

Full Length Research

Ergonomic Computer Workstation considerations for library Staff

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Library staff requires sound health to be maximally productive at work. This is because they sit for long hours carrying out their daily routines, and as such every workstation should be designed with both the worker and the task in mind so that work can be performed comfortably, smoothly and efficiently. 60% of respondents agreed that properly designed computer workstation improves the standard of work in a library, as such preventing on-the-job injury or disease should be the priority of any organization, especially the library, since it is the hub of the institution.

Key words: Ergonomics, Workstation, Occupational Hazards

INTRODUCTION

Working in a library can be demanding in terms of physical exertion and working with computers, mice, and monitors requires many of the same skills that successful athletes have. Potentially harmful situation that leads to back injury include prolonged static posture (for example a cataloguer keying in bibliographic details of library collections into the computer on a daily basis), use of chairs that are not ergonomically designed or sitting in an awkward position for a long period of time (for example, an acquisition librarian stooping over his table while generating acquisition list or making selection for library purchase), and library assistants that have to lift books consulted by library users on a daily basis. That is why sitting at a desk in an office chair, becomes uncomfortable after a short time, and if prolonged for extended periods of time tends to cause back pain. Holding the same position slowly diminishes elasticity in the soft tissues (muscles, ligaments and tendons) in the back. Then, stress builds up and causes back discomfort and / or leg discomfort. Furthermore, due to the sedentary nature of the job of library staff, a situation

whereby they sit for hours generating bibliographical details for the library catalogue, either electronically through the use of computers or manually, and/or attending to library users can lead to cramp or stiffness of some body parts. This was affirmed by Selby and Triano (2006), when they stated that a healthy body can only tolerate staying in one position for about 20 minutes.

Library staff require sound health to be maximally productive at work because running a library has always involved repetitive tasks that expose employees' backs necks, hands, and arms to injury. When workers that are at a high risk for injury on the job are mentioned, library workers are not likely to be thought of. Yet library workers and anyone who works extensively with computers should consider their machines as potential occupational hazards. Preventing on-the-job injury or disease should be the priority of any organization, especially the library, since it is the hub of the institution. The need to ensure that the workstation is suitable for the library staff becomes inevitable. For the purpose of this study, a workstation is defined as *a computer workstation is an*

ergonomically designed area of an office which accommodates a desktop computer and all of its peripherals. Ergonomic design means that the user shouldn't have to assume uncomfortable positions in order to perform his or her duties. A good computer workstation provides a comfortable and adjustable task chair, a properly positioned monitor, a keyboard shelf, a mouse pad with wrist rest and peripherals (printers, speakers, disk drives, etc.) which are easily accessible.(Pollick, 2010).

Workstation ergonomics is used to determine how the workplace can be designed or adapted to the worker in order to prevent a variety of health problems and to increase efficiency; in other words, to make the job fit the worker, instead of forcing the worker to conform to the job.

Princeton University Library (PULEP, 2006) strives to maintain a safe and healthy workplace for all of its employees. Workplace ergonomics has increasing significance for workplace health and safety. The University Library desires to promote and protect the health of its employees through ergonomically sound practices. Rodrigues (2010) opines that lack of necessary planning, incorrect use and placement of equipment may induce muscular disorder, eye fatigue and discomfort, stress, radiation, photosensitive epilepsy and skin rashes. Adeyemi (2010) observed that library staff sit for long hours carrying out their daily routines, and as such every workstation should be designed with both the worker and the task in mind so that work can be performed comfortably, smoothly and efficiently. She emphasized the need for general workstation ergonomic instructions to be taught in library schools and that University Commissions should include ergonomic measures, plans and education as parameters for measuring quality of academic libraries; according to her, this would engender competitiveness and compliance with the resultant effect in the promotion of staff health and welfare.

Ergonomic computer workstation furniture should be designed to facilitate task performance, reduce fatigue and injury by fitting equipment to the body size, strength and range of motion of the user. An ergonomic computer workstation can reduce the number of injuries suffered as a result of poor body positioning or repetitive motions; thereby reducing group health insurance rates and higher worker productivity.

ERGONOMIC WORKSTATION DESIGN FOR LIBRARY STAFF

Either sitting or standing, library staff should be comfortable at his work station. The idea of ergonomic workstation design is to make it fit the user. The arms should rest at the library staff sides and his/her back or neck should be kept straight; therefore, the work level

must be waist-high. It will have to be adjustable for many body heights, sizes, weights and reaches whether sitting or standing.

EWG(<http://www.ncsu.edu/ehs/www99/right/handsMan/office/ergonomic.html>) suggested the following workstation design:

1. Correct work station height depends upon the user of a work station and upon the chair and other factors that interact with the user and table. The ideal is for the user to be able to sit at the work station with the keyboard in place and be able to easily maintain a 90-100 degree elbow angle and straight wrists while keying. The height of an adjustable keyboard support should adjust between 23" and 28" to accommodate most-but not all-users. 26" is a recommended compromise position while leg clearance must still be considered.

