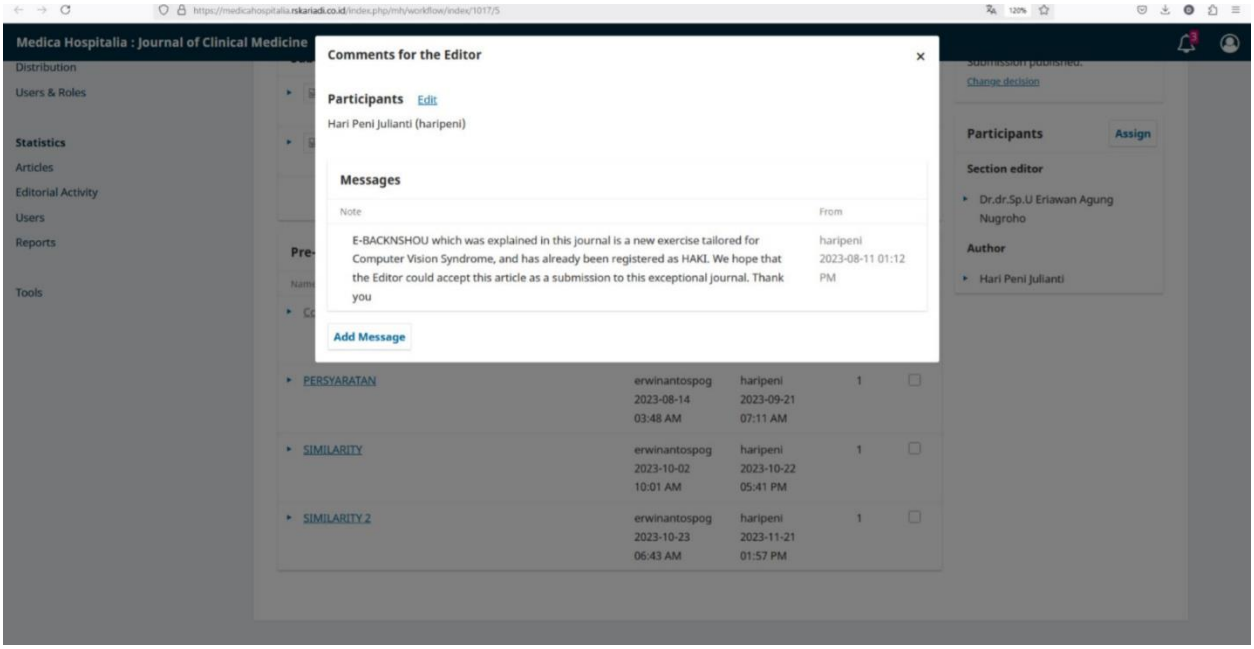
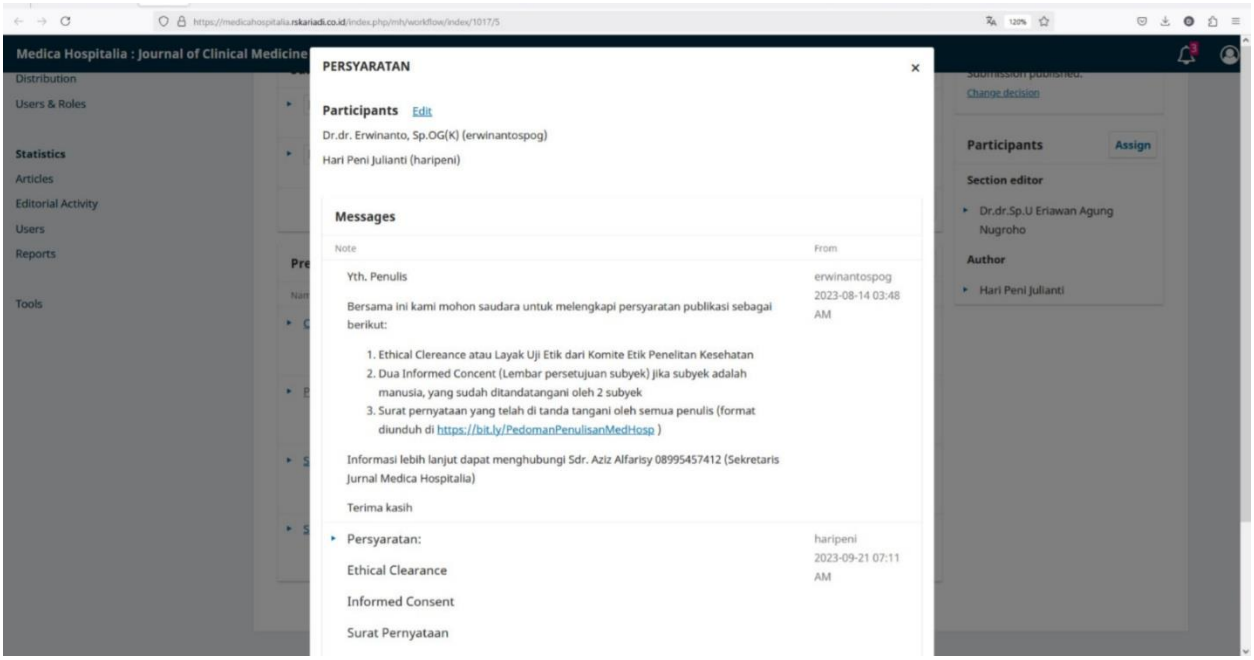
1. Artikel submit ke Medica Hospitalia (Journal of Clinical Medicine) (11 Agustus 2023)
2. Koreksi pertama diminta mengirimkan beberapa lampiran yang belum ada oleh Editor Jurnal (14 Agustus 2023)
3. Pengiriman Lampiran yang diminta (EC, Informed Consent, Surat Pernyataan) (21 September 2023)
4. Hasil cek similarity pertama oleh reviewer (02 Oktober 2023)
5. Pengiriman revisi pertama artikel yang sudah diperbaiki (22 Oktober 2023)
6. Hasil cek similarity kedua oleh reviewer (23 Oktober 2023)
7. Pengiriman revisi kedua artikel yang sudah diperbaiki (21 November 2023)
8. Revisi Ketiga oleh reviewer (24 November 2023)
9. Pengiriman final revisi ketiga oleh penulis (21 Desember 2023)
10. Artikel Accepted Submission dan menerima LoA (01 Maret 2024)

