

Effectiveness Of E-Backshou Exercise on Computer Vision Syndrome Among Physiotherapy Students- An Experimental Study.

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ABSTRACT

Background: As virtual learning is becoming more prevalent, college students spend significant time on digital devices, leading to digital eye strain that may affect a student's academic performance and quality of life. Globally approximately 60 million individuals report symptoms of computer vision syndrome with one million new cases annually. The E Backshou exercise is a structured program aimed at reducing cvs symptoms. **Objective:** To investigate the effectiveness of the E Backshou exercise in reducing CVS Symptoms among physiotherapy students. **Methods:** A Quazi experimental study was conducted involving 30 physiotherapy students aged 19- 25 years experiencing CVS Related neck, shoulder, and low back pain. The participants were divided into two groups, Group A performed E Backshou exercise along with 20- 20- 20 rule, while group B followed only the 20- 20-20 rule. **Outcome measure:** Computer vision syndrome questionnaire, Visual Analogue scale, Neck disability index, Shoulder pain and Disability index and Roland Morris Disability questionnaire Results Statistically significant between group differences were observed using Mann- Whitney tests in neck pain Vas (Mean = 1.80) shoulder pain Vas (Mean= 1.87) SPADI (Mean = 21.10), Low back pain Vas (Mean= 2.13) and ROMDQ (mean= 3.7) all remaining significant after Bonferroni adjustment (a= .007). **Conclusion:** The E Backshou Program significantly reduces musculoskeletal symptoms in students with excessive screen exposure. Although both groups improved, the experimental Group showed greater symptoms reduction and functional improvement..

Keywords: Physiotherapy students, Computer Vision Syndrome, Musculoskeletal disorder, E Backshou exercise

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INTRODUCTION

Computer vision syndrome (CVS), often called digital eye strain (DES), is a modern problem that generates a wide range of visual and muscle problems for those who use electronic items with digital displays for a long time¹. As virtual learning is becoming more prevalent, college students spend a lot of time on devices, and digital eye strain is a condition that could compromise a student's academic performance and quality of life². Prolonged usage of devices, particularly for three hours a day, can compromise your health and result in computer vision syndrome³. Despite recent technological advances, the use of computers and other electronic devices, particularly smartphones and tablets, has significantly increased in colleges and universities for both educational purposes and institutional requirements. These adaptations to technology can yield both advantageous and adverse results⁴. Students can currently easily access books and various other resources online on their phones, which implies they lack the need to utilize numerous paper-based reading materials⁵. Using a display for an extended period may provoke problems including dry eyes, red eyes, eyestrain, irritation,

fatigued eyes, blurred vision, sensitivity to light, headaches, and discomfort in the

muscles, especially in the back, shoulders, and neck⁶. Prolonged accommodation of the intraocular and extraocular muscles leads to muscular fatigue, resulting in static postures of the neck, shoulder, and lower back muscles. The static posture induces muscle spasms, resulting in muscle pain⁷. The elements most commonly causing computer vision syndrome are an intersection of improper working environment and poor habits. Interrelated ideas are lighting, vision, and posture⁸.

Research states that a prevalence rate of 60 million individuals globally experiences symptoms from DES, with an estimated one million new individuals reported annually. In 2014, research conducted in Chennai, Tamil Nadu, states that 78.6% of medical college students are suffering from computer vision syndrome⁹. In a parallel study among visual display terminal users, it was found that participants complained of pain in the shoulder (39.4%), cervical region (45.2%), and lumbar region (61.5%)¹⁰. A research study peculiarly focusing on undergraduate physiotherapy students found that among those who used their phones for learning, 88.5% studied for 4 to 7

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hours a day, and 33% did so for 7 to 10 hours a day¹¹. Furthermore, research conducted among Khartoum medical students stated that only 18.1% of the medical students in this survey knew about the 20-20-20 rule¹². The E-BACKNSHOU exercise combines a series of range of motion and stretching (flexibility) interventions targeting the eyes, extremities, neck, shoulders, and back muscles along with the 20-20-20 rule⁷. For student populations, they are low-cost, need no equipment at all, and fit readily into everyday routines.

A previous study states that the effectiveness of E Backshou exercises showed significant improvement in neck, shoulder, and back pain among individuals with Computer Vision Syndrome (CVS)⁷. Similarly, another study found that the integration of targeted ocular exercises and regular accommodative relaxation techniques was more effective in managing CVS among digital users than specific eye exercises alone, thereby reducing sickness absenteeism and enhancing participants quality of life¹³.

