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RESEARCH ARTICLE

Development of an Integrated Physiotherapy Treatment Protocol for Desk Job Personals: A Pilot Research

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Abstract

Objectives: To develop an Integrated validated Physiotherapy Treatment Protocol for Desk Job personnel along with an assessment of its effectiveness. **Methods:** The research was conducted utilizing a mixed-method methodology. Interviews with thirty computer professionals (having more than five years of experience) and a thorough in-depth literature research were conducted to identify various symptoms which are commonly seen among computer professionals. Search engines such as Ovid MEDLINE, Cochrane Library, Pubmed, and EBSCO CINAHL were used with terms such as Neck Problems in Computer Professionals(cs), Treatment Techniques used in Cervical Spondylitis, and Motor or Sensory issues in Computer Professionals. The treatment protocol was created with the help of identified symptoms and validated using the Delphi technique. After the protocol was developed, a randomized control trial was conducted with thirty samples in each group. A developed and validated regimen was provided to the participants. **Findings:** Item level CVI ranges from 0.79 to 1. The Kappa results demonstrated the protocol's strong content validity, which ranged from 0.79 to 1. In comparison to day 1, there was a decline in both groups' scores of NDI and NPRS on day 30, and there was an even more noticeable decrease on day 60. The experimental group showed a much greater reduction in neck pain and disability when compared to the control group. **Novelty:** The study has focussed on a new category of occupational health issues, namely computer-related health issues, for which there is no established set of Physiotherapy Protocol that can either prevent or treat the issues.

Keywords: Numeric Pain Rating Scale (NPRS); Neck Disability Index (NDI); Content Validity Ratio (CVR) and Content Validity Index (CVI); Integrated Physiotherapy Treatment Protocol (IPTP)

1 Introduction

withstanding the new technological advancements, technologies, and the demand to accommodate a growing variety of work styles, organizations today confront numerous obstacles in maintaining the productivity and well-being of their workforce[(1)]. In today's offices, it is evident that office workers have shifted from an active to a sedentary lifestyle. Office computer users sit in a sedentary posture for six to twelve hours a day on average. The workers' health has been negatively damaged by this[(2)]. When computer users have bad posture, they are more likely to suffer from Musculoskeletal Disorders. Office workers are impacted because they use computers for data entry, letter writing, email correspondence, meeting scheduling, and client and co-worker communication. Employees in the services industry interact with customers via computers, phones, work papers, and stationery[(3)]. Comparing the incidence of musculoskeletal issues among employees in desk jobs, the information gathered indicates that shoulder pain (28%), and neck pain (47%), are more common than the other spots (lower back, upper back, elbow, knee, leg, and ankle). Desk workers are more likely to experience neck pain than those working at other locations[(4)]. When a nerve in the cervical region becomes inflamed or crushed where it splits off from the spinal cord due to specific musculoskeletal and neurological disorders in the upper limbs and neck, it is referred to as cervical radiculopathy, or a "pinched nerve." Information technology workers report 59% of work-related musculoskeletal ailments each year; 30% of these diseases are connected to neck pain[(5)]. Poor posture and extended computer use are two common musculoskeletal complaints that worsen neck pain[(6)]. Prevalent posture for people using computers, tablets, and cellphones is flexion of the cervical spine; the latter has been called "text-neck" in recent years. It just so happens that flexion has been identified as a major mechanical risk factor for the onset of persistent neck pain. Sadly, very few modeling attempts have tried to quantify the pressures on the intervertebral joints during the flexion of the cervical spine while taking into consideration the activation of the muscles[(7)]. Static posture during computer use increases muscle stress, leading to a range of muscular and neural symptoms, most commonly in the upper body: pain, numbness, functional loss, and other symptoms. With the arrival of the technology revolution, contemporary communication and computer technologies have become essential for both work and play. For users of visual display terminals who have a forward head posture, stabilizing exercises are better than traditional training in terms of decreasing the craniovertebral angle and increasing the cervical ROM[(8)].

