EFFECTIVENESS OF TELEREHABILITATION-BASED EXERCISE PROGRAM FOR CHRONIC GRADE II NONSPECIFIC NECK PAIN AMONG PT & OT ONLINE LEARNERS

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ABSTRACT

Neck pain is a very common condition associated with disability worldwide. It is the 4th most burdensome condition in terms of years lived with disability having a one-year prevalence of 20.3%, lifetime prevalence of 27% to 71%, and can be observed in individuals from the age groups of 15-25. Telerehabilitation is a physical therapy service at a distance using any telecommunication media that has been a way by physical therapists to deliver treatment, management, and checkups for conditions such as nonspecific neck pain. This study aimed to determine the Effectiveness of Telerehabilitation-based exercises in reducing Grade II Chronic Nonspecific Neck Pain among Physical Therapy and Occupational Therapy Online Learners in UPH-DJGTMU. The researchers evaluated the respondents if they fit the criteria to be part of the study, ruling-out the "red flags" (set by the Neck Pain Task Force) such as trauma, tumor/cancer/malignancy, spinal cord compromise, systemic diseases, infections, pain, and prior medical history. A total of thirty-six (36) male and female students have passed the required inclusion criteria and were selected as respondents for the study. Visual Analogue Scale (VAS) and Neck Disability Index (NDI) outcome measures were used to measure the pain and disability of the respondents prior and after the treatment sessions. The VAS and NDI scores showed significant improvement in the post-test compared to the pre-test, indicating that there is a decrease in the neck pain experienced by the respondents. The results showed that the use of telerehabilitation-based exercise program was effective in decreasing the neck pain of Physical Therapy and Occupational Therapy online learners.

Keywords: Neck Pain, Telerehabilitation, Online Classes, Physical Therapy

INTRODUCTION

Nonspecific neck pain comprises the largest group of people with neck pain, and it is defined as pain not attributed to a recognizable or specific pathology (e.g., nerve root compromise, fracture, cancer or inflammatory diseases) or when there are no features (i.e., red flags) to suggest more serious conditions. It is often multifactorial in nature and can be acute or chronic. The Neck Pain Task Force recommends four grades in classifying neck pain – Grades I, II, III, IV, depending on the signs of major pathology and interference with daily activities. Various interventions are recommended in improving neck pain such as massage, manual therapy, education ergonomics, multidisciplinary treatment, therapeutic modalities, and exercise depending on the grading of neck pain set and recommended by the Neck Pain

Task Force. Exercises for neck pain typically include isotonic and isometric exercises. Examples of stretching exercises are upper trapezius stretch, shoulder stretch, neck rotation, neck retraction, neck flexion and extension with resistance, and shoulder shrugs, to name a few. (Cleveland, 2017). The COVID-19 pandemic has become a major health problem globally, hugely affecting sectors of society including education. Distance learning was always considered to be an advantageous platform; however, its importance was highlighted in the year 2020 as the COVID-19 virus spread all across the globe. “E-learning” demands gadgets such as smartphones, tablets, and computers for students to study from home, making students spend their time in front of these gadgets for prolonged periods of time – producing stress, causes pain in the neck, hands, and shoulders (Sharan et al., 2014; Sharan and Ajeesh, 2012).

As life goes on with the new normal, particularly online education, students are exposed to prolonged sedentary behavior associated with gadget use, causing repetitive strain of the musculoskeletal system associated with inappropriate ergonomic equipment during daily work. Telerehabilitation is the delivery of rehabilitation services over telecommunication media such as websites, smartphone apps, videoconferencing systems and telephone, with interventions such as treatment based on education, exercise prescription and self-management – that can be offered at a distance, overcoming some of the potential barriers to healthcare access such as travel, time consumption, high demand for the public health system, and high costs for long-term treatment (Kairy, 2017; Lee, 2018). With the cited problems associated with neck pain, the researchers came up with the study of utilizing telerehabilitation, in seeking the best plan of treatment for students experiencing neck pain, specifically Chronic Grade II Nonspecific Neck Pain. In this light, the researchers aim to create an exercise program, combining different types of stretching exercises, to address the reduction, prevalence and progression of neck pain among individuals, particularly among students. This study aimed to determine the effectiveness of telerehabilitation-based exercise program for Chronic Grade II Nonspecific Neck Pain among students, particularly those who are taking online classes.

