Knowledge and Practice regarding Computer Ergonomics among Faculty Staff in Helwan University

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Abstract

Background: Computers are widely used in academic institutions, working for prolonged period in an ergonomically deficient workplace increases the risk of many health issues. **Aim:** To assess knowledge and practice regarding computer ergonomics among Faculty Staff. **Design:** A descriptive research design was used. **Setting:** This study was conducted at faculty of nursing, Helwan university. **Sample:** A convenient sample of 102 faculty staff at Faculty of Nursing, Helwan University was included in this study. **Tool:** Three tools was used; Tool I: Structured Interviewing Questionnaire, Tool II: Faculty staff's reported practices regarding Computer workstation Ergonomics and Tool III: Computer Health Hazards Questionnaire. **Results:** only 23.5% of the studied faculty staff had satisfactory level of knowledge regarding computer ergonomics, 24.5% of them had adequate level of reported practices, and 59.8% of them had a sever level of computer health hazards. Also, there was a high statistically significant positive correlation between the studied faculty staffs' knowledge and reported practices regarding computer ergonomics at (r= 0.985 & P= 0.000) while there was a high statistically significant negative correlation between the studied faculty staffs' knowledge, reported practices and computer health hazards at (r=-0.795, -0.828 & P= 0.000). **Conclusion:** less than one quarter of the studied faculty staff had satisfactory level of knowledge regarding computer ergonomics and adequate level of reported practices while, more than half of them had a severe level of computer health hazards. **Recommendations:** Design and implement ergonomic programs for faculty staff to improve their knowledge and practices regarding prevention of computer health hazards.

Key words: Computer ergonomics, Computer health hazards, Faculty staff.

I.Introduction

Nowadays, the development of technology along with the need to access information has resulted in use of computer to be inevitable. Computer is an integral and essential part of daily work in academic institutions due to its positive effects on accuracy, efficiency, and the achievement of desired outcomes.[1] However, the prolonged use of computers, along with the inappropriate adherence to ergonomics principles, health and safety requirements of workstations, has been associated with various potential health problems. [2]

Computer is related with many health issues such musculoskeletal problems and computer vision syndrome. Common cause for these disorders is use of computers extensively over a prolonged period in awkward postures or static postures without any position change, leading to reduce circulation, joint pain and stiffness .Extended period of continuous work raises the risk of Musculoskeletal Disorders (MSDs) and leads to prolonged disability. [3] Muscles and tendons can become inflamed due to repetitive movement or intensive use of a mouse or keyboard. Carpal tunnel syndrome is a common example of an overuse injury associated with computer. [4]

Computer ergonomics is a field of study which aims to reduce the effects of working at a computer for an extended period by improving the placement of computer monitor, desk, keyboard as well as accessories that can be used. Among the computers, laptop also is found to be not ergonomically designed for prolonged use because of the monitor and keyboard that are close together where they cannot both be in a good position at the same time. [5]

The faculty staff are the most important components of the higher education system and more risky for Work related Musculoskeletal Disorders (WMSD) because they spend a lot of their time working in front of a computer. Long-term use of computer, working at a desk and static sitting postures for long time play an important role in developing WMSDs. [6] As such, serious attention ought to be given to workplace conditions under which they perform their respective tasks as prerequisites for improving their performance and outcomes. [7]

Community Health Nurses (CHNs) is a pivotal member who can work for the prevention of computer related health hazards and enhancement of safe ergonomic principles. CHN assess faculty staffs' health needs and conduct educational programs that afford tailored health information about computer related health problems and safe preventive ergonomic practices to prevent health hazards associated with computer use.[8]

1.1 Significance of the Study

Computers have become an important part of life and necessary device for all the faculty staff engaged in universities. Around 90 million adults in the world are using computer on a regular basis. [9] Globally, 25% of computer users are already suffering from computer related health hazards. The United States has to shell out more than 2 billion US dollars annually for having ignored these computer related problems. [10]

Musculoskeletal disorders are the most common, widespread, computer work related problems and account for 42% to 58% of all work-related illnesses. Approximately 1.71 billion computer users have musculoskeletal conditions worldwide.[11] The annual prevalence of WMSDs among computer users varied from 33.8 to 95.3 %. In Egypt, study was performed on computer users in Alexandria city showed that 54.1% of computer users reported musculoskeletal discomforts symptoms as 69% in the neck, and 70% at shoulder. [12]

Computer vision syndrome (CVS) affects more than 70% of all computer users. [13] Approximately 60 million individuals globally suffer from CVS, with 1 million new instances occurring each year. [15] In Egypt, eyestrain (72.4%) and headache (64.4%) were the most reported symptoms of CVS among computer users. [14] So, this study conducted to assess knowledge and practice regarding computer ergonomics among faculty staff.

Aim of the study

The aim of this study is to assess knowledge and practice regarding computer ergonomics among faculty staff through:

Assessing knowledge of faculty staff about computer ergonomics.

Assessing reported practices of faculty staff regarding computer ergonomics.

Assessing computer health hazards among faculty staff.

Research Questions:

Q 1 –Are faculty staff having satisfactory level of knowledge about computer ergonomics?

Q 2 –Are faculty staff having adequate level of reported practices regarding computer ergonomics?

