Occupational Health Hazards among Computer Users in Benha University Administration

Hoda Hassan Bahgat[1], Amina Abdelrazek Mahmoud[2] and Taisser Hamido Abosree[3]

(1) Nursing Specialist in Ganzour Hospital and (2,3) Assist. Prof. of Community Health Nursing, Faculty of Nursing-Benha University

Abstract

Background: Computers are widely used in the office workplace, use of computers leads to some health hazards to human, which can be classified as physical, ergonomic, chemical, psychosocial and biological hazards. **The aim of the study:** Was to assess occupational health hazards among computer users in Benha University Administration. **Research Design:** A descriptive research design was used for this study. **Setting:** The study was conducted at Benha University Administration. **Sample**: Convenience sample of 100 computer users at Benha University Administration. **Tools**: Two tools were used in this study to collect the data. **Tool 1**: A structure interview questionnaire consists of three parts to assess socio demographic data of computer users, present and past medical history and computer users' knowledge regarding occupational health hazards. **II**: Observational checklist of computer users practices regarding preventing occupational health hazards. **Results**: 58% of the studied computer users took one training course. 18% of the studied computer users had hypertension as chronic disease, 30% of them had spinal surgery and 35% of them had Lasik eye surgery. 19% of them had good total knowledge level about occupational health hazards and 65% of the studied computer users had unsatisfactory total practices regarding prevention of occupational health hazards. **Conclusion**: There were highly statistically significant relations between the studied computer users' total practices scores and their total knowledge scores. **Recommendation**: Develop and implement educational programs to increase knowledge and practices of computer users regarding prevention of occupational health hazards.

Keywords: Occupational Health Hazards, Computer users

Introduction

Occupational health is multidisciplinary activity aimed for promotion and maintenance of the highest degree of physical, mental and social well-being of computer users by preventing and eliminating occupational health hazards. Occupational health dealing with all aspects of health and safety in the workplace and has a strong focus on primary prevention of health hazards and enabling computer users to conduct socially and economically productive lives (**Bernier et al ., 2021).**

Occupational health hazards are any activity, situation or substance at the workplace that can cause harm and have negative impacts on health and well-being among computer users. There are many types of hazards, including physical, chemical, biological, psychosocial and ergonomic hazards. It is estimated that world-wide, 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 **(Adamopoulos & Syrou, 2022).** Occupationally caused

Repetitive Strain Injuries (RSI) rank first among the health problems, in the frequency with which affect the quality of life **(Sanjith & Kumar, 2021).**

Computer health hazards results from prolonged computer usage that has reversible impact on physiological and psychological processes at which can cause different short-term and long term physical afflictions in human body. Working in static sitting positions for prolonged duration, results in reduced circulation, joint pain and stiffness. Extended period of continuous work raises the risk of Musculo Skeletal Disorders(MSDs), and leads to prolonged disability **(Chika & Ndidi, 2020).**

The health problems most highly associated with the use of computer equipment are upper limb disorders, eye problems, stress and fatigue, and skin complaints. Upper limb disorders are a term used to describe a range of conditions affecting the fingers, hands, arms and shoulders. Such conditions may range from mild aches and pains, through to chronic tissue and/or muscular complaints **(Abudawood et al., 2020).** Some computer users may experience continued visual impairment even after work. Some individuals who experience symptoms of visual discomfort have been found to have uncorrected vision problems. The symptoms of visual discomfort include sore, red, watery and dry eyes **(Yan et al., 2019).**

Computer related injury is defined as a constellation of work-related symptoms. Sitting improperly in front of a computer for long time can lead to chronic debilities such as stiffness, headache, and backache. Muscles and tendons can become inflamed due to greater periods of sitting on computer with intensive use of a mouse or keyboard. Carpal tunnel syndrome is a common example of an overuse injury associated with computer work (**Jomoah, 2021).**