LITERATURE REVIEW

Neck Pain Types and Classifications

Bogduk & McGuirk (2017) argued that the causes of common neck pain are not known; Hence, common neck pain is often termed 'nonspecific' neck pain. The only recognizable causes are due to serious but rare conditions like tumors, fractures, etc. According to Cerezo-Tellez (2018), neck pain without a known pathological basis as the cause of the complaint is diagnosed as nonspecific neck pain. Chronic neck pain is a time-based classification of neck pain that is experienced greater than 12 weeks and is "recurrent" or "episodic", acute neck pain for less than 6 weeks, and subacute for 6 to 12 weeks. Some symptoms are limited mobility of the cervical spine and weak neck muscles, which can often be related to other problems, such as spinal, neck or shoulder dysfunction and physical and mental stress at work. Additionally, patients with chronic nonspecific neck pain have more functional limitations that can lead to disability, decreased vitality, and overall poor health. The Neck Pain Task Force (2010) recommends a clinical classification in 4 grades according to severity of pain: grade I is neck pain with no signs or symptoms of major structural pathology and no or minor interference with activities of daily living, grade II is neck pain with no signs or symptoms of major structural pathology but major interference with activities of daily living (interference with ADLs can be assessed through self-report questionnaires), grade III is neck pain with no signs or symptoms of major structural pathology but with neurologic signs of

nerve compression, and grade IV is neck pain with signs of major structural pathology. Major structural pathologies include, but are not limited to, fractures, spinal cord injuries, infections, neoplasm, or systemic diseases.

Neck Pain associated with Prolonged Computer and Cellphone Use

Amit et al., (2020) conducted a local study about the predictors of occupational health outcomes of call center workers from selected companies in Cebu and Manila. The study aimed to determine the prevalence of the occurrence of occupational health problems based on personal and work-related variables. The researchers of this study conducted a survey answered by 227 call center workers who are all computer users. The results of the study showed that the most prevalent forms of occupational health problems were back pain, headache, neck pain, and insomnia. Among all of the health problems, 93% of individuals who had neck pain is often caused by holding the neck in a forward bent posture and maintaining the position for a prolonged period of time according to the authors. The results of their study showed that their respondents most commonly felt pain in their necks, backs, waists, and shoulders. In addition, risk factors to these musculoskeletal disorders include repeated manipulation of objects, continuous sitting, static work, deconditioning due to physical inactivity, awkward posture, continuous keyboard and mouse use.

A local study conducted by Revilla (2019) examined the organizational factors on the occurrence of musculoskeletal diseases in the Philippines. The study's goal was to explore which workplace characteristics are associated with the occurrence of musculoskeletal disorders such as neck pain, shoulder pain, and back pain among Filipino workers. The study's data used the survey from DOLE, with data collected from 9,894 establishments nationwide taking into account 6 variables, 2 of which are physical attributes of the establishments and 4 were related to organizational practice while the main outcome measure is the occurrence of musculoskeletal disease. Results showed that the organizational factors associated with musculoskeletal diseases in the workplace are (1) business classification, (2) geographic location, (3) lifestyle program, (4) annual physical examination, and (5) ergonomic intervention. In conclusion, the author stated that despite the implementation of safety and health measures, programs, and interventions in the workplace, musculoskeletal diseases are still prevalent in the workplace.

Exercises, Treatment, and Interventions for Nonspecific Neck Pain

Tunwattanapong et al., (2015) conducted a study about the effectiveness of neck and shoulder exercises for office workers with neck pain. The study focused on using stretching exercises as their treatment of interest because this kind of exercise is effective in decreasing muscle stiffness, decreasing pain, and improving flexibility. According to the authors, although there are numerous studies focusing on the effects of exercise for neck and shoulder pain among office workers, there is conflicting evidence of the benefits of exercise. In addition, the authors also stated that there are no definite conclusions in the present time as to what types of exercise can provide relief and improve neck functions in office workers. The study was composed of 96 participants with moderate-to-severe neck pain with a visual analogue score of greater than or equal to 5-10ccm (moderate to severe neck pain). The interventions include an informative brochure that is to be received by all participants, and it indicates the proper ergonomics to be applied during daily work The treatment group however, received an additional instruction of exercises comprised of a stretching exercise focused on the neck and shoulder that will be performed for 5 days a week, for 4 weeks. Compliance was assured

through a checklist handed out to the participants. The exercise program included 20-30 repetitions/sessions of neck stretching, shoulder stretching, shoulder rolling, trunk stretching, and back exercises with a duration of approximately 15 minutes per session. The exercise included neck stretching, shoulder stretching, shoulder rolling, trunk stretching and back extension exercises. Furthermore, all participants were instructed to refrain from performing any exercises other than the stretching exercises prescribed and to avoid the use of pain relief therapy such as pain medication, physical therapy, massage, or acupuncture. Results showed that both groups had improved outcomes for pain and quality of life significantly. However, the treatment group had a greater improvement as compared to those of the control group. In conclusion, the authors stated that a stretching exercise program performed for four weeks can improve neck and shoulder pain and quality of life for office workers who have moderate-to-severe neck or shoulder pain. A previous study, performed by Weerapong and colleagues in 2018, was a before-and-after study to determine the efficacy of a computerized stretching exercise program for four weeks to reduce neck and shoulder pain in office workers. However, they could not demonstrate the improvement in either the visual analogue scale nor Northwick Park Neck Pain Questionnaire scores. This result was caused perhaps by the small sample size (II subjects) and very low pain scores at baseline (1.8 +2.1) in their study.