Q 4 – Is there a relation between faculty staffs' total knowledge, reported practices regarding computer ergonomics and computer health hazards?

II. Subjects and Method

Research design:

A descriptive study was applied to achieve the aim of the current study.

Research setting:

The study was conducted at Faculty of Nursing, Helwan University. It composed of four floors. Ground floor was specialized for administrative offices for employees and vice deans of the faculty, the 1st floor composed of Dean's office, the quality assurance office, medical surgical department offices, clinical labs and two seminar classes. The 2nd floor composed of two departments' pediatric and obstetric departments' offices, measurement and evaluation unit, obstetric clinical labs and seminar classes. The 3rd floor composed of three departments' community health nursing, psychiatric and administration departments' offices, the electronic examination labs, library, objective structured clinical examination lab (OSCE) and seminar classes.

Subjects:

A convenient sample of faculty staff at Faculty of Nursing, Helwan University was included in this study. The sample was equal 102 faculty staff.

Tools of data collection
The data were collected through using the following tool:

Tool I: Structured Interviewing Questionnaire: This tool was developed by the investigator after reviewing the related literature and include the following three parts:

1st part: Personal data of studied faculty staff:
It consists of 5 items which include data regarding age, sex, marital status, occupation, and years of experience.

2nd part: Faculty staff computer usage:
This part was developed by the investigator and include faculty staff's usage of computer as duration of computer usage, type of computer used, average numbers of daily hours using computer, number of consecutive hours using computer, number of hours using computer for academic works,

number of hours using computer for personal works and average number of breaks taking during computer use. It consists of 7 items.

3rd part: Ergonomics Knowledge Assessment Questionnaire:

This part was developed by the investigator and included faculty staff's knowledge regarding to computer ergonomics as meaning of ergonomics, benefits of ergonomics, health hazards of prolonged use of computer, risk factors and symptoms of work related musculoskeletal disorders, symptoms of computer vision syndrome, correct postures while using computer, standards and specifications that must be available in the chair when using a computer, correct placement of the keyboard and input device, correct position of the screen while using the computer, correct placement of computer accessories and health precautions while using the computer. It consists of 12 items.

Scoring system for knowledge items:

This tool consisted of 12 items with a total grade (24). Two grade was given for each complete correct answer, one grade was given for incomplete correct answer and zero grade was given for don't know. The total grades for each item were summed up and then converted into a percentage score. They were classified into two levels *as* the following:

- **Satisfactory level**: if total score $\geq$ **75%.** It means ($\geq$ 18 grades.)
- **Un-satisfactory level**: if total score **< 75%.** It means **(< 18 grades.)**

Tool II: Faculty staff's reported practices regarding Computer Workstation Ergonomics:

Concerned with the faculty staff's reported practices regarding workstation ergonomics and it was adapted from **Occupational Safety and Health Administration (OSHA, 2014).** [15] Which consist of 58 items for working postures covering 13 items, seating covering 9 items, keyboard and input devices covering 7 items, screen covering 5 items, mobile devices (laptop / I pad) covering 5 items, computer accessories covering 8 items and healthy practices when using computer covering 11 items. It contains 7 sections.

1st section: Included working postures**,** which include correct postures of head and neck, trunk, torso, shoulders, elbows, forearms, wrists and hands, thighs, legs and feet, leaving a sufficient room under the work surface and ensuring that sharp or square edges are padded or rounded. It is covering 13 items.

2nd section: Included seating which include adjusting backrest height, using a chair with a sturdy 5 leg base, using a seat with an appropriate width and depth, using a seat front does not press on knees and lower legs, using a cushioned and rounded seat, adjusting seat height, using a chair with an adjustable armrest, using an adjustable head rest, and using a chair with an appropriate caster. It covers 9 items.

3rd section: Included keyboard and input devices which include ensuring that keyboard/input device is stable, adjusting the keyboard / input device, adjusting the keyboard to a horizontal or slightly tilted position, using an input device that easy to activate, shape/size fits hand, putting the input device close to the midline of the body, using a detached keyboard and mouse, and ensuring absence of any sharp edges contact wrists and hands. It covers 7 items.

4th section: Included screen which include adjusting top of the screen at or below eye level, adjusting the screen position directly in front of user, putting the primary screen directly in front of user and the other screens are directly beside it, ensuring that glare is not reflected on screen, and adjusting the screen brightness and contrast. It covers 5 items.

5th section: Included mobile devices (laptop / I pad) which include using the same ergonomic principles with the use of laptops, changing postures regularly, using a separate keyboard and stylus, correct postures for shoulders, arms and neck, and using a separate keyboard and mouse if the duration of use is more than 2 hours a day or 30 minutes at a time. It covers 5 items.

6th section: Included computer accessories which include using a stable and large document holder, correct position of the document holder, using a padded wrist/palm rest, using wrist/palm rest keeping forearms, wrists, and hands straight, placing the telephone within easy reach, using the telephone with head upright and shoulders relaxed, using a suitable headset, and using a footrest. It covers 8 items.

7th section: Included healthy practices when using computer which include ensuring workstation adjustability, making sure that the computer workstation, and accessories are function properly, placing items within easy reach, organizing computer tasks, alternating between sitting and standing, practicing stretching exercises, taking small breaks, resting the eyes, using safety glasses, adjusting the lighting levels for various tasks and avoid holding a pen in hand while typing. It covers 11 items.