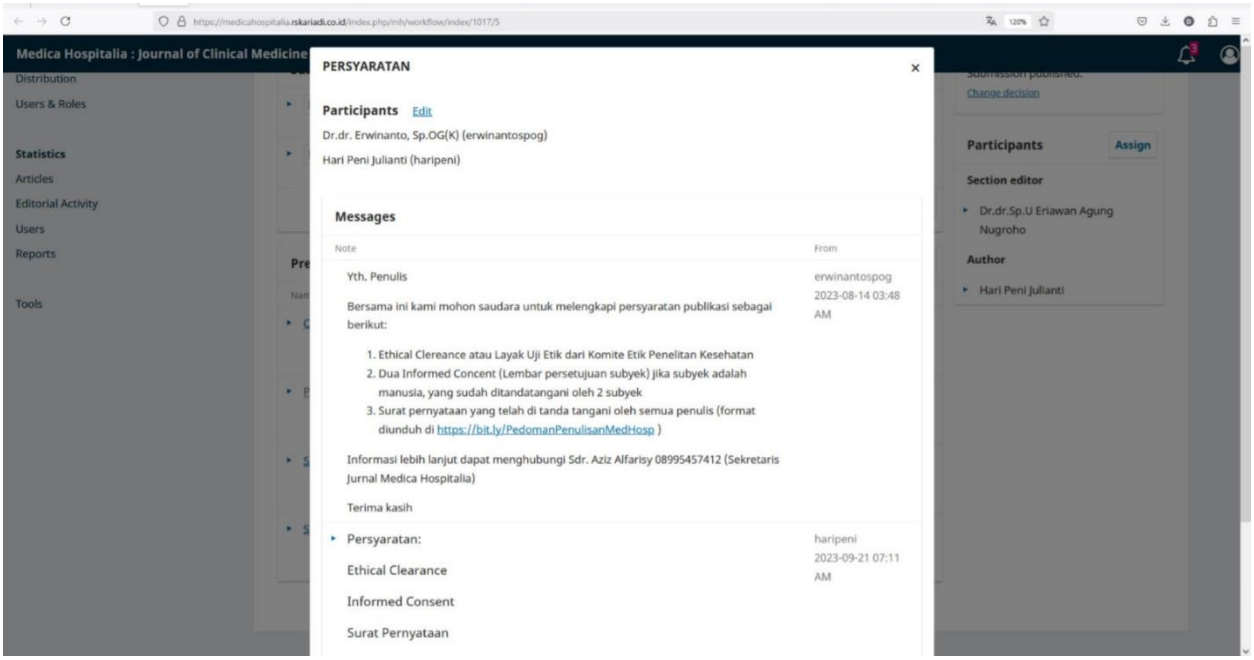
Artikel submit ke Medica Hospitalia (Journal of Clinical Medicine) (11 Agustus 2023)