2 Methodology

2.1. Study Design:

The study was done by using a mixed-method approach. Mixed methods stem from the fundamental belief that combining quantitative and qualitative methods yields a more comprehensive understanding of complicated occurrences and research challenges than either method alone.[(9)]

2.2. Data Collection

Table 1. Data Collection Methods

Data Collection for Protocol Development			
Source of Data Collection		**Research Setting**	**Tool for Data Collection**
Review of Literature[(10)]	**Focus Group Interview** Focus groups are often employed as a qualitative method to acquire a comprehensive understanding of a subject.[(11)]	Clinical settings of Delhi-NCR.	Self-administered Google Questionnaire,[(12)]
Cochrane library	Computer Professionals		
PUBMED			Physical Assessment of Computer Professionals • NDI • NPRS
Google Scholar	Clinical Practitioners		
Elsevier			

2.3. Sampling

2.3.1 Sampling Technique :

The study examined a ”sample” that is sizable enough and representative of the total population. A sample is a portion of the population that has been chosen to be representative of the entire population [13]. Simple random sampling, which was employed in this study, is a common sampling strategy used in quantitative research using survey instruments. Standard random sampling is seldom accompanied by a readily available list of the individuals [14].

2.4. Sample Selection Criteria

Table 2. Inclusion and Exclusion Criteria of the samples

SAMPLE SELECTION CRITERIA	
Inclusion Criteria	**Exclusion Criteria**
• Age range between 20 to 30 years • Desk job workers working for 6 hours per day. • Desk job workers have been working for 2 years. • Desk job workers who have been diagnosed with stage 1 and stage 2 Cervical Spondylosis and are not advised for surgery by an orthopedic or Neuro surgeon. • Both the male and female.	• Those who have recently got neck injury • Systemic illnesses like Ankylosing Spondylitis, Gout, Rheumatoid Arthritis. • Central nervous system disease

3 Procedure

- Symptoms discovered through interviews with computer professionals and a thorough literature study. Focus groups and available research were then used to select treatment strategies. Using the Delphi validation technique, experts validated the physiotherapy treatment protocol. Following the creation of the protocol, a randomized control trial was carried out. The subjects were administered with a developed, validated regimen. The following steps were carried out for the RCT Selection of the Subjects: Participants were selected from the IT companies of Delhi/NCR. Informed consent was obtained before the study started along with Ethical approval from the ethical committee of SVSU, Meerut. According to the preset inclusion and exclusion criteria, the subjects were identified for further research.
- Pre-Intervention Assessment: Related symptoms and complications were assessed before starting the Randomised Control Trial for both groups.
- Post-Intervention Assessment: Related symptoms and complications were checked again after delivering of the treatment protocol for both groups.

4 Results and Discussion

4.1 Content Validity Index:

For item level CVI the percent agreement ranged from 0.79 to 1. In cases where there were nine or more panel experts, a CVI cut-off score of 0.75 was considered adequate for the development of a new protocol. The strong content validity of the protocol was demonstrated by the Kappa results, which ranged from 0.79 to 1.

Assessment of Pain and Disability of Neck

4.2.1 NDI:

Figure 3 and Figure 4, reveal a comparison of the scoring of NDI on day 1, day 30, and day 60 for the experimental and control group respectively.

Figure 5 and Figure 6 reveal a comparison of the scoring of NDI for the experimental and control group on day 30, and day 60 respectively.

In comparison to day 1, there was a decline in both groups’ scores of NDI on day 30, and there was an even more noticeable decrease on day 60. The experimental group showed a much greater reduction in symptoms related to neck disability when compared to the control group.

