



Original Research Article

Risk of Upper Limb Complaints Due to Use of Computer Among Young Adults

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ABSTRACT

Background and purpose: Upper limb pain and dysfunction are frequent complaints associated with computer work. There are various factors that are supposed to produce many upper limb complaints in working people due to computer use. The aim of the study is to explore side effects and complaints in upper limb due to use of computers and related technologies in human life.

Methodology: Severity and functional scale (SFS) questionnaire was randomly distributed among 100 medical and engineering students of Gujarat. The Questionnaire section was divided into two parts: 1) Symptom severity scale and 2) Functional status scale. The principal investigator met the participants personally and explained about the study and distributed questionnaires.

Result: Based on symptom severity scale our result suggests that 51.63% people have no complaints of upper limb problem due to use of computer, 27.81% people have mild complaints of upper limb problem due to use of computer, 13.09% people have moderate complaints of upper limb problem due to use of computer, 4.7% people have severe complaints of upper limb problem due to use of computer and 2.7% people have very severe complaint of upper limb problem due to use of computer.

Based on functional status scale 54% people have no complaint of upper limb problem due to use of computer, 24.5% people have mild complaint of upper limb problem due to use of computer, 12.87% people have moderate complaint of upper limb problem due to use of computer, 4.5% people have severe complaint of upper limb problem due to use of computer and 4.1% people have very severe complaint of upper limb problem due to use of computer.

Conclusion: The present study suggests that almost 50% people have no problem due to use of computer and 50% people have problem by using computer.

Key words: Computer, Severity and functional scale (SFS)

INTRODUCTION

Upper limb pain and dysfunction are frequent complaints associated with computer work. However, the responsible pathology and the pathophysiological mechanisms are insufficiently understood. In addition, there is no consensus with regard to physical findings that may reflect symptoms.

The involvement of the nerves in "non-specific" upper limb disorder, e.g. in computer operators, is suggested by various observations: The demonstration of an elevated threshold to vibratory stimulation;^[1-3] abnormal upper limb tension tests;^[4,5] reduced nerve mobility,^[6,7] abnormal nerve tenderness (mechanical allodynia),^[8] changed axonal flare reaction,^[9] allodynic response to supra-threshold vibration,^[2] reduced muscle strength^[10,11] and sympathetic reflexes,^[12] and thermographic changes.^[13] Still, clinical practice and epidemiological studies tend to attribute upper limb symptoms in computer operators to a disorder in muscle, tendon, or insertion.^[14] Focal neuropathy including carpal tunnel syndrome is infrequently reported.^[15,16]

The personal computer has become an ubiquitous technology, both at home and in the workplace. Everyday computer activities are generally characterized by repetitive upper limb movements and a relatively fixed bodily position.^[17] Regular interaction with a computer interface, using a standard keyboard and a mouse, has been related to a complex of complaints related to the hand, arm and shoulder, often referred to as 'repetitive strain injury' (RSI), or sometimes as 'cumulative trauma disorder', 'non-specific work-related upper limb disorder' or 'repetitive strain disorder'.^[18] This pain syndrome of the

upper limb consists of protracted complaints of the hand, arm or shoulder, leading to functional impairment that is difficult to treat.^[19] Although the exact cause of RSI is still unknown, risk factors have been identified in epidemiological studies. Prolonged exposure to repetitive movements and less than optimal ergonomic conditions have been shown to increase risk, while secondary factors like working under time pressure and lack of autonomy and social support in the workplace can increase the frequency and severity of complaints.^[19] Little is known, however, about the relative contribution of each risk factor and any possible synergistic effect. Exact prevalence figures of RSI are unavailable, in part due to a lack of valid working definitions of RSI as a diagnostic entity, but in a recent Dutch population survey RSI complaints were reported by 20–40 percent of the working population.^[20]

More insight into the long-term effects of computer use may be of particular relevance for older individuals because they may be even more susceptible to the development of RSI related complaints compared to younger or middle-aged persons. Firstly, hand function deteriorates with age due to age-related degenerative changes in the musculoskeletal, nervous and vascular system.^[21] Besides these more general degenerative mechanisms, hand function in the elderly can be impaired by specific pathological conditions, such as osteoporosis, osteoarthritis, or rheumatic arthritis.^[21,22]

The incidence of specific upper extremity disorders such as epicondylitis and rotator cuff syndrome has not been well described in the general population or in large working populations. There have been several epidemiologic studies, mainly of

carpal tunnel syndrome, conducted within specific working populations.^[23-25]

Work-related carpal tunnel syndrome (compression of the median nerve at the wrist) has been associated with high repetition, force, awkward wrist postures, and segmental vibration.^[26]

Statement of Problem

There are various factors that are supposed to produce many upper limb complaints in working people due to computer use.