Community Health Nurses (CHNs) educate computer users on the healthy use of the computer, instruct for necessary precautions that has been taken about this issue, assess health needs, recommend and implement programs appropriate to computer users needs of the present and the goals of the future. CHNs educate computer users on how to change style of computer use to an ergonomic way and how to avoid certain illness by simple exercises, instruct computer users to mantain good work posture, proper training, and self-control in using computer (**Burgess et al., 2019).**

Significance of the study:

Millions of people around the world now use computers as the primary business tooling the last decade or so, the number of hours people use computers has increased tremendously with this increase in the use of computers, problems have also increased. Some of the most common problems related to computer use are carpal tunnel syndrome, repetitive strain injury; computer vision syndrome (**King, 2018).** The percentage of computer users in Egypt was 21.6% in 2010 which become 37.82%in 2015 and 55.31% in 2018. Study was performed on computer users in Zagazig University showed that 67.85% of computer users reported musculoskeletal discomforts symptoms in the neck, 66.33% in back, 59.49% in lower back and 45.32% at right shoulder **(Andrae, 2019).** Another study conducted among office workers in Tanta University indicated that the prevalence rate of shoulder, elbow, wrist hand, upper and low back pain were 50.5%, 20,3%, 26.3%, 44.8% and 65.1% respectively(**Shariat et al ., 2018).** This study is important to help computer users to prevent occupational health hazards by having a healthy lifestyle and working at ergonomically good workstation.

Aim of the study

This study aimed to assess occupational health hazards among computer's users in Benha University Administration.

Research questions:

- What are the health problems among computer users in last six months?
- What is the knowledge of computer users regarding occupational health hazards?
- What are the practices of computer users regarding prevention of occupational health hazards?
- Is there a relation between computer users knowledge and their practices regarding occupational health hazards?

Subject and Methods

Research Design:

A descriptive research design was used in carrying out this study.

Setting:

This study was conducted at Benha University Administration.

Sampling:

A convenience sample of computer users attending to the previously mentioned setting through six months, the total sample was 100 computer users.

Tools of data collection:

Data were collected by using two tools:

Tool I: A structured interview questionnaire: It was designed by the researchers and based on reviewing related literatures and it was written in simple clear Arabic language and consisted of three parts to assess the following:-

First part: It was concerned with: Socio demographic data of computer users which included six questions about age, sex, marital status, level of education, residence and monthly income .

Second part: It was concerned with medical history of computer users which includes :

a) Present medical history of the studied computer users which included four items e.g; musculoskeletal system injury, exposure to nervous system problems, eye problems and ear problems.

b) Past Medical history of studied computer users which included five items as presence of chronic diseases, previous ortho surgery, previous neurosurgery, previous eye surgery and mental and neurological diseases.

Third part: It was concerned with the studied computer users knowledge regarding occupational health hazards which included nine questions such as meaning of the occupational health hazards, types of occupational health hazards, physical health hazards ,chemical health hazards, ergonomic health hazards, psychosocial hazards, heath problems resulted from using computer, methods of prevention of occupational health hazards and source of knowledge about occupational health hazards.

Scoring system of knowledge:

The scoring system for each answer was given as follows: (2) score for correct and complete answer, (1) score for correct and in complete answer and (0) score for don't know. For each item of knowledge, the scores of questions was summed up and the total divided by the number of questions, which converted into a percent score.

N.B The source of knowledge didn't include in the scoring system.

Total knowledge score = 16 point

The total knowledge score was considered good if the score >75 (> 12points) while considered average if equals 50-75% (8-12points) and considered poor if less than 50 %(8 point).

Tool II: Observational checklist of computer users to observe practices to prevent occupational health hazards adapted from

(Ivana et al., 2021) which include five sections about how to sit properly, how to use screen prober, how to use key board properly, how to use mouse properly and how to configure work place for computer users. .

Scoring system

The scoring system for the practices of studied computer users was scored as follows: (1) score for done and (0) score for not done. For each item of practice, the score of of questions was summed up and the total divided by the number of questions, which converted into a present score.

The total practice score = 53

The total practice score was considered satisfactory if the score >60% (> 31points) while considered un satisfactory if the score < 60 % (<31 points) .