CVS is extremely common among physiotherapy students. One reason for its popularity could be that they tend to use digital screens mainly for educational tasks and to make clinical decisions⁴. While few studies have assessed the benefits of exercise in the reduction of musculoskeletal discomfort among screen users, the literature on its particular contribution in lowering CVS symptoms is lacking

In today's generation, students frequently use screen-based gadgets for various everyday tasks in educational institutions, at home, and during recreational activities. Addressing this condition is crucial for their academic achievement and overall well-being. There is much research that illustrates the incidence of screen-induced ocular and musculoskeletal (DES) complaints in the student population, but there is significant gap in awareness about physiotherapy interventions. This study promotes the concept of E Backshou exercise among students. This study also promotes awareness of indulging in E Backshou exercise in their routine activities to enhance academic performance, physical well-being, and overall quality of life.

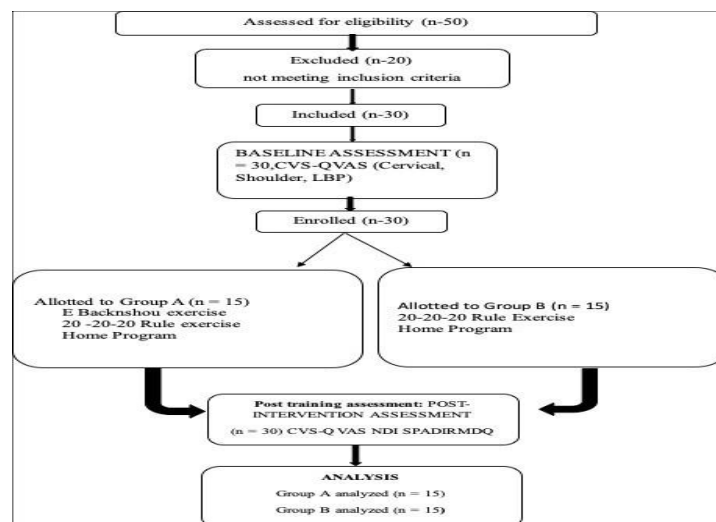
Methodology

Ethical Consideration:

This study was approved by the SRM Institutional of Ethical committee (Reg. No: STO125-2128). A detailed orientation of the survey objectives, procedures, possible outcomes were explained prior to the signing of the informed consent form. This study was conducted in accordance with the Declaration of Helsinki.

Study Design, Design Population

TREND FLOW CHART



It is a Quazi Experimental study, pre and post type conducted in the year 2025. This study is reported in accordance with TREND Guidelines. The SRM Institute of science and technology college. ranks in Country Wise and 147 in World Wide Ranking by UI Metric. The Kattankulathur campus is spread across a massive 250 acres which subsists of 150 departments with total of 50,000 students and 3,000 faculties. The SRM College of Physiotherapy was conveniently selected. The participants of age group between 19- 25 years of both men and women, the participants those who experience symptoms of CVS with a score of more than 6 were included. The participants who had a history of mental disorder, osteoarthritis, neurological disorder and underwent recent eye surgeries were excluded from the study.

Sample Size calculation

A Priori Power Analysis was conducted using G*Power to determine the minimum sample sizes required for two different study designs. For the independent t-test, a total sample of 30 participants (15 per group) is necessary to detect a medium effect size (d = 0.5) with 80 %power and a 5% significance level.

Data Collection Procedure

The participants were provided with detailed information regarding the need and procedure of the study, after which informed consent was obtained and demographic data were collected. Participants exhibiting the symptoms of CVS were identified by the CVS-Q. Participants who achieved a score of 6 or higher were selected to confirm the presence of CVS symptoms. Before initiating the intervention, all selected participants (n=30) underwent baseline assessment using the following tools: CVS-Q was to confirm CVS symptoms. Pain severity was measured with the VAS for cervical, shoulder, and LBP. The impact of pain on daily activities was evaluated using NDI, SPADI, and RMDQ. After the baseline assessment, the participants were allocated into two separate group by using computer lottery method. The participants in Group A were intervened with the E Backshou exercise program along with the 20-20-20 rule. The participants in Group B were intervened with the 20-20-20 rule. The exercise protocol was followed for 4 weeks. Participants received a briefing about their exercise protocol on the first day. Both written and visual exercise instructions were provided for home- based practice. After the four-week of intervention period ended, the post-assessment results were evaluated using the CVS-Q, VAS, NDI, SPADI, and RMDQ. Statistical analysis was performed using SPSS software.

