

# Prevalence of Neck pain and its effects on Quality of life of Software Engineers in Lahore

AMBER NASIR<sup>1</sup>, MAMOONA SHAUKAT<sup>2</sup>, SAJJAD ALI SAJJAD<sup>3</sup>, ARIF ALI RANA<sup>4</sup>, MUNAZZA WASEEM<sup>5</sup>, HAFIZA AROOSA SYED<sup>6</sup>

<sup>1</sup>Physiotherapist, Anabia Physical Therapy and Rehabilitation Center Rasheed Hospital Garden Town Lahore

<sup>2</sup>Demonstrator/Physiotherapist, ABWA College of Physiotherapy, Jaranwala Faisalabad

<sup>3</sup>Assistant Professor/HOD, ABWA College of Physiotherapy, Jaranwala Faisalabad

<sup>4</sup>Associate Professor/HOD Physiotherapy, Central Park Medical College, Lahore

<sup>5</sup>Senior Lecturer/Physiotherapist, ABWA College of Physiotherapy, Jaranwala Faisalabad

<sup>6</sup>Demonstrator/Physiotherapist, ABWA College of Physiotherapy, Jaranwala Faisalabad

Correspondence to Dr. Sajjad Ali Sajjad, Email: [sajjadali@kemu.edu.pk](mailto:sajjadali@kemu.edu.pk), Cell No. +923347329370

## ABSTRACT

**Background:** Neck pain is a sensation of discomfort in the dorsal and lateral side of cervical spine due to postural or mechanical faults. It affects health - status, work productivity and multiple interventions are used to treat neck pain.

**Aim:** To check the prevalence of neck pain, its effects on quality of life of software engineers of Lahore city.

**Methodology:** This was an observational study Cross-sectional survey. Three hundred and thirty eight participants with minimum one year of job experience in software house were included in the study. Neck pain disability and quality of life were observed by using NDI and SF-12 respectively. Data was entered and analyzed by SSS 22.0.s

**Results:** Results showed the prevalence as mild, moderate, severe and complete neck pain disability in software engineers was 150(44.38%), 68(20.12%), 19(5.62%) and 3(0.89%) respectively and 98(28.99%) participants were without neck pain. There are more male participants 86(25.44%) without neck pain than female participants 12(3.55%) without neck pain. Neck pain showed no significant association with age of software engineers because  $p > 0.05$  in chi-square test. There were fewer participants with excellent and poor physical health 8.28% and 10.36% respectively.

**Conclusion:** Neck pain is common in software engineers of Lahore city. Neck pain is more prevalent in female software engineers as compared to male. Severe neck pain declined their Physical health and complete neck pain caused disability. They are facing the physical health issues with resulting limitations in their routine office work, physical activities and social activities. Neck pain is associated with gender and physical health of software engineers.

**Keywords:** Neck pain, quality of life, software engineers, Lahore city

## INTRODUCTION

Software engineers usually design or analyze computer software network control system, computer games, operating systems and various applications to operate the computers<sup>1</sup>. Thus, they have to work on computers or laptops for longer period of time leading to abnormal posture and have more probability of developing the works related musculoskeletal problems. 60 to 70% of people have pain for once or more times during course of their employment<sup>2</sup>. It has significant effect in reducing the ability to do work and on another hand in reducing the income to meet daily life expenses<sup>3</sup>. Diseases or conditions that affect any tissue of the neck can result in neck pain. It is a pain in the dorsal and lateral side of neck from superior nuchal line to 1st thoracic vertebra owing to cervical posture or cervical mechanics. It is more in females. The neurological sign and symptom are absent. It may not affect daily working routine or may have insignificant to significant effect on working routine<sup>4</sup>. If the neck pain persists for longer duration and remains untreated it will definitely decrease the strength of neck extensors and affect the individual's quality of life<sup>5</sup>.

Risk factors of neck pain for software house workers include female gender, previous history, old age, cold environment of workstation, improper monitor adjustment (either on the left or right side not in front of the user), awkward posture, poor social support, psychological stress, prolonged neck flexion and long working hours<sup>6</sup>.

Physical risk factors for neck pain are less functional capacity, poor fitness level and endurance capacity and reduced strength of neck muscles. Neck pain is not very much related to increased job demands, incompetence, less support from lord but when these factors combine with increased working hours<sup>7</sup>.

When people remain emotionally distressed or physically unfit or when there is reduced neck extensor ability to resist the fatigue for longer period of activity and when the individual intrinsic pain control mechanism of CNS is unable to modulate pain there is a chance of developing the chronic neck pain<sup>8</sup>.

Neck pain is a common musculoskeletal problem among software engineers. It is considered as a one of more common underlying cause to develop musculoskeletal disorders<sup>9</sup>. Neck pain is more related to working hours per day rather than age of computer

workers. It affects computer workers of all ages<sup>10</sup>. It is more common in females. A study conducted to find the prevalence of neck pain shows that prevalence of neck pain was high 62.1% in computer users throughout their lives<sup>11</sup>.