Effectiveness of Telerehabilitation

Oliveira et al., (2020) conducted a systematic review to investigate whether exercise-based telerehabilitation improves pain, physical function and quality of life in adults with physical disabilities. The authors stated that there are several health care services challenges that are needed to be addressed for people with disabilities such as a patient's physical incapacity to attend treatment centers, absence of caregivers, scarcity of health professionals and limited resources in local communities. Telerehabilitation was used to address these problems and finally make use of the telecommunication technologies medically. The study consists of 48 study trials testing the effectiveness of telerehabilitation. The review aimed to examine short-term and long-term effectiveness of exercise telerehabilitation on Pam, physical function, and quality of life in adults with physical disabilities when compared with other interventions. According to the presented data of the researchers' findings from 50 trials, it is reported the overall effect analyses of telerehabilitation in people with physical disabilities. In conclusion, the overall analyses of telerehabilitation on physical function showed high- quality evidence that it is not different from other interventions on physical function at long term and there was moderate evidence of no difference between telerehabilitation and control or other interventions at short term.

Shrestha et al., (2020) conducted a study about the feasibility and effectiveness of telephone-based telephysiotherapy of pain in low-resource setting. According to the authors, telephysiotherapy has shown its effectiveness in developed countries for years but no studies proved its effectiveness in developing countries. The authors also stated that telephysiotherapy based interventions through the internet and video call is difficult in low-resource settings due to feasibility issues and low-literacy rate. The researchers of this study aimed to identify the effectiveness of telephysiotherapy even if conducted in a low-resource setting. The study is composed of 15 patients from the rural areas that are experiencing pain due to various conditions, such as musculoskeletal pain like back pain, knee pain, and ankle pain. The respondents were assessed and treated by qualified physical therapists. Interventions were given through pamphlets containing pictures of prescribed exercises and the therapists made telephone calls to every patient each week to give necessary information,

correction, modification, and progression of the exercise whatever required. The respondents were assessed during the second and fourth week using the numeric pain rating scale. The results showed a significant decrease in pain caused by musculoskeletal problems showing that telephysiotherapy could be a feasible and effective treatment in developing countries. The authors recommend more trials to establish the effectiveness of telephysiotherapy based interventions in developing countries.

METHODOLOGY

Research Design

The study utilized quasi-experimental research, specifically the One-group Pretest-Posttest Research Design. The researchers conducted a study in which the treatment, procedure, or program were intentionally introduced, and a result or outcome can be observed. The Visual Analogue Scale and Neck Disability Index were used to assess and establish the effectiveness of the telerehabilitation-based exercise program in reducing neck pain. The research design was chosen to obtain a baseline measure of the outcome of interest prior to administering the treatment procedure with the pre-test, followed by a post-test on the same measure after treatment occurs to obtain the results for the comparison to the baseline measure.

Population and Sampling Technique

This study consisted of 36 students who were taking online classes and enrolled in UPH-DJGTMU who experienced Chronic Grade II Nonspecific Neck Pain. The researchers drew the sample population with the use of probability, purposive sampling technique in the form of criterion sampling.

Inclusion Criteria

The inclusion criteria were the following: 1. enrolled in UPH-DJGTMU; 2. aged 18 – 25 years old; 3. either male or female; 4. Taking-up online classes; 5. Experiencing Grade II Nonspecific neck pain; 6. Experiencing chronic neck pain (>3 months); 7. Neck pain being experienced has a VAS score of 5-74 (Mild - Moderate Pain) due to prolonged gadget use.

Exclusion Criteria

The exclusion criteria were the following: 1. have been undergoing other consistent, formal exercise programs targeted for neck pain; 2. have undergone surgery for other medical conditions; 3. have experienced severe headaches that have come on for no apparent reason, have never gone away, and are gradually getting worse; 4. have had episodes of severe headaches that are accompanied by nausea and dizziness; 5. should not have any underlying condition or disorder that would limit their ability to perform exercises (e.g., myelopathy and systemic diseases, pathological disorders, infections, and inflammations, neoplasm and other pre-existing medical conditions); 6. currently obtaining medical treatment for neck pain (e.g., medications, electrical stimulation, manipulation, etc.) during the time of intervention.