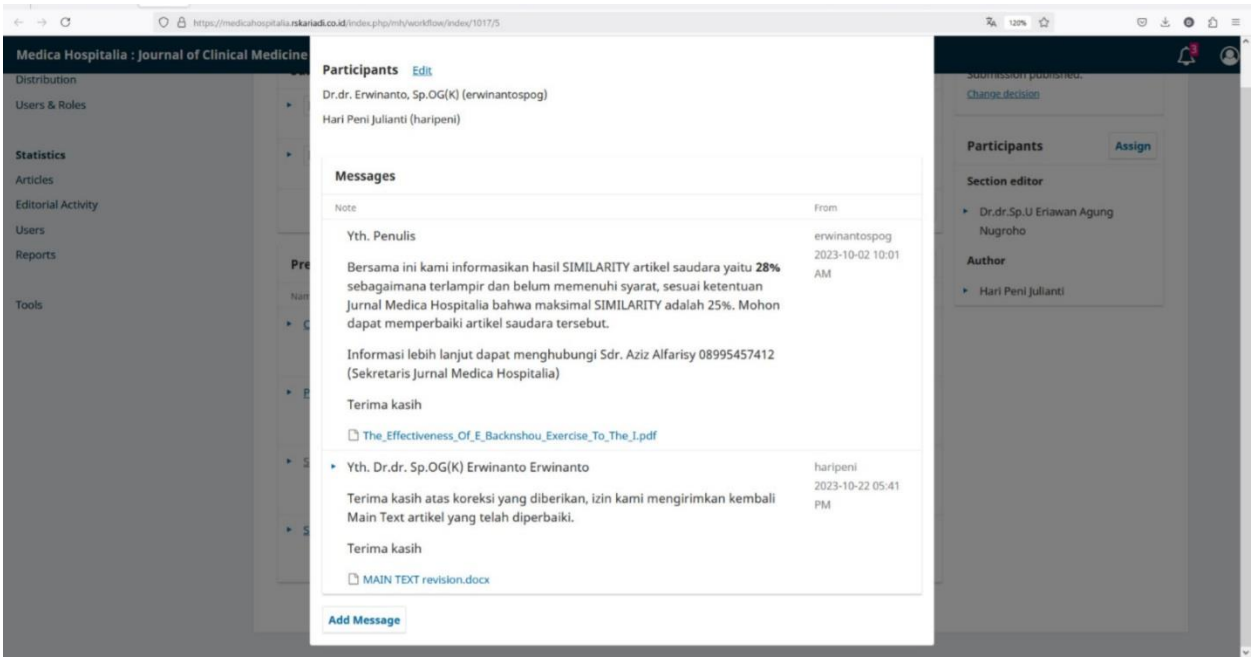
Koreksi pertama diminta mengirimkan beberapa lampiran yang belum ada oleh Editor Jurnal (14 Agustus 2023)



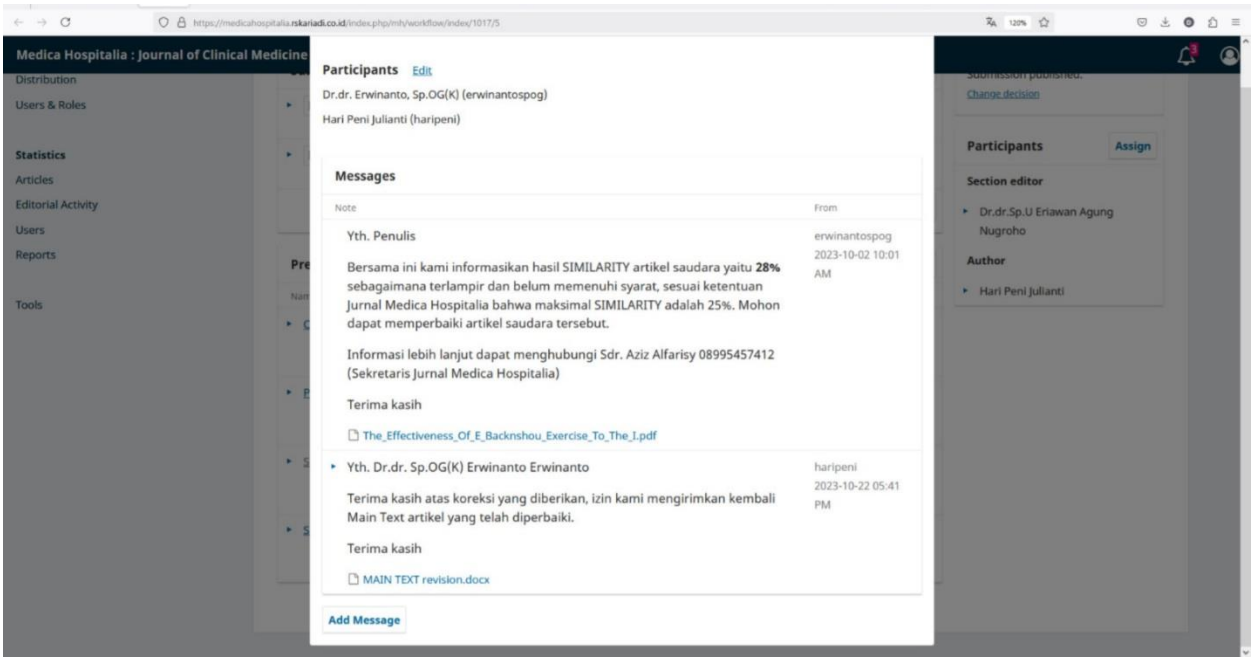
Pengiriman Lampiran yang diminta (EC, Informed Consent, Surat Pernyataan) (21 September 2023)