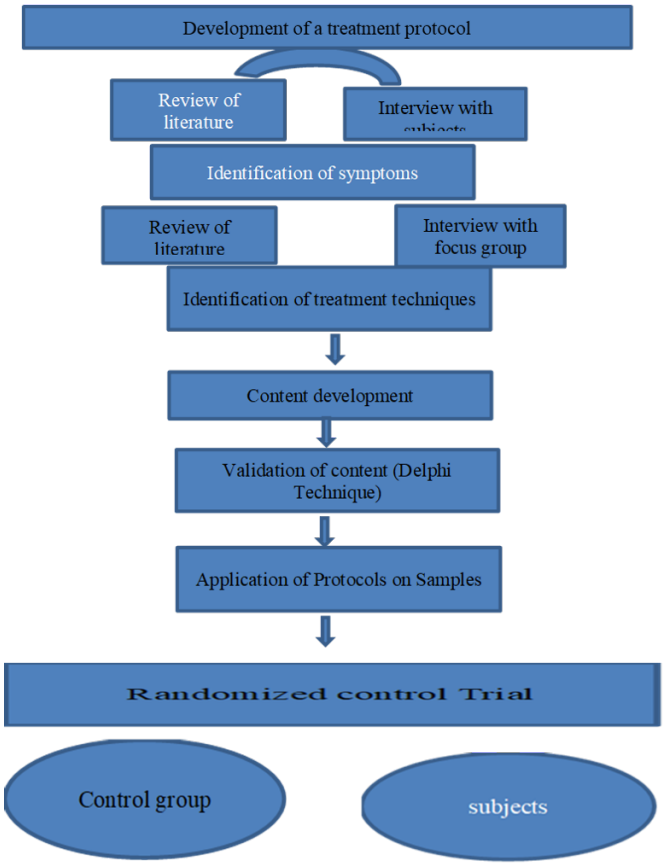

Fig 1. Procedure of the study

subjects selection	Pre-Intervention assessment	Post-Intervention Assessment
1.Identification of target population(Inclusion /exclusion criteria) 2.Obtain Informed Consent	• Symptoms,Work Related Factors & relevant health information through questionnaire • physical assessment. • NPRS • NDI	• To evaluate changes in symptoms • NPRS • NDI

Fig 2. Phases for RCT

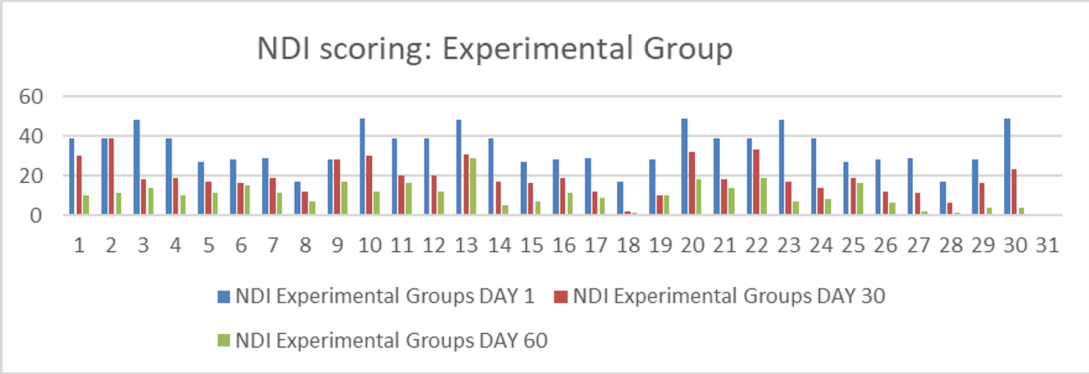

Fig 3. Comparison of scoring of NDI of the experimental group on day 1, day 30, and day 60

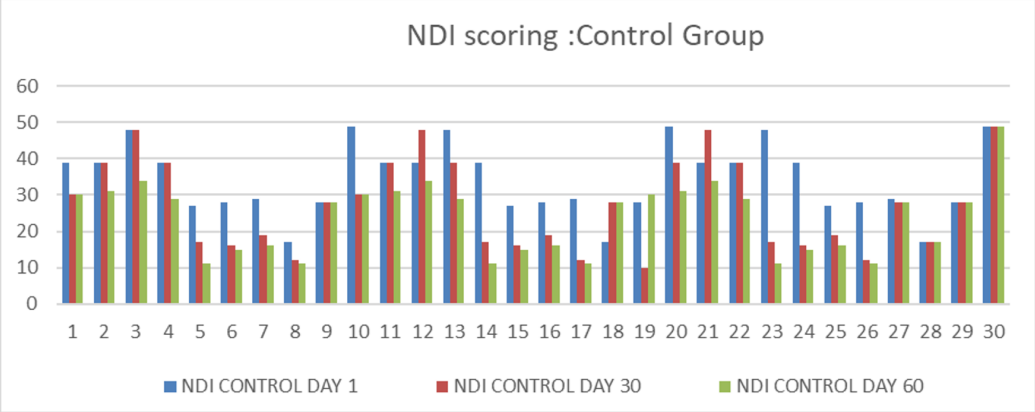

Fig 4. Comparison of scoring of NDI for the control group on day 1, day 30, and day 60

