medications, braces, therapy, etc. are palliative (Amadio et al., 2001). Given that main stream health providers are still working on the best approach to Repetitive Strain Injury, it is not surprising that alternative treatments are popular. For example, some people with RSI find relief in specific movement therapies such as Taijiquan or yoga (Ratzlaff et al., 2007). Likewise, doctors often recommend that those suffering from RSI should engage in specific exercises to improve posture.

More often than not, the inflammation and the swelling of the affected area can be reduced using non-steroidal anti-inflammatory drugs. In all cases, resting the affected area of the body is of the utmost importance, with most doctors recommending at least two weeks of rest (Ross, 2000). Surgery may be necessary to correct the problem in the event of an advanced case of repetitive stress injury. Luckily, most repetitive stress injuries surgeries are outpatient surgeries which require little down-time (Wiley et al., 1994).

3. Research Methodology

This study was carried out at selected computer graphic design industries around Lagos state, Nigeria. The target population was the graphic designers working in these industries. A total of 30 graphic designers were sampled. Questionnaire was used as data collection instrument, with questions on demographics, frequency of use of computers, awareness on RSI, ergonomics and incidence of RSI symptoms. Data collected from the respondents were analyzed using Statistical Package for the Social Science (SPSS). The major statistical technique used was descriptive (use of frequency tables and charts).

4. Result

4.1 Demographics of respondents

Figure 1 and Figure 2 present the age and gender of the respondents, respectively. The age range of the respondents is between 21-30 years (66.7%) and 31-40 years (33.3%). The responses on gender show that male respondents accounted for 56.7% while the female respondents are 43.3%.

4.2 Frequency of use of computer and work intensity

Table 1 shows how often respondents work on their computer. Most respondent responded that they work with their computer for 8 hours (46.7%) and 10 hours (26.7%). This is followed by those that work all day except when sleeping (20.0%) and those that work for 4 hours per day (6.7). Also, most of the respondents responded that they work with their computer 7 days per week (36.7%), 5 days per week (33.3%) and 6 days per week (26.7%). Others (13.3%) have a tendency of working constantly at regular schedule.

Table 2 presents the work type and work intensity of the designers. The largest percentage of the respondents (36.7%) have a tendency of working right before the dead line, 23.3% responded that when they immerse themselves to work they forget the time, that is they do not take breaks. Another 23.3% responded that they are hard workers and they don't know how long they work until they finish. This is followed by 13.3% of the respondents who have a tendency of working constantly at regular schedule. Only 3.3% of the designers responded that they cannot sit for a long time without taking coffee breaks.

4.3 Ergonomic issues

Table 3 shows how the respondents position themselves while they work. Majority (50.0%) responded that they keep both feet on the ground when working while 43.3% responded that they do not care about where they keep their feet when working. Also most of the respondents (60.0%) responded that they set their monitor above eye level, 33.3% responded that their monitors at eye level and only 6.7% responded that they set their monitor below eye level. A lot of the designers (76.7%) often make use of both mouse and keyboard while working, 13.3% often make use of keyboard alone and 10.0% often use mouse. Almost all the respondents (90.0%) use more of right hand when working; only 10.0% responded that they use both left and right hand. For most respondents (60%), the angle between the forearm and the bicep is usually larger than 90 degrees, 30% of the respondents usually have it at 90 degrees and very few, 10%, have the angle at less than 90 degrees.

4.4 Symptoms of RSI

Table 4 describes how the respondents responded on the symptoms of RSI. A higher percentage (70.0%) of the respondents agreed that they have experienced the symptoms of RSI. About 37% of the designers responded that the RSI symptoms occur after working, 33% responded that they feel the discomforts while working, and the remaining 30.0% responded that it is not applicable. This percentage agrees with the 30% that has not experienced the symptoms of RSI. On the awareness of RSI, about 33% of the respondents responded that they are aware of RSI and they are trying to reduce the symptoms, 30.0% responded that they have heard of it but haven't tried anything to reduce it, and 37% responded that they are not aware of RSI. Finally, the designers were asked what they think was the reason for experiencing the symptoms. About 33% responded that they would think their body was not strong enough to support their work, approximately 37% responded that they would think it was due to the habit of their work pattern, and 30.0% responded that they would think they experienced these symptoms due to badly designed work environment.