Forward head posture (FHP) is common cause of neck pain as it causes abnormal posture development which ultimately leads to muscle spasm. FHP enhances the load on neck muscles that hold the head causing stiffness in that muscles which may lead to the neck pain. FHP maintained for longer duration results in ischemia in neck muscles and pain. Sitting in front of computer while working especially when there is an improper adjustment of monitor results awkward posture in software engineers. That awkward posture or FHP is more common among computer users with neck pain<sup>12</sup>.

FHP involves the extension of occipital bone on cervical vertebrae which reduces the craniovertebral angle in the computer users with forward head posture. FHP may or may not cause neck pain it may be asymptomatic. Reduced craniovertebral angle has been seen in persons having FHP with neck pain than those having FHP without neck pain. Decreased craniovertebral angle shows more FHP<sup>13</sup>.

For modern computer workstation it is suggested that there would be a number of computer displays arranged in an arc, each with equal distance from the user. It will definitely prevent the unnecessary neck bending, side bending and rotation<sup>14</sup>.

Computer workers work on computers and have less physical activity. Neck pain can be prevented by keeping them physically active, by avoiding the awkward posture and by ergonomically designing their workstations<sup>15</sup>.

Interventions for the neck pain are not same for all the patients. Treatment of neck pain based on the patient symptoms<sup>16</sup>. Study suggests that proper examination of neck is necessary before designing its treatment plan<sup>17</sup>.

The use of patient education apart from physical therapy has nothing to do with neck pain. However, it is advantageous when combines with the physical therapy. The impact of patient education is temporary<sup>18</sup>. Stretching of neck, trunk and shoulder muscles is really helpful in preventing and reducing the neck pain in software engineers. Muscle stretching program for the period of one month in people working in front of computers is useful in reducing neck pain and increasing work productivity<sup>19</sup>. Hot pack is also useful in reducing the neck pain in computer workers<sup>20</sup>.

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There are few studies on physical condition of computer workers who have to work late hours with great concentration. So the present study was conducted to check the prevalence of neck pain, its effects on physical health of software engineers of Lahore city.

**MATERIALS AND METHODS**

After permission from IRB, this observational study was conducted to find the prevalence of neck pain and quality of life in software engineers of Lahore. Data of software Engineers (20 to 55 years of age with minimum 12 months of job experience) from Arbisoft software house, ibex software house, Spark World, Crewlogix technologies, Technisoft consulting, Team Solutions, Proglabs software house, IT Solutions, Nextbridge Magic Mayo software company and from others through online Google form in Lahore.

**Data Analysis:** Descriptive data analysis is used to evaluate responses obtained from software engineers of Lahore city. Data is analyzed by using SPSS 22.0. Tables of Frequency and percentage are made. Bar charts and cross tables are made and interpreted.

**RESULTS**

Neck pain showed no significant association with age of software engineers because  $p > 0.05$  in chi-square test. Amongst 338 participants, more number of participants (n=302. 89.35%) lie between 20 to 35 years of age and participants between 36 to 50 years of age were 36(10.65%).

Table 1: Age groups of the Participants:

Age Group	Frequencies	Percentages
20 years to 35 years	302	89.3
36 years to 50 years	36	10.7
Total	338	

Table 2: Gender wise percentage of participants

Gender	Frequencies	Percentages
Male	263	77.0
Female	75	23
Total	338	100.0

Frequencies male participants were 263(77.81%) and female participants were 75(22.19%). Result shows that there were more male have adopted the profession of software engineers compared to female.

**Neck disability index (NDI) scoring:** Neck disability index (NDI) scoring, among total number of (n=338) participants 98 participants have no disability (n=98), 150 participants have mild disability because of neck pain (n=150), 68 participants have moderate disability because of neck pain (n=68), 19 participants have severe disability because of neck pain (n=19), 3 participants have complete disability because of neck pain (n=3). Result shows that there are greatest number of participants with mild disability (n=150) and least number of participants with complete disability (n=3) due to neck pain

Table 3: Neck disability index (NDI) scoring:

	n	%age	Overall
No Disability	98	29	29
Mild	150	44.4	73.4
Moderate	68	20.1	93.5
Severe	19	5.6	99.1
Complete	3	0.9	100
Total	338		