Scoring system for reported practices items:

This tool consisted of 58 items with a total grade (116). Two grade was given for done, one grade was given for sometimes done and zero grade was given for not done. The total grades for each item were summed up and then converted into a percentage score. They were classified into two levels as the following:

- **Adequate level**: if total score ≥ 75%. It means (≥ 87 grades.)
- **Inadequate level:** if total score < 75%. It means (< 87 grades.)

Tool III: Computer Health Hazards Questionnaire:

This tool included the following two parts:

1st part: Computer vision syndrome questionnaire (CVS-Q):

This tool adapted from **(Crespo et al., 2015)** [16] and concerned with questions about vision symptoms such as burning eye, itching eye, feeling of foreign body in the eye, watery eye, excessive blinking, eye redness, eye pain, heavy eyelids, dryness in eye, blurred vision, double vision, difficulty focusing for near vision, increased sensitivity to light, colored halos around objects, feeling that sight is worsening and headache. It consists of 16 items.

2nd part: Cornell Musculoskeletal Discomfort Questionnaire:

This part adapted from **(Hedge, etal., 1999)** [17] and concerned with items about complains related to musculoskeletal system such as feeling pain or discomfort in neck, right and left shoulder, upper back, right and left arm, lower back, right and left forearm, right and left wrist, hip and buttocks, right and left thigh, right and left knee, right and left lower leg and foot. It consists of 20 items.

Scoring system for computer health hazards items:

This tool consisted of 36 items with a total grade (72). Two grade was given for always response, one grade was given for sometimes response and zero grade was given for never response. The total grades for each item were summed up and then converted into a percentage score. They were classified in to three levels *as* the following:

- **Mild level**: if total score **< 50%.** It means (< 36 grades.).
- **Moderate level**: if total score ≥ **50 % - < 75%.** It means (≥ 36 grades - < 54 grades.).
- **Severe level**: if total score ≥ **75%.** It means (≥ 54 grades.).

Validity:

Content and face validity of the tools for clarity, comprehensiveness, appropriateness, and relevance was done by five experts in community health nursing, Faculty of Nursing, Helwan University. No modifications done but the expertise recommended rephrasing for some questions and items of the tool.

Reliability

Reliability for the utilized tools was tested to determine the extent to which the items of the tools are inter-correlated to each other. The Cronbach's alpha model is one of the most popular reliability statistics in use today and considered as a model of internal consistency that is used to estimate reliability of test scores. The statistical equation of Cronbach's alpha reliability coefficient normally ranges between 0-1. [18] The following table show the degree of Alpha Cronbach's for the used tools.

Tools	No of items	Alpha Cronbach test
knowledge regarding ergonomic	12	0.980
Reported practices regarding ergonomic	58	0.997
Computer health hazards	36	0.987

Ethical considerations:

An official permission to conduct the proposed study obtained from the Scientific Research Ethics Committee Faculty of Nursing, Helwan University. Participation in the study was voluntary and subjects were given complete full information about the study which included explaining the purpose and nature of the study, stating the possibility to withdraw at any time and confidentiality of the information were guaranteed. Ethics, values, culture and beliefs were respected.

Pilot study:

The simplicity, clarity, and applicability of the tools were evaluated in a pilot study involving 10% of the entire sample (10 faculty staff). The time required to collect the questionnaire was determined as well as any problems during data collection were identified. Since no modifications were made, pilot study participants were included within the total sample size.

Fieldwork

Data was collected during six months from (the beginning of July 2023 to the end of December 2023). The questionnaire was distributed as a google form to the studied faculty staff through WhatsApp application for assessing their knowledge, reported practice regarding computer ergonomics and computer health hazards.

Statistical analysis:

Data entry and analysis were performed using SPSS statistical package version 25. Categorical variables were expressed as number and percentage while continuous variables were expressed as (mean ±SD). Chi-Square (x2) was used to test the association between row and column variable of qualitative data. Additionally marginal homogeneity test is used to test categorical data. This test is an extension of the McNemar test from binary response to multinomial response. It tests for changes in response (using the chi-square distribution). The fisher exact test was used with small, expected numbers when value being less than 5 and if table being 2×2.

While T test used to compare mean in normally distributed quantitative variables between. Pearson correlation was done to measure correlation between quantitative variables. For all tests, a two-tailed p-value ≤ 0.05 was considered statistically significant, P-value ≤ 0.01 was considered highly statistically significant. While p-value > 0.05 was considered not significant.

III. Results

Table 1 shows that, 56.9% of the studied faculty staff, their age was ranged from 24 - < 35 years old, with a mean age of 34.72 ± 6.4. Regarding to marital status, 89.2% of them were married. Concerning occupation, 31.4% of them were lecturer. Regarding years of experience, 40.2% of them were working in a nursing field for 5- < 10 years with a total mean ± SD of 9.68 ± 5.10.

Figure 1 illustrates that, 84.3% of the studied faculty staff were female, while 15.7% of them were male with a male to female ratio is 0.2:1.