Many studies reveal different kinds of upper limb complaints in computer users due to faulty positions.

The present study is an attempt to focus on various upper limb complaints in working people due to the use of computers.

Purpose of Study

The aim of the study is to explore side effects and complaints in upper limb due to use of computers and related technologies in human life.

Significance of the Study

The present study may be helpful

- To explore correct position during use of computers
- To avoid faulty postures
- To prevent various complaints in human life due to use of computers
- To suggest correct techniques and exercise to prevent and improve faulty positions of the body while using computers.

Operational definitions

Carpal Tunnel Syndrome: Carpal Tunnel Syndrome is pressure on median nerve, the nerve in the wrist that supplies feeling and movement to parts of the hand. It can lead to numbness, tingling, weakness or muscle damage in the hand and fingers.^[27]

Repetitive stress injury: Repetitive stress injury is an injury of the musculoskeletal and nervous system that may be caused by repetitive tasks, forceful exertions, vibrations, mechanical compressions or sustained or awkward positions.^[28]

Work related musculoskeletal disorder: Work related musculoskeletal disorders are a number of physical conditions affecting muscles, tendons, nerves and joints that are not caused by acute trauma.^[29]

METHODOLOGY

The present study involves 100 medical and engineering students of Gujarat, India by using random sampling method in the age group from 18 to 25 years.

Selection criteria

- Age group between 18-25 years.
- Both male and female students.

Exclusion criteria

- Recent fracture
- Eye problem; cataract
- Astigmatism
- Psychologically disturbed patient
- Epileptic patient
- Medications which can effect balance and coordination
- Uncontrolled systemic medical conditions

Procedure

Severity and functional scale (SFS) questionnaire was randomly distributed among 100 medical and engineering students of Gujarat, India.

The Questionnaires section was divided into two parts.

- 1) Symptom severity scale
- 2) Functional status scale

The principal investigator met the participants personally and explained about the study and distributed questionnaires.

RESULT

TABLE: 1 SYMPTOM SEVERETY SCALE

Questions	No. of subject	Percentage
1. How severe is the hand or wrist pain that you have at night?		
1 (never)	52	52
2 (mind)	27	27
3 (moderate)	7	7
4 (severe)	9	9
5 (very severe)	5	5
2. How often did hand or wrist pain wake you up during a typical night in the past two weeks (times/day)?		
0x (never)	50	50
1x (1 times/day)	15	15
2-3x (2-3 times/day)	28	28
4-5x (4-5 times/day)	4	4
5+x (5 or more times/day)	3	3
3. Do you typically have pain in your hand or wrist during the daytime?		
1 (never)	42	42
2 (mind)	26	26
3 (moderate)	21	21
4 (severe)	7	7
5 (very severe)	4	4
4. How often do you have hand or wrist pain during the daytime (times/day)?		
0x (never)	60	60
1-2x (1-2 times/day)	28	28
3-5x (3-5 times/day)	3	3
5+x (5 or more times/day)	6	6
constant	3	3

5. How long, on average, does an episode of pain last during the daytime (minutes)?		
0 (never)	37	37
<10 (below 10)	40	40
10-60 (between 10-60)	18	18
>60 (above 60)	2	2
constant	3	3
6. Do you have numbness (loss of sensation) in your hand?		
1 (never)	69	69
2 (mild)	11	11
3 (moderate)	13	13
4 (severe)	3	3
5 (very severe)	4	4
7. Do you have weakness in your hand or wrist?		
1 (never)	68	68
2 (mild)	14	14
3 (moderate)	18	18
4 (severe)	0	0
5 (very severe)	0	0
8. Do you have tingling sensations in your hand?		
1 (never)	45	45
2 (mild)	38	38
3 (moderate)	9	9
4 (severe)	4	4
5 (very severe)	4	4
9. How severe is numbness (loss of sensation) or tingling at night?		
1 (never)	50	50
2 (mild)	27	27
3 (moderate)	7	7
4 (severe)	12	12
5 (very severe)	4	4