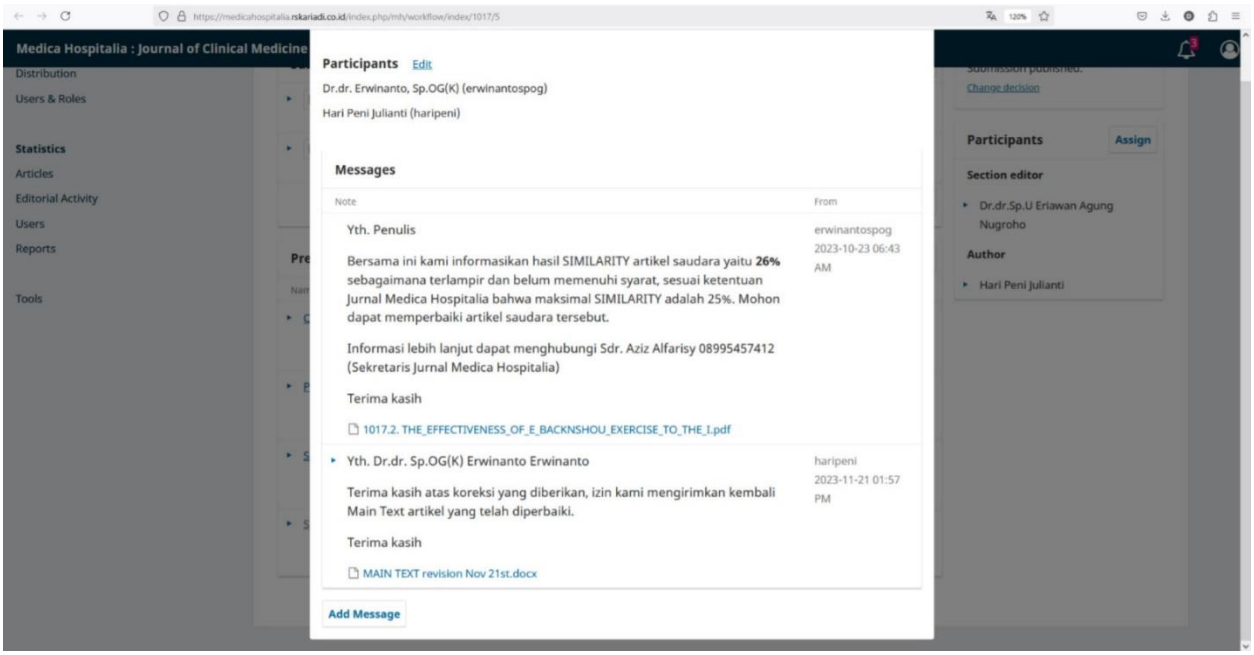
Hasil cek similarity pertama oleh reviewer (02 Oktober 2023)



