

# Knowledge, Attitude And Practice About Laptop Ergonomics Among University Students

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## Abstract-

**Background:** With the increased industrialization and technology in Pakistan, use of laptop computers also became popular, but majority of the people are not aware of laptop ergonomics and its safe use even those people who have some knowledge about laptop ergonomics do not apply it.

**Objective:** Aim of this study was to find the knowledge, attitude, and practice of laptop ergonomics among university students.

**Methodology:** It was a cross sectional study with a sample size of 806 participants. Convenient sampling technique was used for collection of data from different universities of Lahore. Through Laptop computer using screening survey (LCUSS) questionnaire of knowledge, attitude. LUCSS by using a questionnaire assessing knowledge and practice of laptop ergonomics among university students.

**Results:** Mean age of participants was of  $25 \pm 1.15$  years, mean working hours of all the participants was of  $7 \pm 2$  hours. About 415 (51.9%) has heard about laptop ergonomics and have basic knowledge about ergonomics but lack detailed ergonomics. About 421 (52.2%) enjoy using laptops but 84 (10.4%) got frustrated due to use of laptop.

**Conclusion:** The study concluded that there is need to increase the knowledge about laptop usage, more than half of the laptop users among university students were familiar with laptop

ergonomics but still not all of them practice it while using laptop for prolong periods.

**Key Words:** Attitude, Ergonomics, Knowledge, Laptop, Musculoskeletal disorders.

## I. INTRODUCTION

Ergonomics phrase is derived from Greek words, "ergo" and "nomos", which means work and regulation respectively<sup>1</sup>. Physical ergonomic is associated with human anatomical, physiological, anthropometric, and biomechanical features as they relate to physical movement which encompass working postures, repetitive movements, materials management, work associated musculoskeletal disorders, administrative center layout, health and protection described through International Ergonomic Association. Ergonomic seeks to evolve task, operating conditions, effort methods, tools and apparatuses to enhance their appropriateness for people<sup>2</sup>.

Computer apparatus, ergonomics is related with such aspects as the physical design of the screens, keyboard, and related hardware, and the way in which people connect with these hardware devices<sup>3</sup>. Personal Computer such as Laptop has been synonym with student life in university. Laptop is a requirement for them to perform daily events such as completion assignments, seeking data, communication, browsing internet as well as for relaxation activity such as watching films and gaming. Besides being lightweight and portable, laptop empowers them to access info on technology at the instructions of their hand. Prior to this, it isn't quite to look maximum of student spend longer time period the

usage of laptop. Students additionally stated to spend greater hours of labor in keeping with day on laptop than professionals<sup>4</sup>. A study done by Jacobs K et.al stated that pc income contain as a minimum 1 / 4 of the general laptop market, with those numbers leaping to 75.8% amongst university and graduate students<sup>5</sup>. Increasing use of computer systems in colleges and universities have ended in a number of laptop associated health problems<sup>6</sup>. Despite of bad effect to fitness associated with lengthen used of computer without right ergonomic measure, more often than not college scholars are nevertheless ignorant of this outcome. Knowledge of ergonomics is needed to area laptop customers to keep away from sure threat elements which could make a contribution to the development of MSK signs and symptoms and musculoskeletal (MSK) disorders<sup>7</sup>. The incidence of work-associated MSK disorders is growing amongst pc customers all through the world<sup>8</sup> and boom withinside the frequency of signs over the years has been discovered with the fast improvement of laptop technology and ever-growing utilization of computers<sup>9,10</sup>. In the absence of an excellent ergonomic design, prolonged workings for lengthen durations can adversely have an effect on vision, however additionally the muscle tissues of neck, upper & lower back, shoulders and arms, leading to visible and muscular tiredness and uneasiness (MSK condition). Signs like pain, tingling, numbness in numerous body components like wrists, shoulders, spinal muscles and legs and eye problems arise because of incorrect seating, loss of quick breaks for the duration of work and incorrect viewing distance<sup>7</sup>. Prolong used of laptop without right ergonomic exercise can divulge student with the danger of computing associated neck and upper extremity ache has been reported amongst graduate students of university over the last ten years<sup>11-14</sup>. Computer use creates a danger of MSK pain specifically for the higher extremities<sup>15</sup>. Working on a pc in awkward postures for lengthen durations may also bring about lots of pc associated health issue<sup>16,17</sup>. Getting musculoskeletal signs and symptoms including cervical ache, shoulder ache, and lower back ache. Current exercise of students for using laptop was ergonomically wrong and occurrence of fitness issues

amongst computer customers changed into excessive and it's miles stated that as much as 20% of the scholars suffered from at the least one of the musculoskeletal troubles on every occasion after they worked with computer pc (3). Many users aren't aware about ergonomics and that they fail to place it into practice. Only 25.5% in Nigeria and 28.7% in Pakistan associated with health professions have been visible to privy to ergonomics<sup>18,19</sup>. The understanding and use of ergonomics can serve to save from the onset and development of musculoskeletal damages and enhance one's fitness status<sup>20</sup>. So, there is a necessity to teach new computer handlers about computer-associated ergonomics<sup>21</sup>. Having known about the importance of ergonomic principles involved in Laptop computer usage, this study aims at studying the Knowledge, Attitude and Practice of University students about laptop ergonomics and their perceived need for formal training on ergonomics.