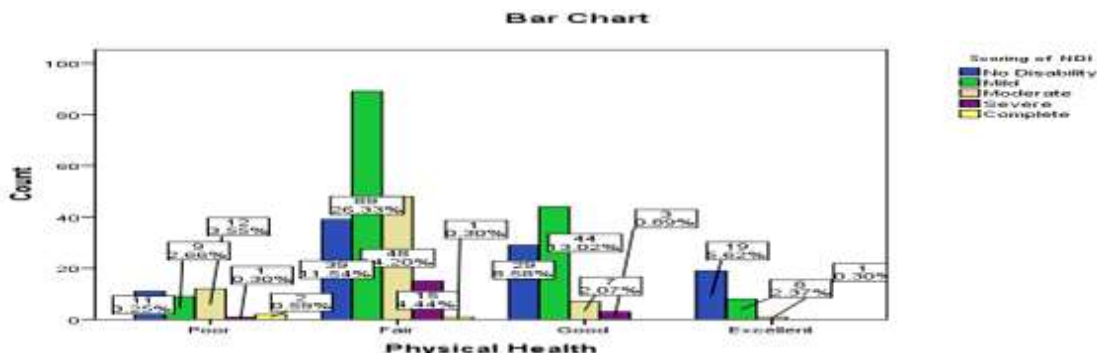
Neck disability index (NDI) scoring shows that 28.99% participants have no disability (n=98), 44.38% participants have mild disability because of neck pain (n=150), 20.12% participants have moderate disability because of neck pain (n=68), 5.62% participants have severe disability because of neck pain (n=19), 0.89% participants have complete disability because of neck pain (n=3). Results show that there is high percentage of participants with mild disability (44.38%) and lowest percentage of participants (0.89%) with complete disability while 28.99% participants have no disability at all.

**QUALITY OF LIFE BY SF12:** Among total number N=338 participants, participants have excellent general health (n=39), 35.80% participants have very good general health (n=121), 38.17% participants have good general health (n=129), 10.95% participants have fair general health (n=37), 3.55% participants have poor general health (n=12). Among total number N=338 participants 60 participants (n=60) have a lot of limitation, 133 participants (n=133) have a little limitation in daily routine activities, 145 participants have no limitation in moderate activities (n=145).

Above bar chart shows that there are more participants with fair physical health among them 11.56% with no disability, 26.33% with mild, 14.20% with moderate, 4.44% with severe and 0.30% with complete disability due to neck pain. Good physical health is second most prevalent among total participants (n=338), among them 8.58% with no disability, 13.02% with mild, 2.07% with moderate and 0.89% with severe neck pain disability. Least participants are with excellent physical health among them 5.62% is with no disability, 2.37% with mild neck pain, and 0.30% with moderate and there is no participant with severe or complete disability due to neck pain. For participants with poor health there are fewer 3.25% with no disability, 2.66% with mild, 3.55% with moderate 0.30% with severe neck pain disability and 0.59% with complete disability due to neck pain.. Results show that complete disability is more in participants with poor physical health and no disability is more among participants with excellent physical health.

Table 4: Quality of life of participants

	n	%age	Overall
Excellent	39	11.5	11.5
Very good	121	35.8	47.3
Good	129	38.2	85.5
Fair	37	10.9	96.4
Poor	12	3.6	100.0
Total	338		



## DISCUSSION

The study highlights prevalence of neck pain, general health and psychosocial health in software engineers of Lahore city working in software houses. Sample size is estimated from Rao software is 377 out of them 338 are respondents and 39 are non-respondents. Data is collected from software engineers working in Arbisoft software house, ibex software house, Spark World, Crewlogix technologies, Technisoft consulting, Team Solutions, Proglabs software house, IT Solutions, Nextbridge Magic Mayo software company and from others through online Google form in Lahore city. NDI and Short Form 12 is used to describe the pain in neck and quality of life in software engineers.

Immediate study indicates prevalence of disability due to pain in neck among software engineers which is mild, moderate and severe in 44.38%, 20.12%, 5.62% participants. 0.89% participants with complete disability and 28.99% without neck pain. It is a greater figure than 42.40% in similar study conducted on different population i.e. bankers of same city Lahore<sup>21</sup>.

More number of participants 89.35% between 20 years to 35 years of age among them 26.04% are with no disability, 40.53% with mild, 16.57% with moderate, 5.33% with severe and 0.89% with complete disability due to neck pain. Among the fewer participants 10.65% between 36 years to 50 years, there are 2.98% with no disability, 3.85% with mild, 3.55% with moderate and 0.30% with complete disability due to neck pain. According to results neck pain is more common among 36 years to 50 years of age group because participants with no disability are comparatively more in 20 years to 35 years of age group.

There are more male participants 77.8% than female participants 22.2%. Among male participants 25.44% with no disability, 35.50% with mild, 12.72% with moderate, 3.85% with severe and 0.30% with complete disability due to neck pain. Among female participants 3.55% with no disability, 8.88% with mild, 7.40% with moderate, 1.78% with severe and 0.59% with complete disability. Results shows that there neck pain is more common among females because there are more male participants without neck pain as compare to the female participants without neck pain. Participants with complete disability are more among female participants .the same situation was depicted in other similar research on neck pain in computer users<sup>22</sup>.

There are more male participants 25.44% without neck pain than female participants 3.55% without neck pain because female gender is more prone to develop neck pain according to a research on computer workers<sup>23</sup>.

## CONCLUSION

We concluded that neck pain is common in software engineers of Lahore city and they are facing the physical and mental health issues with resulting limitations in their routine office work, physical activities and social activities. Neck pain is not associated with the age of software engineers.

**Conflict of interest:** Nil

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