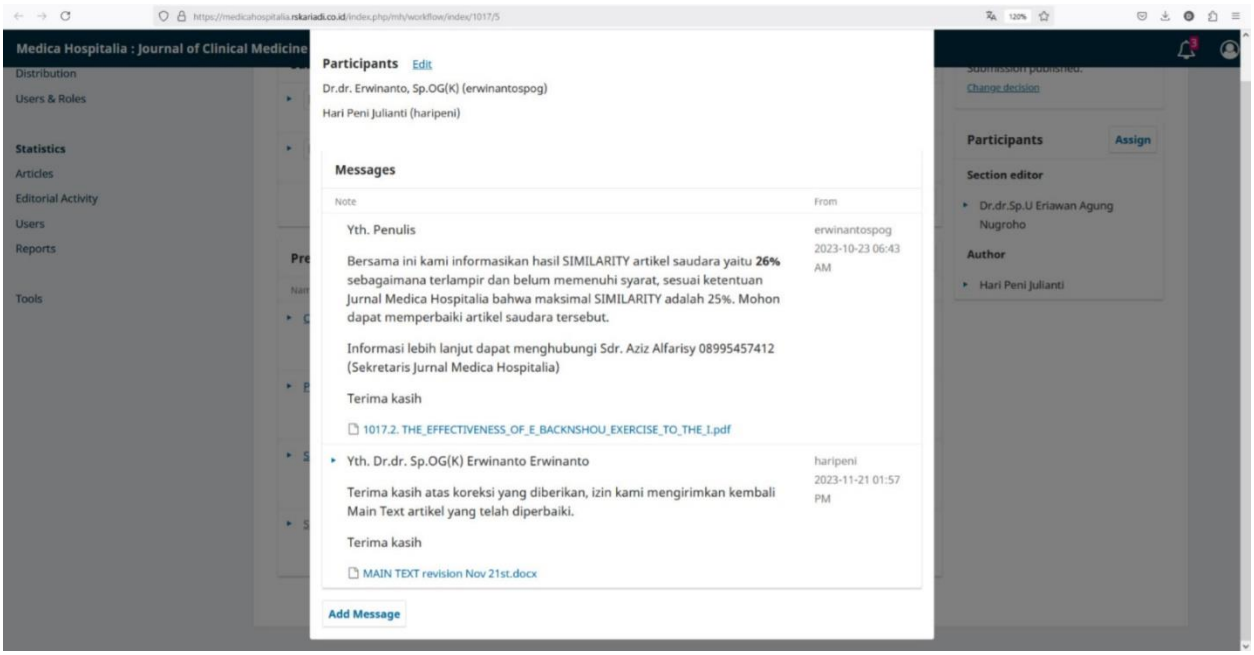
Pengiriman revisi pertama artikel yang sudah diperbaiki (22 Oktober 2023)



Hasil cek similarity kedua oleh reviewer (23 Oktober 2023)



Pengiriman revisi kedua artikel yang sudah diperbaiki (21 November 2023)



Revisi Ketiga oleh reviewer (24 November 2023)

THE EFFECTIVENESS OF E-BACKNSHOU EXERCISE TO THE IMPROVEMENT OF NECK, SHOULDER AND BACK PAIN IN COMPUTER VISION SYNDROME PATIENT

ABSTRACT

BACKGROUND : Extra-ocular complaints of Computer Vision Syndrome (CVS) are neck, shoulder, and back pain. The 20-20-20 method and E-BACKNSHOU exercise are expected to improve accommodative mechanisms, ocular surface of the eye and extra ocular symptoms of CVS.

AIMS : Proving the effectiveness of E-BACKNSHOU exercise for the improvement of neck, shoulder and back pain in CVS patient.

METHOD : The research design was Pre-Post Test with Control Design. Subjects were 30 medical students of Semarang, Indonesia who experienced CVS and neck, shoulder and back pain. The treatment group got the 20-20-20 method and E-BACKNSHOU exercise and the control group got the 20-20-20 method. Pain was measured by Visual Analogue Scale (VAS). Statistical test was conducted using paired t-test, unpaired t-test and chi square. Value of significance $p<0.05$.

RESULT : There were significant differences in VAS score of neck, shoulder, upper back pain (p=0.00), and low back pain (p=0.022) before and after the intervention in the treatment group and VAS score of neck (p=0,002), shoulder (p=0.020), upper back (p=0.011), and low back pain (p=0.019) in the control group. Delta VAS score of the treatment group was greater than the control group and there was a significant difference in delta VAS score of shoulder pain (p=0,030), but there were no significant differences in delta VAS score of neck (p=0,934), upper back (p=0,356), and low back pain (p=0,150).

CONCLUSION : The effectiveness of 20-20-20 method and E-BACKNSHOU exercise is better than the 20-20-20 method alone on treating neck, shoulder and back pain in CVS patient.

Keywords: CVS, E-BACKNSHOU exercise, pain

WU **Windows User**
Please stated in which faculty and or university

WU **Windows User**
How long the treatment was given?

1. Introduction

Excessive use of computers can cause Computer Vision Syndrome, neck, shoulder and back pain. Computer Vision Syndrome (CVS) which is also referred as digital eye strain, is defined as a collection of problems related to eyes and vision caused by prolonged use of computers, tablets, e-readers, cellular phones or cellphones[1]. Symptoms of CVS are broadly classified into four categories: 1) asthenopic (sore eyes, eye strain), 2) ocular surface related (dry eye, irritation, watering), 3) visual (double vision, blurred vision, slowness of focus change), 4) extra ocular (shoulder pain, neck pain, back ache).[2]

E-BACKNSHOU exercise is a range of motion and stretching (flexibility) exercise therapy for the eyes, extremities, back, neck, and shoulders with Central Java musical accompaniments created by the researchers.