## II. MATERIAL AND METHODS

It was cross-sectional survey, conducted at different universities of Lahore. Participants who were using desktop on a regular basis for a minimum 1or maximum more than 5 years without having any orthopedic prescription for any musculoskeletal disorder. Data was collected of 806 participants through convenient sampling technique. A questionnaire, Laptop computer using screening survey (LCUSS), assessing Knowledge, Attitude and Practice among laptop computer users after taking informed consent. It consists of three parts, first parts consist of knowledge with 24 questions in yes or no, second part consists of attitude with 9 questions, and in third part there are 10 question about practice.

## III. RESULTS

Data was entered and analyzed by SPSS version 25. Mean age of participants was of  $25 \pm 1.15$  years, working hours was of  $7 \pm 2$  hours, Results of knowledge, attitude (Strongly agree, Agree, Neutral, Disagree, Strongly disagree) and practice (Never, seldom, occasionally, always) are shown in Table 1, Table 2, and Table 3 respectively.

Table 1: Knowledge about Laptop Ergonomics

	Variable	Yes		No	
		Frequency	%age	Frequency	%age
1	Ever heard about laptop ergonomics?	415	51.9%	391	48.1%
2	Received any training about laptop ergonomics?	275	34.1%	531	65.9%
3	Arm rest is important to support elbow?	536	66.5%	270	33.5%
4	Chair back isn't important to support back?	379	47%	427	53%
5	Good posture while computing is required to prevent musculoskeletal symptoms?	651	80.8%	155	19.2%
6	Prolonged use of laptop rest/break could not lead to musculoskeletal symptoms?	474	58.8%	332	41.2%
7	Goals of ergonomics are to increase musculoskeletal symptoms and to reduce productivity?	502	62.2%	304	37.8%
8	Improper seating, lack of short breaks improper viewing distance, awkward posture, repetitive motion, and sustained posture are risk factor for ergonomic problems in laptop users ?	636	85%	170	15%
9	Keyboarding can cause repetitive motion forceful static exertion and contact stress?	555	70%	251	30%
10	Are you able to identify signs and symptoms of Musculoskeletal symptoms of prior to long use of laptop?	476	61%	330	39%
11	Laptop screen should be positioned at least at arm length away?	581	72%	225	28%
12	I place my laptop screen slightly below eye level?	386	50.1%	420	49.9%
13	It is not necessary to avoid laptop screen from glare?	370	44.3%	436	55.7%
14	Keyboard and mouse are not necessary to place at same level at elbow height?	502	62.2%	304	37.8%
15	Keyboard should be close to form edge of desk allowing space for wrist to rest on desk?	590	73.2%	216	26.8%
16	When keying keyboard should be flat in line with elbow position to avoid awkward posture?	581	72%	225	28%
17	It is not important to use an ideal mouse pad with wrist support to provide support?	534	66.2%	272	33.8%
18	Regular eye break from laptop screen should be taken?	502	62.2%	304	37.8%
19	Mini break isn't required after prolong use of laptop ?	602	74.5%	204	25.5%
20	Stretching after some time can reduce risk of pain ,prevent stiffness ,improves circulation	594	73.7%	212	26.3%
21	If I use chair height seat and back of the chair does need to be adjusted to achieve good posture	412	55.9%	394	44.1%
22	Chair does not need back rest to support back	439	54.5%	367	45.5%
23	When I use desk ,I locate frequently use item in reachable are to avoid over stretch	521	64.5%	285	35.5%
24	I know that sitting with different posture with laptop such as sitting on floor , lying on bed ,laptop in lap ,could possess musculoskeletal symptoms	594	74.6%	212	25.4%

Table 2- Attitude about Laptop Ergonomics

	Variable	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
		Frequenc y	%age	Frequenc y	%age	Frequenc y	%age	Frequenc y	%age	Frequenc y	%age
1	A laptop computer makes university easier	421	52.2 %	287	35.5 %	72	9.1%	14	1.7%	12	1.5%
2	Laptop computer makes university more enjoyable	273	33.9 %	316	39.2 %	158	19.6 %	38	4.9%	21	2.4%
3	Laptop computer helps me interact with other employs	280	34.7 %	275	34.1 %	162	20.1 %	74	9.2%	15	1.9%
4	It is easier for me to take data during office with my laptop	250	31%	298	37%	193	23.9 %	50	6.2%	15	1.9%
5	I can organize my data easily with my laptop computer	119	16%	205	25.1 %	247	30.6 %	170	21.1 %	65	7.2%
6	A laptop computer is a distraction in office	140	17.3 %	240	27.1 %	160	32.2 %	100	12.4 %	166	11%
7	I rarely use my laptop	100	12.4 %	152	18.9 %	183	22.7 %	272	33.7 %	99	12.3 %
8	I do not enjoy using my laptop	78	9.7%	117	14.5 %	136	16.9 %	313	38.8 %	162	20.1 %
9	I often feel frustrated using my laptop	84	10.4 %	129	16%	150	18.6 %	314	39%	129	16%