Content validity of the tools:

The tools were reviewed for comprehensiveness, appropriateness and legibility by three experts of Faculty of Nursing Staff from the Community Health Nursing Specialties. The experts ascertained the face and content validity of the tools**.**

Reliability of the tools:

The reliability of the tools was done by Cornbrash's Alpha coefficient test which revealed that each of the two tools consisted of relatively homogeneous items as indicated by the moderate to high reliability of each tool. The internal consistency of knowledge was 0.927 and practice was0.744.

Ethical considerations:

Permission has been obtained from each computer user before conducting the interview and given a brief orientation to the purpose of the study. They were also reassured that all information gathered would be confidential and used only for the purpose of the study. The computer users had right to withdraw from the study at any time without given any reasons. No names were required on the forms to ensure anonymity and confidentiality.

Pilot study:

A pilot study was conducted on10% of the total sample (10 computer user) to test the content, applicability and simplicity of the tool using the questionnaires and observational check list. Based on the pilot study, the tools were organized. Organization of the tool included rephrasing, rearrangement of some questions. The pilot study was included in the study as no modifications were done.

Field of work:

The actual field work was carried out at a period of 6 months from the beginning of February to the end of July 2022. The study was conducted by the researchers at Benha University Administration. Data were collected by interviewing computer users in the previously mentioned setting. The researchers was available at the study setting from 9 am to 12 pm two days per week (Sunday, Monday). The average number of interviewed computer was 2-3 computer user / day depending on their response and understanding. The time needed to fill each questionnaire was 30-60 minutes to collect the needed data depending upon the computer users understanding and response.

Statistical analysis:

All data were organized, tabulated and analyzed using appropriate statistical test. The data were analyzed by using the Statistical Package for Social Science (SPSS) version 21.Which was applied to calculate number and percentages for qualitative data mean ±S.D for quantitative data as well as test statistical significance and associations by using chi-square test and person correlation test to detect the associations between the variables for (p-value).

The statistical significance was considered:

- Highly Significant p-value ≤ 0.001.
- Significant p-value < 0.05.
- Not Significant p > 0.05.

Results

Table (1): Shows that 48% of the studied computer users their age than 40 years with mean age was 38.25±7.64, while 56% of them were females. Regarding marital status, 59% of studied computer users were married; 51% of computer users had secondary education. In addition, 51% of them were lived in rural areas and 64% of them had enough monthly income.

Table (2): Shows that; 18% of the studied computer users had hypertension as chronic disease, 10% of them had herniated disc surgery, 30% of them had spinal surgery and 35% of them had Lasik eye surgery. As regard mental& neurological diseases, there were 14% of computer users had sleep disturbance.

Table (3): Shows that, 27% of studied computer users had sprains and bruises, 35% of them had numbness in the extremities, 38% of them had eye inflammation and 33% of them had ear inflammation and hearing impairment.

Figure (1): Illustrates that; 53% of the studied computer users had poor total knowledge level, while 19% of them had good total knowledge level about occupational health hazards of computer using.

Figure (2): Illustrates that 65% of the studied computer users had unsatisfactory total practices regarding prevention of occupational health hazards.

Table (4): Shows that, there was a highly statistically significant relation between the studied computer users total knowledge scores and their total practices scores regarding prevention of occupational health hazards. ($P \leq 0.001$).

Table (1): Frequency distribution of the studied computer users regarding to their socio demographic data (n=100).

Socio demographic data	No	%
Age\ year		
20-<30	27	27.0
30-<40	48	48.0
40- <50	23	23.0
50 +	2	2.0
Mean ±SD	38.25±7.64	
Sex		
Male	44	44.0
Female	56	56.0
Marital status		
Single	33	33.0
Married	59	59.0
Widowed	5	5.0
Divorced	3	3.0
Educational level		
Secondary	51	51.0
University	41	41.0
Post graduate	8	8.0
Residence		
Rural	51	51.0
Urban	49	49.0
Monthly income		
Enough	64	64.0
Enough and save	31	31.0
Not enough	5	5.0

Table (2): Frequency distribution of the studied computer users regarding their past medical history at the last six months (n=100).

