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Effectiveness of Isometric Exercises on Neck Pain Among Computer Professionals at Selected Companies at Tech Parks, Bengaluru, Karnataka

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Abstract

Background: *With the rapid growth of computer technology, many professionals now spend long hours at their desks, which has led to a common issue – neck pain. Poor ergonomics, such as improper screen placement and bad posture, contribute significantly to this problem. Neck pain is widespread, affecting between 21% and 75% of computer users globally. In India, the prevalence can be as high as 85%. Isometric exercises, which strengthen neck muscles without altering their length, have been suggested as an effective remedy to reduce this discomfort.* ***Materials and Methods:*** *This study used a quantitative approach to evaluate the impact of isometric exercises on neck pain among computer professionals. Conducted at Tech Parks, Bengaluru, the research followed a preexperimental one-group pretest-posttest design. Sixty computer professionals suffering from neck pain were selected through purposive sampling.* ***Data Collection:*** *It is involved in two Sections. The first Section gathered demographic details (age, gender, education, etc.), and the second assessed pain levels using a numeric pain rating scale before and after the intervention. The pain levels were categorized into no pain, mild pain, moderate pain, and severe pain.* ***Results:*** *The study revealed a significant improvement in pain levels postintervention. Before the exercises, 33.33% of participants had severe pain, and 46.67% had moderate pain. After the exercises, no one reported severe pain, and only 16.67% had moderate pain. The proportion of participants with no pain increased to 20% from 3.33%, and those with mild pain rose to 63.33% from 16.67%. The average pain score dropped from 5.13 to 1.96, indicating a substantial reduction in discomfort.* ***Conclusion:*** *The findings suggest that isometric exercises are highly effective in reducing neck pain among computer professionals. Despite variations in factors like gender and working hours, the exercises significantly alleviated pain, improving participants' overall comfort. Incorporating these exercises into daily routines can be a practical solution for managing and preventing neck pain related to prolonged computer use.*

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INTRODUCTION

The rapid advancement of computer and information technology has significantly impacted modern work environments, especially among computer professionals [1]. This technological revolution has led to a substantial increase in the number of people who spend prolonged hours working on computers, resulting in the widespread occurrence of neck pain [2]. Studies suggest that poor ergonomic practices, such as improper screen positioning, extended sitting with poor posture,

and repetitive movements, are major contributors to neck pain among computer users [3]. This discomfort often arises from the imbalance between the anterior neck muscles becoming shorter and tighter, and the posterior neck muscles becoming longer and weaker due to forward head posture during prolonged computer use [4].

Neck pain, particularly nonspecific neck pain, is prevalent among computer professionals, with global studies revealing a high incidence rate ranging from 21% to 75%. The condition is more common among women and is influenced by factors, such as poor posture, improper workstation design, and lack of ergonomic awareness [5]. In India, where the IT industry is booming, neck pain among computer professionals is alarmingly high, with prevalence rates reported as high as 85% in some regions [6].

To combat this issue, various interventions, including ergonomic adjustments and exercises, have been recommended. One effective approach is the use of isometric exercises, which strengthen the neck muscles without changing their length [7]. These exercises help in reducing discomfort and stiffness, ultimately improving posture and preventing the recurrence of neck pain [8]. Given the growing reliance on computer technology and the increasing incidence of neck pain among professionals, it is crucial to explore and implement effective preventive measures to address this emerging health concern [9].

MATERIALS AND METHODS

In this study, a quantitative approach was used to explore the impact of isometric exercises on neck pain among computer professionals. The research was conducted using a preexperimental one-group pretest-posttest design at Tech Parks in Bengaluru, Karnataka. The participants were 60 computer professionals who experienced neck pain, selected through purposive sampling. The independent variable in the study was the isometric exercises, while the dependent variable was the level of neck pain. The tool used for data collection consisted of two sections: Section A gathered demographic details like age, gender, education, and work-related factors; Section B used a numeric pain rating scale to assess the severity of neck pain before and after the intervention. The pain levels were categorized as no pain, mild, moderate, and severe, helping to evaluate the effectiveness of the exercises.

RESULTS

The data reveals that most computer professionals with neck pain are aged 30–35 years (40%), followed by those aged 40–45 years (23.33%). A larger portion are male (63.33%) compared to female (36.67%). Most of them hold a B.Tech degree (40%), with others having completed M.Tech (20%), M.C.A (13.33%), or other computer courses (26.67%). A significant number identify as Hindu (53.33%), with smaller percentages being Christian (26.67%) or Muslim (20%). More than half have no family history of neck pain (56.67%). Non-vegetarian food habits dominate (63.33%), followed by ovo-lacto vegetarians (20%) and vegans (16.67%). Smoking (40%) and alcohol consumption (33.33%) are common, while 26.67% have no such habits. Most professionals have been experiencing neck pain for 3–6 months (60%), work around 8 hours daily (56.67%), and primarily use two-wheelers (36.67%) or trains (26.67%) for transportation (Table 1).