Table 3- Practice about Laptop Ergonomics

		Never		Seldom		Occasionally		Always	
	Variable	Frequency	%age	Frequency	%age	Frequency	%age	Frequency	%age
1	I need a chair with back rest to support back	114	14.1%	206	25.6%	355	44%	131	16.3%
2	I adjust height ,seat of chair to achieve comfort	80	9.9%	264	32.8%	323	40.1%	139	17.2%
3	My knees are at same level as my hip	102	12.7%	286	35.5%	312	38.7%	106	13.1%
4	I use footrest under my feet	90	11.2%	309	38.3%	308	38.2%	99	12.3%
5	I used arm rest while using laptop	142	17.6%	265	32.9%	295	36.6%	104	12.9%
6	I used chair that provide back support	141	17.5%	261	32.4%	285	35.4%	119	14.7%
7	My desk is at same height with my elbow	139	17.2%	280	34.7%	291	36.1%	96	12%
8	I keep frequently used items in my reach	99	12.3%	270	33.5%	332	41.2%	105	13%
9	It doesn't matter how I sit as long I feel comfortable	113	14%	213	26.6%	337	41.8%	143	17.6%
10	I prefer to sit with my laptop on desk	164	12.9%	214	26.6%	305	45.3%	123	15.2%

#### IV. DISCUSSION

Laptop is an integral part of office workers these days. Although work efficiency has been improved with their usage. There are some ergonomic issues associated with frequent long term use of laptop if not tackled properly can bring permanent MSDs and posture abnormalities which ultimately decrease the work efficiency of employees.

A study conducted in by Khan R et al in 2012 where 210 were males and 134 were females. 52% participants heard about ergonomics, while 92% were aware of its importance. Knowledge about the significance of arm rest is 24%, back rest 32%, was there but practiced by 21% and 31 %. Proper positioning of wrist is known to 56% and practiced by 40%. While 54% respondents had knowledge about ideal height of chair. But practiced by only 32%. Khan R et al results as compared to this study where among 806 participants all participants were males. 51% participants never heard about laptop ergonomics. Knowledge about back rest is 46%. Knowledge about arm rest is 65%. About 61% people think that goals of ergonomics are to increase musculoskeletal symptoms. But practice score is 17.5% they always need a chair for back support. 18% always adjust height of the chair. 13% use always use chair with arm rest <sup>22</sup>.

A study conducted in by Elias SM in Malaysia, a cross sectional study was conducted on 197 subjects from public university student in Selangor shows knowledge score of ergonomics 74%. 67% of student's experience MSK symptoms. The most common were shoulder pain. The results are in align with this study <sup>3</sup>. A study was conducted by Tafese A1 et al in university of Gondar Ethiopia 2016, were 58% participants were females and results show knowledge about computer ergonomics 51%, while practice score is 48% <sup>23</sup>. Another study conducted by

Shantakumari N , including university students conducted in UAE included 389 students show that 44% of students were aware of computer ergonomics. Students who read documents on ergonomics put ergonomic rules into practice, as compared to those who received training <sup>24</sup>. A study conducted by Ekta Chavda SP and Manish Parmar, in India including 100 participants show that 44% of participants were aware of laptop ergonomics majority of the students were using laptop with incorrect postures<sup>25</sup>.

A cross-sectional study conducted by Sirajudeen MS and Siddik SSM by recruiting 177 Computer Science and Information Technology students briefed that majority of the subjects were unaware of ergonomics (32.8% correct responses), healthy postures related to elbow (34.4% correct responses), wrist & hand (39.5% correct responses), Level of Monitor (35% correct responses), Position of mouse (47.4% correct responses) and Mini breaks (42.9% correct responses). This research highlighted the necessity of Ergonomic training regarding healthy postures and the measures to reduce the risk of musculoskeletal disorders for the students <sup>26</sup>.

A number of musculoskeletal disorders results due to prolonged use of laptops in improper posture. As improper sitting posture during laptop usage leads to neck and back strains, current practice of laptop usage should be improved by increasing the awareness of ergonomics to minimize health hazards.

#### V. CONCLUSION

The study concluded that there is need to increase the knowledge about laptop usage, more than half of the laptop users among university students were familiar with laptop ergonomics but still not all of them practice it while using laptop for prolong periods.

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