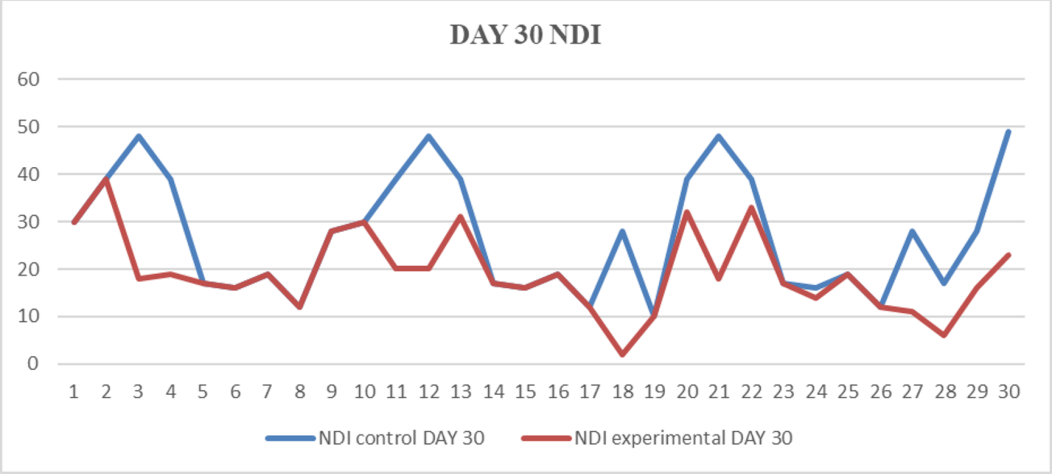

Fig 5. Comparison of scoring of NDI for the experimental and control group on day 30

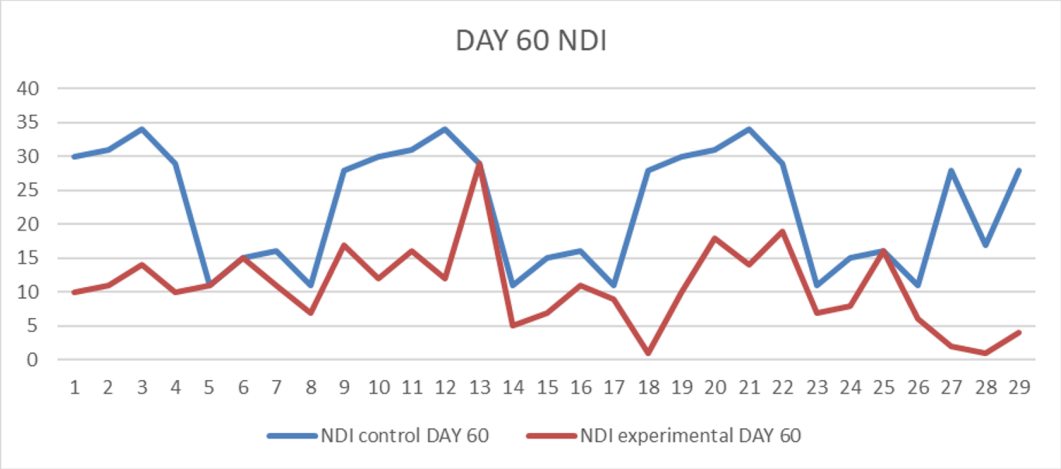

Fig 6. Comparison of scoring of NDI for the experimental and control group on day 60

Table 3. Independent Samples Effect Sizes for NDI (the denominator used in estimating the effect sizes. Cohen's d usesthe pooled standard deviation. Hedges' correction uses the pooled standarddeviation, plus a correction factor. Glass's delta uses the sample standarddeviation of the control group)

Independent Samples Effect Sizes					
		Standardizer[a]	Point Estimate	95% Confidence Interval	
				Lower	Upper
NDI DAY1	Cohen's d	9.80904	.000	-.506	.506
	Hedges' correction	9.93820	.000	-.499	.499
	Glass's delta	9.80904	.000	-.506	.506
NDI DAY30	Cohen's d	10.72756	.752	.225	1.273
	Hedges' correction	10.86881	.742	.222	1.257
	Glass's delta	8.43801	.956	.387	1.512
NDI DAY60	Cohen's d	8.16884	1.600	1.011	2.178
	Hedges' correction	8.27640	1.579	.998	2.150
	Glass's delta	6.03829	2.164	1.405	2.906

Table 4. Unpaired t-test values for experimental andcontrol groups related to NDI

NDI Score							
Un paired t-test	N	Day 1		Day 30		Day 60	
		Mean	p-value	Mean	p-value	Mean	p-value
Experimental Group	30	34.3000	1.000	27.2667	.003*	23.6333	0.000164*
Control group	30	34.3000		19.2000		10.5667	

When the group was assessed using an unpaired t-test, there was no significant difference observed in the score for NDI on day 1, but on day 30, there was a significant difference, and on day 60, there was a clearer reduction in disability.