Instrumentation

The study made use of self-stretching and ROM exercises that can be prescribed through Telerehabilitation. Each position within the exercise program was executed by the respondents for 30 seconds. In between each exercise, a 10-second break was given to let the

respondents prepare for the next position. Each therapy session was guided and supervised by the recruited physical therapist and the researchers. Every session lasted for approximately 45 minutes. The respondents were given a pamphlet which contained the exercises (Figures 1 to 3) that served as a supplemental guide during treatment sessions. The whole intervention was done for 4 weeks and the days of the week - synchronous sessions every Monday, Wednesday, and Friday and asynchronous sessions every Tuesday and Thursday.

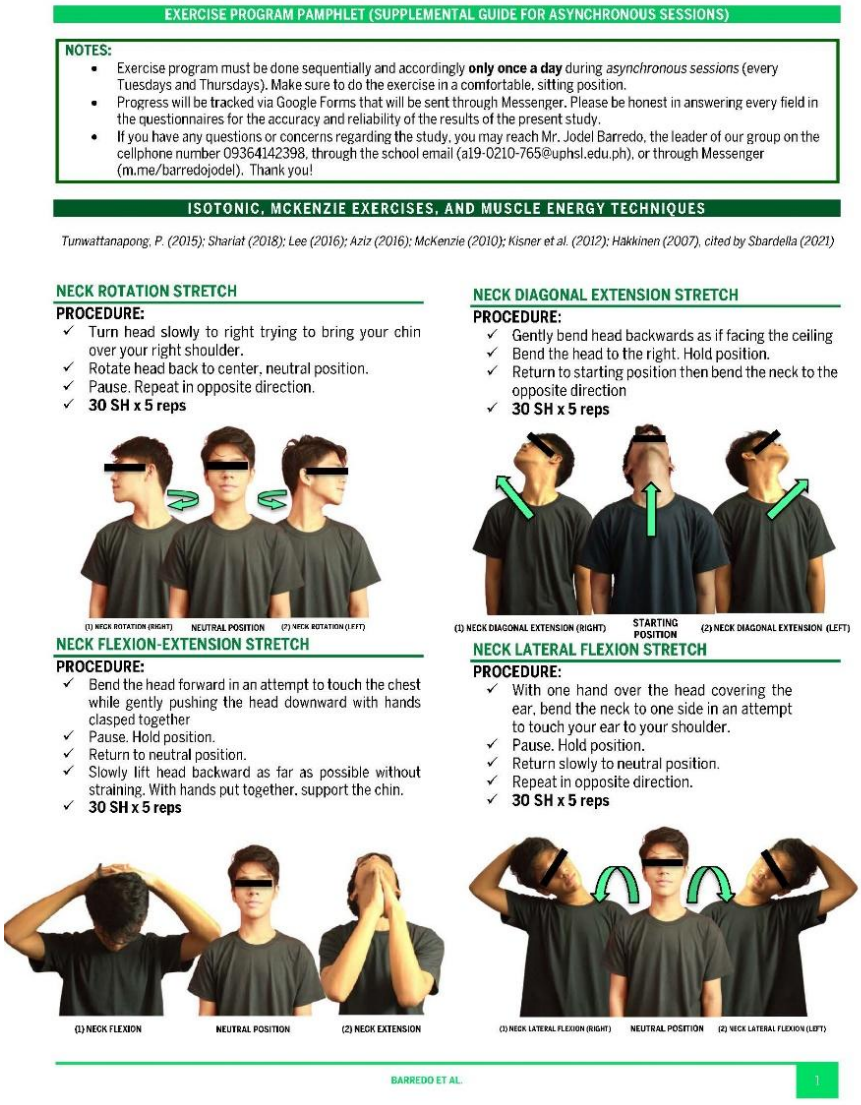


Figure 1. Telerehabilitation-based Exercise Program for Chronic Grade II Nonspecific Neck Pain