Table 2 and Figure 1 show a clear improvement in the level of pain among computer professionals after practicing isometric exercises. Before the intervention, 33.33% of participants experienced severe pain, and 46.67% had moderate pain. However, after practicing the exercises, no one reported severe pain, and only 16.67% had moderate pain. The percentage of participants with no pain increased from 3.33% before the exercises to 20% afterward, and those with mild pain reduced significantly from 16.67% to 63.33%. This suggests that isometric exercises were effective in reducing neck pain among the participants.

Table 1. Frequency and percentage distribution of demographic variables of computer professionals.

S.N.	Demographic Variables		Frequency	Percentage (%)
1	Age Group (Years)	25–30	10	16.67
		30–35	24	40.00
		40–45	14	23.33
		>45	12	20.00
2	Gender	Male	38	63.33
		Female	22	36.67
3	Educational Status	B. Tech	24	40.00
		M. Tech	12	20.00
		M.C.A.	8	13.33
		Other Computer Courses	16	26.67
4	Religion	Hindu	32	53.33
		Christian	16	26.67
		Muslim	12	20.00
		Others	0	0.00
5	Family History of Neck Pain	Yes	26	43.33
		No	34	56.67
6	Food Habits	Vegans	10	16.67
		Ovo-lacto Vegetarian	12	20.00
		Non-Vegetarian	38	63.33
7	Habits	Alcoholism	20	33.33
		Smoking	24	40.00
		None	16	26.67
8	Duration of Neck Pain	Less than a month	8	13.33
		1-<3 months	16	26.67
		3-<6 months	36	60.00
9	Working Hours	8 hours	34	56.67
		8-10 hours	20	33.33
		>10 hours	6	10.00
10	Mode of Transportation	By Bus	8	13.33
		By Two-Wheeler	22	36.67
		By Car	14	23.33
		By Train	16	26.67

Note: N = 60

Table 2. Frequency and percentage distribution of pre and posttest level of neck pain among computer professionals.

Level of Pain	Pretest Frequency	Pretest Percentage	Posttest Frequency	Posttest Percentage
No Pain	2	3.33%	12	20.00%
Mild Pain	10	16.67%	38	63.33%
Moderate Pain	28	46.67%	10	16.67%
Severe Pain	20	33.33%	0	0.00%

Note: N = 60

Table 3. Comparison of pre and posttest neck pain scores.

Test	Mean ± SD	t-value	p-value
Pre-Test	5.13 ± 2.41	11.4	<0.01
Post-Test	1.96 ± 1.62		