4.2.2 NPRS:

Figure 7 and Figure 8 reveal a comparison of the scoring of NPRS on day 1, day 30, and day 60 for the experimental and control group respectively.

In comparison to day 1, there was a decline in both groups' scores of NPRS on day 30, and there was an even more noticeable decrease on day 60. The experimental group showed a much greater reduction in neck pain when compared to the control group (Figure 9).

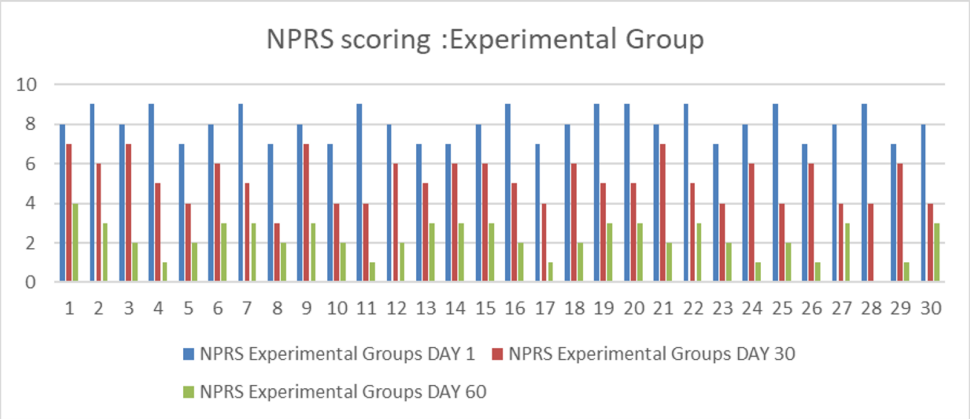

Fig 7. Comparison of scoring of NPRS for the experimental group on day 1, day 30, and day 60

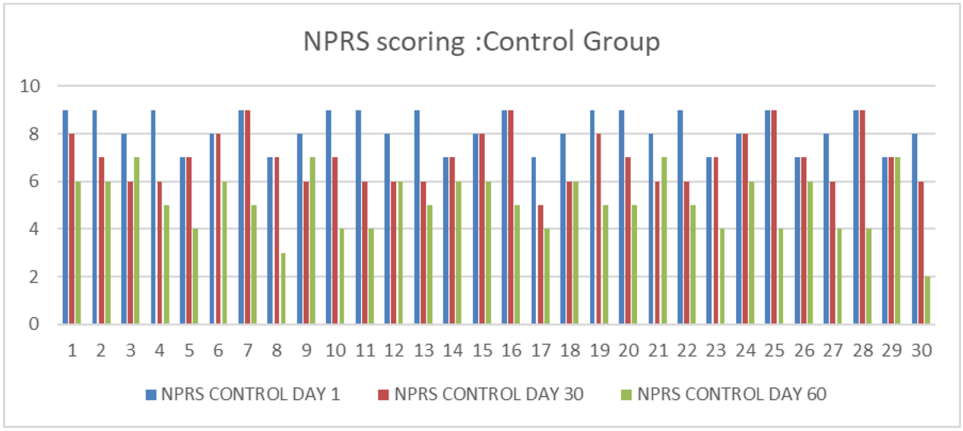

Fig 8. C omparison of scoring of NPRS for the control group on day 1, day 30, and day 60