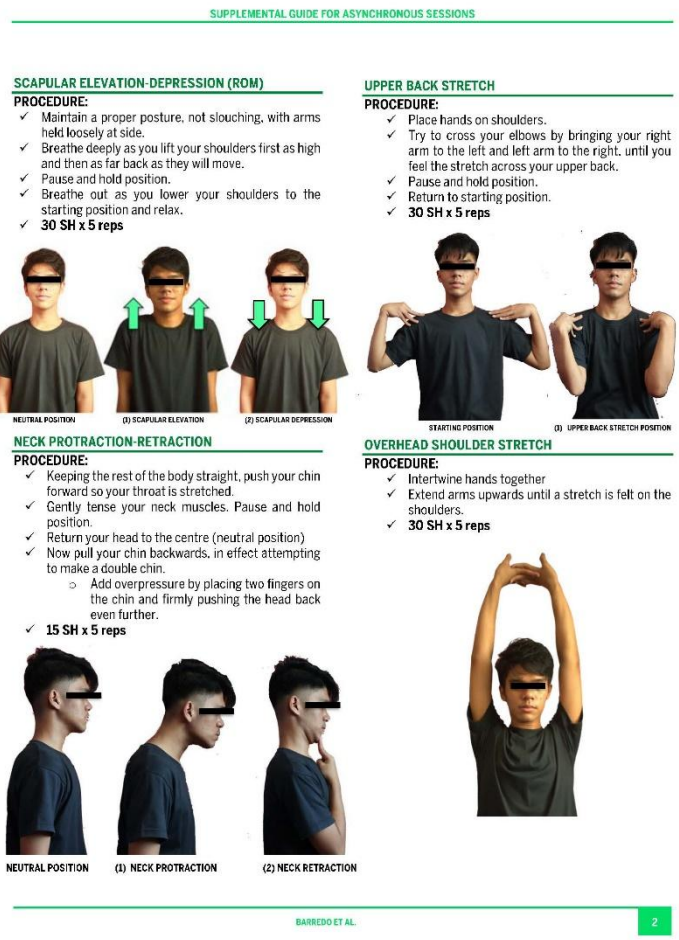


Figure 2. Telerehabilitation-based Exercise Program for Chronic Grade II Nonspecific Neck Pain

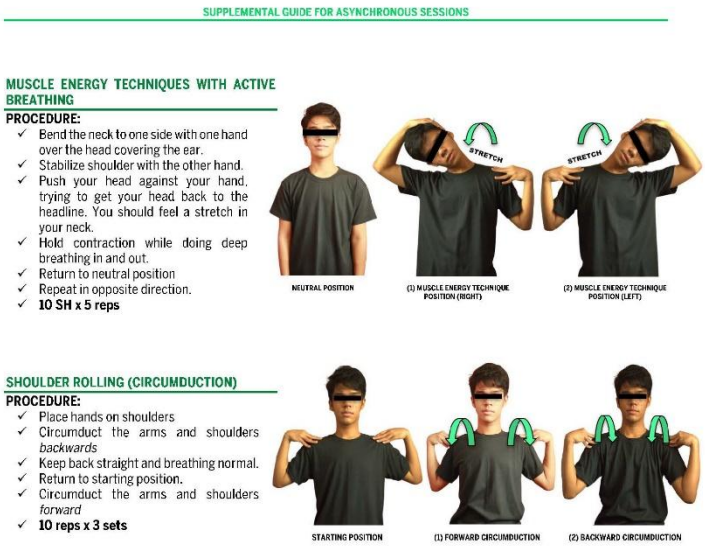


Figure 3. Telerehabilitation-based Exercise Program for Chronic Grade II Nonspecific Neck Pain

The researchers selected the eligible respondents with the use of the selected outcome measuring instruments were the Visual Analogue Scale (VAS) (Figure 4) and the Neck Disability Index (NDI) (Figure 5).

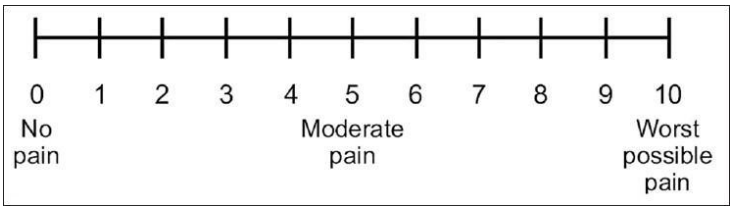
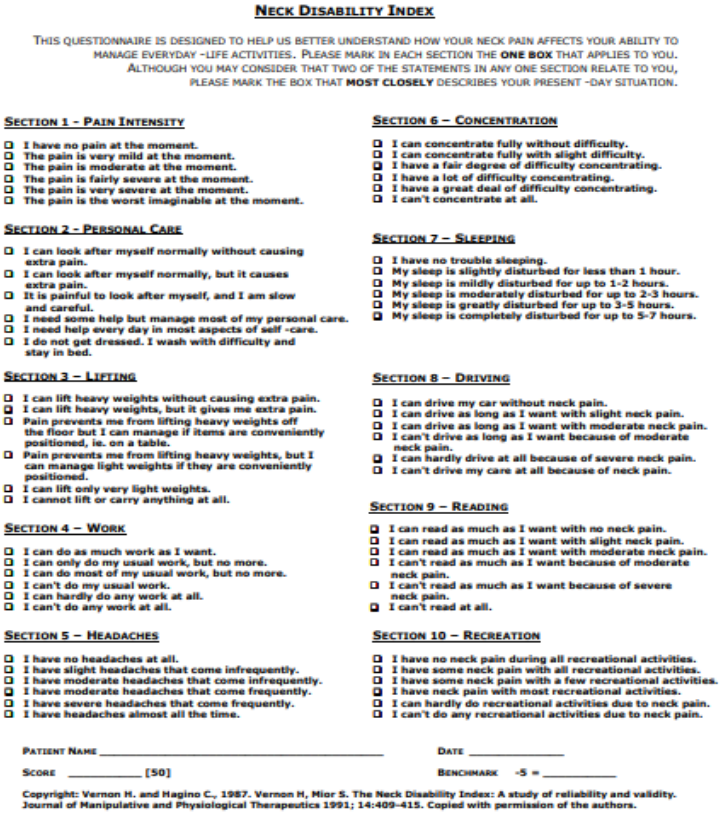