5. Discussion

Most of the graphic designers sampled were between the ages of 21 to 30 years. This tally with the fact that the industry is relatively young in Nigeria and it is being dominated by young graduates or young people who have acquired some level of skills in graphics design. Sampling higher number of males than females also shows the peculiarity of the

Nigerian culture; a place where more responsibilities lie on the male children. Though with women empowerment programs, female children are getting more involved in businesses and societal development.

Most of the computer graphic designers spend between 8 hours and above working on the computer. Majority of them even used more than the usual 5 working days on the computer. More interesting is the fact that majority of them get so immersed in their work on the computer, that they forget about time. They were more interested in finishing the jobs at hand before the deadline; hence, they had almost no reason to think of break. No wonder the majority of them reported that they worked under pressure. Very few of them were conscious enough to see a need for regular break. These show the nature of work in the computer graphic industries and the reason why the researchers were so much interested in carrying out this study.

The study also shows that half of the respondents do not maintain good posture while working, especially when it comes to positioning of the feet. More so, most of the computer graphic designers position their monitor above the eye level while a few percentage have the computer set at the appropriate level (that is the eye level). The fact that most of these designers make use of keyboard and mouse at an equal rate shows that they were more likely to have repetitive motions while using these tools, a situation that subjects them to RSI. Another interesting observation is that only a few of them have the angle between their forearms and the bicep at 90 degrees. The rest maintain a bad posture of either less than 90 degrees or greater than 90 degrees.

It is therefore not surprising to have a very large number of the respondents experiencing RSI symptoms such as numbness, tingling, soreness or pain in the neck, arm, wrist or back while working or after working. Though most of these designers have heard about RSI, almost half of those that were aware were not even trying to do anything to reduce the symptoms. These sets were much more concerned about their jobs than they were concerned about their health. A shocking observation is the excuse some of these designers gave when they observed any of the RSI symptoms. Although some of them related these symptoms to the work pattern, a good number of them simply believed their bodies were not just strong enough to support their work.

The result of this study shows that ignorance is a major cause of the spread of RSI in the computer graphic industries. It is important to create the awareness that computer users should learn to sit up straight with their lower back supported and the monitor set to eye level. They should maintain neutral positioning of the fingers, wrist, forearm, elbow, shoulder and neck. They should also understand the need for regular breaks. In addition, those working regularly on laptop should get a laptop stand to raise the screen to eye level. They should work from a stable base and not on their laps. It is expected that there will be a reduction on the problems of RSI if these things were taken into consideration.

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Biographies

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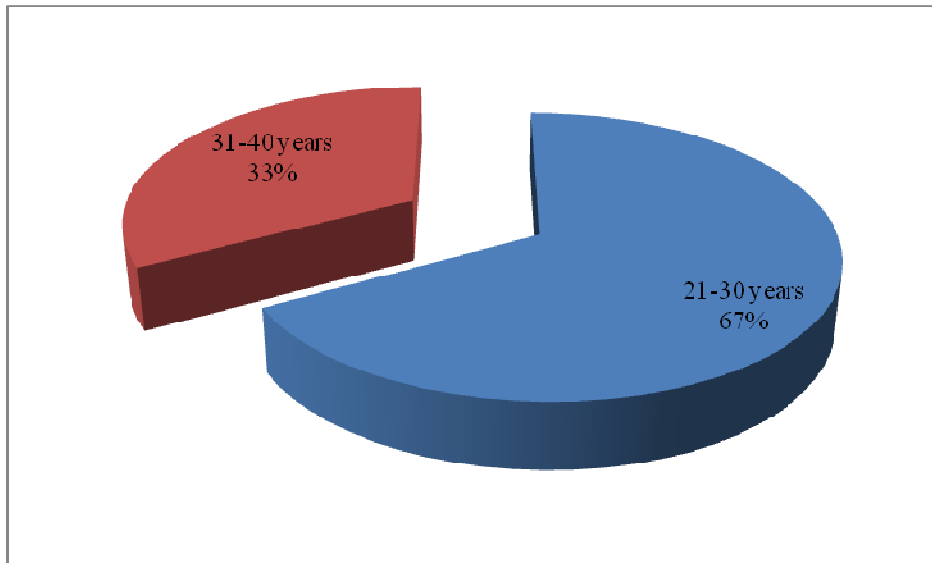