Therefore, in this study, the researchers want to prove that the improvement of neck, shoulder, upper and low back pain in CVS patient is better by ~~performing~~ E-BACKNSHOU exercises rather than the 20-20-20 standard therapy method only.

2. Methods

This research is an experimental research, pre-post test with control design. This research was conducted at the Faculty of Medicine, at a Univesity at Semarang from May to June 2019.

The research subjects were students of the Faculty of Medicine, Diponegoro University, Semarang who met the criteria, which are those who experienced CVS, neck pain, shoulder pain and back pain. Diagnosis of CVS has been done using Computer Vision Syndrome Questionnaire (CVS-Q). Research subjects who had a history of mental disorders, high myopia, and refused to participate were not included in the study. This study has been approved by Diponegoro University ~~ethical committee~~ with number 121/EC/KEPK/FK-UNDIP/V/2019.

Based on the calculation, the sample size needed for this study were 15 subjects in the treatment group and 15 subjects in the control group with a total of 30 subjects. The independent variable of this study is the type of therapy. The dependent variable ~~of the study~~ is improvement of neck, shoulder pain, upper back and low back pain symptoms, which was obtained from the evaluation results using the VAS.

The treatment group got the 20-20-20 method and E-BACKNSHOU exercises, while the control group only got the 20-20-20 method. The 20-20-20 method consists of looking at objects 20 feet long for 20 seconds each working with the computer for 20 minutes and flashing 20 times. E-BACKNSHOU exercises were range of motion and stretching exercises for extremity, eye, back, neck, and shoulder with 18 minutes and 48 seconds duration, with warming up for 1 minute 36 seconds repeated once, main

Windows User
Within this paragraph, it seems that you want compare two methods of exercises, but in the method was stated that it does not. So it needs addition of the following words in order to make clearer. ….. *addition of* ….

Windows User
20-20-20 rule should little bit being elaborated to give an clear idea to the unfamiliar reader.

Windows User
Please make it short, more concise and clearer.

Windows User
This inclusion criteria was not clear enough, wether the participants in fresh condition or after how many hours using computer.

Windows User
Is there are no Exclusion criteria?

Windows User
… Ethical Review Board (ERB) …

Windows User
Are you doing random allocation or not?

Windows User
This variable was the type of experiments (see your type of the research). This study is a research and you are not doing a treatment, so the term of **type of experiment** I think more appropriate than **type of treatment**.

Windows User
the "20-20-20" rule: **every 20 minutes, shift your eyes to look at an object at least 20 feet away, for at least 20 seconds**

Windows User
the description unclear.

exercise 15 minutes 36 seconds repeated 3 times each and cool down 1 minute and 36 seconds repeated once, 3-5 times a week.

Hypothetical testing for differences in VAS score of neck, shoulder pain, upper and low back pain improvement in the treatment group and control group before and after the intervention were done using paired t-test. Hypothetical testing for differences in VAS score of neck, shoulder, upper back pain and low back pain after the intervention between the treatment group and the control group were done using unpaired t-test. Hypothetical testing for differences in score improvement between the delta treatment group and the control group was done using unpaired t-test. Hypothetical testing for VAS scores improvement on neck pain, shoulder pain upper back pain and low back pain events after the interventions between the treatment and control groups were done using chi square test. P value is considered significant if <0.05. Statistical analysis was performed using SPSS program for Windows.

3. Results

This research has been carried out on the students of Faculty of Medicine, Diponegoro University, Semarang who met the inclusion and exclusion criteria. The method of selecting samples was simple random sampling. This research was conducted towards 15 respondents in the treatment group and 15 respondents in the control group.

There were significant differences in VAS score of neck pain (p=0,000), shoulder pain (p=0.000), upper back pain (p=0.000), and low back pain (p=0.022) before and after the intervention in the treatment group. There were significant differences in VAS score of neck pain (p=0,002), shoulder pain (p=0.020), upper back pain (p=0.011) and low back pain (p=0.019), before ~~intervention~~ and after interventon in the control group. The VAS score of neck pain, shoulder pain, upper back pain and low back pain before and after ~~the~~ intervention in the treatment and control group ~~can be seen in~~ (Table 1).

Table 1. VAS score neck, shoulder, upper and low back pain, before and after intervention in the treatment group and the control group.