Figure 4. Visual Analogue Scale



NECK DISABILITY INDEX

THIS QUESTIONNAIRE IS DESIGNED TO HELP US BETTER UNDERSTAND HOW YOUR NECK PAIN AFFECTS YOUR ABILITY TO MANAGE EVERYDAY -LIFE ACTIVITIES. PLEASE MARK IN EACH SECTION THE **ONE BOX** THAT APPLIES TO YOU. ALTHOUGH YOU MAY CONSIDER THAT TWO OF THE STATEMENTS IN ANY ONE SECTION RELATE TO YOU, PLEASE MARK THE BOX THAT **MOST CLOSELY** DESCRIBES YOUR PRESENT -DAY SITUATION.

SECTION 1 - PAIN INTENSITY

- I have no pain at the moment.
- The pain is very mild at the moment.
- The pain is moderate at the moment.
- The pain is fairly severe at the moment.
- The pain is very severe at the moment.
- The pain is the worst imaginable at the moment.

SECTION 2 - PERSONAL CARE

- I can look after myself normally without causing extra pain.
- I can look after myself normally, but it causes extra pain.
- It is painful to look after myself, and I am slow and careful.
- I need some help but manage most of my personal care.
- I need help every day in most aspects of self -care.
- I do not get dressed. I wash with difficulty and stay in bed.

SECTION 3 – LIFTING

- I can lift heavy weights without causing extra pain.
- I can lift heavy weights, but it gives me extra pain.
- Pain prevents me from lifting heavy weights off the floor but I can manage if items are conveniently positioned, ie. on a table.
- Pain prevents me from lifting heavy weights, but I can manage light weights if they are conveniently positioned.
- I can lift only very light weights.
- I cannot lift or carry anything at all.

SECTION 4 – WORK

- I can do as much work as I want.
- I can only do my usual work, but no more.
- I can do most of my usual work, but no more.
- I can't do my usual work.
- I can hardly do any work at all.
- I can't do any work at all.

SECTION 5 – HEADACHES

- I have no headaches at all.
- I have slight headaches that come infrequently.
- I have moderate headaches that come infrequently.
- I have moderate headaches that come frequently.
- I have severe headaches that come frequently.
- I have headaches almost all the time.

SECTION 6 – CONCENTRATION

- I can concentrate fully without difficulty.
- I can concentrate fully with slight difficulty.
- I have a fair degree of difficulty concentrating.
- I have a lot of difficulty concentrating.
- I have a great deal of difficulty concentrating.
- I can't concentrate at all.

SECTION 7 – SLEEPING

- I have no trouble sleeping.
- My sleep is slightly disturbed for less than 1 hour.
- My sleep is mildly disturbed for up to 1-2 hours.
- My sleep is moderately disturbed for up to 2-3 hours.
- My sleep is greatly disturbed for up to 3-5 hours.
- My sleep is completely disturbed for up to 5-7 hours.

SECTION 8 – DRIVING

- I can drive my car without neck pain.
- I can drive as long as I want with slight neck pain.
- I can drive as long as I want with moderate neck pain.
- I can't drive as long as I want because of moderate neck pain.
- I can hardly drive at all because of severe neck pain.
- I can't drive my care at all because of neck pain.

SECTION 9 – READING

- I can read as much as I want with no neck pain.
- I can read as much as I want with slight neck pain.
- I can read as much as I want with moderate neck pain.
- I can't read as much as I want because of moderate neck pain.
- I can't read as much as I want because of severe neck pain.
- I can't read at all.