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GENDER FREQUENCY IN EXPERIMENTAL GROUP					
		Freq.	%	Valid %	Cumulative %
Valid	Female	9	60.0	60.0	60.0
	Male	6	40.0	40.0	100.0
	Total	15	100.0	100.0	
GENDER FREQUENCY IN CONTROL GROUP					
Valid	Female	6	40.0	40.0	40.0
	Male	9	60.0	60.0	100.0
	Total	15	100.0	100.0	

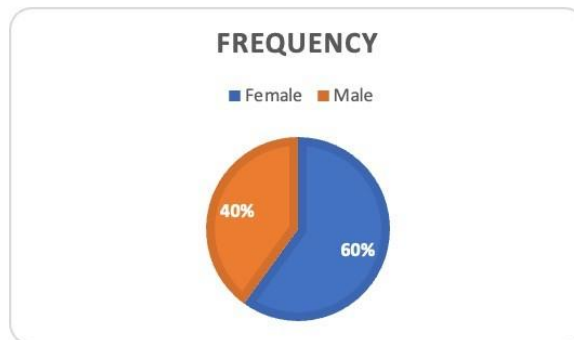
DATA ANALYSIS TABLE I

TABLE I ILLUSTRATES FREQUENCY OF PARTICIPANTS AGE IN EXPERIMENTAL AND CONTROL GROUPS

TABLE I illustrates that in group A, 15 participants were included. Among them, 40% male (n = 6) and 60% female (n = 9). In group B, 15 participants were included. Among them, 60% male (n = 9) and 40% female (n = 6).

PIE CHART I

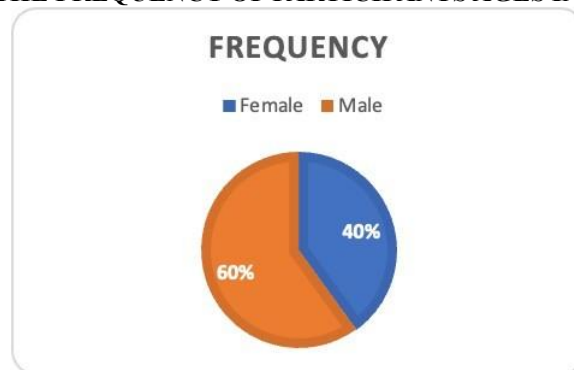
PIE CHART ILLUSTRATES THE FREQUENCY OF PARTICIPANTS AGES IN THE EXPERIMENTAL GROUP



PIE CHART I shows that in group A, 15 participants were included. Among them, 40% (n = 6) were males and 60% (n = 9) were females.

PIE CHART II

PIE CHART ILLUSTRATES THE FREQUENCY OF PARTICIPANTS AGES IN THE CONTROL GROUP



PIE CHART II shows that in group B, 15 participants were included. Among them, 60% male (n = 9) and 40% female (n = 6).

TABLE II

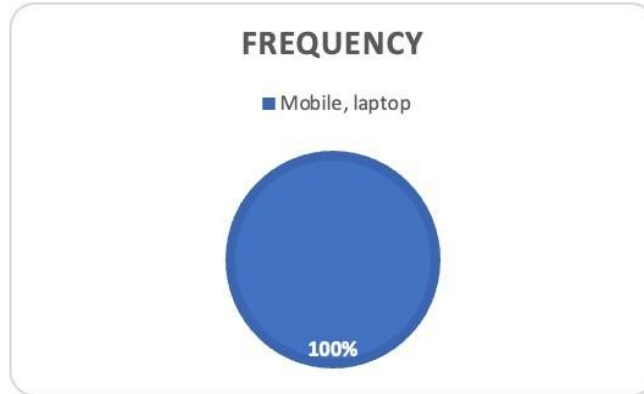
TABLE ILLUSTRATES THE FREQ. OF USE OF DIGITAL DEVICES IN THE EXPERIMENTAL AND CONTROL GROUPS

FREQ. OF USE OF DIGITAL DEVICES IN THE GROUP A					
		Freq.	%	Valid %	Cumulative %
Valid	Mobile, laptop	15	100.0	100.0	100.0
FREQ. OF USE OF DIGITAL DEVICES IN THE GROUP B					
Valid	Mobile	12	80.0	80.0	80.0
	Mobile, laptop	3	20.0	20.0	100.0
	Total	15	100.0	100.0	

Table II illustrates that in group A, 15 participants were included. All the participants (100%) used both mobile phones and laptops. In group B, 15 participants were included. Among them, 80% (n=12) reported using only mobile phones, while the remaining 20% (n=3) used both mobile phones and laptops.

PIE CHART III

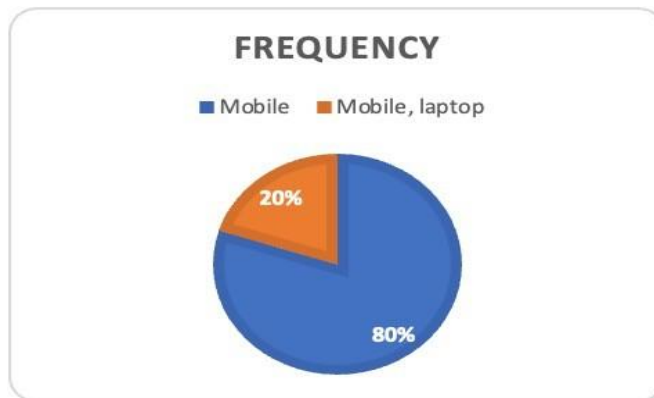
PIE CHART ILLUSTRATES THE FREQUENCY OF PARTICIPANTS WHO USE ELECTRONIC GADGETS IN THE EXPERIMENTAL GROUP



PIE CHART III shows that in group A, participants were included. All the participants (100%) used both mobile phones and laptops.