Table 2 shows that, 76.5 % of the studied faculty staff using computer since ≥ 10 years and 59.8% of them use laptop, while 62.7%, 51%, 52%, 94.1% and 43.1% of them using computer daily for 3-< 7 hours, using computer consecutively for 1- < 3 hours, using computer for academic works for 3-< 6 hours, using computer for personal works for 1-< 3 hours, and taking one break during computer use respectively.

Figure 2 clarifies that, 23.5% of the studied faculty staff had satisfactory level of knowledge while 76.5% of them had unsatisfactory level of knowledge regarding computer ergonomics. In addition to, satisfactory to unsatisfactory ratio= 0.3:1.

Figure 3 clarifies that, 24.5% of the studied faculty staff had adequate level of reported practices while 75.5% of them had inadequate level of reported practices regarding computer ergonomics. In addition, adequate to in- adequate ratio= 0.3:1.

Figure 4 clarifies that,19.6% of the studied faculty staff had a mild level, 20.6% of them had moderate level and 59.8% of them had severe level of computer health hazards.

Table 3 describes that, there was a statistically significant relation between computer usage related data regarding to (using computer, type of computer, average number of breaks taking during computer use, numbers of daily hours using computer, hours of using consecutively, and for academic works) and levels of computer health hazards among the studied faculty staff at P ≤ 0.01. Additionally, it shows that being ≥ 10 years, using desktop pc and taking one break only during computer use had severe level of computer health hazards. Also, using higher numbers of daily hours using computer, higher numbers of consecutive hours using computer, higher numbers of hours using

computer for academic works, higher numbers of hours using computer for personal works had severe level of computer health hazards.

Table 4 clarifies that, there was a high statistically significant positive correlation between the studied faculty staffs' knowledge and reported practices regarding ergonomics at (r=0.985 & P= 0.000). Moreover, it describes that there was a high statistically significant negative correlation between the studied faculty staffs' knowledge, reported practice regarding ergonomics and computer health hazards at (r=- 0.795, -0.828, & P= 0.000).

Table (1): Frequency Distribution of Personal Data among the Studied Faculty Staff (n=102)

| Personal data		No.	%
Age (year)	24 - < 35 Yrs.	58	**56.8**
	35 - < 45 Yrs.	36	35.3
	45 - < 55 Yrs.	7	6.9
	Yrs. ≥ 55	1	1.0
	Mean ± SD	**34.72 ± 6.4**	
Marital status	Single	10	9.8
	Married	91	**89.2**
	Divorced	1	**1.0**
Occupation	Demonstrator	16	15.7
	Assistant lecturer	23	22.5
	Lecturer	32	**31.4**
	Assistant professor	23	22.5
	Professor	8	7.8
Years of Experience	< 5 years.	18	17.6
	5 - < 10 years.	41	**40.2**
	10 - < 15 years.	24	23.5
	≥ 15 years.	19	18.6
	Mean ± SD	**9.68 ± 5.10**	
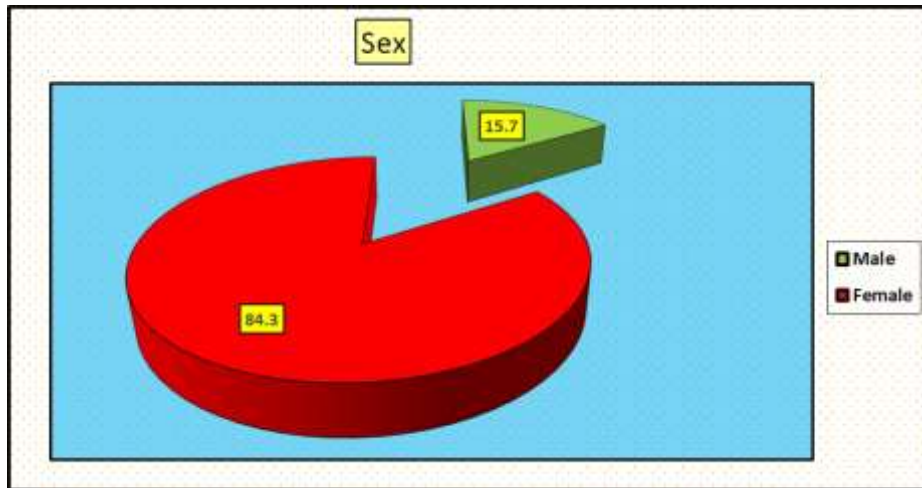
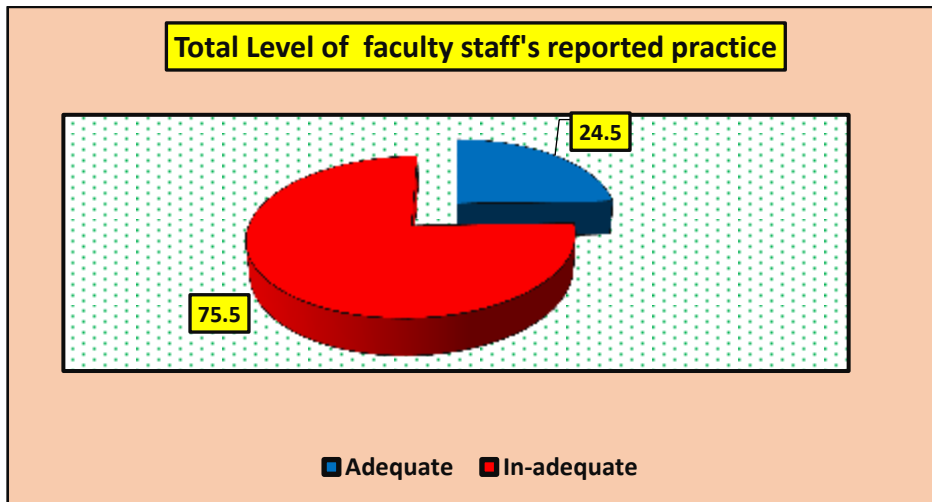**Figure (1):** Percentage Distribution of the Studied Faculty Staff regarding their Sex (n= 102)