Past medical history	No	%
***Presence of chronic diseases**		
Hypertension	18	18.0
Artrial and heart diseases	9	9.0
Diabetes mellitus	6	6.0
Bronchial asthma	7	7.0
Liver diseases	4	4.0
***Previous Ortho surgery**		
Knee replacement	8	8.0
Heel operations	6	6.0
Herniated disc surgery	10	10.0
Cruciate ligament surgery	6	6.0
Previous neuro surgery*		
Spinal surgery	30	30.0
Brain operations	10	10.0
***Previous eye surgery**		
Lasik eye surgery	35	35.0
Cataract surgery	12	12.0
Mental and neurological diseases: *		
Psychological disturbances after major accidents	6	6.0
Sleep disturbance	14	14.0
Mood disturbance	12	12.0
Depression	12	12.0
Anxiety and tension	5	5.0
Phobia	6	6.0

Table (3): Frequency distribution of the studied computer users regarding their present medical history (n=100).

Present medical history	No	%
***Musculoskeletal system Injury**		
Fractions	7	7.0
Sprains and bruises	27	27.0
Lumber disc	15	15.0
Muscle strain	11	11.0
***Exposure to nervous system problems**		
Change in the ability of movement	3	3.0
Numbness in the extremities	35	35.0
Shiver	4	4.0
Inability to concentrate	16	16.0
Increased nervous pressure	16	16.0
***Eye problems**		
Eye inflammation	38	38.0
Irritation of the membranes of the eyes	15	15.0
Eye sensitivity	18	18.0
Near sightedness	6	6.0
Far sightedness	3	3.0
double vision	23	23.0
***Ear problems**		
Ear inflammation	33	33.0
Ear discharge	26	26.0
hearing loss	18	18.0
Hearing impairment	33	33.0

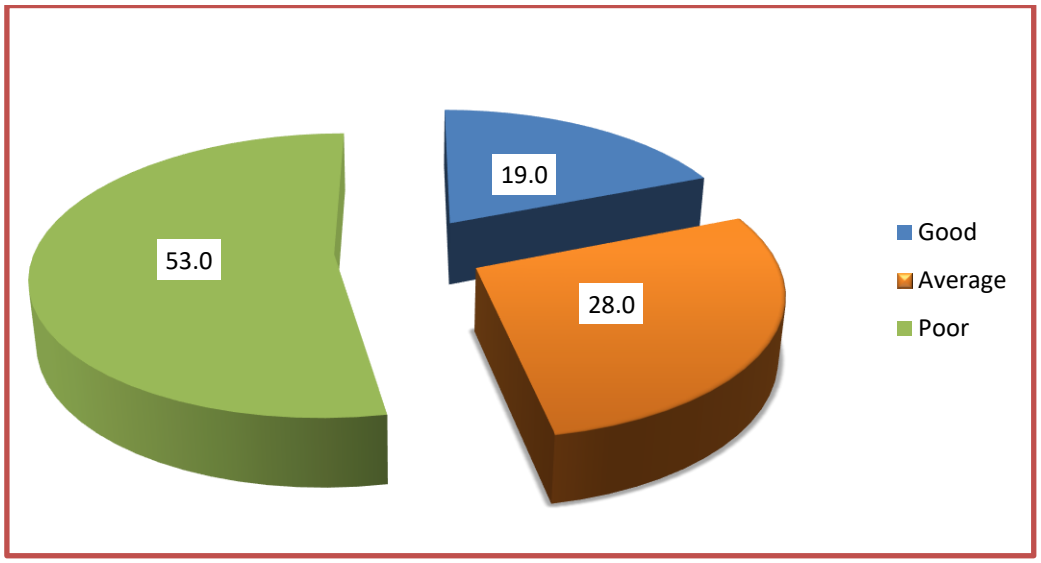

Figure (1): Percentage distribution of the studied computer users total knowledge level about occupational health hazards (n=100).