10. How often did hand numbness or tingling wake you up during a typical night during the past two weeks?		
0x (never)	35	35
1x (1 times/day)	55	55
2-3x (2-3 times/day)	10	10
4-5x (4-5 times/day)	0	0
5+x (5 or more times/day)	0	0
11. Do you have difficulty with the grasping and use of small objects such as keys or pens?		
1 (never)	60	60
2 (mild)	25	25
3 (moderate)	10	10
4 (severe)	5	5
5 (very severe)	0	0

SYMPTOM SEVERITY SCALE

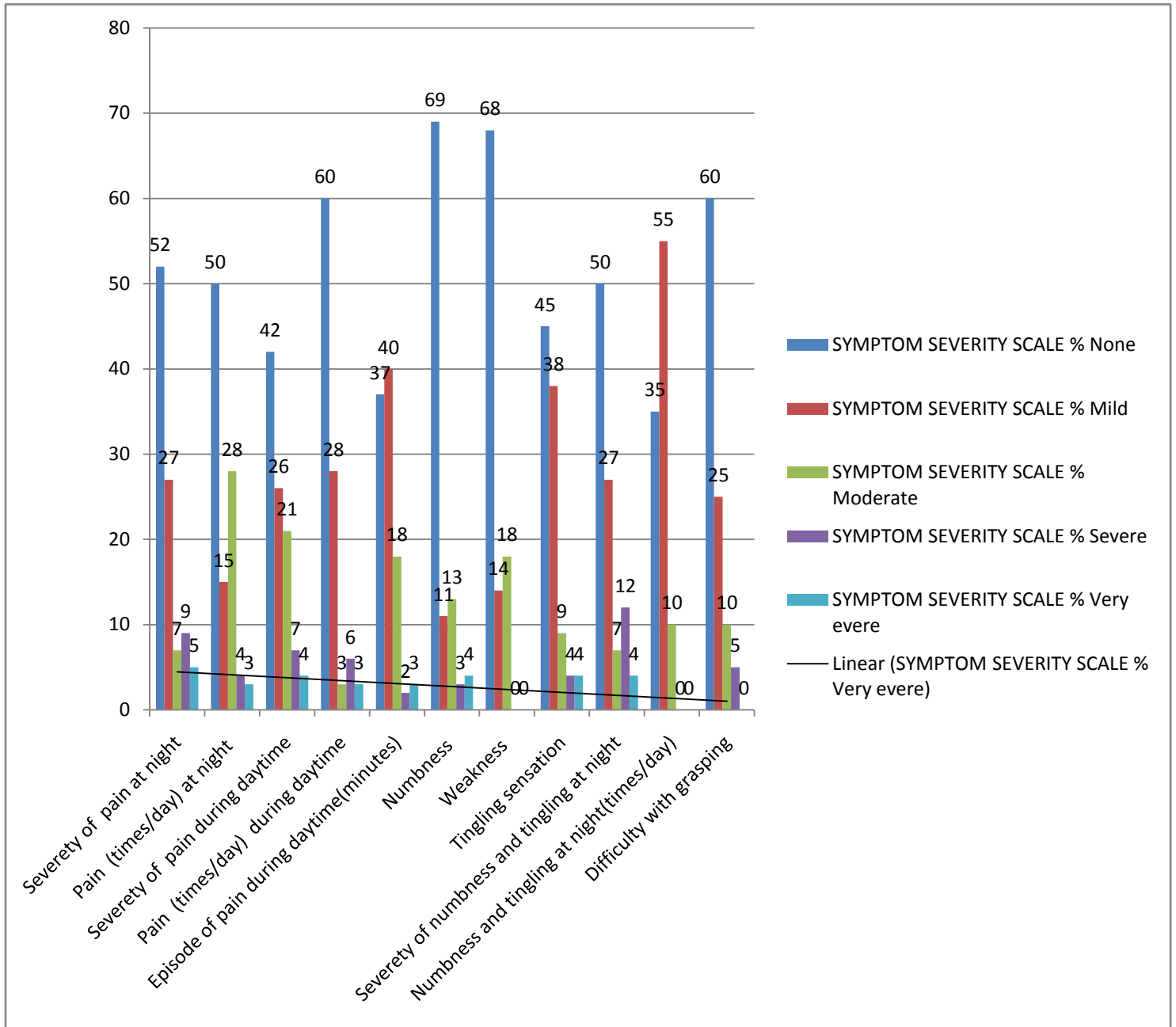


Figure 1: Symptom Severity Scale

Based on symptom severity scale our result suggests that 51.63% people have no complaints of upper limb problem due to use of computer, 27.81% people have mild complaints of upper limb problem due to use of computer, 13.09% people have moderate complaints of upper limb problem due to use of computer, 4.7% people have severe complaints of upper limb problem due

to use of computer and 2.7% people have very severe complaint of upper limb problem due to use of computer.