Table (2): Frequency Distribution of Computer Usage related data among the Studied Faculty Staff (n= 102)

Computer usage		No.	%
Using computer	< 1 years.	2	2.0
	1- < 5 years	7	6.9
	5- < 10 years.	15	14.7
	≥ 10 years.	78	76.5
	Mean ± SD	13.93 ± 6.39	
Type of computer	Desktop pc	34	33.3
	Laptop	61	59.8
	Tablet / I Pad	7	6.9
Average numbers of daily hours using computer	1- < 3 hours	31	30.4
	3- < 7 hours	64	62.7
	7- < 10 hours	4	3.9
	≥ 10 hours	3	2.9
	Mean ± SD	3.78 ± 1.92	
Number of consecutive hours using computer	1- < 3 hours	52	51.0
	3 - < 6 hours	46	45.1
	≥ 6 hours	4	3.9
	Mean ± SD	3.14 ± 1.49	
Number of hours using computer for academic works	1 - <3 hours	37	36.3
	3 - <6 hours	53	52.0
	≥ 6 hours	12	11.8
	Mean ± SD	3.70 ± 1.74	
Number of hours using computer for personal	1- < 3 hours	96	94.1

works	3- < 6 hours	5	4.9
	≥ 6 hours	1	1.0
	Mean ± SD	2.14 ± 0.65	
Average number of breaks taking during computer use	One break	44	43.1
	Two breaks	31	30.4
	Three breaks	27	26.5
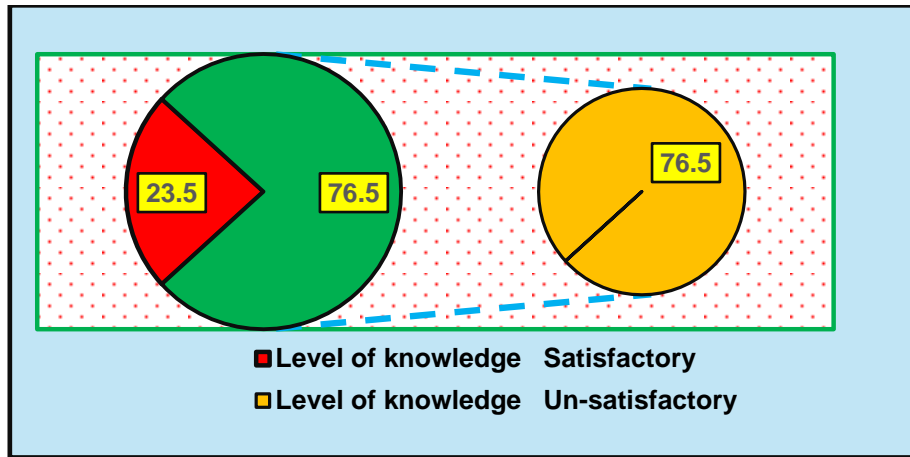
Figure (2): Percentage Distribution of Studied Faculty Staff's Total Knowledge Level regarding Computer Ergonomics (n=102).

Figure (3): Percentage Distribution of Studied Faculty Staff's Total Level of Reported Practices regarding Computer Ergonomics (n=102)
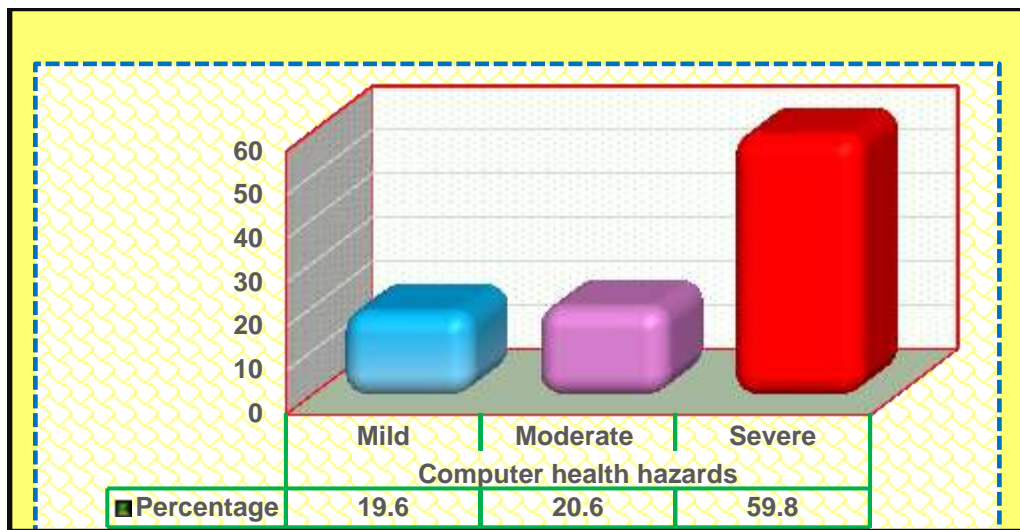
Figure (4): Percentage Distribution of Total Levels of Computer Health Hazards among the Studied Faculty Staff (n=102)

Table (3): Association between Levels of Computer Health Hazards and Computer Usage Related Data among the Studied Faculty Staff (n= 102).