	Treatment Group			Control Group		
	Mean (SD) before intervention	Mean (SD) after intervention	*p*	Mean (SD) before intervention	Mean (SD) after intervention	*p*
VAS score neck pain	4,80±1,373	2,13±1,995	0,000	4,93±1,486	2,33±2,440	0,002
VAS score shoulder pain	5,00±1,254	2,13±1,807	0,000	3,80±2,145	2,53±2,295	0,020
VAS score upper back pain	4,20 ±1,568	1,93±1,792	0,000	3,80 ±2,541	2,20±2,305	0,011
VAS score low back	4,13 ±1,727	2,73 ±1,944	0,022	2,87 ±2,356	1,07 ±1,438	0,019

Windows User
How long (how many weeks) you give an experiment to the participant up to the end of the study? In the analyses you should analyses the effects of 3 weeks, 4 weeks and 5 weeks exercises, then you concluded which duration of exercises was more effective. Because the exercises could be done either 3, 4 or 5 weeks.

Windows User
You used paired t-test to analyzes VAS before and after intervention, but again you used unpaired t-test after intervention.
What you want to showed to the reader about these thing by using 2 type of different analysis?

Windows User
Your VAS data is an ordinals scale, NOT nominal scale. Why you used chi square test, and not Mann-Whitney U test?

Windows User
What SPSS version was used for this analysis?

Windows User
This portion of paragraph should be put within Method section.

pain

The VAS scores of neck, shoulder, upper back pain after the intervention in the treatment group were lower than in the control group, but there were no significant differences VAS scores of neck (p=0,808), shoulder (p=0,600), upper back pain (p=0,725) after the intervention between treatment and control group. There ~~wereas~~ significant difference in VAS score low back pain after the intervention (p=0,013) between the treatment group and the control group. ~~The VAS score of neck pain, shoulder pain, upper back pain and low back pain after the intervention between the treatment and control group can be seen in~~ (Table 2).

Table 2. VAS score neck, shoulder, upper and lower back pain after intervention between the treatment group and the control group

	Treatment Group Mean (SD)	Control Group Mean (SD)	*p*
VAS score neck pain	2,13±1,995	2,33±2,440	0,808
VAS score shoulder pain	2,13±1,807	2,53±2,295	0,600
VAS score upper back pain	1,93±1,792	2,20±2,305	0,725
VAS score low back pain	2,73 ±1,944	1,07 ±1,438	0,013*

Delta VAS score of treatment group ~~wereas~~ greater than the control group, but there were no significant differences in delta VAS score of neck pain (p=0,934), upper back pain (p=0,356), and low back pain (p=0,150) between the treatment group and the control group. There ~~wereas~~ a significant difference in delta VAS score of shoulder pain (p=0,030) between the treatment group and the control group. The delta VAS scores of neck pain, shoulder pain, upper back pain and low back pain between the treatment and control group can be seen in Table 3.

Table 3. Delta VAS score neck, shoulder, upper and lower back pain between the treatment group and the control group

Delta	Treatment Group Mean (SD)	Control Group Mean (SD)	p
VAS score neck pain	2,67±1,839	2,73±2,463	0,934
VAS score shoulder pain	3,00±1,852	1,53±1,642	0,030*
VAS score upper back pain	2,53±1,356	2,00±1,732	0,356
VAS score low back pain	1,13 ±1,598	2,20 ±2,274	0,150

The results showed that there were no significant differences in the incidence of neck pain (p=0,705), shoulder pain (p=0,690), upper back pain (p=0,099), low back pain (p=0,256) after the

Windows User
The table should ~~only have~~ a three horizontal lines.

Windows User
The table should only have a three horizontal lines.

Windows User
You are not study about incidence! … symptoms …. Is more appropriate.

intervention ~~between the treatment group~~ and the control group. ~~The incidence of neck pain, shoulder pain, upper back pain and low back pain after the intervention in the treatment and control group can be seen in~~ (Table 4).

Table 4. Incidence of neck pain, shoulder pain, upper back pain, low back pain after the intervention between the treatment group and the control group.

Incidence	Group		Total	P value
	Treatment	Control		
Neck pain (-)	6	5	11	0,705
Neck pain (+)	9	10	19	
Total	15	15	30	
shoulder pain (-)	5	4	9	0,690
shoulder pain (+)	10	11	21	
Total	15	15	30	
Upper back pain (-)	6	2	8	0,099
Upper back pain (+)	9	13	22	
Total	15	15	30	
Lower back pain (-)	4	7	11	0,256
Lower back pain (+)	11	8	19	
Total	15	15	30	

Windows User
The table should only have a three horizontal lines.