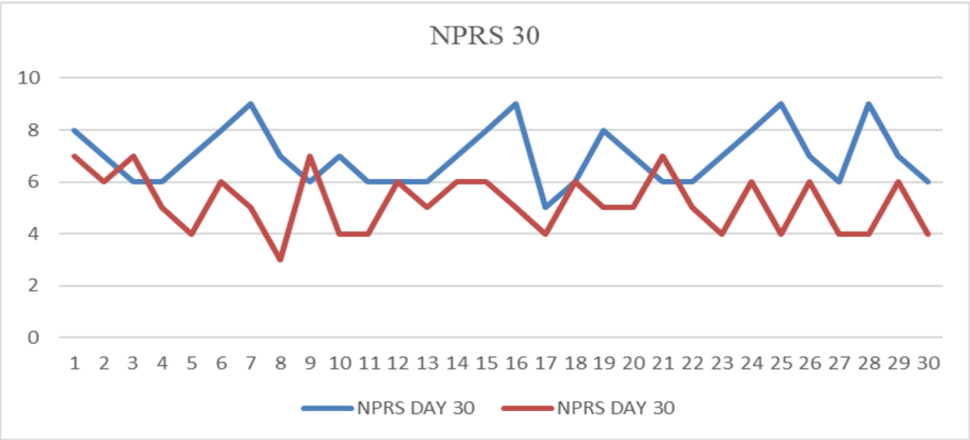

Fig 9. Comparison of scoring of NPRS for the experimental and control group on day 30

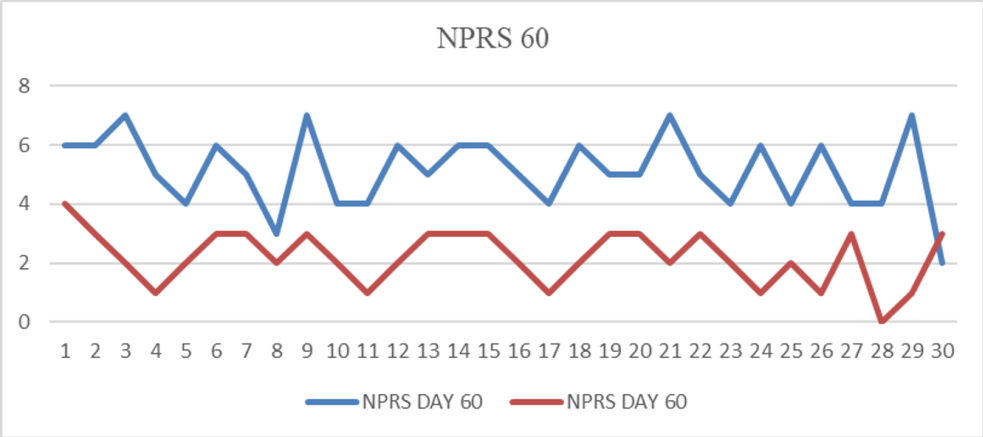

Fig 10. Comparison of scoring of NPRS for the experimental and control group on day 60

Day 30 saw a noticeable decrease in the patients' NPRS values for both the experimental and the controls, and day 60 saw an even more notable reduction in their pain But the NPRS values were found to be significantly lower in the experimental group on days 30 and 60 compared to the control group, as seen in Figure 10.

Table 5. Independent Samples Effect Sizes for NPRS (the denominator used in estimating the effect sizes. Cohen's d uses the pooled standard deviation. Hedges' correction uses the pooled standard deviation, plus a correction factor. Glass's delta uses the sample standard deviation of the control group)

Independent Samples Effect Sizes					
		Standardizer[a]	Point Estimate	95% Confidence Interval	
				Lower	Upper
NPRSDay1	Cohen's d	.80694	.207	-.302	.713
	Hedges' correction	.81756	.204	-.298	.704
	Glass's delta	.80872	.206	-.304	.713
NPRSDay30	Cohen's d	1.12034	1.607	1.017	2.186
	Hedges' correction	1.13510	1.586	1.004	2.157
	Glass's delta	1.12648	1.598	.939	2.240
NPRSDay60	Cohen's d	1.10068	2.665	1.959	3.359
	Hedges' correction	1.11517	2.630	1.933	3.315
	Glass's delta	.92476	3.172	2.207	4.121

Table 6. Unpaired t-test values for experimental and control group related to NPRS

NPRS Score							
Unpaired t -test	N	Day 1		Day 30		Day 60	
		Mean	p -value	Mean	p -value	Mean	p -value
Experimental Group	30	8.2000	.473	7.0000	.000*	5.1333	.000*
Control group	30	8.0333		5.2000		2.2000	

There was no significant difference between the two groups on day 1, although significant differences were observed in the values of NPRS as a decrease in neck pain on days 30 and 60, according to the unpaired t-test.