Computer usage related data	Levels of computer health hazards					
	Mild		Moderated		Severe	
	No.	%	No.	%	No.	%
Using computer						
< 1 years.	2	2.0	0	0.0	0	0.0
1- < 5 years	7	6.9	0	0.0	0	0.0
5 - < 10 years.	11	10.8	4	3.9	0	0.0
≥ 10 years.	0	0.0	17	16.7	61	59.8
(χ2 & P Value)	**(87.9 & 0.000**)					
Type of computer						
Desktop pc	0	0.0	0	0.0	34	33.3
Laptop	13	12.7	21	20.6	27	26.5
Tablet / I Pad	7	6.9	0	0.0	0	0.0
(χ2 & P Value)	**(59.7 & 0.000**)					
Average number of breaks taking during computer use						
One break	0	0.0	0	0.0	44	43.1
Two breaks	0	0.0	14	13.7	17	16.7
Three breaks	20	19.6	7	6.9	0	0.0
(χ2 & P Value)	**(102 & 0.000**)					
Average numbers of daily hours using computer						
1- <3 hours	18	17.6	13	12.7	0	0.0
3- < 7 hours	2	2.0	8	7.8	54	52.9
7- < 10 hours	0	0.0	0	0.0	4	3.9
≥ 10 hours	0	0.0	0	0.0	3	2.9
(χ2 & P Value)	**(70.8 & 0.000**)					

Number of consecutive hours using computer						
1-<3 hours	17	16.7	21	20.6	14	13.7
3-< 6 hours	3	2.9	0	0.0	43	42.2
≥ 6 hours	0	0.0	0	0.0	4	3.9
(χ2 & P Value)	(48.7 & 0.000**)					
Number of hours using computer for academic works						
1-<3 hours	18	17.6	17	16.7	2	2.0
3-< 6 hours	2	2.0	4	3.9	47	46.1
≥ 6 hours	0	0.0	0	0.0	12	11.8
(χ2 & P Value)	(72.3 & 0.000**)					
Number of hours using computer for personal works						
1-<3 hours	20	19.6	21	20.6	55	53.9
3-< 6 hours	0	0.0	0	0.0	5	4.9
≥ 6 hours	0	0.0	0	0.0	1	1.0
(χ2 & P Value)	(4.2 & 0.369)					

*Significant $p \leq 0.05$ **Highly significant $p \leq 0.01$

Table (4): Correlation Matrix between the Studied Faculty Staffs' Knowledge, Reported Practice regarding Computer Ergonomics and Computer Health Hazards (n=102)

Items		Knowledge	Reported Practices	Computer health hazards
Knowledge	R		0.985	-0.795
	p-value		0.000**	0.000**
Reported Practices	R	0.985		-0.828
	p-value	0.000**		0.000**

Significant $p \leq 0.05$ **Highly significant $p \leq 0.01$ r-Pearson Correlation Coefficient.

IV. Discussion

Ergonomics is a crucial issue nowadays because with the advancement in technology, all tasks in most organizations, especially universities, are completed in a sedentary position and on the computer. Computer ergonomics is vital for the health and productivity of faculty staff in universities. Ensuring proper workstation design, promoting awareness of ergonomics principles, and encouraging compliance with ergonomic guidelines are essential steps to prevent computer-related illnesses and musculoskeletal disorders. [19]

Regarding personal characteristics of the studied faculty staff and compuer usage, the current study results revealed that more than half of the studied faculty staff's ages ranged from 24 - < 35 years old, with a mean age of 34.72 ± 6.4 years. This result was supported by **Kibria and**

Rafiquzzaman[20] in Bangladesh (n=265), who reported that 59.62% of the studied subjects aged between 23 and 30 years. Although, this result disagreed with **Tajurahim et al.** [21] in Malaysia (n=40), found that 47.5% of the studied faculty staffs' age was ranged from 31–40 years. In addition, this study result was dissimilar with **Abdul Aziz & Azmi** [22] in Malaysia(n=50), who clarified that 58% the studied subjects were between 31 and 40 years old. From the investigator's point of view, these findings clarify that the studied faculty staffs' age is young, and this age is a productive age, that indicates they highly need training to continue the productivity of their work and avoid musculoskeletal disorders symptoms.

Related to marital status of the studied faculty staff, the current study represented that more than four-fifths of them were married. This finding was in line with **AlOmar et al.**, [23] in Saudi Arabia(n=451), who revealed that 76.9 % of the studied subjects were married.

Considering occupation, the present study showed that nearly one-third of the studied faculty staff were lecturer. This result was in agreement **with Kibria and Rafiquzzaman** [20] who reported that 32 % of the studied subjects were lecturer. Also, in consistent with **Tajurahim et al.**, [21] and reported that 70% of the studied faculty staff were lecturer. From the investigator's point of view, these findings might be due to the younger ages represents more than half of the studied faculty staff as their ages ranged from 24 - < 35 years old.