PIE CHART IV

PIE CHART ILLUSTRATES THE FREQUENCY OF PARTICIPANTS WHO USE ELECTRONIC GADGETS IN THE CONTROL GROUP



PIE CHART IV shows that in group B, 15 participants were included. Among them, 80% (n=12) reported using only mobile phones, while the remaining 20% (n=3) used both mobile phones and laptops.

TABLE III

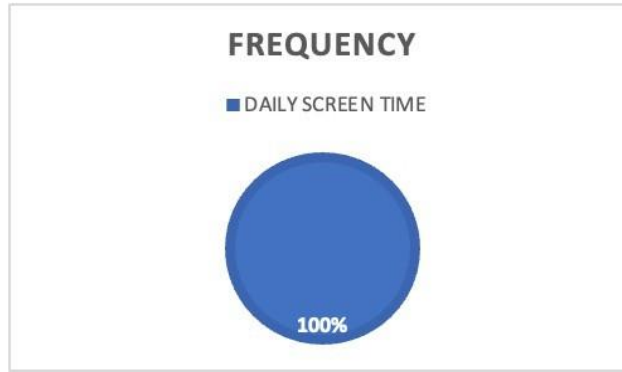
TABLE ILLUSTRATES THE FREQUENCY OF PARTICIPANTS DAILY SCREEN TIME IN GROUPS A AND B

FREQUENCY OF DAILY SCREEN TIME IN THE GROUP A					
		Freq.	%	Valid %	Cumulative %
Valid	≥3hrs	15	100.0	100.0	100.0
FREQUENCY DAILY SCREEN TIME IN THE GROUP B					
Valid	≥3hrs	15	100.0	100.0	100.0

TABLE III shows that in group A, all 15 participants (100%) reported screen exposure exceeding 3 hours per day. In group B, for the daily screen time, all participants (100%, n = 15) reported spending more than 3 hours per day on digital screens.

PIE CHART V

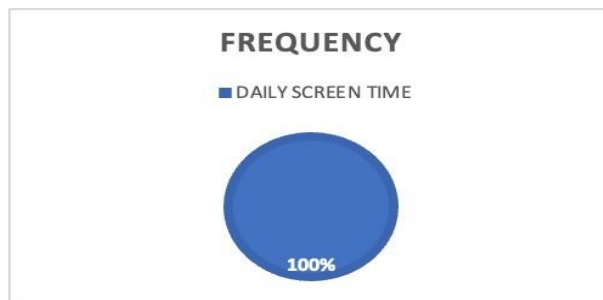
PIE CHART ILLUSTRATES THE FREQUENCY OF PARTICIPANTS DAILY SCREEN TIME IN THE EXPERIMENTAL GROUP



PIE CHART V shows that in the experimental group, all 15 participants (100%) reported daily screen time of more than 3 hours.

PIE CHART VI

PIE CHART ILLUSTRATES THE FREQUENCY OF PARTICIPANTS DAILY SCREEN TIME IN THE CONTROL GROUP



PIE CHART VI shows that in the control group, for the daily screen time, all participants (100%, n = 15) reported spending more than 3 hours per day on digital screens.

TABLE IV

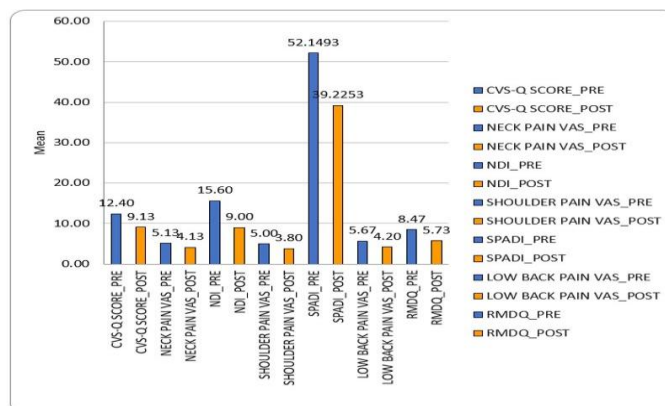
TABLE ILLUSTRATES THE PRE- AND POST- TEST COMPARISON IN THE EXPERIMENTAL GROUP

Outcome Measure	N	Pre Mean	Post Mean	Pre S.D	Post S.D	Z-value	p-value	Asymp. Sig. (2-tailed)
CVS-Q	15	12.73	8.60	4.448	1.844	-3.31	.001	.001
Neck Pain (VAS)	15	5.60	3.00	1.352	.756	-3.50	<.001	.000
NDI	15	16.73	5.93	6.170	2.890	-3.41	.001	.001
Shoulder Pain (VAS)	15	5.47	2.93	1.356	1.100	-3.44	.001	.001
SPADI	15	47.1753	17.8947	16.68290	8.35462	-3.41	.001	.001
Low Back Pain (VAS)	15	6.20	3.40	1.320	1.502	-3.44	.001	.001
RMDQ	15	8.33	3.60	3.222	1.454	-3.43	.001	.001