TABLE- 2 FUNCTIONAL STATUS SCALE

Question	No. of student	Percentage
1. Writing		
1 (never)	37	37
2 (mind)	30	30
3 (moderate)	22	22
4 (severe)	3	3
5 (very severe)	8	8
2. Buttoning of clothes		
1 (never)	61	61
2 (mind)	19	19
3 (moderate)	4	4
4 (severe)	11	11
5 (very severe)	5	5
3. Holding a book while reading		
1 (never)	50	50
2 (mind)	32	32
3 (moderate)	17	17
4 (severe)	1	1
5 (very severe)	0	0
4. Gripping of a telephone handle		
1 (never)	61	61
2 (mind)	27	27
3 (moderate)	9	9
4 (severe)	3	3
5 (very severe)	0	0
5. Opening of jars		
	69	69
	11	11
	19	19
	0	0

1 (never) 2 (mind) 3 (moderate) 4 (severe) 5 (very severe)	1	1
6. Household chores 1 (never) 2 (mind) 3 (moderate) 4 (severe) 5 (very severe)	52 28 9 6 5	52 28 9 6 5
7. Carrying of grocery bags 1 (never) 2 (mind) 3 (moderate) 4 (severe) 5 (very severe)	48 26 18 4 4	48 26 18 4 4
8. Bathing and dressing 1 (never) 2 (mind) 3 (moderate) 4 (severe) 5 (very severe)	54 23 5 8 10	54 23 5 8 10