Regarding years of experience, the current study clarified that two-fifths of the studied faculty staff were working for 5- < 10   years with a total mean ± SD of 9.68 ± 5.10. This result was similar to **Kibria et al.** [24], in Bangladesh(n=271), who reported that 60 % of the participants had 5–15 years of experience in using computers. Although, this result was in discrepancy with **Abdul Aziz & Azmi** [22] and clarified that 46% of the studied subjects had more than 11 years of work experience. From the investigator's point of view, this finding might be due to nearly large proportion of the studied faculty staff had completed their postgraduates' studies and appointed as a lecturer.

As regards sex of the studied faculty staff, the present study clarified that more than four-fifths of the studied faculty staff were females, while the minority of them were male with a male to female ratio was 0.2:1. This result was similar to **Nwosu et al**. [25] in Nigeria(n=423), who reported that the majority of the studied subjects were females. Also, this result was in the same line with **De Barros et al.** [26] in Brazil(n=60) and reported that 75.9 % of the studied subjects were females and 24.1% were males. As well, this result was supported by **Kanika et al.** [27] in India (n=130), who reported that 76.2% of the study participants were female. From the investigator's point of view, this finding might be due to the field of nursing which be dominated by its feminine nature as most of the faculty staff recruits in the faculty are females.

Regarding computer usage related data, the current study clarified that the majority, more than three quarters, more than three-fifths, more than half and more than two-fifths of the studied faculty staff using computer for personal works for 1< 3 hours, using computer for ≥ 10 years, using computer daily for 3< 7 hours, use laptop, using computer consecutively for 1<3 hours, using computer for academic works for 3< 6 hours and taking one break during computer use respectively. This result was in agreement with **Shahwan et al**. [2] in Jordan(n=231), reported that 40.7% of the studied faculty staff worked on the computer for 3–5 h/day, using computer for personal works for 1-3 hours and for 3-5 hours for academic work. Also reported that 54.1% of them had a continuous computer work pattern. Also, these findings in consistent with **Stanam etal**. [28] in Western Kentucky

University (n=51), stated that majority 70% of participants exposed for prolonged time periods (i.e. > 4 hours/day) with reduced rest breaks during their computer work. From the investigator's point of view, this finding might be due to the workload on faculty staff that requires them to sit for more than seven hours in their day to complete the required daily work.

In relation to the total levels of knowledge regarding computer ergonomics, the current study clarified that less than one fourth of the studied faculty staff had satisfactory level of knowledge while three quarters of them had unsatisfactory level of knowledge regarding computer ergonomics. In addition to, satisfactory to unsatisfactory ratio= 0.3:1. This result was congruent with **Mahmoud & Hussien[29]** in Egypt (n=75), stated that 2.7% of the studied subjects had a good knowledge level, 44% of them had fair level and 53.3 % of them had poor knowledge level. As well, this result was similar to **Mussa, [30]** in Iraq (n=17), who found that 30% of the studied subjects had a good knowledge level while 70% of them had poor level of knowledge regarding computer ergonomics. These findings may be attributed to lack of exposure to ergonomic educational content and activities that highlighted the principles of computer ergonomics safety practice and its application.

In relation to the total levels of faculty staffs' reported practices, the current study revealed that less than one quarter of the studied faculty staff had adequate level of reported practices while nearly three quarters of them had inadequate level of reported practices regarding computer ergonomics. In addition, adequate to in- adequate ratio= 0.3:1. This result of the current study was consistent with **El Swerky et al.** [31] in Egypt (n=400), revealed that only 15% of computer users practices were scored as good level of practices, 30% of them had fair practice level and 85% of them had poor practice level. In addition, this result was in accordance with the result of the study performed by **Subashini et al.** [32] in India (n=50), who reported that 74% of the studied subjects had poor practice level and 26% had average practice level regarding computer ergonomics. From the investigator's point of view, the faculty staffs' inadequate level of reported practice may be due to small proportion (23.5%) of them had satisfactory level of knowledge while 76.5% of them had unsatisfactory level of knowledge regarding computer ergonomics.

Concerning total levels of computer health hazards among the studied faculty staff, the current study clarified that only less than one fifth of the studied faculty staff had a mild level of computer health hazards, one fifth of them had moderate level and more than half of them had severe level of computer health hazards. These results were confirmed by **Mahmoud & Hussien [29]** who reported that 5.3% of the studied subjects had mild level of computer health hazards, 65.3% of them moderate level while 29.4% had severe level. Also, this result was in the same line with **Sayed et al.** [8] in Egypt (n=140), who revealed that, the studied subjects had 0% mild, 57.1% moderate and 42.9% sever levels of computer health hazards. These results may be due to 75.5% of the studied faculty staff had inadequate level of reported practices regarding computer ergonomics which subsequently increase their risk of exposure to health hazards.