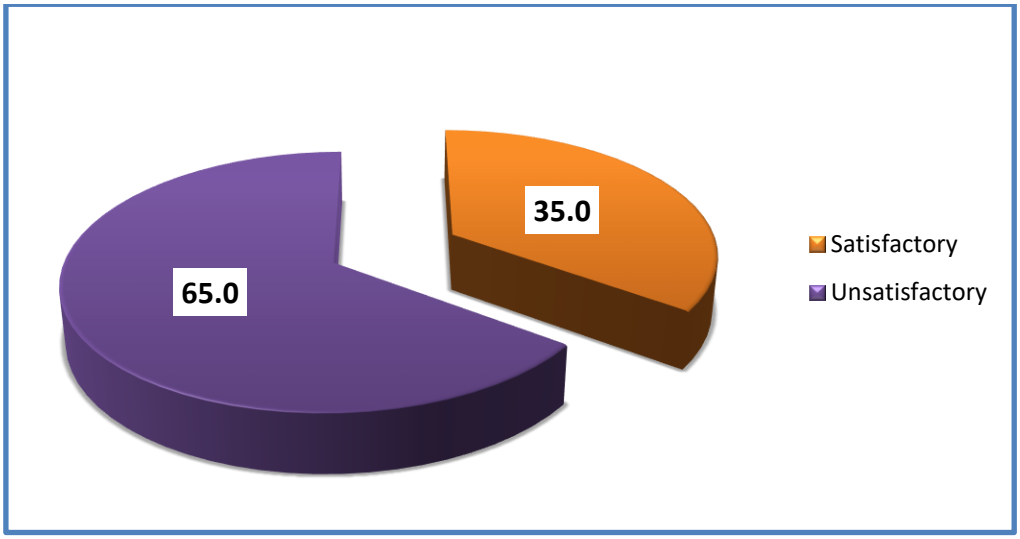

Figure (2): Percentage distribution of the studied computer users total practices level about occupational health hazards (n=100).

Table (4): Relation between total knowledge scores and total practices scores regarding prevention of occupational health hazards among computer users (n=100).

Total practice scores	Total knowledge scores						X^2	p-value
	Poor (n=53)		Average (n=28)		Good (n=19)			
	No	%	No	%	No	%		
Unsatisfactory (n=65)	45	84.9	17	60.7	3	15.8	29.68	≤0.001**
Satisfactory (n=35)	8	15.1	11	39.3	16	84.2		

Discussion

Occupational health hazards are risks associated with working in specific occupations. Occupational use of computers has increased rapidly over recent decades, with the advents of recent technology and affordable prices, its use is very common at work places, with this increase in the use of computers, occupational health hazards have also increased. Occupational health is important because work plays a central role in people's lives, since most workers spend at least eight hours a day in the workplace **(Crawford et al., 2020).**

According to socio demographic characteristics of the studied computer users. The present study showed that more than two fifth of the studied computer users their age were 30- < 40years with mean age was 38.25± 7.64 years and more than half of them were female. More than half of the studied computer users were married, more than half of computer users had secondary education, more than half of them were lived in rural area and less than two thirds of them had enough monthly income.

Concerning to past medical history at last six months. The current study revealed that more than tenth of the studied computer users had hypertension as chronic disease. This finding was in the same line with **Vaghefi & Tulu (2019)**, who studied " The continued use of computer health apps: Insights from a longitudinal study"(n=310), and found that more than one third of studied computer users had chronic diseases. This might be due to the sitting position for long periods affects the body's causing arterial stiffening that lead to increase pressure in blood vessels.

The current study revealed that tenth of the studied computer users had herniated disk surgery, According to **D'Antoni et al. (2022)**, who studied "Artificial Intelligence and Computer Aided Diagnosis in Chronic Low Back Pain "in Uganda (n=259), and found that more than two third of the studied computer users had herniated disk surgery . This might be due to poor posture of computer users during working on computer.

Concerning to present medical history. The current study revealed that more than one quarter of the studied computer users had sprains and bruises. This finding agreed with **Roghani (2022)**, who studied " Neuropathic pain among computer users of an urban area with a special focus on carpal tunnel syndrome: Across-sectional study" (n=207), and found that more than two thirds of studied computer users suffer from musculoskeletal injury. This might be due to nature of their work made them spend more time sitting on computer.