SECTION 10 – RECREATION

- I have no neck pain during all recreational activities.
- I have some neck pain with all recreational activities.
- I have some neck pain with a few recreational activities.
- I have neck pain with most recreational activities.
- I can hardly do recreational activities due to neck pain.
- I can't do any recreational activities due to neck pain.

PATIENT NAME _____ DATE _____

SCORE _____ [50] BENCHMARK -5 = _____

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Figure 6. Neck Disability Index (NDI)

Statistical Treatment of Data

The following statistical methods were used for the quantitative analysis in this study: the mean, which determined the average for the respondents' pre-test and post-test scores of the treatment group. The paired sample t-test, which determined the significant difference between the mean of the respondents' pretest and posttest findings of VAS and NDI results after the implementation of the treatment intervention.

RESULTS

The study gathered from thirty-six (36) respondents who are students from the College of Physical Therapy and College of Occupational Therapy of the University of Perpetual Help – Dr. Jose G. Tamayo Medical University. The data that were obtained are based on the

objectives of the study which includes determining the mean score measurements of the respondents for every pre-test and post-test and determining if there is a significant difference between the mean score measurement of pre-test and post-tests.

Table 1. The VAS and NDI Pre-Test Results of Respondents Before the Telerehabilitation-based Exercise program

Respondent	VAS Pre-test Scores	NDI Pre-test Scores
1	50	19
2	65	25
3	60	23
4	30	18
5	20	14
6	31	16
7	18	18
8	23	20
9	32	17
10	25	20
11	19	15
12	45	20
13	40	18
14	31	22
15	20	16
16	40	19
17	20	14
18	40	20
19	40	18
20	30	16
21	50	19
22	18	13
23	60	24
24	25	12
25	60	23
26	35	18
27	25	15
28	45	22
29	15	13
30	40	21
31	27	15
32	19	14
33	21	15
34	35	23
35	21	24
36	25	22
AVERAGE	33.33	18.36

Visual Analogue Scale		Neck Disability Index	
Mean:	**33.33**	*Mean:*	**18.36**
Standard Deviation:	**13.84**	*Standard Deviation:*	**3.59**

Table 1 shows the Visual Analogue Scale (VAS) and Neck Disability Index (NDI) Scores of each participant before the exercise intervention (pre-test). It shows that the highest score in Visual Analogue Scale (VAS) is 25 while the lowest is 15 and the mean score is 33.33. Consecutively, the highest score in Neck Disability Index (NDI) is 25 while the lowest score is 13 and the mean score is 18.36. Table 3 served as a baseline measure and an indication that the respondents have already been experiencing neck pain, specifically Chronic Grade II Nonspecific Neck Pain, before the telerehabilitation-based exercise program.

Table 2. The VAS and NDI Post-Test Results of Respondents Before the Telerehabilitation-based Exercise program

Respondent	VAS Post-test Scores	NDI Post-test Scores
1	13	8
2	5	4
3	4	2
4	8	5
5	4	2
6	0	0
7	4	5
8	10	6
9	7	4
10	5	3
11	6	3
12	0	2
13	12	7
14	7	4
15	0	0
16	7	6
17	5	6
18	6	4
19	0	0
20	10	5
21	8	6
22	0	0
23	0	0
24	5	2
25	9	7
26	0	0
27	5	3
28	0	0
29	0	2
30	0	0
31	7	5
32	8	6
33	3	2
34	0	0
35	0	0
36	3	2
AVERAGE	**4.47**	**3.08**

Visual Analogue Scale		Neck Disability Index	
Mean:	**4.47**	*Mean:*	**3.08**
Standard Deviation:	**3.87**	*Standard Deviation:*	**2.50**

Table 2 shows the Visual Analogue Scale (VAS) and Neck Disability Index (NDI) Scores of each participant after the exercise intervention (post-test). It shows that the highest score in Visual Analogue Scale (VAS) is 13 while the lowest is 0 and the mean score is 4.47. Consecutively, the highest score in Neck Disability Index (NDI) is 8 while the lowest is score 0 and the mean score is 3.08. The results showed that the neck pain experienced by the respondents before the intervention program has decreased after the four weeks of intervention period. As seen from the result of VAS, the pain of the respondents after the program is now ranging from no pain to mild pain. On the other hand, the result of the NDI showed that the respondents have reported no disability to mild disability, indicating that the respondents' neck pain-related disability has improved after the intervention period.