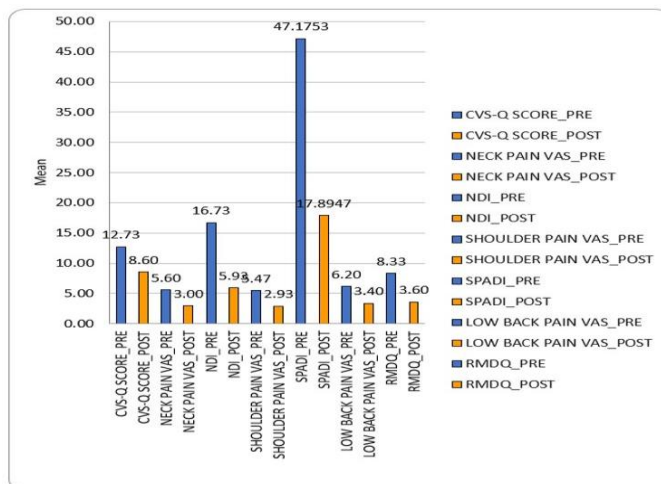
Table IV shows that the Wilcoxon signed-rank results show a uniform, statistically significant improvement on every outcome after the E-BACKNSHOU program. The mean value decreased from CVS-Q pre=12.73, post=8.60 (p = .001); neck pain VAS pre=5.60, post=3.00 (p < .001); NDI pre=16.73, post=5.93 (p = .001); shoulder pain VAS pre=5.47, post=2.93 (p = .001); SPADI pre=47.1753, post=17.8947 (p = .001); low back pain VAS pre=6.20, post=3.40 (p = .001); and RMDQ pre=8.33, post=3.60 (p = .001).

BAR DIAGRAM VII

A BAR DIAGRAM ILLUSTRATES THE PRE- AND POST-TEST COMPARISON IN THE



EXPERIMENTAL GROUP



Bar Diagram VII shows that the mean values, respectively, were as follows: CVS-Q pre=12.73, post=8.60; Neck pain VAS pre=5.60, post=3.00; NDI pre=16.73, post=5.93; Shoulder pain VAS pre=5.47, post=2.93; SPADI pre=47.1753, post=17.8947; Low back pain VAS pre=6.20, post=3.40; RMDQ pre=8.33, post=3.60.

TABLE V

TABLE ILLUSTRATES THE PRE- AND POST- TEST COMPARISON IN THE CONTROL GROUP

Outcome Measure	N	Pre Mean	Post Mean	Pre S.D	Post S.D	Z-value	p-value	Asymp. Sig. (2-tailed)	Sig.
CVS-Q	15	12.4	9.13	4.437	2.532	-3.07	.002	.002	
Neck Pain (VAS)	15	5.13	4.13	.990	.915	-3.42	.001	.001	
NDI	15	15.60	9.00	5.514	3.423	-3.30	.001	.001	
Shoulder Pain (VAS)	15	5.00	3.80	1.134	1.146	-3.63	<.001	.000	
SPADI	15	52.1493	39.2253	10.01201	12.97577	-3.01	.003	.003	
Low Back Pain (VAS)	15	5.67	4.20	1.496	1.474	-3.37	.001	.001	
RMDQ	15	8.47	5.73	1.995	1.710	-3.43	.001	.001	

Table V shows that across the 15 students, every outcome showed a statistically significant improvement after the 20-20-20 rule. The Wilcoxon signed-rank test yielded Z-values between -3.01 and -3.63 with two-tailed p-values ranging from .000 to .003, and mean values, respectively, were as follows: CVS-Q pre=12.40, post=9.13 (p = .002); Neck-VAS pre=5.13, post=4.13 (p = .001); NDI pre=15.60, post=9.00 (p = .001); Shoulder-VAS pre=5.00, post=3.80 (p < .001); SPADI pre=52.1493, post=39.2253 (p = .003); Low-back-VAS pre=5.67, post=4.20 (p = .001); RMDQ pre=8.47, post=5.73 (p = .001). For every scale, the vast majority of cases carried a negative rank (post-score < pre-score), and

no participant showed a positive rank (worsening), confirming uniform symptom.

