

## Assessment of Knowledge and Practice of Computer Ergonomics among Secretaries and Data Processing Workers in University of Gondar, Northwest Ethiopia, 2016

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### Abstract

**Background:** Ergonomics is the science of fitting jobs to workers by taking into account the requirements of the job and peoples' physical and mental capacities. Knowledge and practice about computer ergonomics helps employers and data processing workers to develop strategies that used to reduce the effects of poor computer ergonomics in the selected population.

**Objectives:** the aim of the study is to assess knowledge and practice towards computer ergonomics among desk top users of secretaries and data processing workers who are working in different departments or staffs in university of Gondar.

**Methods:** An institutional based cross-sectional study was conducted from the 1st February to June 2nd week, 2016 on secretaries and data processing workers in university of Gondar. Stratified sampling was used to get the total sample size of 260 participants. A self-administered structured questionnaire and observational checklists have been used to collect quantitative data on assessment of knowledge and practice of computer ergonomics. All the questionnaires have been checked visually, coded and entered into SPSS version 20 software package and also for analysis.

**Result:** Among the total respondents 152(58.5%) of the participants were females while the mean age of the study participants was 29.62. About 165(63.5%) of the study participants had information about computer ergonomics with the mean knowledge and practice 51.9% and 48.1% respectively.

**Conclusion:** Even though the workers had a good knowledge their practices were below the mean score. So the concerned body should be responsible to improve the awareness of the workers on computer ergonomics practice through office ergonomics strategies.

**Keywords:** Ergonomics; Computer ergonomics; Musculoskeletal; Health hazards

### Introduction

Computers are an integral part of life. In every sphere of life the dependence on computers is ever increasing. In the absence of a good ergonomic design, extended work for prolonged periods can adversely affect not only vision, but also leads to musculoskeletal disorders [1]. Computer ergonomics is used to design an appropriate computer workstation and decreases computer related health problems through optimizing the association between environment and the person where the concern to assemble things at the workstation [2,3].

The point should understood the posture requires feet resting comfortably on the floor or on a foot rest; knees slightly lower than hips with two to four inch gap between the back of knees and the front edge of the chair when the back is against the chair and the users should have an adequate space to prevent leg injuries [4,5]. Study revealed that the number of people suffering from musculoskeletal

conditions has increased by 25 percent over the past decade and these conditions make up 2% of the global disease burden [6,7]. A user-centered approach to impart knowledge of the anatomy and physiology of the body in addition to the nature of work and workstation design is needed to enable individuals to organize their workplace to prevent various health hazards by adjusting proper height of the seat, working posture, proper use of armrest, backrest, straight alignment of the wrist and the elbow and positions on keyboard can prevent various health hazards [1,8].

Computer users are generally encouraged; this is to keep up with the fast moving world of technology, research and science. Researchers have come to an agreement that this could actually be harmful, if not properly managed for future generation [9]. A study indicates the knowledge and practices of ergonomics among desktop users of different professions high [10,11].

A cross sectional study show that the majority of the study participants agreed they learned more about ergonomics and felt confident to recognize and fix their ergonomic problems in the future,

however in another study their knowledge is very low due to an individual behavioral patterns on the computer ergonomics which could affect their work habits, postures adopted and their perceptions towards the discomforts they were experiencing [12,13]. Other related study conducted on self-reported computer vision syndrome among secretaries and data processors in Ethiopia show that 73.9% of the study participants were found to suffer from computer vision syndrome.

## Methods and Materials

An institutional based cross-sectional study was conducted in University of Gondar from February to June. The University of Gondar, until 2003 known as the Gondar College of Medical Sciences, is the oldest medical school in Ethiopia. Established as the Institute of Public Health training center in 1954, it is located in Gondar town, the former capital of Ethiopia, about 738 km from Addis Ababa and 173 km far from the regional city of Amhara Regional State, Bahirdar

The study population was all secretaries and data processing workers who are working in all campuses of University of Gondar were proportional allocated and randomly selected. Secretaries or data processing workers who are not willing to participate in the study and academic staffs were excluded in the time of data collection.

The sample size was determined using the assumptions: Level of confidence taken to be 95%, 5% margin of error and P is the proportion of knowledge and practice among these computer users. But since there is no study done on this specific population group in our country the p was taken as 50% and the sample size were 384, but our source of population is less than 10,000 which is 601 since by using correction factor the actual sample size is 235 by adding 10% none repose rate 260.

In the data collection process, data were collected using standardized questionnaire. A total of 15 close ended questions categorized in to 5 main components of their work station were asked to measure the independently the knowledge and practice of computer ergonomics. While in our research we said the users is knowledgeable or practice the computer ergonomics if he/she answers questions above mean score value. The questionnaire was translated from English into Amharic and then independently back translated to English with adjustment of the Amharic version where problems were identified. In the questionnaire the socio demographic characteristics were included. Before the actual data collection, the questionnaire was pre-tested private university college workers.