Table 3. Comparison of Pre-test and Post-test Scores of Respondents in Terms of The Visual Analogue Scale (VAS) and Neck Disability Index (NDI) Scores

Profile	*Statistical Test*	*Mean*	*Test Statistics*	*Sig*	*Interpretation*
Visual Analogue Scale					
Pretest **Posttest**	***Paired Sample T-test***	***33.33*** ***4.47***	***t = 12.431*****	***0.000***	**SIGNIFICANT**
Neck Disability Index					
Pretest **Posttest**	***Paired Sample T-test***	***18.36*** ***3.08***	***t = 20.250*****	***0.000***	**SIGNIFICANT**

Significant at **0.01
n = 36
Degree of Freedom = 35

Table 3 shows the difference in Pre-test and Post-test Scores with regard to the effectiveness of Telerehabilitation-based exercises in reducing Grade II Chronic Nonspecific Neck Pain among Physical Therapy and Occupational Therapy Online Learners before and after the implementation of the exercise program. The mean in the paired sample t-test for the pre-test of VAS is 33.33 and 4.47 for the post-test. On the other hand, the mean in the paired sample t-test for the pre-test of NDI is 18.36 and 3.08 for the post-test. For the VAS, the computed t-value is 12.431, while 20.250 for the NDI. Based on these results, there is a significant difference on the respondents' post test scores result in Visual Analogue Scale compared to the pretest result, thus the null hypothesis is rejected. This means that a significant decrease of pain intensity was observed after the Telephysiotherapy Based Exercise Program indicating effectiveness of the program. Furthermore, a significant difference on the respondents' post test scores result in Neck Disability Index is observed compared to the pretest result, thus the null hypothesis is rejected. This means that there is also a huge decrease of neck pain after the Telephysiotherapy Based Exercise Program indicating effectiveness of the exercise program. These findings showed that the exercise program administered for four (4) weeks through telerehabilitation was effective in decreasing the pain and neck pain-related disability being experienced by Physical Therapy and Occupational Therapy online learners.

DISCUSSION

In this study, which aimed to determine the effectiveness of telerehabilitation-based exercises in reducing Grade II chronic nonspecific neck pain, it was hypothesized that there is no significant difference between the mean pre-test and post-test results of the respondents after the telerehabilitation-based neck exercises in terms of VAS and NDI. Three (3) research questions were addressed to answer this hypothesis. The first and second questions focused on the VAS and NDI scores of the respondents before and after the treatment. The respondents' neck pain prior to the telerehabilitation-based exercise program ranged from mild to moderate neck pain with a mean VAS score of 33.33. On the other hand, the respondents' disability ranged from mild to complete disability with a mean NDI score of 18.36. After the treatment intervention period, the respondents' neck pain after the telerehabilitation-based exercise program ranged from no pain to mild neck pain with a mean VAS score of 4.47. On the other hand, the respondents' disability ranged from no disability to mild disability with a mean NDI score of 3.08 Lastly, the third question focused on determining if there was a significant difference between the mean pre-test and post-test findings of VAS and NDI results after the treatment intervention period. The results of the study showed that there was a significant difference between pre-test and post-test scores.

Thus, the null hypothesis must be rejected. The findings support the findings of Tunwattanapong et al., (2015); and Leochico and Valera (2020) which stated that stretching exercises have an impact in decreasing musculoskeletal discomfort, neck pain, and improving quality of life; and that telerehabilitation is feasible in developing countries, such as the Philippines and is as effective as face-to-face interventions, bridging gaps in delivery of healthcare and addressing concerns that need more rapid action when face-to-face method is not accessible. Results also proved that telerehabilitation is as effective as face-to-face intervention for the improvement of physical function and pain of musculoskeletal conditions, such as neck pain, correlating with the study conducted by Cottrell, et al., (2016).

The results of this study exhibited positive results – however, the researchers have found limitations during implementation and with the recommendations of the research panelists and adviser. First is to conduct research which tests the effectiveness of telerehabilitation compared to a group with physical therapy management aside from stretching and ROM exercises and collate the results if there's a difference in the results in providing treatment for patients experiencing neck pain. Second is to conduct research to compare the effectiveness of several intervention groups, such as groups with telerehabilitation alone, manipulation alone, other self-management methods, and assess if there is a significant difference in the effectiveness of these interventions based on their results and lastly, to conduct research that uses a wider range of age groups as respondents, as well as a larger and different population other than physical therapy and occupational therapy online learners.

CONCLUSIONS

The statistical data gathered which showed that the Visual Analogue Scale (VAS) and Neck Disability Index (NDI) scores showed significant improvement in the post-test compared to the pre-test, indicated that there is a decrease in the neck pain experienced by the respondents. This proves that the use of telerehabilitation-based exercise program was effective in decreasing the neck pain of Physical Therapy and Occupational Therapy online learners. Telerehabilitation has also been proven by the study to be an effective mode of rehabilitation that can be used as an alternative to face-to-face interventions in administering exercises to patients with neck pain.

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