Figure 1. Age of respondents

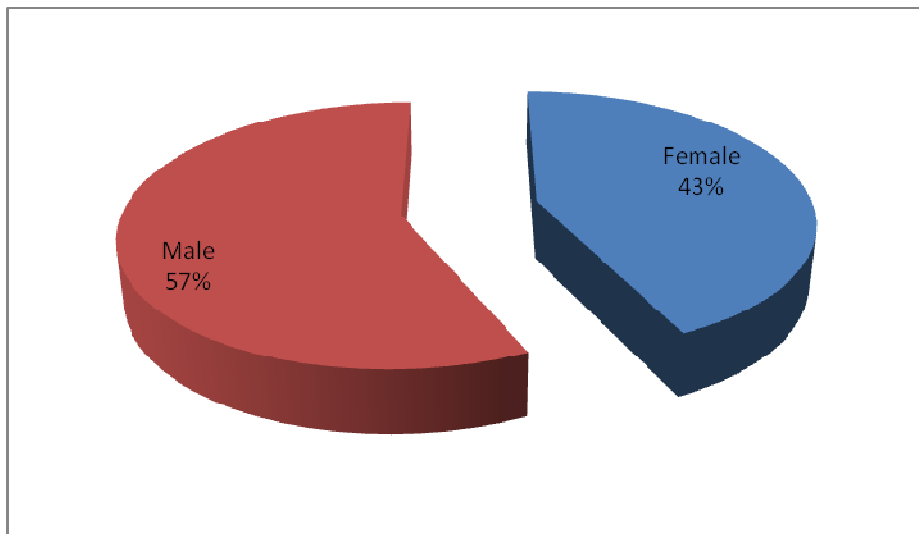


Figure 2. Gender of respondents

Table 1. Use of computer

Variable	Measurements	Frequency	Percent
How long do you use computer per day	Less than 4 hours	0	0
	4 hours	2	6.7
	8 hours	14	46.7
	10 hours	8	26.7
	All day except when sleeping	6	20.0
How many days do you use computer per week	No response	1	3.3
	5days	10	33.3
	6days	8	26.7
	7days	11	36.7
	I have a tendency of working constantly at regular schedule	4	13.3

Table 2. Work type and work intensity

Variable	Measurements	Frequency	Percent
What's your work type	Once I immerse myself to work, I forget the time	7	23.3
	I can't sit for a long time. I often take coffee breaks	1	3.3
	I am a hard worker. I don't know how long I work until I finish	7	23.3
	I have a tendency of working right before the dead line	11	36.7
	I have a tendency of working constantly at regular schedule	4	13.3
How was your work intensity over the past one week	I had lots of workloads/worked under pressure	15	50.0
	It was just usual, worked but not much intensity	10	33.3
	I didn't have to work very hard lately	5	16.7

Table 3. Ergonomic issues

Variable	Measurements	Frequency	Percent
When working my feet are	Both on the ground	15	50.0
	Each leg different places	1	3.3
	Both on the chair	1	3.3
	I don't care	13	43.3
My monitor is set	Above eye level	18	60.0
	Below eye level	2	6.7
	Both equally	10	33.3
When working I most often use	Mouse	3	10.0
	Keyboard	4	13.3
	Both equally	23	76.7
When working I use more of	Left hand	0	0
	Right hand	27	90.0
	Both hand equally	3	10.0
The angle between the forearm and the bicep is usually	Less than 90 degrees	3	10.0
	Equal to 90 degrees	9	30.0
	Larger than 90 degrees	18	60.0

Table 4. Symptoms of RSI

Variable	Measurements	Frequency	Percent
Have you experienced any of these symptoms numbness, tingling, soreness or pain in your neck, arm, wrist or back for a certain amount of time	Yes	21	70.0
	No	9	30.0
What time do the discomforts occur	While working	10	33.3
	After working	11	36.7
	Not applicable	9	30.0
Are you aware of Repetitive Strain Injuries (RSI)	I am aware of it and trying to reduce the symptoms	10	33.3
	I have heard of it but I haven't tried anything	9	30.0
	I am not aware	11	36.7
If you have any symptom what do you think it's the reason	My body isn't strong enough to support my work	11	33.3
	My habit of work pattern	10	36.7
	Badly designed work environment	9	30.0

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