FUNCTIONAL STATUS SCALE

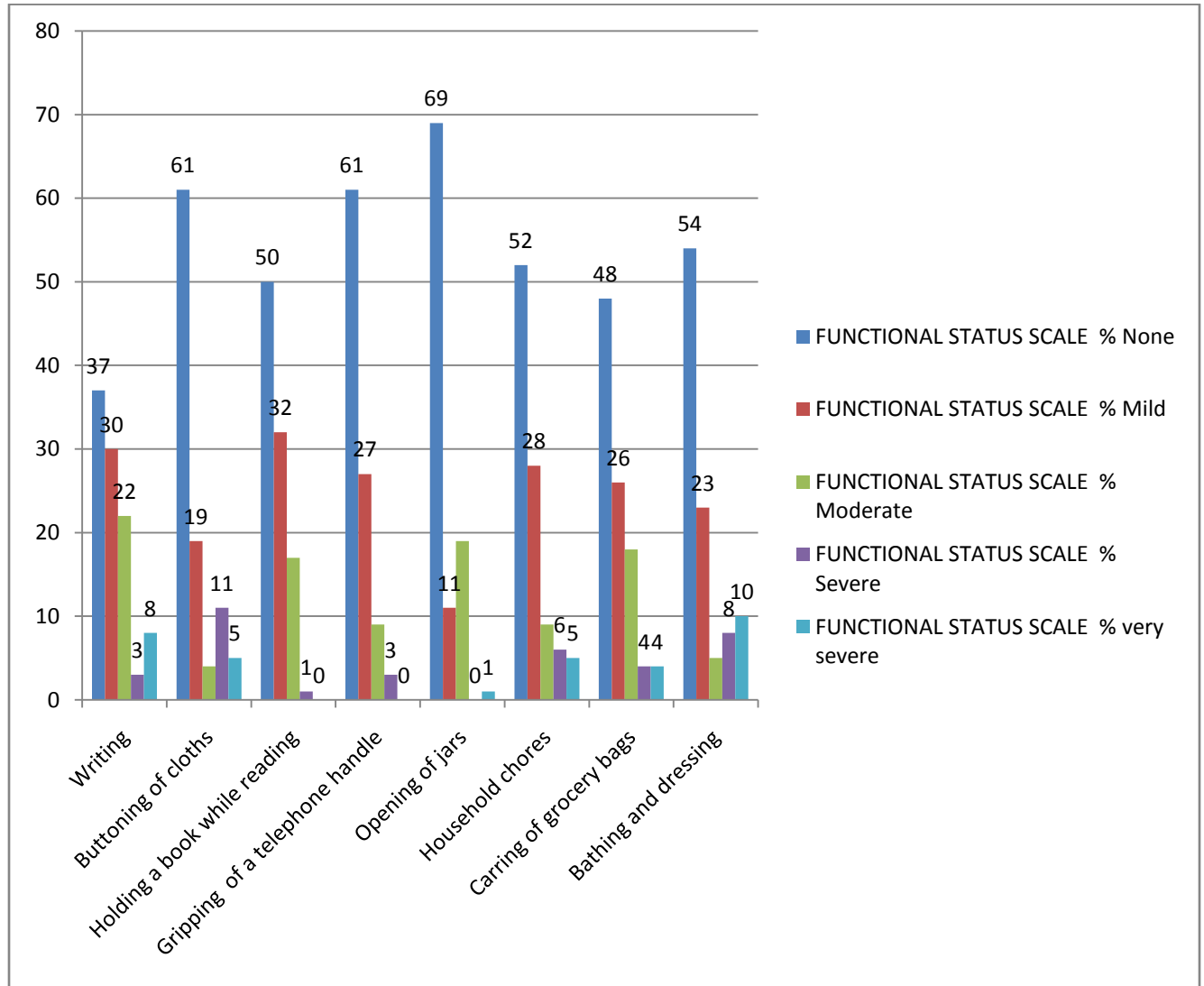


Figure 2: Functional Status Scale

Based on functional status scale 54% people have no complaint of upper limb problem due to use of computer, 24.5% people have mild complaint of upper limb problem due to use of computer, 12.87% people have moderate complaint of upper limb problem due to use of computer, 4.5% people have severe complaint of upper limb problem due to use of computer and 4.1% people have very severe complaint of upper limb problem due to use of computer.

DISCUSSION

Upper limb pain and dysfunction are frequent complaints associated with computer work. The present study is an

attempt to focus on various upper limb complaints in working people due to use of computer. The present study suggests that almost 50% of people have no problem due to use of computer and 50% of people have

problem after using computer. But there are various factors which are suppose to or not suppose to produce any complaints in working people.

In the study of computer users of Malaysia, thirty six percent of the respondents used chairs with adjustable backrest while working on their PCs though 51 % of them knew how to adjust it. Only 20% of them had any idea about the ergonomic seating posture.^[30] So lesser risk of developing problem who have an idea about ergonomic seating posture during use of computer.

In same way chronic user having greater risk of developing upper limb complaints ^[31] in study on older users of computer suggest prevent symptoms at later stage by maintaining an ergonomic posture and by avoiding prolonged computer usage.^[32] Similarly one study suggest that prolonged, self-paced use of a standard computer interface does not put older persons at a risk of upper limb complaints or reduce functional health in older adult.^[33]

Our study suggests about 50% of people have upper limb complaints. It may be due to their prolonged use of computer or bed seating posture.

CONCLUSION

This study concluded that 50% people suffer from upper limb complaints due to use of computer. Small sample size is one of the limitations of the present study which may be increased in future study. The current study did not explore about the duration of computer use among the students, ergonomic positions and rest time between the uses of computer. Future study may be carried out with considerations of these limitations.

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