2. Leg room: Knee space should allow a worker to be able to change position even with the keyboard support lowered to the correct level for use. The knee space should be at least 30" wide by 19"deep by 27" high to comply with the requirements of the Americans with Disabilities Act. For those using a footrest, clearance must be calculated with the legs in place on the footrest. Likewise, depth of the "clearance envelope" for both legs and toes should be evaluated while the workstation user is in a normal working position at the work station (determined by the design of the seating system and the way the user sits). Drawers and support legs (for furniture) should not go where human legs need to fit.

3. The work station top should be big enough to allow space not only for all computer-related necessary equipment, but also for paperwork, books, and other materials needed by the library staff while working at the computer. Frequently used items should be kept close to avoid long reaches. A general recommendation is that the work area top should be at least as big as the standard office desk - 30 inches by 60 inches. A depth of at least 30 inches allows flexibility in use/reuse of the work area. Usable space may be maximized by good wire/cable management.

4. Thickness of work surface: one inch.

It is evident as indicated by the Figure 1, that the workstation should be adjustable to fit any body shape and size; and that the following tips should be considered for an ergonomic workstation:

1. Place the monitor directly in front of and centered about the user.

2. Place the monitor at a distance of more than 16" from the user with the viewing angle between 0 to negative 18 degrees.

3. Keep CPU within arm's reach, but off the work surface.

4. Place work surface at a height that allows legs to

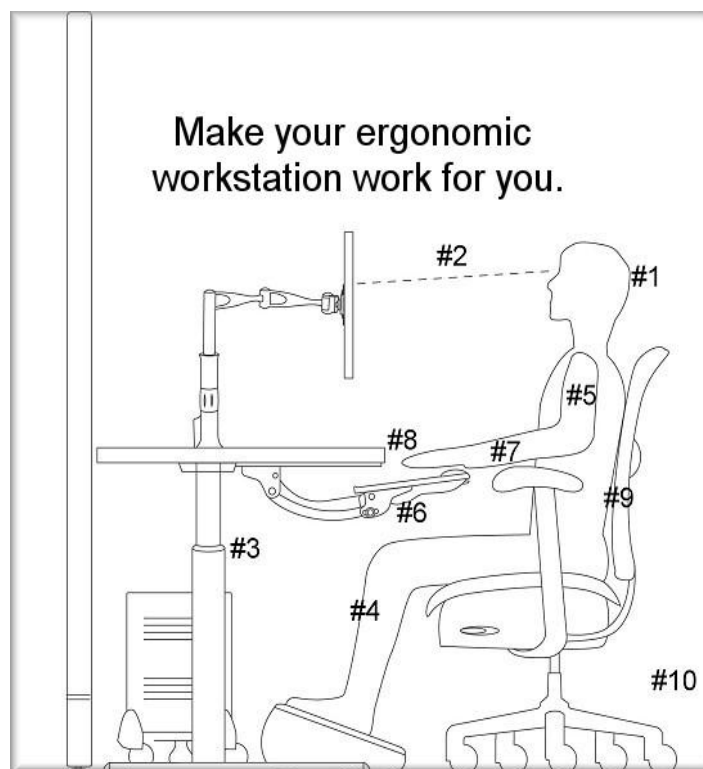


Figure 1. Source: <http://www.opraxmedical.com/Accessories/Digital/Furniture/> (Mayo, 2010)

fit comfortably underneath with feet flat on the floor. Use a footrest if needed.

5. Keyboard should be located at a height that allows the worker to key with the upper arms hanging relaxed from the shoulders.

6. Keyboard should have a light negative tilt.

7. Elbows should be roughly at right angles to allow the wrists to be fairly straight.

8. Place the pointing device (mouse) at the same height as the keyboard and as close to the keyboard as possible.

9. Always maintain contact with backrest of chair to minimize back discomfort.

10. Take 20 second to 2 minute rest breaks between regularly scheduled breaks.

METHODOLOGY

For the purpose of this study, copies of questionnaire on Computer Workstation Ergonomics were distributed to staff of CLR - Centre for Learning Resource (University Library), Covenant University Ota, Ogun State in South-West, Nigeria. The members of staff of CLR as at the period of this study were thirty-five (35) in number. The researcher and the University Librarian were excluded in

the filling of the questionnaire. The thirty-three (33) copies of questionnaire distributed were all returned; hence, 100% return rate was achieved since the researcher is a member of the staff of CLR.

DATA PRESENTATION

The analysis of the data collated is presented below: In Table 1, Male constitute (49%), while female constitute (51%), this show that both gender participated in the study.

Table 2 shows that 7 respondents (22%) have 1- 2 years working experience, 16 respondents (42%) have 2 – 4 years, 6 respondents (20%) have 5 – 6 years, 4 respondents (16%) have 7 – 8 years while no respondents have 9 years and above working experience.

Table 3, revealed that 1 respondent (1%) spent 1 – 3 hours at workstation daily, 2 respondents (4%) spent 4 – 6hours, 22respondents (59%) spent 7 -9 hours, while 8 respondents (36%) spent 10 hours and above at workstation daily.