Concerning relation between total levels of computer health hazards and computer usage related data among the studied faculty staff, the current study described that, there was a statistically significant relation between computer usage related data regarding to(using computer, type of computer, average number of breaks taking during computer use, numbers of daily hours using computer, hours of using consecutively, and for academic works) and levels of computer health hazards among the studied faculty staff, at P ≤ 0.01. Additionally, it shows that being ≥ 10 years, using desktop pc and taking one break only during computer use had severe level of computer health

hazards. Also, using higher numbers of daily hours using computer, higher numbers of consecutive hours using computer, higher numbers of hours using computer for academic works, higher numbers of hours using computer for personal works had severe level of computer health hazards.

These results were confirmed by **Kibria et al.** [24] and stated that there were significant relations between daily hours using computer, taking break after 2 hours and computer health problems (musculoskeletal and visual symptoms) among the studied subjects p < 0.05. Also, these findings were supported by **Chinedu et al.,** [33] who showed that there were significant positive relationships between the prevalence of work-related musculoskeletal disorders and inadequate rest breaks (p<0.05). Also, reported that there was a significant association between the prevalence of work-related musculoskeletal disorders and increasing working hours using computer (p = 0.003). More complaints of work-related musculoskeletal disorders were noted among 76.9% staff who worked for more than 9 hours compared to 48.6% of them who spent the least hours at work. As well, this result reinforced by **Jabeen et al.,** [1] in Pakistan (n=65), and indicated that there was a significant association between prevalence of visual symptoms with 1-4 hours computer work at home and taking breaks during computer work (p<0.02)

On the other hand, these results contrary to **Etana et al.,** [34] in Ethiopia (n=335), and found that there was no significant association between total daily working hours using computer and work-related musculoskeletal disorders among the studied subjects. As well, these findings disagreed with **Sirajudeen et al.,** [35] in Saudi Arabia (n=146), who concluded that there were no significant relations between computer use, daily hours using computer, taking breaks and prevalence of visual symptoms among the studied subjects. This might be due to a prolonged and continuous computer use with insufficient rest breaks have enough exposure for risk factors. This means computer health hazards (especially work-related musculoskeletal disorders) by their nature are cumulative trauma or repetitive strains that develop gradually as a result of computer overuse.

As regards correlation between the studied faculty staffs' knowledge, reported practice regarding ergonomics and computer health hazards, the present study represented that there was a high statistically significant positive correlation between the studied faculty staffs' knowledge and reported practices regarding ergonomics at (r=0.985 & P= 0.000). Moreover, it describes that there was a high statistically significant negative correlation between the studied faculty staffs' knowledge, reported practice regarding ergonomics and computer health hazards at (r=- 0.795, -0.828, & P= 0.000).

These results of the present study were in the same context with **Bahgat et al.** [10] in Egypt (n=100) and reported that there were highly statistically correlation between the studied subjects' knowledge and their practices at P ≤ 0.001. As well, these results were in the same line with **Abd Rabou & Akel** [36] in Egypt (n=90), and reported that there was a highly statistically significant positive correlation between the studied subjects' knowledge regarding ergonomics, and their ergonomics' practice at (r= 0.231, p < 0.05). This might be due to the studied faculty staffs' knowledge might be effect on their total practices.

Similarly, this result was supported by **Mahmoud & Hussien** [29] who clarified that highly statistically negative correlations were found between computer health hazards with the studied subjects' total knowledge (r = -0.596 & P= 0.007) and ergonomic practices (r = -0.612 & P= 0.004). In addition, this result was confirmed by **Kanika et al.** [27] who reported that there was a significant

correlation between the studied subjects' computer ergonomic knowledge and computer health hazards (p=0.03), which emphasizes the importance of computer ergonomics to decrease the related musculoskeletal and visual disorders. And were agreed by **Mohammad et al.** [37] in Iran (n=260), who revealed that there was a significant and negative correlation between the studied subjects' knowledge of ergonomics and musculoskeletal disorders (r =-0.180 & P= 0.005).

Moreover, this result was in accordance with the result of the study performed by **Jasmine et al.** [38] **in** India (n=403), who clarified that there was a highly statistically significant negative correlation between the studied faculty staffs' practices regarding ergonomics and computer health hazards. Furthermore, these results were reinforced by **Boadi-Kusi et al.** [39] in Ghana (n=200), who indicated that, there was a significant association between the presence of computer health hazards and poor ergonomic practices (χ = 15.175, p = 0.001).From the investigator's point of view, this could be due to faculty staffs with satisfactory knowledge levels regarding ergonomics, tend to practice more healthy preventive behaviors to eliminate or prevent computer health hazards.

V. Conclusion

The current study answered the research questions, less than one quarter of the studied faculty staff had satisfactory level of knowledge regarding computer ergonomics and adequate level of reported practices while, more than half of them had a severe level of computer health hazards. Also, there was a high statistically significant positive correlation between the studied faculty staff's knowledge and reported practices regarding computer ergonomics at (r= 0.985 & P= 0.000), while there was a high statistically significant negative correlation between the studied faculty staff's knowledge, reported practices and computer health hazards at (r=-0.795, -0.828 & P= 0.000).

VI. Recommendations

On the light of the current study findings the following recommendations are suggested:

Students:

- Design and implement ergonomic programs for faculty staff to improve their knowledge and practices regarding prevention of computer health hazards.
- Increase training courses and conducting workshops about computer ergonomics and its health hazards.

Further research

- Further researches are needed for faculty staff regarding prevention of computer health hazards, applying it on large sample and in different setting in Egypt.

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