As regard total knowledge level. The present study revealed that more than half of the studied computer users had poor total knowledge scores regarding occupational health hazards. This finding agreed with **Hossian et al (2022),** who studied "Computer Users Knowledge and Occupational Factors Associated With Low Back Pain: The First-ever Occupational Health Study Among Bangladeshi Online Professionals " (n= 789), and found that more than two fifth of studied computer users had poor knowledge scores regarding occupational health hazards. This might be due to lack of importance from organization for training on computer occupational health hazards.

As regard total practices level. The present study revealed that less than two thirds of the studied computer users had unsatisfactory total practices levels regarding prevention of occupational health hazards. According to **Yang et al. (2023),** who studied "The prevalence and risk factors of work-related musculoskeletal disorders among computer users: A cross-sectional analytical study in

China. "(n= 522), and found that more than two thirds of studied computer users had un satisfactory practices regarding prevention of occupational health hazard. This might be due to the government not take a precautions and preventive measures to counter the growth of problems associated with computer users.

The present study revealed that there were highly statistically significant relations between the studied computer users' total practices scores and their total knowledge scores. This finding agreed with **Alanazy et al. (2021)**, who found that there were highly statistically significant relations between the studied computer users' total practices scores and their total knowledge scores. This might be due to computer users' knowledge might be effect on computer users' total practices.

Conclusion

More than half of the studied computer users had poor total knowledge scores regarding occupational health hazards and less than one fifth of the studied computer users had good total knowledge scores regarding prevention of occupational health hazards. Less than two thirds of the studied computer users had unsatisfactory total practices levels regarding prevention of occupational health hazards. There were highly statistically significant relations between the studied computer users' total practices scores and their total knowledge scores.

Recommendation

1. Develop and implement educational programs to increase knowledge and practice of Computer users regarding prevention of occupational health hazards
2. Increase training courses of computer users about occupational health hazards
3. Regular periodic screening for all workers to identify computer users health problems.

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مخاطر الصحة المهنية بين مستخدمي الكمبيوتر في ادارة الجامعة في بنها

هدي حسن بهجت حسن - أمينة عبد الرازق محمود- تيسير حميدو أبو سريع

الخطر المهني هو الذي يحدث في مكان العمل ويتسبب في حدوث تسبب خطرًا على صحة الموظف مما يزيد من احتمالية حدوث المرض أو الإعاقة أو الوفاة ويشمل العديد من أنواع المخاطر. استخدام الكمبيوتر لفترات طويلة له تأثير قابل للعكس على العمليات الفسيولوجية والنفسية التي يمكن أن تسبب اضطرابات جسدية مختلفة قصيرة وطويلة المدي علي جسم الإنسان كما أن العمل في أوضاع جلوس ثابتة لفترات طويلة، يؤدي إلى انخفاض الدورة الدموية وآلام المفاصل وتيبسها. كما أن إستمرار العمل علي الكمبيوتر يؤدي إلى زيادة فرصة الإصابة بأمراض القلب والأوعية الدموية، وتؤدي إلى إعاقة طويلة الأمد. لذا هدفت هذه الدراسة الي تقييم مخاطر الصحة المهنية بين مستخدمي الكمبيوتر في ادارة الجامعة في بنها حيث تم استخدام تصميم البحث الوصفي للبحث في هذه الدراسة. وقد أجريت هذه الدراسة في إدارة الجامعة بجامعة بنها على عينة متاحه من ١٠٠ مستخدمي الكمبيوتر. وقد خلصت الدراسة بأن هناك علاقة ذات دلالة إحصائية عالية بين مجموع درجات ممارسات مستخدمي الكمبيوتر الذين تمت دراستهم وإجمالي المعلومات لديهم. كما اوصت الدراسة بتنفيذ برامج تثقيفية لمستخدمي الكمبيوتر لزيادة معلوماتهم وممارساتهم تجاه المخاطر المهنية الصحية.