Note: N = 60

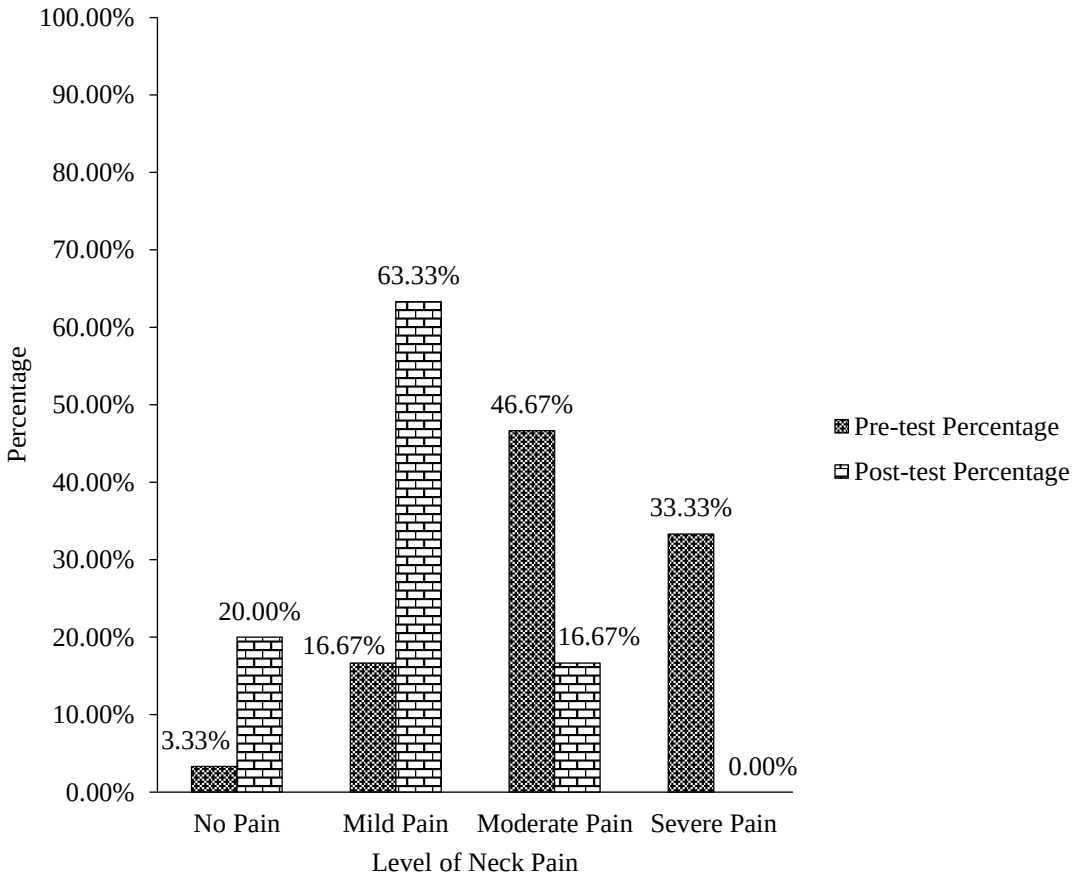

Figure 1. Percentage distribution of pre and posttest level of neck pain among computer professionals.

The data shows in Table 3 that before practicing isometric exercises, the average pain level among computer professionals was 5.13 with a standard deviation of 2.41. After the exercises, the average pain level significantly dropped to 1.96 with a standard deviation of 1.62. The t-value of 11.40 and the p-value of less than 0.01 indicate that the reduction in pain was statistically significant. This suggests that isometric exercises were effective in reducing neck pain among the participants.

The analysis of the demographic variables in relation to the level of neck pain reveals several interesting patterns. For age, the distribution of pain levels did not show significant differences across age groups (Chi-square value = 6.44, $p > 0.05$). Gender did have a notable effect, with males experiencing less severe pain compared to females (Chi-square value = 10.52, $p < 0.05$). Education levels also showed no significant association with pain levels (Chi-square value = 7.08, $p > 0.05$). Religion did not significantly impact pain levels (Chi-square value = 1.9, $p > 0.05$). Family history of neck pain also showed no significant effect on the pain levels (Chi-square value = 4.82, $p > 0.05$). Food habits were not significantly associated with neck pain (Chi-square value = 4.46, $p > 0.05$). Habits, such as alcoholism, smoking, and not having any of these habits did not show significant differences in pain levels (Chi-square value = 0.8, $p > 0.05$). The duration of neck pain was significant, with those having pain for 3-<6 months reporting higher pain levels (Chi-square value = 7.96, $p > 0.05$). Working hours had a significant impact, with individuals working 8 hours showing more pain compared to those with longer or shorter working hours (Chi-square value = 18.02, $p < 0.05$). Finally, the mode of transportation did not show a significant effect on pain levels (Chi-square value = 2.9, $p > 0.05$) (Table 4) [10, 11].

Table 4. Association of post-test level of neck pain among computer professional with their demographic variables.

S.N.	Demographic Variables		Level of Neck Pain			Chi-square Value	p-value
			No Pain	*Mild Pain*	*Moderate Pain*		
1.	Age in Years	25–30 years	0	8	2	6.44	> 0.05
		30–35 years	8	14	2		
		40–45 years	2	10	2		
		>45 years	2	6	4		
2.	Gender	Male	10	26	2	10.52	< 0.05
		Female	2	12	8		
3.	Education	B. Tech	8	16	0	7.08	> 0.05
		M. Tech	2	8	2		
		M.C.A.	2	4	2		
		Other Computer Courses	0	10	6		
4.	Religion	Hindu	8	20	4	1.9	> 0.05
		Christian	2	10	4		
		Muslim	2	8	2		
5.	Family History	Yes	2	20	4	4.82	> 0.05
		No	10	18	6		
6.	Food Habits	Vegans	4	4	2	4.46	> 0.05
		Ovo-lacto Vegetarian	2	10	0		
		Non-Vegetarian	6	24	8		
7.	Habits	Alcoholism	4	12	4	0.8	> 0.05
		Smoking	4	16	4		
		None	4	10	2		
8.	Duration of Pain	Less than a month	4	2	2	7.96	> 0.05
		1-<3 months	4	10	2		
		3-<6 months	4	26	6		
9.	Working Hours	8 hours	2	28	4	18.02	< 0.05
		8-10 hours	6	8	6		
		>10 hours	4	2	0		
10.	Mode of Transportation	By bus	2	6	0	2.9	> 0.05
		By two-wheeler	4	14	4		
		By car	2	8	4		
		By train	4	10	2		

Note: N = 60

CONCLUSIONS

The study shows that isometric exercises significantly reduce neck pain among computer professionals. Initially, most participants experienced moderate to severe pain, but after practicing the exercises, pain levels decreased notably. The average pain score dropped from 5.13 to 1.96, highlighting the exercises' effectiveness. Gender and working hours influenced pain levels, with males and those working 8 hours reporting more pain. Other factors like age, education, and food habits did not show significant effects. Incorporating isometric exercises can effectively alleviate neck pain in computer professionals, improving their comfort and well-being at work.

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