BAR DIAGRAM VIII

A BAR DIAGRAM ILLUSTRATES THE PRE- AND POST-TEST COMPARISON IN THE CONTROL GROUP

Bar Diagram VIII shows that the mean values, respectively, were as follows: CVS-Q pre=12.40, post=9.13; Neck pain VAS pre=5.13, post=4.13; NDI pre=15.60, post=9.00; Shoulder pain VAS pre=5.00, post=3.80; SPADI pre=52.1493, post=39.2253; Low back pain VAS pre=5.67, post=4.20; RMDQ pre=8.47, post=5.7

TABLE VI

TABLE ILLUSTRATES THE COMPARISON BETWEEN GROUPS A AND B

Outcome Measure	N	Mean	S.D	Mann-Whitney U	Z-value	p-value	Asymp. Sig. (2-tailed)	Exact Sig. [2*(1-tailed Sig.)]
CVS-Q SCORE PRE-POST	30	3.70	3.687	90.500	-.922	.357	.357	.367 ^a
NECK PAIN VAS PRE-POST	30	1.80	1.186	16.500	-4.230	<.001	.000	.000 ^b
NDI PRE-POST	30	8.70	4.692	54.500	-2.415	.016	.016	.015 ^b
SHOULDER PAIN VAS PRE-POST	30	1.87	1.074	33.000	-3.566	<.001	.000	.001 ^b
SPADI PRE-POST	30	21.1023	16.12596	44.500	-2.823	.005	.005	.004 ^b
LOW BACK PAIN VAS PRE-POST	30	2.13	1.137	39.000	-3.165	.002	.002	.002 ^b

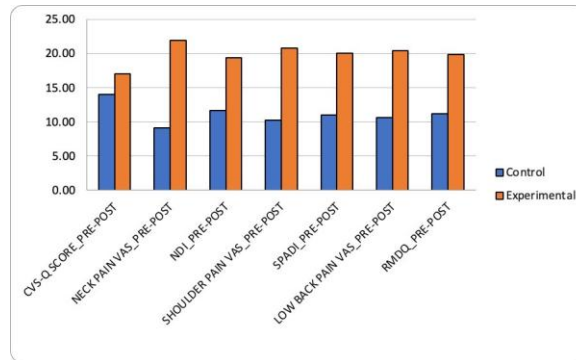
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RMDQ PRE-POST	50	5.73	2.067	47.500	2.757	.006	.006	.006 ^b
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Table VI shows that compared with the control group, students who performed the E-BACKNSHOU exercises in the experimental group achieved markedly larger pre-to-post improvements on every pain- and disability-related measure except the global computer- vision score. Mann-Whitney tests confirmed statistically significant between-group differences for neck-pain VAS (mean = 1.80, U = 16.5, p < .001), shoulder-pain VAS (mean = 1.87, U = 33.0, p < .001), SPADI (mean = 21.1023, U = 44.5, p = .005), low-back- pain VAS (mean = 2.13, U = 39.0, p = .002), and RMDQ (mean = 3.73, U = 47.5, p = .006); all remain significant after Bonferroni adjustment ($\alpha = .007$). The advantage for NDI (mean = 8.70, U = 54.5, p = .016) does not survive this correction, and no group difference emerges for CVS-Q (mean = 3.70, U = 90.5, p = .357).

BAR DIAGRAM

IX



THE BAR DIAGRAM ILLUSTRATES THE COMPARISON BETWEEN GROUPS A AND B

Bar Diagram IX shows that median change scores were consistently greater in the experimental group, reflected in substantially higher mean ranks (16.97 vs.

14.03 for CVS-Q, 21.9 vs. 9.1 for neck-pain VAS, 19.37 vs. 11.63 for NDI, 20.80 vs. 10.20 for shoulder-pain VAS, 20.03 vs. 10.97 for SPADI, 20.40 vs. 10.60 for low back pain VAS, and 19.83 vs. 11.17 for RMDQ)

DISCUSSION

Digital eye strain (DES) is a modern problem that generates a wide range of visual and muscle problems for those who use electronic items with digital displays for a long time. This research assesses the effect of E-Backshou exercises in reducing the symptoms of computer vision syndrome (CVS) and associated musculoskeletal discomfort among physiotherapy students. It is a quasi-experimental study with 30 participants from SRM College of Physiotherapy aged between 19-25 of both genders. The participants were allocated into two separate groups. Group A was intervened with E-BACKNSHOU; the participants in Group B followed the 20-20-20 rule. The pre- and post-tests were analyzed using the Computer Vision Syndrome Questionnaire (CVS-Q), the Visual Analogue Scale (VAS) for neck, shoulder, and low-back pain, and three functional disability indices: the Neck Disability Index (NDI), the Shoulder Pain and Disability Index (SPADI), and the Roland-Morris Disability Questionnaire. The experimental and control groups were age-matched (mean age = 20-21 years), with balanced gender distribution and comparable device use habits (all participants used mobile and laptop devices for more than 3 hours per day). This procedure guaranteed consistent baseline screen exposure.