Windows User
The symptoms

4. Discussion

Computer Vision Syndrome is caused by continuous accommodation involving the intra and extra ocular muscles so that the eye muscles experience fatigue.[3]-[7] ~~Computer Vision Syndrome is caused by continuous eye accommodation which requires the eye to focus on one point,~~ causing static positions in the neck muscles, shoulders, upper back and lower back. The static position causes the muscles to spasm and cause pain in the muscles. .[3]-[7][8]

The treatment group got the 20-20-20 method and E-BACKNSHOU exercises. The 20-20-20 method ~~consists of looking at objects 20 feet long for 20 seconds each working with the computer for 20 minutes and flashing 20 times.~~[9] ~~This method~~ aims to accommodate the eye so that the intra and extra ocular muscles can relax and blink 20 times to wet the surface of the eyeball. E-BACKNSHOU exercises consist of ~~eye~~ extra ocular muscles exercises ~~that exercise extra ocular muscle movements~~ (medial rectus, superior rectus, inferior rectus, lateral rectus, superior oblique, and inferior oblique), range from ~~of~~ motion and stretching exercises in the muscles of the extremities, neck, shoulder and back. E-BACKNSHOU exercises, like other stretching exercises have been able to increase the range of joint motion, flexibility, stretch muscles, decrease muscle spasm, increase endorphin hormone production and decrease cortisol response.

Windows User
Citation???

Previous study by Kurunbikattil (2016) stated that eye and neck exercises are very effective in reducing eye strain and neck pain. The eye exercise in this previous study was moving eyes toward right, left, up and down to relax the eye muscles. Neck exercise consists of moving neck right, left, up and down, rotating clockwise and counter-clockwise every 3 hours. E-BACKNSHOU eye exercises in this study used more direction of eye movement, compared to Kurunbikattil's study.[10]

Another study by Gaikwad (2021) stated that 4 weeks of isometric neck setting exercises and eye exercises, significantly improved pain on VAS and improving score of quality of life, compared to isometric neck exercises alone in subjects with bifocal lens.[11]

20-20-20 method has induced significant changes in reducing CVS sign, although can't eliminate CVS completely, according to the previous study.[12]

E-BACKNSHOU exercises in this study used ROM and stretching movements for eye, neck, shoulder, back and extremities, more than the previous studies, combined with the 20-20-20 method to decrease pain due to CVS. E-BACKNSHOU exercises has been able to improve the mechanism of extra ocular pathogenesis, namely musculoskeletal pain disorders including low back pain and shoulder pain.

The results showed significant differences in VAS scores of neck pain, shoulder pain, upper back pain, and lower back pain before and after the intervention in both the treatment and control groups. The difference is in the form of a decrease in the mean VAS score before and after the intervention in both the treatment and control groups. The decrease in CVS score was greater in the treatment group than in the control group. This shows that E-BACKNSHOU and the 20-20-20 method both were effective in reducing the complaints of neck, shoulder, upper back pain and lower back pain.

VAS score of neck, shoulder, upper back pain after the intervention in the treatment group was lower than the control group, but there was no significant difference in VAS scores of neck, shoulder, upper, and lower back pain after the intervention between the treatment group and the control group. There was significant difference in VAS score of lower back pain after the intervention between the treatment group and the control group.

Delta VAS score of the treatment group was greater than control group, but there were no significant differences in delta VAS score of neck pain, upper back, and lower back pain between the treatment group and the control group. There was significant difference in delta VAS score of shoulder pain between the treatment group and the control group. This could be due to neck ROM and stretching component of E-BACKNSHOU in the intervention group that relaxed the shoulder muscles and reducing pain.

The results showed no significant differences in the incidence of neck pain, shoulder pain, upper back pain, and lower back pain after the intervention between the treatment and control group.

This study's results showed that both control and intervention group experienced improvement of VAS in neck, shoulder, upper back and lower back pain, although there were no statistical significances for delta VAS of neck, upper and lower back pain. The delta VAS in shoulder pain and VAS for lower back pain in intervention compared with control group, were reduced significantly and showed that E-BACKNSHOU with 20-20-20 exercise could improved extra ocular symptoms of CVS.

The limitation of this study is the short intervention time, only about 1 month, and the limited number of participants. The participants all came from the same department (Faculty of Medicine of Diponegoro University). So, further research with more intervention duration, more participants with more varieties of department or university can be implemented.

Windows User
What does it mean of ROM? Which muscle exercises involved in this term?

Windows User
Something already done in the past, you describe it by using **were** rather than **was**.

Windows User
I think is appropriate using occurrence rather than incidence (see epidemiology term)

5. Conclusion and Suggestions

Shoulder and low back pain were decreased by performing the 20-20-20 method and E-BACKNSHOU exercises rather than the 20-20-20 method only.

The 20-20-20 method and E-BACKNSHOU exercises can be used in CVS patients with neck, shoulder, and back pain.

6. Expression of Gratitude

The researcher would like to thank students of Faculty of Medicine, Diponegoro University, Semarang who have been willing to become research subjects, and also other parties that have helped the process of this research up till the writing of this article so that it can be conducted successfully.

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Artikel Accepted Submission dan menerima LoA (01 Maret 2024)