Table 4 revealed that 3 respondents (11%) spent 0 – 1 hours before taking break, 6 respondents (15%) spent 2 – 3 hours, 7 respondents (20%) spent 4 – 5hours, 8

Table 1. Distribution of Respondents by Sex

Sex	Frequency	Percentage
Male	16	49%
Female	17	51%
Total	33	100%

Table 2. Working Experience of Respondents

Working Experience	Frequency	Percentage
1 – 2 years	7	22%
2 – 4 years	16	42%
5 – 6 years	6	20%
7 – 8 years	4	16%
9 years and above	----	----
Total	33	100%

Table 3. Hours Spent at Computer Workstations

Hours Spent at Workstations	Frequency	Percentage
1 – 3 hours	1	1%
4 – 6 hours	2	4%
7 – 9 hours	22	59%
10 and above hours	8	36%
Total	33	100%

Table 4. Number of hours Before Observing Break

Hours Before Break	Frequency	Percentage
0 – 1 hours	3	11%
2 – 3 hours	6	15%
4 – 5 hours	7	20%
6 – 7 years	8	25%
8 hours and above	2	9%
Not at all	7	20%
Total	33	100%

respondents (9%) spent 8 hours and above, while 7 respondents (20%) do not take break at all. It was also discovered that, 24 respondents (70%) take break from their workstations, 8 respondents (24%) do not take break, while 1 respondent (6%) is undecided.

Table 5 shows that 20 respondents (65%) experience

Table 5. Symptoms Experienced while Using the Workstations

Symptoms	Frequency	Percentage
Back ache	20	65%
Shoulder ache	4	11%
Arm Pain	1	3%
Neck Pain	1	3%
Wrist Pain	2	5%
Headache	2	5%
Eyes Strain	----	----
Weakness	1	3%
Tension	2	5%
Total	33	100%

backache, 4 respondents (11%) shoulder ache, 1 respondent (3%) neck pain, 2 respondents (5%) wrist pain, 2 respondents (5%) headache, 1 respondent (3%) weakness, 2 respondents (5%) tension and no respondent experience eyes strain.

DISCUSSION AND ANALYSIS

The study reveals that 18 respondents (63%) could adjust their chairs, 14 respondents (30%) could not, while 1 respondent (7%) is undecided. It was also gathered that, 7 respondents (25%) have screen protector on their workstations, 25 (5%) is undecided. It was observed that, 21 respondents (68%) agreed that there is a policy guiding workstations design in the library, 9 respondents (22%) disagreed and 3 respondents (10%) were undecided.

60% of respondents agreed that properly designed computer workstation improves the standard of work in a library, and (55%) of respondents strongly agreed that the arrangement of computer workstation reduces or increases the level of injuries sustained by library staff. Lambert (2004) put forward that computer workstations improve the standard of work in the library by saving space, maintaining files, acquisition module, serial module, cataloguing and classification online, circulation control, data information and transferring report generated and host of others. Aaras et.al. (2001) opined that the design and arrangement of the workstation furniture, computer hardware, software, and other workstation accessories will help reduce the level of injury sustained by users.

Furthermore, eye strain is a common health disorder experienced by 46% of the respondents, while 57% of respondents agreed that body pain are caused by poorly designed computer workstation.

This agrees with IAPA (2007) on *Office Workstation Design* that 'the purpose of a well-designed seating is to provide stable support that allows movement, comfort and task accomplishment.' It is therefore obvious that good human posture is the basis of good workstation ergonomic, good posture is the best way to avoid related injuries (Hedge, 2010).

RECOMMENDATION

Based on the findings and conclusion drawn above, the following are hereby recommended:

- (a) The various likely body postures of present and would be library staff should be considered when designing the computer workstations.
- (b) The library management should employed a policy for the design of computer workstations in the library and be involved in the design.
- (c) The library management should install an ergonomic software on all computer systems of the library staff, so as to alert them when to observe break
- (d) The library staff should be trained on ergonomics, for better understanding of the design of their workstation.
- (e) Library staff should observe micro breaks at regular intervals away from the workstation. If you must sit or stand for a prolonged period, change your position often. Take a 30-second timeout every 15 minutes or so to stretch, move or relax. Try standing up when you answer the phone, to stretch and change positions. If your back hurts, stop activities that aggravate it.

Adeyemi (2009) confirmed that there are constraints militating against effective implementation of ergonomics in Nigerian libraries; such as funding, attitude of employers, etc. This should be given thorough consideration, because library staff contribute a great deal to the attainment of the organizational vision and mission via their services within the library. Good posture is the basis of good workstation ergonomics and the best way to avoid a computer-related injury. Employers, library staff and users can help ensure good posture by committing and being attentive to proper computer ergonomics.

CONCLUSION

The most visible causes of ergonomic problem as indicated by the respondents are poorly designed seats, awkward posture, exposure to computer screens on a regular basis without screen protectors, sitting in the same position for continuous long hours, frequent repetitive motion tasks, among others. The sedentary nature of library tasks readily predisposes staff to

ergonomic problems, whether the staff conceptualizes their experience as ergonomics or not, the fact remains that the causative factors are intricately present in their daily activities.

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