The data were coded and entered into SPSS software version 20.0 for further analysis. Bivariate logistic regression analysis was used to determine the association of independent and dependent variables, and those variables with P-value <0.15 were exported to multiple logistic regressions for further analysis and to remove insignificant variables. The summary statistics such as mean, standard deviation and percentage were used to describe the study population in relation to outcome variables. The degree of association between independent and dependent variables were assessed using odds ratio with 95% confidence interval.

## Ethical consideration

The study was carried out after getting permission from the ethical review board (IRB) of University of Gondar. Informed consent was also obtained from the study participants to participate in the study.

Confidentiality was granted for information collected from the individual and by removing the name of study participants from the questionnaires.

## Result

### Socio demographic characteristics of the study participants

A total of 260 individuals in university of Gondar were included in the study, about 152(58.5%) of the participants were females. Among the respondents the mean age of the study participants was 29.62, median 28 and mode of 28. Most of the study participants about 134(51.5%) were unmarried. Among the respondents 119(45.8%) were diploma holder (Table 1).

More than half of the participants 160(61.5%) were using computer for less than 6 years. among all participants of the workers, most of them were working on less or equal to 8 hours in a day and 100 (38.5%) were using more than 8 hours a day (Table 2).

Variables	Frequency	Percent	
Sex	Male	108	41.5
	Female	152	58.5
Age	19-24	62	23.8
	25-30	116	44.6
	31-36	53	20.4
	37-42	9	3.5
	>42	20	7.7
Marital status	Married	115	44.2
	Unmarried	134	51.5
	Divorced	8	3.1
	Widowed	3	1.2
Education	Elementary	2	0.8
	Certificate	11	4.2
	Diploma	119	45.8
	Degree	98	37.7
	Masters	29	11.2
	Other	1	0.4
Income	500-1500	27	10.4
	1501-2500	113	43.5
	2500-3500	55	21.2
	3501-4500	38	14.6
	>4501	27	12.4

**Table 1:** Socio-demographic characteristics of respondents among secretaries and data processing workers in University of Gondar Northwest Ethiopia, June 2016 (n=260).

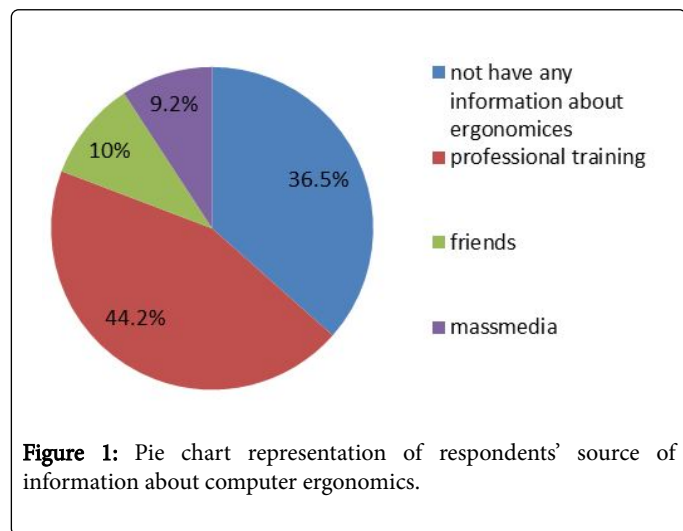
Variables	Duration	No. respondents	Percentage
Length of computer usage ( in year )	1-5	160	61.5
	6-10	80	30.8
	11-15	16	6.2
	>16	4	1.5
Duration of usage (in hours)	≤ 8	251	96.5
	≥ 9	9	3.5

**Table 2:** Computer duration of usage.

### General knowledge of respondents about computer ergonomics

Among the participants 165 (63.5%) responded that they had heard about ergonomics, while 95(36.5%) had never heard of the term. Of those who had heard of it, 115(44.2%), 26(10%) and 24(9.2%) get information about computer ergonomics from during the time of professional training, friends and mass media respectively (Figure 1).

Most of the study participants 227(87.3%) were agree that knowing computer ergonomics is an important for wellbeing and health. Of those subjective rating of this knowledge on a scale of 1 to 4 (where 1=excellent, 2=good, 3=satisfactory and 4=poor) showed that most of them 174 (66.9%) of those who had heard of ergonomics, rated it as excellent, 43(16.5%) rated their knowledge as good, 9(3.5%) rated it as satisfactory and 1(0.4%) rated it as poor (Tables 3 and 4).



**Figure 1:** Pie chart representation of respondents' source of information about computer ergonomics.

A total of 15 close ended questions categorized in to 5 main components of their work station were asked to measure the knowledge on computer ergonomics. About more than half of the study participants which were 135(51.9%) knew these questions.

### The practice of respondents about computer ergonomics on their workstation

A total of 15 corresponding close ended questions also categorized in to 5 main components of their work station were asked to measure the practice on computer ergonomics. About more than half of the

study participants which were 48.1% practice on the usage of computer ergonomics.