In group A, 15 participants were included. As per the gender distribution, 60% (n = 9) female and 40% (n = 6) male. All (100%, n = 15) reported using both mobile phones and laptops, indicating a uniform device usage pattern within the experimental group. Furthermore, all 15 participants (100%) reported daily screen time of more than 3 hours,

suggesting consistent and prolonged digital screen exposure across the group. In group B, 15 participants were analyzed. According to gender distribution, 60% (n = 9) male and 40% (n = 6) female, with a cumulative percentage of 100%. With respect to device usage, the majority of participants (80%, n = 12) used only mobile phones, while 20% (n = 3) reported using both mobile phones and laptops. In terms of daily screen time, all participants (100%, n = 15) reported spending more than 3 hours per day on digital screens. This indicates a high level of screen exposure among the control group.

The Wilcoxon signed-rank results show a uniform, statistically significant improvement in the experimental group E-BACKNSHOU program. The mean value was significantly reduced in CVS-Q pre=12.73, post=8.60 (p = .001); neck pain VAS pre=5.60, post=3.00 (p < .001); NDI pre=16.73, post=5.93 (p = .001); shoulder pain VAS pre=5.47, post=2.93 (p = .001); SPADI pre=47.1753, post=17.8947 (p = .001); low back pain VAS pre=6.20, post=3.40 (p = .001); and RMDQ pre=8.33, post=3.60 (p = .001). Because all p-values are well below the Bonferroni-adjusted threshold of $\alpha = .007$ for seven comparisons, these findings remain significant after controlling for multiple testing. Collectively, the data reject the null hypothesis and confirm that E- BACKNSHOU exercises produce marked reductions in computer-vision symptoms and related neck, shoulder, and low-back pain/disability across the entire sample.

Group B also showed a statistically significant improvement after the 20-20-20 rule. The Wilcoxon signed-rank test yielded Z-values between -3.01 and -3.63 with two-tailed p-values ranging from .000 to .003, and mean values, respectively, were follows: CVS-Q pre=12.40, post=9.13 ($p = .002$); Neck-VAS pre=5.13, post=4.13 ($p = .001$); NDI pre=15.60, post=9.00 ($p = .001$); Shoulder-VAS pre=5.00, post=3.80 ($p < .001$); SPADI pre=52.1493, post=39.2253 ($p = .003$); Low-back-VAS pre=5.67, post=4.20 ($p = .001$); RMDQ pre=8.47, post=5.73 ($p = .001$). For every scale, the vast majority of cases carried a negative rank (post-score < pre-score), and no participant showed a positive rank (worsening), confirming uniform symptom relief. Because all p-values are below the Bonferroni-adjusted $\alpha = .007$ (7 tests), the findings remain significant after controlling for multiple comparisons. These results collectively reject the null hypothesis and support the conclusion that the 20-20-20 rule meaningfully reduces computer-vision-related eye strain as well as neck, shoulder, and low-back pain and disability in physiotherapy students.

In comparing the experimental and control groups, the students who performed the E- BACKNSHOU exercises in the experimental group achieved markedly larger pre-to-post improvements on every pain- and disability-related measure except the global computer-vision score. Mann-Whitney tests confirmed statistically significant between-group differences for neck-pain VAS (mean = 1.80, $U = 16.5$, $p < .001$), shoulder-pain VAS (mean = 1.87, $U = 33.0$, $p < .001$), SPADI (mean = 21.1023, $U = 44.5$, $p = .005$), low-back-pain VAS (mean = 2.13, $U = 39.0$, $p = .002$), and RMDQ (mean = 3.73, $U = 47.5$, $p = .006$); all remain significant after Bonferroni adjustment ($\alpha = .007$). The advantage for NDI (mean = 8.70, $U = 54.5$, $p = .016$) does not survive this correction, and no group difference emerges for CVS-Q (mean = 3.70, $U = 90.5$, $p = .357$). Median change scores were consistently greater in the experimental group, reflected in substantially higher mean ranks (16.97 vs. 14.03 for CVS-Q, 21.9 vs. 9.1 for neck-pain VAS, 19.37 vs. 11.63 for NDI, 20.80 vs. 10.20 for shoulder-pain VAS, 20.03 vs. 10.97 for SPADI, 20.40 vs. 10.60 for low back pain VAS, and 19.83 vs. 11.17 for RMDQ). Thus, the intervention delivers robust additional relief of neck, shoulder, and low-back pain and related disability beyond usual activity, while its impact on overall computer-vision symptoms is not demonstrated in this sample.