Among all workers, those who use computers at work had a higher frequency of neck pain than people in general. When it comes to years lived with a disability, neck pain ranks fourth globally, and when it comes to overall burden measured in years of disability-adjusted life, it ranks 21st [15]. Low skill discretion, low decision authority, low peer support, and high job demands were not substantially correlated with neck pain. However, these factors become significant when they are paired with longer

computing activities or ergonomic requirements.[16]. The pilot study was carried out to find out the practical difficulty of the study. All procedures showed favorable findings. For validation of contents of IPTP the Delphi technique of content validation has been used. The current study effectively created an intervention plan based on the expanding notion of health by employing the e-Delphi technique to gather expert opinion in addition to a thorough literature analysis[16]. The percent agreement for item level CVI varied from 0.79 to 1. To develop a new protocol, a CVI cut-off score of 0.75 was deemed sufficient in situations involving nine or more panel experts. The Kappa scores, was varied from 0.79 to 1, showed that every item of the protocol is valid for the treatment of the desk job personnel[17] [18]. A random sampling technique was used to get the data for both groups. In both the groups, the data had a normal distribution and there were no extreme outliers noted in any of the groups. Pain assessment was done with the NPRS and neck disability was tested through the NDI. One frequent way to measure patients with cervicogenic headaches is through self-reported disability and pain severity. In patients with cervicogenic headaches, the NPRS and NDI instruments appear to be well-suited as brief self-report measures[19]. When assessing chronic neck pain in clinical and research settings, the Neck Disability Index (NDI) is frequently utilized. The NDI was found to have good internal consistency, unidimensional characteristics, and an excellent capacity to identify patients with varying levels of reported disability among patients with chronic neck pain[20]. When used in conjunction with more extensive multi-item patient-reported outcome measures, the NPRS can be a helpful single-item assessment for neck pain research and management[21].

Assessment was done on three days Day 1, Day 30, and then on Day 60th. Day 30 saw a noticeable decrease in the patients' NDI and NPRS values for both, the experimental group receiving the IPTP and the controls, and day 60 saw an even more notable reduction in their symptoms. The improvement of symptoms occurs with both conventional physiotherapy and IPTP. The reduction of symptoms like headaches, shoulder, arm, and neck pain, paresthesia, upper limb weakness, incoordination, and vertigo was more marked after two months of treatment. The outcomes demonstrated the efficacy of both therapies in treating cervical-related symptoms in desk job workers But the values were found to be significantly lower in the experimental group on days 30 and 60 compared to the control group. This implies that patients receiving the IPTP had more symptom reduction than those in the control group. There was no significant difference between the two groups on day 1, although significant differences were observed in the values of NDI and NPRS on days 30 and 60, according to the unpaired t-test. The majority of guidelines for the diagnosis and treatment of neck pain suggest that the best evidence-based physiotherapy therapies for treating neck pain patients use a combination of manual therapy, exercise, and education. There is mixed evidence to support the potential benefits of massage, behavioral therapy, psychiatric counseling, and multimodal care for specific patient populations[22].

Strength:

The study utilized a comprehensive approach for the development of the IPTP. Before application of IPTP the validation of content was done with the help of experts. This protocol is the only one to date that can treat all the musculoskeletal symptoms related to neck pain seen in desk job personnel. Good physical health has been demonstrated to have a positive effect on individual, organizational, and psychological factors—all of which are thought to affect the overall growth of employees.

Limitation:

The sample size was small despite the fact this was a pilot study[23] .

Further Recommendation:

A study with a large sample size can be conducted with the same methodology

5 Conclusion

The developed Protocol is valid and effective for the treatment of Musculoskeletal complications in computer professionals. When applied to desk job individuals in Delhi/NCR, the created IPTP demonstrated effective results in reducing symptoms such as paraesthesia, subjective weaknesses, headache, neck, arm, and shoulder pain, as well as the ensuing impairment caused by these problems and related symptoms. The IPTP is the only comprehensive treatment protocol that might help computer workers to avoid serious work-related issues such as lower productivity, absenteeism from work due to illness, and eventually losing their jobs. Good physical health, on the other hand, has been shown to positively impact psychosocial, organizational, and individual aspects that are all believed to have an impact on employees' musculoskeletal health.

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