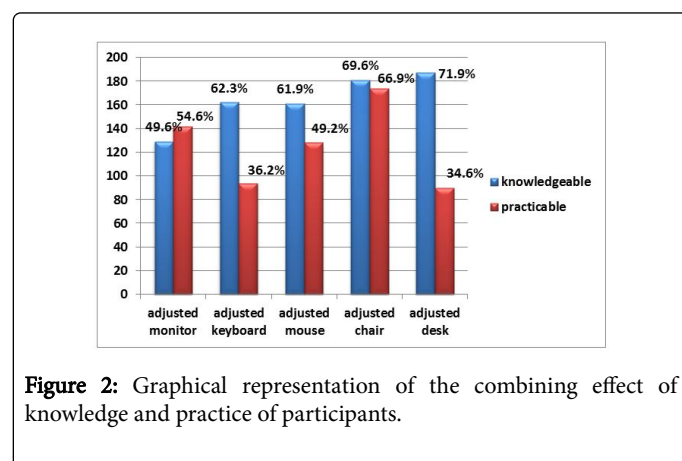
Categorized variables	Frequency	
	knowledgeable	Not knowledgeable
Adjusted monitor	129(49.6%)	131(50.4%)
Adjusted key board	162(62.3%)	98(37.7%)
Adjusted mouse	161(61.9%)	99(38.1%)
Adjusted chair	181(69.6%)	79(30.4%)
Adjusted desk	187(71.9%)	73(28.1%)

**Table 3:** Knowledge of participants concerning on their workstation in terms of adjusting their workstation in to five categories.

Categorized variables	Frequency	
	practicable	Not practicable
Adjusted monitor	142(54.6%)	118(45.4%)
Adjusted key board	94(36.2%)	166(63.8%)
Adjusted mouse	128(49.2%)	132(50.8%)
Adjusted chair	174(66.9%)	86(33.1%)
Adjusted desk	90(34.6%)	170(65.4%)

**Table 4:** Practice of participants concerning on their workstation in five categories.

The combination of both knowledge and practice of respondents on ergonomics office were presented on the figure below.



**Figure 2:** Graphical representation of the combining effect of knowledge and practice of participants.

### Discussion

This research, conducted in university of Gondar mainly aimed to assess knowledge and practice of secretaries and data processing workers on computer ergonomics. The study includes a total of 260 study participants. In the investigation we found that the level of good knowledge and practice of the community was below mean value.

In this study more than half of the participants heard about computer ergonomics. From the total majority of them were aware the importance of computer ergonomics for the wellbeing of their health. But when we compared with study done it is less [9]. In this study the discrepancy might be due the difference in sample size, the gap on provision of training of computer ergonomics and access of information in the usage of computers ergonomics with technology advancement either in the form of electronic or printing media. The knowledge about the importance of adjusting of monitor to use computer is under mean score value, however the practice on the usage is above the mean value. This implies the workers sitting position experience can be determine. In another case 62.3% of workers had awareness on the adjustment of keyboard but their practice is very low. This gap might be due to unable to give an attention while using the keyboarding.

More than half of respondents place their wrist in line with elbow while their practice is less than mean. This in line with the research conducted in Bahria university staffs whereas the majority of the respondents had knowledge about the importance of adjusting the chair. The adjustment of desk is as an important to solve health related with computer ergonomics but the finding indicates that the minimum number respondents were had the adjusted desk and they uses either too up or down positioned desk. The observational checklist result shows the practice of ergonomics while working at their working station like adjusting the monitor at or slightly below eye level was very low but study conducted in Nigerian indicates the practice of workers on the usage of the monitor screens were at or slightly below eye level is high and the majority employees had their elbow joint not angled at the recommended angle that is 90 degree, this is in line the research conducted in Nigerian university [10]. The finding indicates that females are more knowledgeable and practicable than males this means most of the time females are exposed computer related works and it enables them to know and practical more than male. The age categories of between 25-30 year were more knowledgeable and practicable than other age categories respectively. This might be due to more of the adult session is sensitive for information and trying to practicing it. In the same way participants who were single were more knowledgeable and practicable than others. This might be due to the concentration of respondents on their work by giving emphasis while working.

## Conclusion

Although the majority of the study participants have heard about computer ergonomics with the mean knowledge and practice of them are 51.9% and 48.1% respectively. Even if they had good knowledge they were not practically safe since it has a score of below the mean practice. As we have observed from the result upgrading is one of method to improve computer knowledge and practice, it is better to improve employee's knowledge using through different media and the university should be provide ergo design workstation environment as much as possible. Additionally employees improve their knowledge by updating with technology advancements and let try to practice it for

their wellbeing and report while they are exposed for a material which is not ergo designed while their working let try substitute in to less harm full workstation equipment.

## Limitation of the Study

Lack of instruments to measure the posture of workers or equipment design rather than simply observe to increase the accuracy of the data

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