CVS results from the intricate interplay between visual requirements and extended screen exposure. In contrast to printed text, digital displays present characters composed of pixels, which do not possess defined edges. This diminishes the eye's capacity to sustain a stable focus, leading to frequent accommodation efforts and visual fatigue. The resting point of accommodation (dark focus) is often induced by an increased gaze angle and persistent concentrating and refocusing on pixelated imagery. This repetitive strain on the ciliary muscles results in symptoms like blurred vision, ocular fatigue, and headaches. Furthermore, reduced blink frequencies during screen use

and increased corneal exposure resulting from the typical upward look contribute to tear film instability and ocular dryness. These ocular surface issues are further aggravated by environmental conditions like glare, poor air quality, and prolonged screen use. Besides visual symptoms, CVS is significantly linked to muscle issues, such as cervical pain, shoulder discomfort, and LBP. These issues are generally associated with inadequate ergonomic configurations, incorrect viewing angles, and prolonged maintenance of static postures. Repeated muscular contractions and improper postures result in physical strain and pain, exacerbating the extraocular symptoms of CVS. Consequently, CVS encompasses more than only ocular symptoms; it is a multifaceted illness characterized by visual strain, ocular surface stress, and musculoskeletal discomfort, all arising from modern screen-centric work settings.

The results of this study go in line with Julianti et al. (2024), who stated that the E-Backshou intervention demonstrated efficacy in decreasing musculoskeletal pain among CVS patients. The present study validates these results within a student population, demonstrating a uniformity of the intervention's advantages. Like other stretching exercises, E-BACKNSHOU has been able to improve range of joint motion, flexibility, stretch muscles, reduce muscular spasm, improve endorphin hormone production, and lower cortisol response, and Kurunhikattil (2016) found that exercises that focus on the eyes and neck are particularly beneficial in decreasing eye strain and neck pain. In this earlier research, the eye exercise consisted of moving the eyes in several directions, including to the right, left, up, and down, to relax the eye muscles. The exercises for the neck include rotating it clockwise and anticlockwise every three hours, as well as moving it to the right, left, up, and down. When compared to the research conducted by Kurunhikattil, the E-BACKNSHOU eye exercises used more eye movement in a particular direction. The neck is moved to the right, left, up, and down, and it rotates in both the clockwise and anticlockwise directions. Both the muscles in the neck and the muscles in the scalp are likely to experience some strain as a result of the continuous sitting position. Relaxing the muscles in the neck may be accomplished by movements of the neck. Performing eye exercises helps to facilitate the pathways. It is beneficial to move our eye muscles in order to generate movement in the upward and downward, side-to-side, or circular directions. In addition to this, it assists the eye muscles in managing the movement of the natural lens of the eye, which is necessary for good vision at a variety of distances. Afreeen Fathima.J et al. (2024) previously stated that the integration of targeted ocular exercises and regular accommodative relaxation techniques was found to be more successful than specific eye exercises in managing digital eye strain among digital users. This was found to be the case in terms of reducing the manifestation of digital eye strain, which in turn led to a reduction in absenteeism due to illness and an improvement in quality of life among participants. The 20-20-20 rule aims to accommodate the eye such that the intra- and extraocular muscles may relax and blink 20 times to moisten the surface of the eyeball. Waleed

M. Alghamdi et al. (2020) previous study evaluated the efficacy of using the 20/20/20 rule in decreasing CVS symptoms and the related signs and symptoms of dry eye among participants. The research has shown that the educational intervention produces significant changes in dry eye symptoms, supported by the current study.

The endnote of this study states that in the current era, students frequently use screen-based gadgets for various everyday tasks in educational institutions, at home, and during recreational activities. Addressing this condition is crucial for their academic achievement and overall well-being. There is much research that illustrates the incidence of screen-induced ocular and musculoskeletal (DES) complaints in the student population, but there is significant gap in awareness about physiotherapy interventions. This study promotes the concept of E-BACKSHNOU exercise among students. The results showed a statistically significant decrease in symptoms after intervention, which supported the findings of the previous research.

CONCLUSION

This research aimed to assess the effect of E- Backshou exercises in reducing the symptoms of CVS and associated musculoskeletal discomfort in physiotherapy students. The research shows that among students with excessive screen time exposure, the E- Backshou exercise program offers a significant advantage in reducing musculoskeletal pain and enhancing performance. Although both the groups progressed over time, the experimental group— especially in the neck, shoulder, and low-back areas— showcased significantly greater symptom reduction and functional improvement. These findings suggest the integration of E-Backshou exercises into clinical and educational settings to promote physical well-being and counteract the negative consequences of extended digital device usage.

Conflict of interest We do not have any conflict of interest.
Data availability statement We confirm that the data supporting the findings of the study will be shared upon reasonable request.

AI disclosure: None Supplementary file None

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Consent from the Participants

The written informed consent was obtained from the participants prior to the data collection.

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Authors Contribution

All two authors meet the ICMJE criteria for authorship. Author 1 contributed to the study conception and design, data collection, and manuscript drafting. Author 2 supervised the study, contributed to the critical revision of the manuscript, and approved the final version of the manuscript.

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available due to ethical restrictions; however,

anonymized data may be made available from the corresponding author upon reasonable request and subject to ethical approval

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